

Documented Source Code for flowfram.sty v1.16

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This is the documented source code for the flowfram package. For a user manual, see [ffuserguide.pdf](#) (or do `texdoc ffuserguide`).

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Glossary

bounding box

The smallest possible rectangle that completely encompasses the object.

dynamic frame

Frames in which text is fixed in place, but the contents are re-typeset after each page.

flow frame

The frames in a document such that the contents of the document environment flow from one frame to the next in the order that they were defined. There must be at least one flow frame on every page.

frame

A rectangular area of the page in which text can be placed (not to be confused with a frame making command). There are three types: flow, static and dynamic.

frame making command

A \LaTeX command which places some kind of border around its argument. For example: `\fbox`.

identification label (IDL)

A unique label which can be assigned to a frame, enabling you to refer to the frame by label instead of by its IDN.

identification number (IDN)

A unique number assigned to each frame, which you can use to identify the frame when modifying its appearance. Example: if you have defined 3 flow frames, 2 static frames and 1 dynamic frame, the flow frames will have IDNs 1, 2 and 3, the static frames will have IDNs 1 and 2, and the dynamic frame will have IDN 1.

page list

A list of pages. This can either be a single keyword: `all`, `odd`, `even` or `none`, or it can be a comma-separated list of individual page numbers or page ranges. For example: `<3,5,7-11,>15` indicates pages 1,2,5,7,8,9,10,11 and all pages after page 15. Note that these numbers refer to the actual value of the page counter, not the absolute physical page number.

page range

Page ranges can be closed, e.g. 5–10, or open, e.g. <7 or >9.

static frame

Frames in which text is fixed in place. The contents are fixed until explicitly changed.

typeblock

The area of the page where the main body of the text goes. The width and height of this area are given by `\textwidth` and `\textheight`.

1 The Code

1.1 Package Initialisation

Declare package, and identify it as a $\text{\LaTeX}2_{\epsilon}$ package.

```
\NeedsTeXFormat{LaTeX2e}
\ProvidesPackage{flowfram}[2014/06/04 v1.16 (NLCT)]
```

Load packages needed by this package

```
\RequirePackage{ifthen}

\RequirePackage{xkeyval}
\RequirePackage{graphics}
\RequirePackage{afterpage}

\RequirePackage{xfor}
\RequirePackage{etoolbox}

\@ifundefined{oldc@l@r}{\RequirePackage{color}}{}
```

The colour of the **bounding box** borders when the draft option is specified is given by the commands:

```
\newcommand{\setffdraftcolor}{\color[gray]{0.8}}
\newcommand{\setffdrafttypeblockcolor}{\color[gray]{0.9}}
```

`\fflabelsep` In draft mode, each **bounding box** (apart from the one indicating the **type-block**), has a label positioned to the right of the box, at a distance of `\fflabelsep` from the right hand border.

```
\newlength{\fflabelsep}
\fflabelsep=1pt
```

`\fflabelfont` The appearance of the label is set by the declaration:

```
\newcommand*{\fflabelfont}{\small\sffamily}
```

The command `\@ffdraft` is used to switch to draft mode. Allow user the option to show particular types of bounding boxes.

```
\newif\ifshowtypeblock
\newif\ifshowmargins
\newif\ifshowframebbox
```

`\@ffdraft` Set all draft settings.

```
\newcommand*{\@ffdraft}{%
  \showtypeblocktrue
  \showmarginstrue
  \showframebboxtrue
}
```

`\@ffnodraft` Unset all draft settings.

```
\newcommand*{\@ffnodraft}{%
  \showtypeblockfalse
  \showmarginsfalse
  \showframebboxfalse
}
```

`\@fr@meifdraft` Draw **bounding box**.

```
\newcommand*{\@fr@meifdraft}[3][\setffdraftcolor]{%
  \def\ff@backcol{\none}}%
  \@ifundefined{color}{\frame{#2}}{#1\frame{#2}}%
  \ifthenelse{\equal{#3}{}}{}{}%
  {%
    \makebox[0pt][l]{\hskip\fflabelsep\fflabelfont{[#3]}}%
  }%
}%
```

Colour setting commands, do nothing by default:

```
\newcommand*{\@s@tffc@col}{}
\newcommand*{\@s@tfft@text@col}{}%
```

`\@ffbackground` Deal with **frame** background colour. Note that the background colour only extends to the limit of the **frame's bounding box**. If you want the background colour to be flush with the **frames** border, you will have to create your own customised border.

```
\newcommand*{\@ffbackground}[1]{#1}
```

Now declare the options.

`draft` If draft, switch to draft definitions.

```
\DeclareOptionX{draft}{\@ffdraft}
```

`final` If not draft, reset commands so that no **bounding boxes** are drawn.

```
\DeclareOptionX{final}{\@ffnodraft}
```

Set the default to final:

```
\@ffnodraft
```

verbose Verbose mode is primarily for debug messages.

```
\define@choicekey{flowfram.sty}%  
  {verbose}[\val\nr]%  
  {true,false}[true]%  
  {%  
    \ifcase\nr\relax  
      \renewcommand*{\flf@doifverbose}[1]{##1}%  
      \renewcommand*{\flf@message}[1]{\PackageInfo{flowfram}{##1}}%  
    \or  
      \renewcommand*{\flf@doifverbose}[1]{}%  
      \renewcommand*{\flf@message}[1]{}%  
    \fi  
  }
```

\flf@message Messaging system (to help debugging):

```
\newcommand*{\flf@message}[1]{%  
  \flf@doifverbose  
  {%  
    \PackageInfo{flowfram}{##1}%  
  }%  
}
```

\flf@doifverbose Initialise:

```
\newcommand*{\flf@doifverbose}[1]{}%
```

rotate Allow provision to prevent rotation in the thumbtabs. If no rotation, thumbtab text will be stacked vertically. This will also affect whether or not to rotate **frames**.

```
\define@boolkey{flowfram.sty}[@ttb@]{rotate}[true]{}  
\@ttb@rotatetrue
```

norotate Provide norotate option for backward compatibility

```
\DeclareOptionX{norotate}{\@ttb@rotatetrue}
```

\rotateframe Define command that will only rotate box if rotate option set.

```
\newcommand{\rotateframe}[2]{%  
  \if@ttb@rotate  
    \rotatebox{#1}{#2}%  
  \else  
    #2%  
  \fi  
}
```

Should the thumbtabs include number, title, both or neither?

```

\if@ttb@num
    \newif\if@ttb@num
    \@ttb@numfalse
\if@ttb@title
    \newif\if@ttb@title
    \@ttb@titletrue

thumbtabs The thumbtabs option replaces the ttbtitle, ttbnotitle, ttbnum and ttbnonum
options.
    \define@choicekey{flowfram.sty}%
        {thumbtabs}[\val\nr]%
        {title,number,both,none}[title]%
        {%
            \ifcase\nr\relax
Thumbtabs to only include title
                \@ttb@numfalse
                \@ttb@titletrue
            \or
Thumbtabs to only include number
                \@ttb@numtrue
                \@ttb@titlefalse
            \or
Thumbtabs to include title and number
                \@ttb@numtrue
                \@ttb@titletrue
            \or
Thumbtabs don't have title or number
                \@ttb@numfalse
                \@ttb@titlefalse
            \fi
        }

Provide old options for backward compatibility:

ttbtitle
    \DeclareOptionX{ttbtitle}{\@ttb@titletrue}

ttbnotitle
    \DeclareOptionX{ttbnotitle}{\@ttb@titlefalse}

ttbnum
    \DeclareOptionX{ttbnum}{\@ttb@numtrue}

ttbnonum
    \DeclareOptionX{ttbnonum}{\@ttb@numfalse}

```

pages Determine whether the pages key when defining frames refers to the page number as given by \c@page or the absolute page number as given by \c@absolutepage.

```

\define@choicekey{flowfram.sty}{pages}[\val\nr]{%
  {relative,absolute}%
  {%
    \ifcase\nr\relax

```

Relative (use \c@page):

```

    \renewcommand*{\@ff@pages@countreg}{\c@page}%
  \or

```

Absolute (use \c@absolutepage):

```

    \renewcommand*{\@ff@pages@countreg}{\c@absolutepage}%
  \fi
}
```

\@ff@pages@countreg The default is relative (for backwards compatibility).

```

\newcommand*{\@ff@pages@countreg}{\c@page}

```

absolutepage

```

\newcounter{absolutepage}

```

color If color=true option specified, set up the default colours for the borders and text for all **frame** types. Note that the colour name has to be grouped within the definition of \flowframecol and \flowframetextcol. This was done so that you could do, for example, \renewcommand{\flowframecol}{[rgb]{1,1,0}} so that you can specify the colour model as well. The commands \@s@tffcol and \@s@tfftextcol switch to the border and text colour, respectively. They both assume that \ff@col has been set to the relevant colour before use.

```

\define@choicekey{flowfram.sty}{color}[\val\nr]{true,false}[true]{%
  \ifcase\nr\relax

```

Option set to true:

```

    \@ff@enablecolor
  \or

```

Option set to false, ensure that the colour changing commands do nothing:

```

    \@ff@disablecolor
  \fi
}
```

Provide nocolor option for backward compatibility:

```

\DeclareOptionX{nocolor}{%
  \@ff@disablecolor
}
```

\@ff@enablecolor Enable colour commands.

```

\newcommand*{\@ff@enablecolor}{%
  \def\flowframecol{{black}}}%

```

```

\def\flowframetextcol{{black}}%
\renewcommand*\@stffcol{%
  \ifthenelse{\equal{\ff@col}{}}{%
    {}%
    {%
      \expandafter\color\ff@col}%
    }%
  \renewcommand*\@stffttextcol{%
    \ifthenelse{\equal{\ff@txtcol}{}}{%
      {}%
      {%
        \expandafter\color\ff@txtcol
      }%
    }%
  \renewcommand*\@ffbackground}[1]{%
    \ifthenelse{\equal{\ff@backcol}{none}}{%
      {}%
      ##1%
    }%
    {%
      {\fboxsep=0pt\expandafter\colorbox\ff@backcol{##1}}%
    }%
  }%
}

```

`\@ff@disablecolor` Disable colour commands.

```

\newcommand*\@ff@disablecolor{%
  \def\flowframetextcol{}%
  \def\flowframecol{}%
  \renewcommand*\@stffcol{}\renewcommand*\@stffttextcol{}\%
  \renewcommand*\@ffbackground}[1]{##1}%
}

```

`\iflefttorightcolumns` Determine whether to define the Ncolumn style frames from left to right or from right to left.

```

\newif\iflefttorightcolumns
\lefttorightcolumnstrue

```

Define options that set the direction:

LR

```

\DeclareOptionX{LR}{\lefttorightcolumnstrue}

```

RL

```

\DeclareOptionX{RL}{\lefttorightcolumnsfalse}

```

If the `\normalcolor` command is something other than `\relax`, then implement the `color=true` option as the default, otherwise implement the `color=false` option as the default.


```

\ifx\normalcolor\relax
  \@ff@disablecolor
\else
  \@ff@enablecolor
\fi

```

Now the defaults have all been set, the package options specified by the user can be processed:

```
\ProcessOptionsX
```

If color=true option has been specified, but no color package has been loaded yet, load color.sty

```

\ifx\normalcolor\relax
  \ifthenelse{\equal{\flowframetextcol}{}}%
  {}%
  {%
    \RequirePackage{color}%
  }
\fi

\@ifundefined{chapter}{}%
{}%

```

`\chapterfirstpagestyle` User may want a non standard style for the first page of each chapter, so modify chapter commands to take this into account.

```

\newcommand*{\chapterfirstpagestyle}{plain}%

\let\@ff@OLD@chapter\@chapter
\let\@ff@OLD@schapter\@schapter
\renewcommand{\@chapter}{%
  \thispagestyle{\chapterfirstpagestyle}%
  \@ff@OLD@chapter
}%
\renewcommand{\@schapter}{%
  \thispagestyle{\chapterfirstpagestyle}%
  \@ff@OLD@schapter
}%

```

`\ffprechapterhook` Hook at start of chapter (before page break issued)

```
\newcommand*{\ffprechapterhook}{}%
```

`\chapter` Modify `\chapter` so the hook is called at the start:

```

\let\@ff@OLD@ch@pter\chapter
\renewcommand{\chapter}{%
  \ffprechapterhook
  \@ff@OLD@ch@pter
}

```

End of test if `\chapter` defined:

```
}
```

`maxflow` Now get on with the package. First we need to set up a register to store the number of **flow frames** that have been defined:

```

\newcounter{maxflow}
\c@maxflow=0\relax

```

`thisframe` Next define a counter to keep track of the **identification number (IDN)** of the current **flow frame**.

```

\newcounter{thisframe}
\c@thisframe=0\relax
\@ifpackageloaded{hyperref}
{%
  \def\theHthisframe{\thepage.\arabic{thisframe}}%
}%
{}

```

`\labelflowidn` Define a command to label the current **flow frame** so that its **IDN** can be referenced:

```

\newcommand*{\labelflowidn}[1]{%
  {%
    \def\@currentlabel{\thethisframe}%
    \label{#1}%
  }%
}

```

`displayedframe` Define a counter to store the current frame index for the current page. This will be the same as the **IDN** if all **flow frames** are displayed on the current page, but may be different to the **IDN** if some **flow frames** are not displayed.

```

\newcounter{displayedframe}
\c@displayedframe=0
\@ifpackageloaded{hyperref}%
{%
  \def\theHdisplayedframe{\thepage.\arabic{displayedframe}}%
}%
{}

```

`\labelflow` Define a command to label the current **flow frame** so that its displayed index can be referenced:

```

\newcommand*{\labelflow}[1]{%
  {%
    \def\@currentlabel{\thedisplaysframe}%
    \label{#1}%
  }%
}

```

`maxstatic` Define a counter to store the total number of **static frames**:

```

\newcounter{maxstatic}
\c@maxstatic=0\relax

```

`maxdynamic` Define a counter to store the total number of **dynamic frames**:

```
\newcounter{maxdynamic}  
\c@maxdynamic=0\relax
```

Define some temporary variables

```
\newcount\@colN  
\newcount\@ff@tmpN  
\newcount\ff@id  
\newlength\@ff@offset  
\newlength\@ff@tmp@x  
\newlength\@ff@tmp@x@even  
\newlength\@ff@tmp@y
```

`\sdfparindent` Define a length to govern paragraph indentation within static and dynamic frames. This is 0pt by default.

```
\newlength\sdfparindent
```

1.2 Flow Frames

`\flowframesep` Set up default lengths. The gap between the text and the border is given by:

```
\newlength\flowframesep  
\flowframesep=\fbxsep
```

`\flowframerule` The width of the frame is given by:

```
\newlength\flowframerule  
\flowframerule=\fbxrule
```

`\flowframeshowlayout` Define command to show page layout. This finishes the current page, temporarily sets draft mode, and prints an empty page. Only the **frames** for that page will be shown.

```
\newcommand*{\flowframeshowlayout}{%  
  \finishthispage  
  {%  
    \@ffdraft\mbox{ }\finishthispage\clearpage  
  }%  
}
```

`\framebreak` If the **flow frames** are not all of the same width, the change in `\hsize` will not come into effect until the end of the paragraph. Provide a command to simulate a paragraph break, without making it look as though there is a paragraph. Provides an optional argument that is passed to `\pagebreak`. Make sure it is grouped to localise the change in `\parfillskip` and `\parskip`.

```
\newif\ifusedframebreak  
\newcommand{\framebreak}[1][4]{%  
  \global\usedframebreaktrue  
  {%  
    \parfillskip=0pt\pagebreak[#1]\parskip=0pt\par\noindent
```

```
}%
}
```

`\finishthispage` The commands `\newpage` and `\pagebreak` can be used to move on to the next **flow frame**, but to finish the entire page, use `\finishthispage`. This is (loosely) based on the code for `\clearpage`. (`\dbltopnum` not required as we can't have column-spanning floats.)

```
\newcommand{\finishthispage}{%
\ifvmode
\@colN=\c@thisframe\relax
\count@=\c@absolute page\relax
\ifdim \pagetotal<\topskip
\hbox{}%
\fi
\newpage \write \m@ne {} \vbox {} \penalty -\@Mi
```

If that was the last **flow frame** on the page, then we're done, otherwise iterate through the remaining **flow frames**.

```
\ifnum\count@=\c@absolute page\relax
\whiledo{\@colN<\c@maxflow \OR \@colN=\c@maxflow}%
{%
\@ff@chckifthispg{\@ff@pages@countreg}{\@colN}%
\if@notthiscol
\else
\c@thisframe=\@colN\relax
\hbox{}\newpage
\fi
\advance\@colN by 1\relax
}%
\fi
\fi
}
```

`\cleardoublepage` Modify the definition of `\cleardoublepage`. This may or may not be defined so use `\def`.

```
\def\cleardoublepage{%
\clearpage
\if@twoside
\ifodd\c@page
\else
\hbox{}%
\clearpage
\fi
\fi
}
```

`\newpage` Modify the definition of `\newpage` so that it sets the `usedframebreak` flag.

```
\preto\newpage{\global\usedframebreaktrue}
```

Disable @twocolumn flag, as it makes no sense.

```
\@twocolumnfalse
```

Disable @mparswitch flag, as each **flow frame** has its own predefined margin setting.

```
\@mparswitchfalse
```

`\globalreversemargin` The margins get switched during the output routine, so need the effect to be global.

```
\newcommand{\globalreversemargin}{%  
  \global\@mparbottom\z@  
  \global\@reversemargintrue  
}
```

`\globalnormalmargin`

```
\newcommand{\globalnormalmargin}{%  
  \global\@mparbottom\z@\global  
  \@reversemarginfalse  
}
```

`\@getmarginpos` Determine whether the margin should be on the right or left. This depends on the setting, which can either be right or left (self explanatory) or inner (on the spine side, so left for odd pages and right for even pages) or outer (on the outside of the page, so right for odd pages and left for even pages.) When `\@getmarginpos` is finished, the setting is stored in `\ff@margin`.

```
\newcommand{\@getmarginpos}[1]{%  
  \ifthenelse{\equal{#1}{inner}}{%  
    {%  
      \if@twoside  
        \ifodd\c@page\def\ff@margin{left}\else\def\ff@margin{right}\fi  
      \else  
        \def\ff@margin{left}%  
      \fi  
    }%  
    {%  
      \ifthenelse{\equal{#1}{outer}}{%  
        {%  
          \if@twoside  
            \ifodd\c@page\def\ff@margin{right}\else\def\ff@margin{left}\fi  
          \else  
            \def\ff@margin{right}%  
          \fi  
        }%  
        {%  
          \def\ff@margin{#1}%  
        }%  
      }%  
    }%  
  }
```

`\setmargin` Set the margin for current **flow frame**.

```

\newcommand{\setmargin}{%
  \@getmarginpos
  {%
    \csname @ff@margin@\romannumeral\c@thisframe\endcsname
  }%
  \ifthenelse{\equal{\ff@margin}{left}}{%
    {\globalreversemargin}%
  }{\globalnormalmargin}%
}

```

`\newflowframe` Create a new **flow frame**. Syntax:

```

\newflowframe[<pages>]{<width>}{<height>}{<x>}{<y>}[<label>]

```

First increment `\c@maxflow`, and define boolean to indicate whether or not the **flow frame** has a border, Then check to see whether or not the starred version is begin used. All the settings must be global: the output routine will create a new **flow frame**, if there are no more defined, and since changes made in the output routine are localised, the new **frame** will be lost unless it is globally defined. Flow frames should only be set up in the preamble, but if there are not enough **frames** to fit all the document text, the output routine will create a new **flow frame**. So, define `\newflowframe` so that it calls `\@n@wflowframe`

```

\newcommand{\newflowframe}{\@n@wflowframe}

```

Set the external command for use only in the preamble, an make the output routine use the internal command

```

\@onlypreamble{\newflowframe}

```

`\@n@wflowframe`

```

\newcommand{\@n@wflowframe}{%
  \global\advance\c@maxflow by 1\relax
  \expandafter\global\expandafter
  \newif\csname ifcolumnframe\romannumeral\c@maxflow\endcsname
  \@ifstar\@snewflowframe\@newflowframe
}

```

`\@snewflowframe` Starred version sets boolean flag to indicate a border

```

\newcommand{\@snewflowframe}{%
  \expandafter\global\expandafter
  \let\csname ifcolumnframe\romannumeral\c@maxflow\endcsname\iftrue
  \@@newflowframe
}

```

`\@newflowframe` The unstarred version unsets boolean flag to indicate no border.

```

\newcommand{\@newflowframe}{%
  \expandafter\global\expandafter
  \let\csname ifcolumnframe\romannumeral\c@maxflow\endcsname\iffalse
  \@@newflowframe
}

```

`\@@newflowframe` Now get on with initialising the **flow frame**. By default, it will apply the **flow frame** to all pages, the optional argument can override this.

```
\newcommand{\@@newflowframe}[5][all]{%
  \expandafter\global\expandafter
  \newbox\csname column\romannumeral\c@maxflow\endcsname
  \expandafter\global\expandafter
  \newlength\csname colwidth\romannumeral\c@maxflow\endcsname
  \expandafter\global\expandafter
  \newlength\csname colheight\romannumeral\c@maxflow\endcsname
  \expandafter\global\expandafter
  \newlength\csname col@\romannumeral\c@maxflow @posx\endcsname
  \expandafter\global\expandafter
  \newlength\csname col@\romannumeral\c@maxflow @posy\endcsname
  \expandafter\global\expandafter
  \setlength\csname colwidth\romannumeral\c@maxflow\endcsname{#2}
  \expandafter\global\expandafter
  \setlength\csname colheight\romannumeral\c@maxflow\endcsname{#3}
  \expandafter\global\expandafter
  \setlength\csname col@\romannumeral\c@maxflow @posx\endcsname{#4}
  \expandafter\global\expandafter
  \setlength\csname col@\romannumeral\c@maxflow @posy\endcsname{#5}
  \expandafter\global\expandafter
  \newlength\csname col@\romannumeral\c@maxflow @evenx\endcsname
  \expandafter\global\expandafter
  \newlength\csname col@\romannumeral\c@maxflow @eveny\endcsname
  \expandafter\global\expandafter
  \setlength\csname col@\romannumeral\c@maxflow @evenx\endcsname{#4}
  \expandafter\global\expandafter
  \setlength\csname col@\romannumeral\c@maxflow @eveny\endcsname{#5}
  \expandafter
  \gdef\csname @ff@frametype@\romannumeral\c@maxflow\endcsname{fbox}%
  \expandafter
  \gdef\csname @ff@col@\romannumeral\c@maxflow\endcsname{\flowframecol}
  \expandafter
  \gdef\csname @ff@txtcol@\romannumeral\c@maxflow\endcsname{%
    \flowframetextcol
  }
  \expandafter
  \gdef\csname @ff@backcol@\romannumeral\c@maxflow\endcsname{none}}
  \expandafter
  \gdef\csname @ff@pages@\romannumeral\c@maxflow\endcsname{#1}%
}
```

Page exclusion list:

```
\expandafter
\gdef\csname @ff@xpages@\romannumeral\c@maxflow\endcsname{}%
\expandafter
\gdef\csname @ff@offset@\romannumeral\c@maxflow\endcsname{compute}
\expandafter
\gdef\csname @ff@angle@\romannumeral\c@maxflow\endcsname{0}%
}
```

```

\expandafter
\gdef\csname @ff@margin@\romannumeral\c@maxflow\endcsname{right}
\ifnum\c@thisframe=0\relax
\ifthenelse{\equal{#1}{all}\TE@or\equal{#1}{odd}}{%
{%
\c@thisframe=\c@maxflow
\global\setlength{\hsize}{#2}%
\global\usedframebreaktrue
}%
{%
\ifthenelse{\equal{#1}{even}\TE@or\equal{#1}{none}}{%
{}%
{%
\def\ff@pages{#1}%
\@for\@ff@pp:=\ff@pages\do
{%
\def\@ff@numstart{0}\def\@ff@numend{0}%
\@ff@getrange{\@ff@pp}%
\ifnum\@ff@numstart=0\relax
\def\@ff@numstart{1}%
\fi
\ifnum\@ff@numstart=1\relax
\c@thisframe=\c@maxflow
\global\setlength{\hsize}{#2}%
\global\usedframebreaktrue
\fi
}%
}%
}%
\fi
\@ifnextchar[%
{\@s@tflowframeid{\c@maxflow}}%
{%
\@s@tflowframeid{\c@maxflow}[\number\c@maxflow]%
}%
}

```

`\@s@tflowframeid` If square brackets occur after `\newflowframe`, take the contents to be the label, otherwise the label will be the **flow frame** number.

```

\def\@s@tflowframeid#1[#2]{%
\edef\ff@label{#2}%
\@ff@checkuniqueidl{#1}{\ff@label}%
\expandafter
\xdef\csname @col@id@\romannumeral#1\endcsname{\ff@label}%
}

```

`\@ff@checkuniqueidl` Check **identification label (IDL)** #2 for **flow frame** #1 is unique

```

\newcommand*{\@ff@checkuniqueidl}[2]{%
{%

```



```

\@colN=0\relax
\whiledo{\@colN<\c@maxflow}%
{%
  \advance\@colN by 1\relax
  \ifnum\@colN=#1\relax
  \else
    \ifthenelse
      {%
        \equal{#2}%
      }%
      {%
        \csname @col@id@\romannumeral\@colN\endcsname
      }%
    }%
  {%
    \PackageError{flowfram}%
    {Flow frame IDL '#2' already defined}%
    {%
      You can't assign this label, as it is already defined
      for flow frame \number\@colN
    }%
  }%
  {}%
\fi
}%
}

```

`\getflowlabel` `\getflowlabel{<idl>}` Gets the **IDL** for the **flow frame** identified by its **IDL**.

```

\newcommand*\getflowlabel}[1]{%
  \csname @col@id@\romannumeral#1\endcsname
}

```

`\getflowid` `\getflowid{<cmd>}{<idl>}` Gets the **IDL** for the **flow frame** identified by its **IDL** and stores in `<cmd>` which must be a control sequence.

```

\newcommand*\getflowid}[2]{%
  \@flowframeid{#2}%
  \edef#1{\number\ff@id}%
}

```

`\@flowframeid` Work out the **flow frame IDN** from the label. This iterates through the **flow frames**, so if you have a lot of them it is quicker to identify them by their **IDL** rather than their **IDL**. The **IDL** stored in `\ff@id`.

```

\newcommand*\@flowframeid}[1]{%
  \@colN=0\relax
  \ff@id=0\relax
  \whiledo{\@colN<\c@maxflow}%
  {%
    \advance\@colN by 1\relax
    \ifthenelse

```

```

    {%
      \equal{#1}{\csname @col@id@\romannumeral\@colN\endcsname}%
    }%
    {%
      \ff@id=\@colN\relax
Break out of loop
      \@colN=\c@maxflow
    }%
    {}%
  }%
  \ifnum\ff@id=0\relax
    \PackageError{flowfram}{Can't find flow frame id '#1'}{}%
  \fi
}

Set up the keys for use with \setflowframe, \setstaticframe and \setdynamicframe.
Frame width is stored in \ff@width.
\define@key{flowframe}{width}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'width' key}{}%
  }%
  {}%
  \def\ff@width{#1}%
}

Frame height is stored in \ff@height.
\define@key{flowframe}{height}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'height' key}{}%
  }%
  {}%
  \def\ff@height{#1}%
}

Frame x co-ordinate (odd and even pages) is stored in \ff@x.
\define@key{flowframe}{x}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'x' key}{}%
  }%
  {}%
  \def\ff@x{#1}%
}

Frame y co-ordinate (odd and even pages) is stored in \ff@y.

```

```

\define@key{flowframe}{y}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'y' key}{}%
  }%
  {}%
  \def\ff@y{#1}%
}

```

Frame x co-ordinate (even pages only) is stored in `\ff@evenx`.

```

\define@key{flowframe}{evenx}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'evenx' key}{}%
  }%
  {}%
  \def\ff@evenx{#1}%
}

```

Frame y co-ordinate (even pages only) is stored in `\ff@eveny`.

```

\define@key{flowframe}{eveny}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'eveny' key}{}%
  }%
  {}%
  \def\ff@eveny{#1}%
}

```

Frame x co-ordinate (odd pages only if twoside implemented) is stored in `\ff@oddx`.

```

\define@key{flowframe}{oddx}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'oddx' key}{}%
  }%
  {}%
  \def\ff@oddx{#1}%
}

```

Frame y co-ordinate (odd pages only if twoside implemented) is stored in `\ff@oddy`.

```

\define@key{flowframe}{oddy}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'oddy' key}{}%
  }%
  {}%
  \def\ff@oddy{#1}%
}

```

```

}%
{}%
\def\ff@oddy{#1}%
}

```

New IDL for **frame** is stored in \ff@label.

```

\define@key{flowframe}{label}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'label' key}{}%
  }%
  {}%
\def\ff@label{#1}%
}

```

Frame border. If none, define \ff@frame as false, otherwise define \ff@frame as true. If plain, define \ff@frametype as fbox, otherwise define it to be the specified type, which should be the name of a **frame making command** without the preceding backslash.

```

\define@key{flowframe}{border}[plain]%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}%
    {%
      Missing value for 'border' key - use
      'none' for no border%
    }%
    {}%
  }%
  {}%
  \ifthenelse{\equal{#1}{none}}%
  {%
    \def\ff@frame{false}%
  }%
  {%
    \def\ff@frame{true}%
    \ifthenelse{\equal{#1}{plain}}%
    {%
      \def\ff@frametype{fbox}%
    }%
    {%
      \def\ff@frametype{#1}%
    }%
  }%
}

```

Frame's border colour. (This may not work for non-standard **frame making commands**.)

```

\define@key{flowframe}{bordercolor}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'bordercolor' key}{}%
  }%
  {}%
  \def\ff@col{#1}%
}

```

Frame's text colour.

```

\define@key{flowframe}{textcolor}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'textcolor' key}{}%
  }%
  {}%
  \def\ff@txtcol{#1}%
}

```

The background colour of the **frame**. Note this only covers the region of the **bounding box**, not any extra space between the **bounding box** and the border. If you want the background colour to go right up to the border, you will need to define your own customised border.

```

\define@key{flowframe}{backcolor}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'backcolor' key}{}%
  }%
  {}%
  \def\ff@backcol{#1}%
}

```

Page list for which the **frame** should appear.

```

\define@key{flowframe}{pages}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'pages' key}{}%
  }%
  {}%
  \def\ff@pages{#1}%
}

```

Exclusion list:

```

\define@key{flowframe}{excludepages}%
{%
  \def\ff@xpages{#1}%
}

```

The border takes up extra space, which needs to be adjusted. This can be done for standard border types, but non-standard borders may require some help.

```
\define@key{flowframe}{offset}%
{%
  \def\ff@offset{#1}%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowframe}%
    {%
      Invalid value for key 'offset'%
    }%
  }%
  {%
    'offset' can either be 'compute' (to compute it according
    to certain pre-defined rules) or a length%
  }%
}%
{}%
}
```

Angle to rotate **flow frame**:

```
\define@key{flowframe}{angle}{\def\ff@angle{#1}%
}
```

This key is only for **flow frames**:

```
\define@choicekey{flowframe}{margin}{left,right,inner,outer}%
{%
  \def\ff@margin{#1}%
}
```

This key is only for **static frames**:

```
\define@choicekey{flowframe}{clear}{true,false}[true]%
  \def\ff@clear{#1}%
}
```

This key is only for **dynamic frames**:

```
\define@key{flowframe}{style}%
{%
  \ifthenelse{\equal{#1}{}}%
  {%
    \PackageError{flowfram}{Missing value for 'style' key}{}%
  }%
  {}%
  \ifthenelse{\equal{#1}{none}}%
  {%
    \def\ff@style{relax}%
  }%
  {%
    \def\ff@style{#1}%
  }%
}
```

This key is only for **static frames** and **dynamic frames**.

```
\define@key{flowframe}{shape}%
{%
  \def\ff@shape{#1}%
}
```

This key is only for **static frames** and **dynamic frames**.

```
\define@choicekey{flowframe}{valign}{c,t,b}%
{%
  \def\ff@valign{#1}%
}
```

This key is only for **static frames** and **dynamic frames**:

```
\define@choicekey{flowframe}{hide}{true,false}[true]{%
  \def\ff@hide{#1}%
}
```

This key is only for **static frames** and **dynamic frames**:

```
\define@choicekey{flowframe}{hidethis}{true,false}[true]{%
  \def\ff@hidethis{#1}%
}
```

`\setallflowframes` Provide a command to change the settings for all flow frames. This just iterates through all the **flow frames**, and sets each one in turn.

```
\newcommand*{\setallflowframes}[1]{%
  \@colN=0\relax
  \whiledo{\@colN<\c@maxflow}%
  {%
    \advance\@colN by 1\relax
    \@@setflowframe{\@colN}{#1}%
  }%
}
```

`\setflowframe` Define `\setflowframe` command. Check to see whether or not the starred version is being used.

```
\newcommand*{\setflowframe}{\@ifstar\@ssetflowframe\@setflowframe}
```

`\@ssetflowframe` This is the starred version. It finds the **IDN** for each label in the comma-separated list (first argument), and applies the setting for that numbered **flow frame**.

```
\newcommand{\@ssetflowframe}[2]{%
  \@for\@ff@id:=#1\do{%
    \@flowframeid{\@ff@id}%
    \@@setflowframe{\ff@id}{#2}%
  }%
}
```

`\@setflowframe` This is the unstarred version. It iterates through each **IDN** in the comma-separated list passed as the first argument, but it also checks for number

ranges, and sets the values for that **flow frame**. Ensures that number ranges do not lie out of bounds.

```
\newcommand*{\@setflowframe}[2]{%
  \ifthenelse{\equal{#1}{all}}{%
    {%
      \setallflowframes{#2}%
    }%
  }%
  \ifthenelse{\equal{#1}{odd} \TEor \equal{#1}{even}}{%
    {%
      \ifthenelse{\equal{#1}{odd}}{%
        {%
          \@colN=1\relax
        }%
        {%
          \@colN=2\relax
        }%
      }%
      \whiledo{\@colN<\c@maxflow\TEor\@colN=\c@maxflow}%
      {%
        \@setflowframe{\@colN}{#2}%
        \advance\@colN by 2\relax
      }%
    }%
  }%
  {%
    \@for\@ff@id:=#1\do
    {%
      \def\@ff@numstart{0}%
      \def\@ff@numend{10000}%
      \@ff@getrange{\@ff@id}%
      \ifnum\@ff@numstart=0\relax
        \def\@ff@numstart{1}%
      \fi
      \ifnum\@ff@numend>\c@maxflow\relax
        \def\@ff@numend{\c@maxflow}%
      \fi
      \@colN=\@ff@numstart\relax
      \whiledo{\@colN<\@ff@numend \TEor \@colN=\@ff@numend}%
      {%
        \@setflowframe{\@colN}{#2}%
        \advance\@colN by 1\relax
      }%
    }%
  }%
}
```

\@setflowframe This is the command that actually sets the values for the **flow frame** whose **IDN** is specified by the first parameter.

```
\newcommand*{\@setflowframe}[2]{%
```



```

\def\ff@frame{}\def\ff@width{}\def\ff@height{}\def\ff@margin{}%
\def\ff@x{}\def\ff@y{}\def\ff@frametype{}\def\ff@col{}%
\def\ff@valign{}\def\ff@style{}%
\def\ff@hide{}\def\ff@hidethis{}%
\def\ff@txtcol{}\def\ff@clear{}\def\ff@offset{}\def\ff@pages{}%
\def\ff@label{}\def\ff@backcol{}\def\ff@evenx{}\def\ff@eveny{}%
\def\ff@oddx{}\def\ff@oddy{}\def\ff@angle{}%
\let\ff@xpages\undefined
\let\ff@shape\undefined
\setkeys{flowframe}{#2}%
\ifdefempty{\ff@frame}{}%
{%
  \setboolean{columnframe\romannumeral#1}{\ff@frame}%
}%
\ifdefempty{\ff@width}{}%
{%
  \expandafter
    \setlength\csname colwidth\romannumeral#1\endcsname
      {\ff@width}%
}%
\ifdefempty{\ff@height}{}%
{%
  \expandafter
    \setlength\csname colheight\romannumeral#1\endcsname
      {\ff@height}%
}%
\ifdefempty{\ff@x}{}%
{%
  \expandafter
    \setlength\csname col@\romannumeral#1@posx\endcsname
      {\ff@x}%
  \expandafter
    \setlength\csname col@\romannumeral#1@evenx\endcsname
      {\ff@x}%
}
\ifdefempty{\ff@y}{}%
{%
  \expandafter
    \setlength\csname col@\romannumeral#1@posy\endcsname
      {\ff@y}%
  \expandafter
    \setlength\csname col@\romannumeral#1@eveny\endcsname
      {\ff@y}%
}%
\ifdefempty{\ff@evenx}{}%
{%
  \expandafter
    \setlength\csname col@\romannumeral#1@evenx\endcsname
      {\ff@evenx}%
}

```

```

}%
\ifdefempty{\ff@eveny}{}%
{%
  \expandafter
    \setlength\csname col@\romannumeral#1@eveny\endcsname
      {\ff@eveny}%
}%
\ifdefempty{\ff@oddx}{}%
{%
  \expandafter
    \setlength\csname col@\romannumeral#1@posx\endcsname
      {\ff@oddx}%
}%
\ifdefempty{\ff@oddy}{}%
{%
  \expandafter
    \setlength\csname col@\romannumeral#1@posy\endcsname
      {\ff@oddy}%
}%
\ifdefempty{\ff@label}{}%
{%
  \@s@tflowframeid{#1}[\ff@label]%
}%
\ifdefempty{\ff@frametype}{}%
{%
  \expandafter
    \edef\csname @ff@frametype@\romannumeral#1\endcsname{%
      \ff@frametype}%
}%
\ifdefempty{\ff@col}{}%
{%
  \expandafter\@setframecol\ff@col\end{#1}{col}{ff}%
}%
\ifdefempty{\ff@txtcol}{}%
{%
  \expandafter\@setframecol\ff@txtcol\end{#1}{txtcol}{ff}%
}%
\ifdefempty{\ff@backcol}{}%
{%
  \expandafter\@setframecol\ff@backcol\end{#1}{backcol}{ff}%
}%
\ifdefempty{\ff@margin}{}%
{%
  \expandafter
    \xdef\csname @ff@margin@\romannumeral#1\endcsname{%
      \ff@margin}%
}%
\ifdefempty{\ff@pages}{}%
{%

```

```

\flowsetpagelist{#1}{\ff@pages}%
}%
\ifundef{\ff@xpages}{}%
{%
\flowsetexclusion{#1}{\ff@xpages}%
}%
\ifdefempty{\ff@offset}{}%
{%
\expandafter
\edef\csname @ff@offset@\romannumeral#1\endcsname{%
\ff@offset}%
}%
\ifdefempty{\ff@angle}{}%
{%
\expandafter
\edef\csname @ff@angle@\romannumeral#1\endcsname{%
\ff@angle}%
}%
\ifdefempty{\ff@clear}{}%
{%
\PackageError{flowfram}%
{Key 'clear' not available for flow frames}{}%
}%
\ifdefempty{\ff@style}{}%
{%
\PackageError{flowfram}%
{Key 'style' not available for flow frames}{}%
}%
\ifundef{\ff@shape}{}%
{%
\PackageError{flowfram}%
{Key 'shape' not available for flow frames}{}%
}%
\ifdefempty{\ff@valign}{}%
{%
\PackageError{flowfram}%
{Key 'valign' not available for flow frames}{}%
}%
\ifdefempty{\ff@hide}{}%
{%
\PackageError{flowfram}%
{Key 'hide' not available for flow frames}{}%
}%
\ifdefempty{\ff@hidethis}{}%
{%
\PackageError{flowfram}%
{Key 'hidethis' not available for flow frames}{}%
}%
}

```

`\flowsetpagelist` Sets the page list for the **flow frame** given by #1 (the **IDN**).

```

\newcommand*{\flowsetpagelist}[2]{%
\expandafter
\edef\csname @ff@pages@\romannumeral#1\endcsname{#2}%
\flf@message{Setting page range for flow frame
\number#1\space\space to "#2"}%
}

```

`\flowsetexclusion` Sets the exclusion list for the **flow frame** given by #1 (the **IDN**).

```

\newcommand*{\flowsetexclusion}[2]{%
\expandafter
\edef\csname @ff@xpages@\romannumeral#1\endcsname{#2}%
\flf@message{Setting exclusion for flow frame
\number#1\space\space to "#2"}%
}

```

`\flowaddexclusion` Adds to the exclusion list for the **flow frame** given by #1 (the **IDN**).

```

\newcommand*{\flowaddexclusion}[2]{%
\ifcempty{@ff@xpages@\romannumeral#1}
{%
\expandafter
\edef\csname @ff@xpages@\romannumeral#1\endcsname{#2}%
}%
{%
\expandafter
\edef\csname @ff@xpages@\romannumeral#1\endcsname{%
\csname @ff@xpages@\romannumeral#1\endcsname,#2}%
}%
\flf@message{Setting exclusion for flow frame
\number#1\space\space to
"\csname @ff@xpages@\romannumeral#1\endcsname"}%
}

```

`\ffswapoddeven` Swap odd and even offsets for a given **flow frame**. Do the main stuff for a given **flow frame IDN**.

```

\newcommand*{\@@flowframeswapcoords}[1]{%
\setlength{\@ff@tmp@x}{%
\csname col@\romannumeral#1@evenx\endcsname}
\expandafter\setlength\csname col@\romannumeral#1@evenx\endcsname
{\csname col@\romannumeral#1@posx\endcsname}%
\expandafter\setlength\csname col@\romannumeral#1@posx\endcsname
{\@ff@tmp@x}%
\setlength{\@ff@tmp@y}{%
\csname col@\romannumeral#1@eveny\endcsname}
\expandafter\setlength\csname col@\romannumeral#1@eveny\endcsname
{\csname col@\romannumeral#1@posy\endcsname}%
\expandafter\setlength\csname col@\romannumeral#1@posy\endcsname
{\@ff@tmp@y}%
}

```

\ffswapoddeven Allow user to specify **flow frame** either by **IDN** or **IDL**:

```
\newcommand*{\ffswapoddeven}{%
  \@ifstar\@sflowframeswapcoords\@flowframeswapcoords
}
```

\@sflowframeswapcoords Starred form

```
\newcommand*{\@sflowframeswapcoords}[1]{%
  \@for\@ff@id:=#1\do
  {%
    \@flowframeid{\@ff@id}%
    \@@flowframeswapcoords{\ff@id}%
  }%
}
```

\@flowframeswapcoords Unstarred form:

```
\newcommand*{\@flowframeswapcoords}[1]{%
  \ifthenelse{\equal{#1}{all}}{%
    {%
      \ff@id=0\relax
      \whiledo{\ff@id<\c@maxflow}%
      {%
        \advance\ff@id by 1\relax
        \@@flowframeswapcoords{\ff@id}%
      }%
    }%
  }%
  {%
    \ifthenelse{\equal{#1}{odd} \TE@or \equal{#1}{even}}{%
      {%
        \ifthenelse{\equal{#1}{odd}}{\@colN=1}{\@colN=2}%
        \whiledo{\@colN<\c@maxflow\TE@or\@colN=\c@maxflow}%
        {%
          \@@flowframeswapcoords{\@colN}%
          \advance\@colN by 2\relax
        }%
      }%
    }%
    {%
      \@for\@ff@id:=#1\do
      {%
        \def\@ff@numstart{0}%
        \def\@ff@numend{100000}%
        \@ff@getrange{\@ff@id}%
        \ifnum\@ff@numstart=0\relax
          \def\@ff@numstart{1}%
        \fi
        \ifnum\@ff@numend>\c@maxflow
          \def\@ff@numend{\c@maxflow}%
        \fi
        \@colN=\@ff@numstart
        \whiledo{\@colN<\@ff@numend \TE@or \@colN=\@ff@numend}%
      }%
    }%
  }%
}
```

```

        {%
        \@@flowframeswapcoords{\@colN}%
        \advance\@colN by 1\relax
        }%
    }%
} %
} %
}

```

Allow user to get the dimensions of **flow frame** (useful for **flow frames** created using `\Ncolumns` etc.) Only the **IDN** can be used for these commands.

```

\flowframex
\newcommand*\flowframex[1]{%
  \csname col@romannumeral#1@posx\endcsname
}

```

```

\flowframey
\newcommand*\flowframey[1]{%
  \csname col@romannumeral#1@posy\endcsname
}

```

```

\flowframeevenx
\newcommand*\flowframeevenx[1]{%
  \csname col@romannumeral#1@evenx\endcsname
}

```

```

\flowframeeveny
\newcommand*\flowframeeveny[1]{%
  \csname col@romannumeral#1@eveny\endcsname
}

```

```

\flowframewidth
\newcommand*\flowframewidth[1]{%
  \csname colwidth\romannumeral#1\endcsname
}

```

```

\flowframeheight
\newcommand*\flowframeheight[1]{%
  \csname colheight\romannumeral#1\endcsname
}

```

```

\@setframecol Set the colour of the frame, this is a little tricky because the model may need to
                be specified in square brackets. First check to see if a colour model has been
                specified
                \def\@setframecol{\@ifnextchar[\@setframecol\@setfr@me@col}

```

`\@@setframecol` A colour model has been specified.

```

\def\@@setframecol[#1]#2\end#3#4#5{%
  \expandafter\edef\csname @#5@#4@\romannumeral#3\endcsname{%
    [#1]{#2}}%
  }

```

`\@@setfr@mecol` A colour model has not been specified.

```

\def\@@setfr@mecol#1\end#2#3#4{%
  \expandafter\edef\csname @#4@#3@\romannumeral#2\endcsname{{#1}}%
  }

```

1.3 Static Frames

`\newstaticframe` Now deal with setting up the **static frames**. This is similar to the **flow frames**, except it has an associated \LaTeX savebox rather than a \TeX box. Syntax:

```

\newstaticframe[<pages>]{<width>}{<height>}{<x>}{<y>}[<label>]

```

As with `\newflowframe`, the final optional argument is dealt with at the end.

```

\newcommand*{\newstaticframe}{\@n@wstaticframe}

```

`\@n@wstaticframe`

```

\newcommand*{\@n@wstaticframe}{%
  \global\advance\c@maxstatic by 1\relax
  \newboolean{staticframe\romannumeral\c@maxstatic}%
  \ifstar\@snewstaticframe\@newstaticframe
}

```

`\@snewstaticframe` Starred version (has a border):

```

\newcommand{\@snewstaticframe}{%
  \setboolean{staticframe\romannumeral\c@maxstatic}{true}%
  \@@newstaticframe
}

```

`\@newstaticframe` Unstarred version (no border):

```

\newcommand{\@newstaticframe}{%
  \setboolean{staticframe\romannumeral\c@maxstatic}{false}%
  \@@newstaticframe
}

```

`\@@newstaticframe` Now set up the **static frame**:

```

\newcommand*{\@@newstaticframe}[5][all]{%
  \expandafter
    \newbox\csname @staticframe@\romannumeral\c@maxstatic\endcsname
  \expandafter
    \newlength\csname @sf@\romannumeral\c@maxstatic @posx\endcsname
  \expandafter
    \newlength\csname @sf@\romannumeral\c@maxstatic @posy\endcsname
  \expandafter\setlength

```

```

\csname @sf@romannumeral@c@maxstatic @posx\endcsname{#4}%
\expandafter\setlength
\csname @sf@romannumeral@c@maxstatic @posy\endcsname{#5}%
\expandafter\newlength
\csname @sf@romannumeral@c@maxstatic @evenx\endcsname
\expandafter\newlength
\csname @sf@romannumeral@c@maxstatic @eveny\endcsname
\expandafter\setlength
\csname @sf@romannumeral@c@maxstatic @evenx\endcsname{#4}%
\expandafter\setlength
\csname @sf@romannumeral@c@maxstatic @eveny\endcsname{#5}%
{\@ff@tmp@x=#2\relax
\@ff@tmp@y=#3\relax
\expandafter
\edef\csname @sf@dim@\romannumeral@c@maxstatic\endcsname{%
[c][\the\@ff@tmp@y][c]{\the\@ff@tmp@x}}%
\expandafter
\def\csname @sf@col@\romannumeral@c@maxstatic\endcsname{%
\flowframecol}%
\expandafter
\def\csname @sf@txtcol@\romannumeral@c@maxstatic\endcsname{%
\flowframetextcol}%
\expandafter
\def\csname @sf@backcol@\romannumeral@c@maxstatic\endcsname{%
{none}}%
\expandafter
\edef\csname @sf@pages@\romannumeral@c@maxstatic\endcsname{#1}%

```

Page exclusion list:

```

\expandafter
\gdef\csname @sf@xpages@\romannumeral@c@maxflow\endcsname{%
\expandafter
\gdef\csname @sf@offset@\romannumeral@c@maxstatic\endcsname{%
compute}%
\expandafter
\gdef\csname @sf@angle@\romannumeral@c@maxstatic\endcsname{0}%
\expandafter
\gdef\csname @sf@shape@\romannumeral@c@maxstatic\endcsname{\relax}%
\expandafter
\def\csname @sf@frametype@\romannumeral@c@maxstatic\endcsname{%
fbox}%
\newboolean{@sf@clear@\romannumeral@c@maxstatic}%
\setboolean{@sf@clear@\romannumeral@c@maxstatic}{false}

\newboolean{@sf@hide@\romannumeral@c@maxstatic}%
\setboolean{@sf@hide@\romannumeral@c@maxstatic}{false}%
\newboolean{@sf@hidethis@\romannumeral@c@maxstatic}%
\setboolean{@sf@hidethis@\romannumeral@c@maxstatic}{false}%
\@ifnextchar[{\@s@tstaticframeid{\c@maxstatic}}%
{\@s@tstaticframeid{\c@maxstatic}[\number\c@maxstatic]}%

```


}

`\@s@tstaticframeid` Set the label for the **static frame**:

```
\def\@s@tstaticframeid#1[#2]{%
  \edef\ff@label{#2}%
  \@sf@checkuniqueidl{#1}{\ff@label}%
  \expandafter
  \xdef\csname @sf@id@\romannumeral#1\endcsname{\ff@label}%
}
```

`\@sf@checkuniqueidl` Check **IDL** #2 for **static frame** #1 is unique

```
\newcommand*{\@sf@checkuniqueidl}[2]{%
  \@colN=0\relax
  \whiledo{\@colN<\c@maxstatic}%
  {%
    \advance\@colN by 1\relax
    \ifnum\@colN=#1\relax
    \else
    \ifthenelse
    {%
      \equal{#2}{\csname @sf@id@\romannumeral\@colN\endcsname}%
    }%
    {%
      \PackageError{flowfram}%
      {Static frame IDL '#2' already defined}%
      {%
        You can't assign this label, as it is already defined
        for static frame \number\@colN
      }%
    }%
    {}%
  }%
  \fi
}%
}
```

`\getstaticlabel` `\getstaticlabel{<idl>}` Gets the **IDL** for the **static frame** identified by its **IDL**.

```
\newcommand*{\getstaticlabel}[1]{%
  \csname @sf@id@\romannumeral#1\endcsname
}
```

`\getstaticid` `\getstaticid{<cmd>}{<idl>}` Gets the **IDL** for the **static frame** identified by its **IDL** and stores in `<cmd>` which must be a control sequence.

```
\newcommand*{\getstaticid}[2]{%
  \@staticframeid{#2}\edef#1{\number\ff@id}%
}
```

`\@staticframeid` Work out the IDN of the static frame with the given label. This iterates through each static frame, so if there are a lot of static frames, it may take a while. The IDN stored in `\ff@id`.

```
\newcommand*{\@staticframeid}[1]{%
  \@colN=0\relax
  \ff@id=0\relax
  \whiledo{\@colN<\c@maxstatic}%
  {%
    \advance\@colN by 1\relax
    \ifthenelse
    {%
      \equal{#1}{\csname @sf@id@\romannumeral\@colN\endcsname}%
    }%
    {%
      \ff@id=\@colN\relax
```

Break out of loop

```
    \@colN=\c@maxstatic
  }%
  {}%
}%
\ifnum\ff@id=0\relax
  \PackageError{flowfram}%
  {Can't find static frame id '#1'}{}%
\fi
}
```

Make it easier to get the x and y values for static frames. (Width and height stored differently.)

```
\staticframex
\newcommand*{\staticframex}[1]{%
  \csname @sf@\romannumeral#1@posx\endcsname
}
```

```
\staticframey
\newcommand*{\staticframey}[1]{%
  \csname @sf@\romannumeral#1@posy\endcsname
}
```

```
\staticframeevenx
\newcommand*{\staticframeevenx}[1]{%
  \csname @sf@\romannumeral#1@evenx\endcsname
}
```

```
\staticframeeveny
\newcommand*{\staticframeeveny}[1]{%
  \csname @sf@\romannumeral#1@eveny\endcsname
}
```

`\setallstaticframes` Modify the settings for all the **static frames**:

```

\newcommand*{\setallstaticframes}[1]{%
  \@colN=0\relax
  \whiledo{\@colN<\c@maxstatic}%
  {%
    \advance\@colN by 1\relax
    \@setstaticframe{\@colN}{#1}%
  }%
}

```

`\setstaticframe` Modify the settings for the specified **static frames**:

```

\newcommand*{\setstaticframe}{%
  \ifstar\@ssetstaticframe\setstaticframe
}

```

`\@ssetstaticframe` Starred version: Iterate through the comma-separated list of labels.

```

\newcommand*{\@ssetstaticframe}[2]{%
  \@for\@ff@id:=#1\do
  {%
    \@staticframeid{\@ff@id}%
    \@setstaticframe{\@ff@id}{#2}%
  }%
}

```

`\setstaticframe` Unstarred version. Iterate through the comma-separated list of **IDNs**, and check for number ranges. Ensures that number ranges do not lie out of bounds.

```

\newcommand*{\setstaticframe}[2]{%
  \ifthenelse{\equal{#1}{all}}{%
    {%
      \setallstaticframes{#2}%
    }%
  }%
  \ifthenelse{\equal{#1}{odd} \TEor \equal{#1}{even}}{%
    {%
      \ifthenelse{\equal{#1}{odd}}{\@colN=1}{\@colN=2}%
      \whiledo{\@colN<\c@maxstatic\TEor\@colN=\c@maxstatic}%
      {%
        \@setstaticframe{\@colN}{#2}%
        \advance\@colN by 2\relax
      }%
    }%
  }%
  {%
    \@for\@ff@id:=#1\do
    {%
      \def\@ff@numstart{0}%
      \def\@ff@numend{10000}%
      \@ff@getrange{\@ff@id}%
      \ifnum\@ff@numstart=0\relax
        \def\@ff@numstart{1}%
      \fi
    }%
  }%
}

```

```

\fi
\ifnum\@ff@numend>\c@maxstatic\relax
\def\@ff@numend{\c@maxstatic}%
\fi
\@colN=\@ff@numstart\relax
\whiledo{\@colN<\@ff@numend \TE@or \@colN=\@ff@numend}%
{%
\@@setstaticframe{\@colN}{#2}%
\advance\@colN by 1\relax
}%
}%
}%
}%
}

```

`\@@setstaticframe` Modify the settings for the **static frame** whose **IDN** is given by the first argument.

```

\newcommand*{\@@setstaticframe}[2]{%
\expandafter\expandafter\expandafter
\@ff@getstaticpos\csname @sf@dim@\romannumeral#1\endcsname
\def\ff@frame{}\edef\ff@width{\the\@ff@tmp@x}\def\ff@angle{}%
\edef\ff@height{\the\@ff@tmp@y}\def\ff@style{}\def\ff@frametype{}%
\def\ff@x{}\def\ff@y{}\def\ff@col{}\def\ff@txtcol{}%
\def\ff@backcol{}%
\def\ff@clear{}\def\ff@margin{}\def\ff@offset{}\def\ff@pages{}%
\def\ff@label{}\def\ff@evenx{}\def\ff@eveny{}%
\def\ff@oddx{}\def\ff@oddy{}%
\def\ff@hide{}\def\ff@hidethis{}%
\let\ff@shape\undefined
\let\ff@xpages\undefined
\setkeys{flowframe}{#2}%
\ifdefempty{\ff@frame}{}%
{%
\setboolean{staticframe\romannumeral#1}{\ff@frame}%
}%
\ifdefempty{\ff@x}{}%
{%
\expandafter\global\expandafter
\setlength\csname @sf@\romannumeral#1@posx\endcsname
{\ff@x}%
\expandafter\global\expandafter
\setlength\csname @sf@\romannumeral#1@evenx\endcsname
{\ff@x}%
}%
\ifdefempty{\ff@y}{}%
{%
\expandafter\global\expandafter
\setlength\csname @sf@\romannumeral#1@posy\endcsname
{\ff@y}%
}

```

```

\expandafter\global\expandafter
\setlength\csname @sf@romannumeral#1@eveny\endcsname
{\ff@y}%
}%
\ifdefempty{\ff@evenx}{}%
{%
\expandafter\global\expandafter
\setlength\csname @sf@romannumeral#1@evenx\endcsname
{\ff@evenx}%
}%
\ifdefempty{\ff@eveny}{}%
{%
\expandafter\global\expandafter
\setlength\csname @sf@romannumeral#1@eveny\endcsname
{\ff@eveny}%
}%
\ifdefempty{\ff@oddx}{}%
{%
\expandafter\global\expandafter
\setlength\csname @sf@romannumeral#1@posx\endcsname
{\ff@oddx}%
}%
\ifdefempty{\ff@oddy}{}%
{%
\expandafter\global\expandafter
\setlength\csname @sf@romannumeral#1@posy\endcsname
{\ff@oddy}%
}%
\expandafter
\xdef\csname @sf@dim@romannumeral#1\endcsname{%
[c][\ff@height][\ff@valign]{\ff@width}}%
\ifdefempty{\ff@frametype}{}%
{%
\expandafter
\xdef\csname @sf@frametype@romannumeral#1\endcsname{%
\ff@frametype}%
}%
\ifdefempty{\ff@label}{}%
{%
@s@tstaticframeid{#1}[\ff@label]%
}
\ifdefempty{\ff@col}{}%
{%
\expandafter\@setframecol\ff@col\end{#1}{col}{sf}%
}%
\ifdefempty{\ff@txtcol}{}%
{%
\expandafter\@setframecol\ff@txtcol\end{#1}{txtcol}{sf}%
}%

```

```

\ifdefempty{\ff@backcol}{}%
{%
  \expandafter\@setframecol\ff@backcol\end{#1}{backcol}{sf}%
}%
\ifdefempty{\ff@offset}{}%
{%
  \expandafter
    \xdef\csname @sf@offset@\romannumeral#1\endcsname{\ff@offset}%
}%
\ifdefempty{\ff@angle}{}%
{%
  \expandafter
    \xdef\csname @sf@angle@\romannumeral#1\endcsname{\ff@angle}%
}%
\ifundef{\ff@shape}{}%
{%
  \expandafter\global\expandafter
    \let\csname @sf@shape@\romannumeral#1\endcsname\ff@shape
}%
\ifdefempty{\ff@pages}{}%
{%
  \staticsetpagelist{#1}{\ff@pages}%
}%
\ifundef{\ff@xpages}{}%
{%
  \staticsetexclusion{#1}{\ff@xpages}%
}%
\ifdefempty{\ff@hide}{}%
{%
  \setboolean{@sf@hide@\romannumeral#1}{\ff@hide}%
}%
\ifdefempty{\ff@hidethis}{}%
{%
  \global\csletcs{if@sf@hidethis@\romannumeral#1}{if\ff@hidethis}%
}%
\ifdefempty{\ff@clear}{}%
{%
  \setboolean{@sf@clear@\romannumeral#1}{\ff@clear}%
}%
\ifdefempty{\ff@margin}{}%
{%
  \PackageError{flowfram}%
    {Key 'margin' not available for static frames}%
    {Static frames don't have marginal notes}%
}%
\ifdefempty{\ff@style}{}%
{%
  \PackageError{flowfram}%
    {Key 'style' not available for static frames}{}%
}%

```

```
}%
}
```

`\simpar` Simulate paragraph break inside `\shapepar`

```
%\newcommand*\simpar{\hfil\vadjust{\vskip\parskip}\break\indent}
\newcommand*\simpar{\hfill\\\indent\mbox{}}
```

`\ffpshpar` Provide means to allow parshape to be carried over a paragraph break.

```
\let\FLForgpar\par
\newcommand{\ffpshpar}{%
  \edef\flf@next{\hangafter=\the\hangafter
    \hangindent=\the\hangindent}%
  \FLForgpar\flf@next
  \edef\flf@next{\prevgraf=\the\prevgraf}%
  \@ff@parshape\indent\mbox{}\flf@next
}
```

Provide a means to have section headings within `\parshape`.

```
\@ff@parshape
\def\@ff@parshape{\parshape=0}
```

```
\@ff@sectionhead
\newcommand*\@ff@sectionhead[1]{%
  \def\ff@sehead{#1}%
  \ffpshpar
  \@ifstar{\@s@ff@heading}{\@dblarg\@ff@heading}%
}
```

```
\@s@ff@heading
\def\@s@ff@heading#1{%
  \@ifundefined{\@ff@old\ff@sehead}{%
    {%
      \PackageError{flowfram}%
        {Unknown heading command '\ff@sehead'}{}}%
    }%
  {%
    \begingroup
    \edef\flf@next{\hangafter=\the\hangafter
      \hangindent=\the\hangindent}%
    \FLForgpar\flf@next
    \let\par=\FLForgpar
    \edef\flf@next{\prevgraf=\the\prevgraf}%
    \csname @ff@old\ff@sehead\endcsname*{%
      \@ff@parshape\flf@next #1}%
    \xdef\flf@next{%
      \@ff@parshape
      \prevgraf=\the\prevgraf}%
    \endgroup
  }
```

```

}%
\mbox{}\flf@next
\let\flf@next\undefined
}

\@ff@heading
\def\@ff@heading[#1]#2{%
  \@ifundefined{@ff@old\ff@sehead}%
  {%
    \PackageError{flowfram}%
    {Unknown heading command '\ff@sehead'}{}%
  }%
  {%
    \begingroup
    \edef\flf@next{%
      \hangafter=\the\hangafter
      \hangindent=\the\hangindent}%
    \FLForgpar\flf@next
    \let\par=\FLForgpar
    \edef\flf@next{\prevgraf=\the\prevgraf}%
    \csname @ff@old\ff@sehead\endcsname[#1]{%
      \@ff@parshape\flf@next #2}%
    \xdef\flf@next{\@ff@parshape
      \prevgraf=\the\prevgraf}%
    \endgroup
  }%
  \mbox{}\flf@next
  \let\flf@next\undefined
}

```

`\@ff@setsecthead` Define command to switch to adjusted section headings:

```

\newcommand*{\@ff@setsecthead}{%
  \let\@ff@oldsection=\section
  \let\@ff@oldsubsection=\subsection
  \let\@ff@oldsubsubsection=\subsubsection
  \let\@ff@oldparagraph=\paragraph
  \let\@ff@oldsubparagraph=\subparagraph
  \def\section{\@ff@sectionhead{section}}%
  \def\subsection{\@ff@sectionhead{subsection}}%
  \def\subsubsection{\@ff@sectionhead{subsubsection}}%
  \def\paragraph{\@ff@sectionhead{paragraph}}%
  \def\subparagraph{\@ff@sectionhead{subparagraph}}%
}

```

`\@ff@getshape` Determine what shape command is being used:

```

\def\@ff@getshape#1#2\relax{%
  \ifdefequal{#1}{\parshape}%
  {%
    \def\ff@shape{1}%
  }
}

```



```

}%
{%
  \ifdefequal{#1}{\shapepar}%
  {%
    \def\ff@shape{2}%
  }%
  {%

    \ifdefequal{#1}{\Shapepar}%
    {%
      \def\ff@shape{2}%
    }%
    {%
      \ifx#1\relax
        \def\ff@shape{0}%
      \else
        \PackageError{flowfram}{Unknown shape \string#1}{}%
        \def\ff@shape{2}%
      \fi
    }%
  }%
}%
}

```

`\@ff@disablesec` Disable sectioning commands

```

\newcommand*{\@ff@disablesec}{%
  \def\section{%
    \PackageError{flowfram}%
    {You can't have sectioning commands within a \string\shapepar}{}%
  }%
  \def\subsection{%
    \PackageError{flowfram}%
    {You can't have sectioning commands within a \string\shapepar}{}%
  }%
  \def\subsubsection{%
    \PackageError{flowfram}%
    {You can't have sectioning commands within a \string\shapepar}{}%
  }%
  \def\paragraph{%
    \PackageError{flowfram}%
    {You can't have sectioning commands within a \string\shapepar}{}%
  }%
  \def\subparagraph{%
    \PackageError{flowfram}%
    {You can't have sectioning commands within a \string\shapepar}{}%
  }%
}

```

`staticcontents` Set the contents of the **static frame** given by its **IDN**. Syntax: `\begin{staticcontents}{\langle idn \rangle}`.

```

\newbox\staticframe
\newenvironment{staticcontents}[1]{%
  \let\continueonframe=\@staticcontinueonframe
  \@beginstaticcontents{#1}%
}%
{%
  \@endstaticcontents
  \ignorespaces
}

```

staticcontents* Set the contents of the **static frame** given by its **IDL**. Syntax: `\begin{staticcontents*}{\langle label \rangle}`.

```

\newenvironment{staticcontents*}[1]{%
  \@staticframeid{#1}%
  \let\continueonframe=\@staticscontinueonframe
  \@beginstaticcontents{\ff@id}%
}%
{%
  \@endstaticcontents
  \ignorespaces
}

```

Begin staticcontents stuff.

```

\newcommand{\@beginstaticcontents}[1]{%
  \@ifundefined{staticframe@\romannumeral#1}%
  {%
    \PackageError{flowfram}{Static frame '#1' not defined}{}%
  }%
  {}%
  \expandafter\let\expandafter\@ff@parshape\csname @sf@shape@\romannumeral#1\endcsname
  \expandafter\@ff@getshape\@ff@parshape\relax
  \ifcase\ff@shape

```

no shape:

```

  \edef\@sf@mpg{%
    \noexpand
    \begin{minipage}\csname @sf@dim@\romannumeral#1\endcsname
      \noexpand\begin{group}
        \noexpand\let\noexpand\FLForgpar=\noexpand\par
      }%
    \or

```

\parshape:

```

  \edef\@sf@mpg{%
    \noexpand
    \begin{minipage}\csname @sf@dim@\romannumeral#1\endcsname
      \@ff@parshape
      \noexpand\begin{group}
        \noexpand\let\noexpand\FLForgpar=\noexpand\par
        \noexpand\let\noexpand\par=\noexpand\ffpshpar
        \noexpand\@ff@setsecthead

```

```

    }%
\or
\shapepar or \Shapepar:
    \edef\@sf@mpg{%
        \noexpand
        \begin{minipage}\csname @sf@dim@\romannumeral#1\endcsname
            \noexpand\begin{group}
                \noexpand\@ff@disablesec
                \noexpand\@ff@parshape
            }%
        \fi
        \edef\@sf@thisframe{\csname @staticframe@\romannumeral#1\endcsname}%
        \begin{lrbox}{\staticframe}%
            \edef\ff@txtcol{\csname @sf@txtcol@\romannumeral#1\endcsname}%
            \s@tfftextcol\noindent
            \@sf@mpg
            \setlength\parindent\sdfparindent
        }

```

End staticcontents stuff

```

\newcommand*{\@endstaticcontents}{%
    \ifnum\ff@shape=2\relax
        \par
    \else
        \FLForgapar
    \fi
    \endgroup
    \end{minipage}%
    \end{lrbox}%
    \expandafter\global\expandafter
    \sbox\@sf@thisframe{\usebox\staticframe}%
}

```

`\setstaticcontents` Provide a command version. Syntax: `\setstaticcontents{<idn>}{<text>}`.

```

\newcommand{\setstaticcontents}{%
    \@ifstar\@sstaticconts\@staticconts
}

```

`\@sstaticconts` Starred version: **static frame** identified by label.

```

\newcommand{\@sstaticconts}[2]{%
    \begin{staticcontents*}{#1}%
        #2%
    \end{staticcontents*}%
}

```

`\@staticconts` Unstarred version: **static frame** identified by **IDN**.

```

\newcommand{\@staticconts}[2]{%
    \begin{staticcontents}{#1}%
        #2%
    \end{staticcontents}
}

```

```

        \end{staticcontents}%
    }

\staticsetpagelist Sets the page list for the static frame given by #1 (the IDN).
    \newcommand*{\staticsetpagelist}[2]{%
        \expandafter
            \xdef\csname @sf@pages@\romannumeral#1\endcsname{#2}%
        \flf@message{Setting page range for static frame
            \number#1\space\space to "#2"}%
    }

\staticsetexclusion Sets the exclusion list for the static frame given by #1 (the IDN).
    \newcommand*{\staticsetexclusion}[2]{%
        \expandafter
            \xdef\csname @sf@xpages@\romannumeral#1\endcsname{#2}%
        \flf@message{Setting exclusion for static frame
            \number#1\space\space to "#2"}%
    }

\staticaddexclusion Adds to the exclusion list for the static frame given by #1 (the IDN).
    \newcommand*{\staticaddexclusion}[2]{%
        \ifcempty{@sf@xpages@\romannumeral#1}
        {%
            \expandafter
                \xdef\csname @sf@xpages@\romannumeral#1\endcsname{#2}%
        }%
        {%
            \expandafter
                \xdef\csname @sf@xpages@\romannumeral#1\endcsname{%
                    \csname @sf@xpages@\romannumeral#1\endcsname,#2}%
        }%
        \flf@message{Setting exclusion for static frame
            \number#1\space\space to
            "\csname @sf@xpages@\romannumeral#1\endcsname"}%
    }

@@staticframeswapcoords Swap odd and even offsets for a given static frame. Do the main stuff for a given
static frame IDN.
    \newcommand*{\@@staticframeswapcoords}[1]{%
        \setlength{\@ff@tmp@x}{%
            {\csname @sf@\romannumeral#1@evenx\endcsname}
        \expandafter\setlength\csname @sf@\romannumeral#1@evenx\endcsname
            {\csname @sf@\romannumeral#1@posx\endcsname}%
        \expandafter\setlength\csname @sf@\romannumeral#1@posx\endcsname
            {\@ff@tmp@x}%
        \setlength{\@ff@tmp@y}{%
            {\csname @sf@\romannumeral#1@eveny\endcsname}
        \expandafter\setlength\csname @sf@\romannumeral#1@eveny\endcsname
            {\csname @sf@\romannumeral#1@posy\endcsname}%
    }

```

```

\expandafter\setlength\csname @sf@\romannumeral#1@posy\endcsname
{\@ff@tmp@y}%
}

\sfswapoddeven Allow user to specify flow frame either by IDN or IDL:
\newcommand*{\sfswapoddeven}{%
\@ifstar\@sstaticframeswapcoords\@staticframeswapcoords
}

@sstaticframeswapcoords Starred form
\newcommand*{\@sstaticframeswapcoords}[1]{%
\@for\@ff@id:=#1\do
{%
\@staticframeid{\@ff@id}%
\@staticframeswapcoords{\ff@id}%
}%
}

\@staticframeswapcoords Unstarred form:
\newcommand*{\@staticframeswapcoords}[1]{%
\ifthenelse{\equal{#1}{all}}{%
{%
\ff@id=0\relax
\whiledo{\ff@id<\c@maxflow}%
{%
\advance\ff@id by 1\relax
\@staticframeswapcoords{\ff@id}%
}%
}%
{%
\ifthenelse{\equal{#1}{odd} \TE@or \equal{#1}{even}}{%
{%
\ifthenelse{\equal{#1}{odd}}{\@colN=1}{\@colN=2}%
\whiledo{\@colN<\c@maxflow\TE@or\@colN=\c@maxflow}%
{%
\@staticframeswapcoords{\@colN}%
\advance\@colN by 2\relax
}%
}%
{%
\@for\@ff@id:=#1\do
{%
\def\@ff@numstart{0}\def\@ff@numend{100000}%
\@ff@getrange{\@ff@id}%
\ifnum\@ff@numstart=0\relax
\def\@ff@numstart{1}%
\fi
\ifnum\@ff@numend>\c@maxflow
\def\@ff@numend{\c@maxflow}%

```

```

\fi
\colN=\@ff@numstart
\whiledo{\@colN<\@ff@numend \TE@or \@colN=\@ff@numend}%
{%
  \@staticframeswapcoords{\@colN}%
  \advance\colN by 1\relax
}%
}%
}%
}%
}

```

1.4 Dynamic Frames

Now deal with the **dynamic frames**. These are very similar to the **static frames**, but instead of having a savebox, the contents of the **dynamic frame** are stored in a macro.

`\newdynamicframe` Syntax:

```

\newdynamicframe[⟨pages⟩]{⟨width⟩}{⟨height⟩}{⟨x⟩}{⟨y⟩}[⟨label⟩]
  \newcommand*{\newdynamicframe}{%
    \@n@wdynamicframe
  }
  \newcommand*{\@n@wdynamicframe}{%
    \global\advance\c@maxdynamic by 1\relax
    \newboolean{dynamicframe\romannumeral\c@maxdynamic}
    \@ifstar\@snewdynamicframe\@newdynamicframe
  }

```

`\@snewdynamicframe` Starred version: has a border.

```

  \newcommand*{\@snewdynamicframe}{%
    \setboolean{dynamicframe\romannumeral\c@maxdynamic}{true}%
    \@@newdynamicframe
  }

```

`\@newdynamicframe` Unstarred version: no border.

```

  \newcommand*{\@newdynamicframe}{%
    \setboolean{dynamicframe\romannumeral\c@maxdynamic}{false}%
    \@@newdynamicframe
  }

```

`\@@newdynamicframe` Create new **dynamic frame**:

```

  \newcommand*{\@@newdynamicframe}[5][all]{%
    \expandafter
      \gdef\csname @dynamicframe@\romannumeral\c@maxdynamic\endcsname{%
    \expandafter
      \newlength\csname @df@\romannumeral\c@maxdynamic @posx\endcsname
    \expandafter

```

```

\newlength\csname @df@\romannumeral\c@maxdynamic @posy\endcsname
\expandafter\setlength
\csname @df@\romannumeral\c@maxdynamic @posx\endcsname{#4}%
\expandafter\setlength
\csname @df@\romannumeral\c@maxdynamic @posy\endcsname{#5}%
\expandafter\newlength
\csname @df@\romannumeral\c@maxdynamic @evenx\endcsname
\expandafter\newlength
\csname @df@\romannumeral\c@maxdynamic @eveny\endcsname
\expandafter\setlength
\csname @df@\romannumeral\c@maxdynamic @evenx\endcsname{#4}%
\expandafter\setlength
\csname @df@\romannumeral\c@maxdynamic @eveny\endcsname{#5}%
{%
\@ff@tmp@x=#2\relax
\@ff@tmp@y=#3\relax
\expandafter
\edef\csname @df@dim@\romannumeral\c@maxdynamic\endcsname{%
[c][\the\@ff@tmp@y][t]{\the\@ff@tmp@x}%
}%
}%
\expandafter
\gdef\csname @df@col@\romannumeral\c@maxdynamic\endcsname{%
\flowframecol
}%
\expandafter
\gdef\csname @df@txtcol@\romannumeral\c@maxdynamic\endcsname{%
\flowframetextcol
}%
\expandafter
\gdef\csname @df@backcol@\romannumeral\c@maxdynamic\endcsname{%
{none}}}%
\expandafter
\gdef\csname @df@pages@\romannumeral\c@maxdynamic\endcsname{#1}%

```

Page exclusion list:

```

\expandafter
\gdef\csname @df@xpages@\romannumeral\c@maxflow\endcsname{}%
\expandafter
\gdef\csname @df@frametype@\romannumeral\c@maxdynamic\endcsname{%
fbox}%
\expandafter
\gdef\csname @df@style@\romannumeral\c@maxdynamic\endcsname{relax}%
\expandafter
\gdef\csname @df@offset@\romannumeral\c@maxdynamic\endcsname{compute}%
\expandafter
\gdef\csname @df@angle@\romannumeral\c@maxdynamic\endcsname{0}%
\expandafter
\gdef\csname @df@shape@\romannumeral\c@maxdynamic\endcsname{\relax}%
\newboolean{@df@clear@\romannumeral\c@maxdynamic}%

```

```

\setboolean{@df@clear@\romannumeral\c@maxdynamic}{false}%

\newboolean{@df@hide@\romannumeral\c@maxdynamic}%
\setboolean{@df@hide@\romannumeral\c@maxdynamic}{false}%
\newboolean{@df@hidethis@\romannumeral\c@maxdynamic}%
\setboolean{@df@hidethis@\romannumeral\c@maxdynamic}{false}%
\ifnextchar[{\@s@tdynamicframeid{\c@maxdynamic}}%
  {\@s@tdynamicframeid{\c@maxdynamic}[\number\c@maxdynamic]}%
}

```

`\@s@tdynamicframeid` Set the label for the given **dynamic frame**:

```

\def\@s@tdynamicframeid#1[#2]{%
  \edef\ff@label{#2}%
  \@df@checkuniqueidl{#1}{\ff@label}%
  \expandafter
    \xdef\csname @df@id@\romannumeral#1\endcsname{\ff@label}%
}

```

`\@df@checkuniqueidl` Check **IDL** #2 for **static frame** #1 is unique

```

\newcommand*{\@df@checkuniqueidl}[2]{%
  \@colN=0\relax
  \whiledo{\@colN<\c@maxdynamic}%
  {%
    \advance\@colN by 1\relax
    \ifnum\@colN=#1\relax
    \else
      \ifthenelse
        {%
          \equal{#2}%
          {\csname @df@id@\romannumeral\@colN\endcsname}%
        }%
        {%
          \PackageError{flowfram}%
            {Dynamic frame IDL '#2' already defined}%
            {
              You can't assign this label, as it is already defined
              for dynamic frame \number\@colN
            }%
        }%
      {}%
    \fi
  }%
}

```

`\getdynamiclabel` `\getdynamiclabel{<idn>}` Gets the **IDL** for the **dynamic frame** identified by its **IDN**.

```

\newcommand*{\getdynamiclabel}[1]{%
  \csname @df@id@\romannumeral#1\endcsname
}

```


`\getdynamicid` `\getdynamicid{<cmd>}{<idl>}` Gets the **IDN** for the **dynamic frame** identified by its **IDL** and stores in `<cmd>` which must be a control sequence.

```

\newcommand*\getdynamicid[2]{%
  \@dynamicframeid{#2}\edef#1{\number\ff@id}%
}

```

`\@dynamicframeid` Determine the **IDN** of the **dynamic frame** from its label. The **IDN** is stored in `\ff@id`.

```

\newcommand*\@dynamicframeid[1]{%
  \@colN=0\relax
  \ff@id=0\relax
  \whiledo{\@colN<\c@maxdynamic}%
  {%
    \advance\@colN by 1\relax
    \ifthenelse
    {%
      \equal{#1}{\csname @df@id@\romannumeral\@colN\endcsname}%
    }%
    {%
      \ff@id=\@colN\relax

```

Break out of loop

```

      \@colN=\c@maxdynamic
    }%
  }%
  \ifnum\ff@id=0\relax
    \PackageError{flowfram}%
    {Can't find dynamic frame id '#1'}{}%
  \fi
}

```

`\@getframeid` `\@getframeid{<type>}{<idl>}`

Gets the **IDL** for the frame of type `<type>` whose **IDL** is given by `<idl>`. The **IDN** is stored in `\ff@id`.

```

\newcommand*\@getframeid[2]{%
  \@ifdefined{@#1frameid}%
  {\csname @#1frameid\endcsname{#2}}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type '#1'}%
    {Frame types can be one of: flow, static or dynamic}%
  }%
}

```

Make it easier to get the x and y values for dynamic frames. (Width and height stored differently.)

`\dynamicframex`

\dynamicframex	<pre> \newcommand*{\dynamicframex}[1]{% \csname @df@romannumeral#1@posx\endcsname } </pre>
\dynamicframey	<pre> \newcommand*{\dynamicframey}[1]{% \csname @df@romannumeral#1@posy\endcsname } </pre>
\dynamicframeevenx	<pre> \newcommand*{\dynamicframeevenx}[1]{% \csname @df@romannumeral#1@evenx\endcsname } </pre>
\dynamicframeeveny	<pre> \newcommand*{\dynamicframeeveny}[1]{% \csname @df@romannumeral#1@eveny\endcsname } </pre>
\setalldynamicframes	<p>Change the settings for all the dynamic frames:</p> <pre> \newcommand*{\setalldynamicframes}[1]{% \@colN=0\relax \whiledo{\@colN<\c@maxdynamic}% {% \advance\@colN by 1\relax \@@setdynamicframe{\@colN}{#1}% }% } </pre>
\setdynamicframe	<p>Change the settings for specified dynamic frames:</p> <pre> \newcommand*{\setdynamicframe}{% \@ifstar\@ssetdynamicframe\setdynamicframe } </pre>
\@ssetdynamicframe	<p>Starred version: iterate through comma-separated list of labels.</p> <pre> \newcommand*{\@ssetdynamicframe}[2]{% \@for\@ff@id:=#1\do{% \@dynamicframeid{\@ff@id}% \@@setdynamicframe{\ff@id}{#2}% }% } </pre>
\@setdynamicframe	<p>Unstarred version: iterate through comma-separated list of ID numbers. Include provision for number ranges. If necessary, modify number ranges to ensure they are valid.</p> <pre> \newcommand*{\@setdynamicframe}[2]{% \ifthenelse{equal{#1}{all}}{% {% </pre>

```

\setalldynamicframes{#2}%
}%
{%
\ifthenelse{\equal{#1}{odd} \TE@or \equal{#1}{even}}%
{%
\ifthenelse{\equal{#1}{odd}}%
{\@colN=1}%
{\@colN=2}%
\whiledo{\@colN<\c@maxdynamic\TE@or \@colN=\c@maxdynamic}%
{%
\@@setdynamicframe{\@colN}{#2}%
\advance\@colN by 2\relax
}%
}%
{%
\@for\@ff@id:=#1\do{%
\def\@ff@numstart{0}%
\def\@ff@numend{10000}%
\@ff@getrange{\@ff@id}%
\ifnum\@ff@numstart=0\relax
\def\@ff@numstart{1}%
\fi
\ifnum\@ff@numend>\c@maxdynamic\relax
\def\@ff@numend{\c@maxdynamic}%
\fi
\@colN=\@ff@numstart\relax
\whiledo{\@colN<\@ff@numend \TE@or \@colN=\@ff@numend}%
{%
\@@setdynamicframe{\@colN}{#2}%
\advance\@colN by 1\relax
}%
}%
}%
}%
}

```

`\@@setdynamicframe` Change the setting for the **dynamic frame** given by its **IDN**.

```

\newcommand*{\@@setdynamicframe}[2]{%
\expandafter\expandafter\expandafter
\@ff@getstaticpos\csname @df@dim@\romannumeral#1\endcsname
\def\ff@frame{}\edef\ff@width{\the\@ff@tmp@x}%
\edef\ff@height{\the\@ff@tmp@y}\def\ff@style{}\def\ff@frametype{}%
\def\ff@x{}\def\ff@y{}\def\ff@col{}\def\ff@txtcol{}\def\ff@backcol{}%
\def\ff@clear{}\def\ff@margin{}\def\ff@offset{}\def\ff@pages{}%
\def\ff@label{}\def\ff@evenx{}\def\ff@eveny{}%
\def\ff@oddx{}\def\ff@oddy{}\def\ff@angle{}%
\def\ff@hide{}\def\ff@hidethis{}%
\let\ff@shape\undefined
\let\ff@xpages\undefined
}

```

```

\setkeys{flowframe}{#2}%
\ifdefempty{\ff@frame}%
{}%
{%
  \setboolean{dynamicframe\romannumeral#1}{\ff@frame}%
}%
\ifdefempty{\ff@x}%
{}%
{%
  \expandafter\global\expandafter\setlength
    \csname @df@\romannumeral#1@posx\endcsname{\ff@x}%
  \expandafter\global\expandafter\setlength
    \csname @df@\romannumeral#1@evenx\endcsname{\ff@x}%
}%
\ifdefempty{\ff@y}%
{}%
{%
  \expandafter\global\expandafter\setlength
    \csname @df@\romannumeral#1@posy\endcsname{\ff@y}%
  \expandafter\global\expandafter\setlength
    \csname @df@\romannumeral#1@eveny\endcsname{\ff@y}%
}%
\ifdefempty{\ff@evenx}%
{}%
{%
  \expandafter\global\expandafter\setlength
    \csname @df@\romannumeral#1@evenx\endcsname{\ff@evenx}%
}%
\ifdefempty{\ff@eveny}%
{}%
{%
  \expandafter\global\expandafter\setlength
    \csname @df@\romannumeral#1@eveny\endcsname{\ff@eveny}%
}%
\ifdefempty{\ff@oddx}%
{}%
{%
  \expandafter\global\expandafter\setlength
    \csname @df@\romannumeral#1@posx\endcsname{\ff@oddx}%
}%
\ifdefempty{\ff@oddy}%
{}%
{%
  \expandafter\global\expandafter\setlength
    \csname @df@\romannumeral#1@posy\endcsname{\ff@oddy}%
}%
\expandafter\xdef\csname @df@dim@\romannumeral#1\endcsname{%
  [c][\ff@height][\ff@valign]{\ff@width}%
}%

```

```

\ifdefempty{\ff@label}%
{}%
{%
  \@s@tdynamicframeid{#1}[\ff@label]%
}%
\ifdefempty{\ff@frametype}%
{}%
{%
  \expandafter
    \xdef\csname @df@frametype@\romannumeral#1\endcsname{%
      \ff@frametype
    }%
}%
\ifdefempty{\ff@col}%
{}%
{%
  \expandafter\@setframecol\ff@col\end{#1}{col}{df}%
}%
\ifdefempty{\ff@txtcol}%
{}%
{%
  \expandafter\@setframecol\ff@txtcol\end{#1}{txtcol}{df}%
}%
\ifdefempty{\ff@backcol}%
{}%
{%
  \expandafter\@setframecol\ff@backcol\end{#1}{backcol}{df}%
}%
\ifdefempty{\ff@offset}%
{}%
{%
  \expandafter
    \xdef\csname @df@offset@\romannumeral#1\endcsname{\ff@offset}%
}%
\ifdefempty{\ff@angle}%
{}%
{%
  \expandafter
    \xdef\csname @df@angle@\romannumeral#1\endcsname{\ff@angle}%
}%
\ifundef{\ff@shape}{}%
{%
  \expandafter\global\expandafter
    \let\csname @df@shape@\romannumeral#1\endcsname\ff@shape
}%
\ifdefempty{\ff@pages}%
{}%
{%
  \dynamicsetpagelist{#1}{\ff@pages}%
}

```

```

}%
\ifundef{\ff@xpages}{}%
{%
  \dynamicsetexclusion{#1}{\ff@xpages}%
}%
\ifdefempty{\ff@style}%
{}%
{%
  \ifcsundef{\ff@style}%
  {%
    \PackageError{flowfram}%
    {Unknown style '\ff@style'}%
    {%
      The command \expandafter\@gobble\string\\\ff@style
      \space has not been defined%
    }%
  }%
}%
{%
  \expandafter
  \xdef\csname @df@style@\romannumeral#1\endcsname{\ff@style}%
}%
}%
\ifdefempty{\ff@clear}%
{}%
{%
  \setboolean{@df@clear@\romannumeral#1}{\ff@clear}%
}%
\ifdefempty{\ff@margin}%
{}%
{%
  \PackageError{flowfram}%
  {%
    Key 'margin' not available for dynamic frames%
  }%
  {dynamic frames don't have marginal notes}%
}%
\ifdefempty{\ff@hide}{}%
{%
  \setboolean{@df@hide@\romannumeral#1}{\ff@hide}%
}%
\ifdefempty{\ff@hidethis}{}%
{%
  \global\csletcs{if@df@hidethis@\romannumeral#1}{if\ff@hidethis}%
}%
}

```

`\dynamicsetpagelist` Sets the page list for the **dynamic frame** given by #1 (the **IDN**).

```

\newcommand*{\dynamicsetpagelist}[2]{%
  \expandafter

```

```

\edef\csname @df@pages@\romannumeral#1\endcsname{#2}%
\flf@message{Setting page range for dynamic frame
\number#1\space\space to "#2"}%
}

\dynamicsetexclusion Sets the exclusion list for the dynamic frame given by #1 (the IDN).
\newcommand*{\dynamicsetexclusion}[2]{%
\expandafter
\edef\csname @df@xpages@\romannumeral#1\endcsname{#2}%
\flf@message{Setting exclusion for dynamic frame
\number#1\space\space to "#2"}%
}

\dynamicaddexclusion Adds to the exclusion list for the dynamic frame given by #1 (the IDN).
\newcommand*{\dynamicaddexclusion}[2]{%
\ifcempty{@df@xpages@\romannumeral#1}
{%
\expandafter
\edef\csname @df@xpages@\romannumeral#1\endcsname{#2}%
}%
{%
\expandafter
\edef\csname @df@xpages@\romannumeral#1\endcsname{%
\csname @df@xpages@\romannumeral#1\endcsname,#2}%
}%
\flf@message{Setting exclusion for dynamic frame
\number#1\space\space to
"\csname @df@xpages@\romannumeral#1\endcsname"}%
}

@dynamicframeswapcoords Swap odd and even offsets for a given dynamic frame. Do the main stuff for a
given dynamic frame IDN.
\newcommand*{\@dynamicframeswapcoords}[1]{%
\setlength{\@ff@tmp@x}{%
\csname @df@\romannumeral#1@evenx\endcsname}%
\expandafter\setlength
\csname @df@\romannumeral#1@evenx\endcsname
{\csname @df@\romannumeral#1@posx\endcsname}%
\expandafter\setlength
\csname @df@\romannumeral#1@posx\endcsname{\@ff@tmp@x}%
\setlength{\@ff@tmp@y}{%
\csname @df@\romannumeral#1@eveny\endcsname}%
\expandafter\setlength
\csname @df@\romannumeral#1@eveny\endcsname
{\csname @df@\romannumeral#1@posy\endcsname}%
\expandafter\setlength\csname @df@\romannumeral#1@posy\endcsname
{\@ff@tmp@y}%
}

```

```

\dfswapoddeven Allow user to specify flow frame either by IDN or IDL:
\newcommand*{\dfswapoddeven}{%
\@ifstar\@sdynamicframeswapcoords\@dynamicframeswapcoords}

sdynamicframeswapcoords Starred form
\newcommand*{\@sdynamicframeswapcoords}[1]{%
\@for\@ff@id:=#1\do{%
\@dynamicframeid{\@ff@id}%
\@@dynamicframeswapcoords{\ff@id}}%
}

@dynamicframeswapcoords Unstarred form:
\newcommand*{\@dynamicframeswapcoords}[1]{%
\ifthenelse{\equal{#1}{all}}{%
{%
\ff@id=0\relax
\whiledo{\ff@id<\c@maxflow}%
{%
\advance\ff@id by 1\relax
\@@dynamicframeswapcoords{\ff@id}%
}%
}%
{%
\ifthenelse{\equal{#1}{odd} \TEor \equal{#1}{even}}{%
{%
\ifthenelse{\equal{#1}{odd}}%
{\@colN=1}%
{\@colN=2}%
\whiledo{\@colN<\c@maxflow\TEor\@colN=\c@maxflow}%
{%
\@@dynamicframeswapcoords{\@colN}%
\advance\@colN by 2\relax
}%
}%
}%
{%
\@for\@ff@id:=#1\do{%
\def\@ff@numstart{0}%
\def\@ff@numend{10000}%
\@ff@getrange{\@ff@id}%
\ifnum\@ff@numstart=0\relax
\def\@ff@numstart{1}%
\fi
\ifnum\@ff@numend>\c@maxflow
\def\@ff@numend{\c@maxflow}%
\fi
\@colN=\@ff@numstart
\whiledo{\@colN<\@ff@numend \TEor \@colN=\@ff@numend}%
{%
\@@dynamicframeswapcoords{\@colN}%

```



```

        \advance\@colN by 1\relax
      }%
    }%
  }%
}

```

Set the contents of a **dynamic frame**.

`dynamiccontents` Syntax: `\begin{dynamiccontents}{⟨idn⟩}`

The contents of the `dynamiccontents` environment needs to be stored in the control sequence `\@dynamicframe@⟨rn⟩` (where `⟨rn⟩` is the `⟨idn⟩` as a roman numeral.)

```

\newenvironment{dynamiccontents}[1]{%
  \def\@flf@{dynamiccontents}%
  \xdynamiccontents{#1}%
  \endxdynamiccontents
}

```

Token to store contents of environment:

```
\newtoks\@dynamictok
```

Start of the environment (unstarred):

```

\def\xdynamiccontents#1{%
  \def\@flf@idn{#1}%
  \@dynamictok{}\@flf@get@body
}

```

Get the body of the environment:

```

\long\def\@flf@get@body#1\end{%
  \@flf@checkcontinued#1\continueonframe\@nil
  \ifdfcontinued
    \expandafter\flf@ta\expandafter{\@flf@tmpa}%
    \edef\@flf@tmp{\the\@dynamictok\the\flf@ta}%
    \@dynamictok\expandafter{\@flf@tmp}%
  \else
    \@dynamictok\expandafter{\the\@dynamictok#1}%
  \fi
  \@flf@find@end
}

```

Check if `\continueonframe` has been used.

```

\newif\ifdfcontinued
\long\def\@flf@checkcontinued#1\continueonframe#2\@nil{%
  \long\def\@flf@tmpa{#1}\long\def\@flf@tmpb{#2}%
  \ifx\@flf@tmpb\@empty
    \dfcontinuedfalse
  \else
    \dfcontinuedtrue
    \flf@getcontargs#2\@ff@text\@ff@nextid\@ff@rest
  \fi
}

```

```

\fi
}

```

Long equivalent of \@empty:

```

\long\def\@empty{}

```

Get the first optional argument and store in the forth argument (which should be a control sequence). Get the second argument and store in the fifth argument (which should be a control sequence). Get the third argument and store in the sixth argument (which should be a control sequence).

```

\def\flf@getcontargs{%
  \@ifnextchar[{\@flf@getcontargs}{\@flf@getcontargs[]}%
}

\long\def\@flf@getcontargs[#1]#2#3\continueonframe#4#5#6{%
  \def#4{#1}\def#5{#2}\def#6{#3}%
}

```

Find the end of the environment:

```

\def\@flf@find@end#1{%
  \def\@tempa{#1}%
  \global\let\flf@next=\relax
  \ifdfcontinued
    \@dynamictok\expandafter
      {\the\@dynamictok\ffcontinuedtextlayout}%
    \protected@edef\@tempa{\the\@dynamictok{\@ff@text}}%
    \@dynamictok\expandafter{\@tempa}%
    \toks@\expandafter{\@ff@rest}%
    \edef\flf@next{\noexpand\@flf@get@body\noexpand\end{#1}%
      \noexpand\begin{#1}{\@ff@nextid}\noexpand\par
      \noexpand\noindent\noexpand\ignorespaces
      \the\toks@\noexpand\end{#1}}%
  \else
    \ifx\@tempa\@flf@
      \let\flf@next=\@flf@endxdynamiccontents
    \else
      \@dynamictok\expandafter
        {\the\@dynamictok\end{#1}}%
      \let\flf@next=\@flf@get@body
    \fi
  \fi
  \flf@next
}

```

End of the environment:

```

\let\endxdynamiccontents\relax
\def\@flf@endxdynamiccontents{%
  \ifnum\@flf@idn>\c@maxdynamic
    \PackageError{flowfram}%
      {Dynamic frame \number\@flf@idn\ does not exist}%
    {%

```

```

        You have specified dynamic frame number \number\@flf@idn,
        but there are only \number\c@maxdynamic\space dynamic
        frames currently defined%
    }%
\else
    \expandafter
    \xdef\csname @dynamicframe@\romannumeral\@flf@idn\endcsname{%
        \the\@dynamictok}%
    \expandafter
\fi
\expandafter\end\expandafter{\@flf@}%
}

```

`dynamiccontents*` Starred version

```

\newenvironment{dynamiccontents*}[1]{%
    \def\@flf@{dynamiccontents*}%
    \@dynamicframeid{#1}%
    \xdynamiccontents{\ff@id}}{%
    \enddynamiccontents
}

```

`\setdynamiccontents`

```

\newcommand{\setdynamiccontents}{%
    \@ifstar\@ssetdynamiccontents\setdynamiccontents
}

```

`\@ssetdynamiccontents` Starred version: identify **dynamic frame** by its IDL:

```

\newcommand{\@ssetdynamiccontents}[2]{%
    \@dynamicframeid{#1}\@setdynamiccontents{\ff@id}{#2}%
}

```

`\@setdynamiccontents` Unstarred version: identify **dynamic frame** by its IDN:

```

\newcommand{\@setdynamiccontents}[2]{%
    \ifnum#1>\c@maxdynamic
        \PackageError{flowfram}%
        {Dynamic frame \number#1\ does not exist}%
        {%
            You have specified dynamic frame number \number#1, but there are
            only \number\c@maxdynamic\space dynamic frames currently defined%
        }%
    \else
        \expandafter
        \gdef\csname @dynamicframe@\romannumeral#1\endcsname{#2}%
    \fi
}

```

`\appenddynamiccontents` Append information to **dynamic frame**. First check to see if starred or unstarred version is being used.

```

\newcommand{\appenddynamiccontents}{%
  \@ifstar\@sappenddynamic\@appenddynamic
}

\@sappenddynamic Starred version: find the IDN and pass it to the unstarred version.
\newcommand{\@sappenddynamic}[2]{%
  \@dynamicframeid{#1}\@appenddynamic{\ff@id}{#2}%
}

\@appenddynamic Unstarred version.
\newcommand{\@appenddynamic}[2]{%
  \ifnum#1>\c@maxdynamic
    \PackageError{flowfram}%
    {Dynamic frame \number#1 does not exist}%
    {%
      You have specified dynamic frame number \number#1,
      but there are only
      \number\c@maxdynamic\space dynamic frames currently defined%
    }%
  \else
    \expandafter\@ff@addtolist
    \csname @dynamicframe@\romannumeral#1\endcsname\entry{#2}%
  \fi
}

\@ff@addtolist Append #2 onto the end of #1.
\newtoks\flf@ta \newtoks\flf@tb
\long\def\@ff@addtolist#1\entry#2{%
  \flf@ta={{#2}}%
  \flf@tb=\expandafter{#1}%
  \xdef#1{\the\flf@tb\the\flf@ta}%
}

\continueonframe \continueonframe[<text>]{<id>} Ends current staticcontents or dynamiccon-
tents environment and starts environment of the same type for frame given by
<id>. Can only be used inside staticcontents or dynamiccontents environments.
If the starred version of the environment is used, {<id>} refers to the IDL, oth-
erwise it refers to the IDN of the new frame.
\newcommand{\continueonframe}{%
  \PackageError{flowfram}%
  {%
    Can't continue to new frame: not in static or dynamic frame%
  }%
  {%
    \string\continueonframe\space may only
    be used inside 'staticcontents' or 'dynamiccontents'
    environments (or their starred versions)%
  }%
}

```

`\@scontinueonframe` and `\@continueonframe` are set by `staticcontents` and `dynamiccontents` environments (and their starred forms).

Static starred version uses **IDL**

```
\newcommand*{\@staticscontinueonframe}[2][]{%
  \ffcontinuedtextlayout{#1}%
  \end{staticcontents}%
  \begin{staticcontents*}{#2}\par\noindent\ignorespaces
}
```

Static unstarred version uses **IDN**

```
\newcommand*{\@staticcontinueonframe}[2][]{%
  \ffcontinuedtextlayout{#1}%
  \end{staticcontents}%
  \begin{staticcontents}{#2}\par\noindent\ignorespaces
}
```

`\ffcontinuedtextlayout` Displays the continued text used by `\continueonframe`.

```
\newcommand{\ffcontinuedtextlayout}[1]{%
  \parfillskip=0pt\par\hfill
  \ffcontinuedtextfont{#1}%
}
```

`\ffcontinuedtextfont` Sets the font to display the continuation text used by `\continueonframe`

```
\newcommand*{\ffcontinuedtextfont}[1]{\emph{\small #1}}
```

1.5 Determining Dimensions and Locations

`\computeleftedgeodd` Compute the position of the left most edge of the page, relative to the left side of the **typeblock**. Since odd and even pages may have a different offset if `\oddsidemargin` and `\evensidemargin` have different values, it is necessary to have two separate commands for odd and even pages. First the odd pages.

```
\newcommand*{\computeleftedgeodd}[1]{%
  \setlength{#1}{-1in}%
  \addtolength{#1}{-\hoffset}%
  \addtolength{#1}{-\oddsidemargin}%
}
```

`\computeleftedgeeven` Now for the even pages

```
\newcommand*{\computeleftedgeeven}[1]{%
  \setlength{#1}{-1in}%
  \addtolength{#1}{-\hoffset}%
  \addtolength{#1}{-\evensidemargin}%
}
```

`\computetopedge` Compute the top edge of the page, relative to the bottom of the **typeblock**.

```
\newcommand*{\computetopedge}[1]{%
  \setlength{#1}{\textheight}%
  \addtolength{#1}{\headheight}%
}
```

```

\addtolength{#1}{\headsep}%
\addtolength{#1}{1in}%
\addtolength{#1}{\voffset}%
\addtolength{#1}{\topmargin}%
}

```

`\computebottomedge` Compute the bottom edge of the page, relative to the bottom of the **typeblock**.

```

\newcommand*\computebottomedge[1]{%
\computetopedge{#1}%
\addtolength{#1}{-\paperheight}%
}

```

`\computerightedgeodd` Compute the right edge of the page, relative to the left edge of the **typeblock**. Again, two commands are needed for odd and even pages. First the odd pages.

```

\newcommand*\computerightedgeodd[1]{%
\computeleftedgeodd{#1}%
\addtolength{#1}{\paperwidth}%
}

```

`\computerightedgeeven` Now for the even pages.

```

\newcommand*\computerightedgeeven[1]{%
\computeleftedgeeven{#1}%
\addtolength{#1}{\paperwidth}%
}

```

Compute the minimum area surrounding the listed **flow frames**. Values stored in `\ffareawidth`, `\ffareaheight`, `\ffareax` and `\ffareay`

```

\newlength\ffareawidth
\newlength\ffareaheight
\newlength\ffareax
\newlength\ffareay
\newlength\ffareaevenx
\newlength\ffareaeveny

```

`\computeflowframearea` Starred version identifies frame by **IDL**, unstarred version identifies frame by **IDN**.

```

\newcommand*\computeflowframearea{%
\@ifstar\@scomputeffarea\@computeffarea
}

```

`\@scomputeffarea` Starred version.

```

\newcommand*\@scomputeffarea[1]{%
\setlength{\ffareax}{\paperwidth}%
\setlength{\ffareay}{\paperheight}%
\setlength{\@ff@tmp@x}{0pt}%
\setlength{\@ff@tmp@y}{0pt}%
\@for\@ff@id:=#1\do{%
\@flowframeid{\@ff@id}%
}

```

\ff@id is the IDN

```
\ifnum\ffareax>\flowframex{\ff@id}%
  \setlength{\ffareax}{\flowframex{\ff@id}}%
\fi
\ifnum\ffareay>\flowframey{\ff@id}%
  \setlength{\ffareay}{\flowframey{\ff@id}}%
\fi
\setlength{\@ff@offset}{\flowframex{\ff@id}}%
\addtolength{\@ff@offset}{\flowframewidth{\ff@id}}%
\ifnum\@ff@tmp@x<\@ff@offset
  \setlength{\@ff@tmp@x}{\@ff@offset}%
\fi
\setlength{\@ff@offset}{\flowframey{\ff@id}}%
\addtolength{\@ff@offset}{\flowframeheight{\ff@id}}%
\ifnum\@ff@tmp@y<\@ff@offset
  \setlength{\@ff@tmp@y}{\@ff@offset}%
\fi
}%
\setlength{\ffareawidth}{\@ff@tmp@x}%
\addtolength{\ffareawidth}{-\ffareax}%
\setlength{\ffareaheight}{\@ff@tmp@y}%
\addtolength{\ffareaheight}{-\ffareay}%
}
```

\@computeffarea Unstarred version.

```
\newcommand*{\@computeffarea}[1]{%
  \setlength{\ffareax}{\paperwidth}%
  \setlength{\ffareay}{\paperheight}%
  \setlength{\@ff@tmp@x}{0pt}%
  \setlength{\@ff@tmp@y}{0pt}%
  \@for\@ff@id:=#1\do{%
    \ff@id=\@ff@id\relax
    \setlength{\@ff@offset}{\flowframex{\ff@id}}%
    \ifdim\ffareax>\@ff@offset
      \setlength{\ffareax}{\@ff@offset}%
    \fi
    \setlength{\@ff@offset}{\flowframey{\ff@id}}%
    \ifdim\ffareay>\@ff@offset
      \setlength{\ffareay}{\@ff@offset}%
    \fi
    \setlength{\@ff@offset}{\flowframex{\ff@id}}%
    \addtolength{\@ff@offset}{\flowframewidth{\ff@id}}%
    \ifdim\@ff@tmp@x<\@ff@offset
      \setlength{\@ff@tmp@x}{\@ff@offset}%
    \fi
    \setlength{\@ff@offset}{\flowframey{\ff@id}}%
    \addtolength{\@ff@offset}{\flowframeheight{\ff@id}}%
    \ifdim\@ff@tmp@y<\@ff@offset
      \setlength{\@ff@tmp@y}{\@ff@offset}%
    \fi
  }
```

```

\fi
}%
\setlength{\ffareawidth}{\@ff@tmp@x}%
\addtolength{\ffareawidth}{-\ffareax}%
\setlength{\ffareaheight}{\@ff@tmp@y}%
\addtolength{\ffareaheight}{-\ffareay}%
}

```

`\@ff@swaplen` Swap the values of two lengths

```

\newcommand*{\@ff@swaplen}[2]{%
\setlength{\@ff@tmp@x}{#1}%
\setlength{#1}{#2}%
\setlength{#2}{\@ff@tmp@x}%
}

```

`\@ff@getdim` Get the dimensions for the given type of frame. The first parameter should be a number indicating type of frame : 1 (flow), 2 (static), 3 (dynamic). The second number is its IDN. Values are stored in `\ffareax`, `\ffareay`, `\ffareawidth` and `\ffareaheight`.

```

\newcommand*{\@ff@getdim}[2]{%
\ifnum#2<1\relax
\PackageError{flowfram}%
{Frame IDNs start from 1}%
{%
You have specified a frame IDN of '\number#2'%
}%
\fi
\ifcase#1\relax
\PackageError{flowfram}%
{Unknown frame ID type '#1'}%
{%
Frame ID types are: 1 (flow), 2 (static) and 3 (dynamic)%
}%
\or

```

Flow frame

```

\ifnum#2>\c@maxflow\relax
\PackageError{flowfram}{Invalid flow frame IDN '\number#2'}{%
Flow frame IDNs go from 1 to \number\c@maxflow}%
\else
\setlength{\ffareax}{\flowframex{#2}}%
\setlength{\ffareay}{\flowframey{#2}}%
\setlength{\ffareaevenx}{\flowframeevenx{#2}}%
\setlength{\ffareaeveny}{\flowframeeveny{#2}}%
\setlength{\ffareawidth}{\flowframewidth{#2}}%
\setlength{\ffareaheight}{\flowframeheight{#2}}%
\fi
\or

```

Static frame


```

\ifnum#2>\c@maxstatic\relax
  \PackageError{flowfram}%
  {Invalid static frame IDN '\number#2'}%
  {%
    Static frame IDNs go from 1 to \number\c@maxstatic
  }%
\else
  \setlength{\ffareax}{\staticframex{#2}}%
  \setlength{\ffareay}{\staticframey{#2}}%
  \setlength{\ffareaevenx}{\staticframeevenx{#2}}%
  \setlength{\ffareaeveny}{\staticframeeveny{#2}}%
  \expandafter\expandafter\expandafter
  \@ff@getstaticpos
  \csname @sf@dim@\romannumeral#2\endcsname
  \setlength{\ffareawidth}{\@ff@tmp@x}%
  \setlength{\ffareaheight}{\@ff@tmp@y}%
\fi
\or
Dynamic frame
  \ifnum#2>\c@maxdynamic\relax
    \PackageError{flowfram}%
    {Invalid dynamic frame IDN '\number#2'}%
    {%
      Dynamic frame IDNs go from 1 to \number\c@maxdynamic
    }%
  \else
    \setlength{\ffareax}{\dynamicframex{#2}}%
    \setlength{\ffareay}{\dynamicframey{#2}}%
    \setlength{\ffareaevenx}{\dynamicframeevenx{#2}}%
    \setlength{\ffareaeveny}{\dynamicframeeveny{#2}}%
    \expandafter\expandafter\expandafter
    \@ff@getstaticpos
    \csname @df@dim@\romannumeral#2\endcsname
    \setlength{\ffareawidth}{\@ff@tmp@x}%
    \setlength{\ffareaheight}{\@ff@tmp@y}%
  \fi
\else
  \PackageError{flowfram}%
  {Unknown frame ID type '#1'}%
  {%
    Frame ID types are: 1 (flow), 2 (static) and 3 (dynamic)%
  }%
\fi
}

```

`\@ff@getevendim` Get the dimensions for the given type of frame on even pages. The first parameter should be a number indicating type of frame : 1 (flow), 2 (static), 3 (dynamic). The second number is its **IDN**. Values are stored in `\ffareax`,

```

\ffareay, \ffareawidth and \ffareaheight.
\newcommand*{\@ff@getevendim}[2]{%
  \ifnum#2<1\relax
    \PackageError{flowfram}%
    {Frame IDNs start from 1}%
    {%
      You have specified a frame IDN of '\number#2'%
    }%
  \fi
  \ifcase#1\relax
    \PackageError{flowfram}%
    {Unknown frame ID type '#1'}%
    {%
      Frame ID types are: 1 (flow), 2 (static) and 3 (dynamic)%
    }
  \or

```

Flow frame

```

  \ifnum#2>\c@maxflow
    \PackageError{flowfram}%
    {Invalid flow frame IDN '\number#2'}%
    {%
      Flow frame IDNs go from 1 to \number\c@maxflow
    }%
  \else
    \setlength{\ffareax}{\flowframeevenx{#2}}%
    \setlength{\ffareay}{\flowframeeveny{#2}}%
    \setlength{\ffareawidth}{\flowframewidth{#2}}%
    \setlength{\ffareaheight}{\flowframeheight{#2}}%
  \fi
\or

```

Static frame

```

  \ifnum#2>\c@maxstatic\relax
    \PackageError{flowfram}%
    {Invalid static frame IDN '\number#2'}%
    {%
      Static frame IDNs go from 1 to \number\c@maxstatic
    }%
  \else
    \setlength{\ffareax}{\staticframeevenx{#2}}%
    \setlength{\ffareay}{\staticframeeveny{#2}}%
    \expandafter\expandafter\expandafter
      \@ff@getstaticpos
      \csname @sf@dim@\romannumeral#2\endcsname
    \setlength{\ffareawidth}{\@ff@tmp@x}%
    \setlength{\ffareaheight}{\@ff@tmp@y}%
  \fi
\or

```

Dynamic frame

```

\ifnum#2>\c@maxdynamic\relax
  \PackageError{flowfram}%
  {Invalid dynamic frame IDN '\number#2'}%
  {%
    Dynamic frame IDNs go from 1 to \number\c@maxdynamic
  }%
\else
  \setlength{\ffareax}{\dynamicframeevenx{#2}}%
  \setlength{\ffareay}{\dynamicframeeveny{#2}}%
  \expandafter\expandafter\expandafter
  \@@@getstaticpos
  \csname @df@dim@romannumeral#2\endcsname
  \setlength{\ffareawidth}{\@@@tmp@x}%
  \setlength{\ffareaheight}{\@@@tmp@y}%
\fi
\else
  \PackageError{flowfram}%
  {Unknown frame ID type '#1'}%
  {%
    Frame ID types are: 1 (flow), 2 (static) and 3 (dynamic)%
  }%
\fi
}

```

`\getstaticbounds` Convenience method for calling the above. Firstly for static frames:

```

\newcommand*{\getstaticbounds}{%
  \ifstar\@sgetstaticbounds\@getstaticbounds
}

```

`\@sgetstaticbounds` Starred version (specify by **IDL**):

```

\newcommand*{\@sgetstaticbounds}[1]{%
  \@staticframeid{#1}\@getstaticbounds{\ff@id}%
}

```

`\@getstaticbounds` Unstarred version (specify by **IDL**):

```

\newcommand*{\@getstaticbounds}[1]{\@@@getdim{2}{#1}}

```

`\getstaticevenbounds` Even pages

```

\newcommand*{\getstaticevenbounds}{%
  \ifstar\@sgetstaticevenbounds\@getstaticevenbounds
}

```

`\@sgetstaticevenbounds` Starred version (specify by **IDL**):

```

\newcommand*{\@sgetstaticevenbounds}[1]{%
  \@staticframeid{#1}\@getstaticevenbounds{\ff@id}%
}

```

`\@getstaticevenbounds` Unstarred version (specify by **IDL**):
`\newcommand*{\@getstaticevenbounds}[1]{\@ff@getevendim{2}{#1}}`

`\getflowbounds` Next flow frames:
`\newcommand*{\getflowbounds}{%`
`\@ifstar\@sgetflowbounds\@getflowbounds`
`}`

`\@sgetflowbounds` Starred version (specify by **IDL**):
`\newcommand*{\@sgetflowbounds}[1]{%`
`\@flowframeid{#1}\@getflowbounds{\ff@id}%`
`}`

`\@getflowbounds` Unstarred version (specify by **IDL**):
`\newcommand*{\@getflowbounds}[1]{\@ff@getdim{1}{#1}}`

`\getflowevenbounds` Even pages:
`\newcommand*{\getflowevenbounds}{%`
`\@ifstar\@sgetflowevenbounds\@getflowevenbounds`
`}`

`\@sgetflowevenbounds` Starred version (specify by **IDL**):
`\newcommand*{\@sgetflowevenbounds}[1]{%`
`\@flowframeid{#1}\@getflowevenbounds{\ff@id}%`
`}`

`\@getflowevenbounds` Unstarred version (specify by **IDL**):
`\newcommand*{\@getflowevenbounds}[1]{\@ff@getevendim{1}{#1}}`

`\getdynamicbounds` Next dynamic frames:
`\newcommand*{\getdynamicbounds}{%`
`\@ifstar\@sgetdynamicbounds\@getdynamicbounds`
`}`

`\@sgetdynamicbounds` Starred version (specify by **IDL**):
`\newcommand*{\@sgetdynamicbounds}[1]{%`
`\@dynamicframeid{#1}\@getdynamicbounds{\ff@id}%`
`}`

`\@getdynamicbounds` Unstarred version (specify by **IDL**):
`\newcommand*{\@getdynamicbounds}[1]{\@ff@getdim{3}{#1}}`

`\getdynamicevenbounds` Even pages:
`\newcommand*{\getdynamicevenbounds}{%`
`\@ifstar\@sgetdynamicevenbounds\@getdynamicevenbounds`
`}`

`\@sgetdynamicevenbounds` Starred version (specify by **IDL**):

```
\newcommand*{\@sgetdynamicevenbounds}[1]{%
  \@dynamicframeid{#1}\@getdynamicevenbounds{\ff{id}}%
}
```

`\@getdynamicevenbounds` Unstarred version (specify by **IDN**):

```
\newcommand*{\@getdynamicevenbounds}[1]{\@ff@getevendim{3}{#1}}
```

1.6 Determining the relative location of one frame from another

The commands in this section set the following boolean variables:

```
\newif\ifFLFabove
\newif\ifFLFbelow
\newif\ifFLFleft
\newif\ifFLFrigh
```

These can then be used after one of the `\checkifframe<loc>` commands defined below. For example:

```
\checkifframeabove{static}{1}{flow}{1}
\ifFLFabove
  Static frame is above flow frame.
\else
  Static frame isn't above flow frame.
\fi
```

`\checkifframeabove` `\checkifframeabove{<type1>}{<id1>}{<type2>}{<id2>}`

Checks if the first frame is above the second frame where the first frame is of type `<type1>` with **IDN** given by `<id1>` and the second frame is of type `<type2>` with **IDN** given by `<id2>`. The starred version uses the **IDL** instead of the **IDN**. The first frame is not considered to be above the second frame if they overlap. This code checks the page number to determine whether to use `\oddcheckifframeabove` or `\evencheckifframeabove` so it should not be used in the first paragraph of the first **flow frame** on the page if the paragraph spans the page break.

```
\newcommand*{\checkifframeabove}{%
  \@ifstar\@scheckifframeabove\@checkifframeabove
}
```

Starred version:

```
\newcommand*{\@scheckifframeabove}[4]{%
  \ifodd\c@page
    \@soddcheckifframeabove{#1}{#2}{#3}{#4}%
  \else
    \@sevencheckifframeabove{#1}{#2}{#3}{#4}%
  \fi
}
```

Unstarred version:

```
\newcommand*{\@checkifframeabove}[4]{%
  \ifodd\c@page
    \@oddcheckifframeabove{#1}{#2}{#3}{#4}%
  \else
    \@evencheckifframeabove{#1}{#2}{#3}{#4}%
  \fi
}
```

`\oddcheckifframeabove` `\oddcheckifframeabove{<type1>}{<id1>}{<type2>}{<id2>}` Checks if the first frame is above the second frame where the first frame is of type *<type1>* with **IDN** given by *<id1>* and the second frame is of type *<type2>* with **IDN** given by *<id2>* for odd pages. The starred version uses the **IDL** instead of the **IDN**. The first frame is not considered to be above the second frame if they overlap.

```
\newcommand*{\@oddcheckifframeabove}{%
  \@ifstar\@soddcheckifframeabove\@oddcheckifframeabove
}
```

The starred version

```
\newcommand*{\@soddcheckifframeabove}[4]{%
  \@ifundefined{@sget#1bounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type ‘#1’}%
    {%
      Frame types may only be one of: static, dynamic or flow%
    }%
  }%
  {}%
  \csname @sget#1bounds\endcsname{#2}%
  \edef\@ff@check{\the\ffareay}%
  \@ifundefined{@sget#3bounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type ‘#3’}%
    {%
      Frame types may only be one of: static, dynamic or flow%
    }%
  }%
  {}%
  \csname @sget#3bounds\endcsname{#4}%
  \advance\ffareay by \ffareaheight\relax
  \expandafter\ifdim\@ff@check>\ffareay
    \FLFabove true
  \else
    \FLFabove false
  \fi
}
```

The unstarred version

```

\newcommand*{\@oddcheckifframeabove}[4]{%
  \@ifundefined{@get#1bounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type ‘#1’}%
    {%
      Frame types may only be one of: static, dynamic or
      flow%
    }%
  }%
}%
\csname @get#1bounds\endcsname{#2}%
\edef\@ff@check{\the\ffareay}%
\@ifundefined{@get#3bounds}%
{%
  \PackageError{flowfram}%
  {Unknown frame type ‘#3’}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
}%
\csname @get#3bounds\endcsname{#4}%
\advance\ffareay by \ffareaheight\relax
\expandafter\ifdim\@ff@check>\ffareay
  \FLFabove>true
\else
  \FLFabove=false
\fi
}

```

`\checkifframebelow` `\checkifframebelow{<type1>}{<id1>}{<type2>}{<id2>}` Checks if the first frame is below the second frame where the first frame is of type *<type1>* with **IDN** given by *<id1>* and the second frame is of type *<type2>* with **IDN** given by *<id2>*. The starred version uses the **IDL** instead of the **IDN**. The first frame is not considered to be below the second frame if they overlap. This code checks the page number to determine whether to use `\oddcheckifframebelow` or `\evencheckifframebelow` so it should not be used in the first paragraph of the first **flow frame** on the page if the paragraph spans the page break.

```

\newcommand*{\checkifframebelow}{%
  \@ifstar{\scheckifframebelow}\checkifframebelow
}

```

Starred version:

```

\newcommand*{\scheckifframebelow}[4]{%
  \ifodd\c@page
    \soddcheckifframebelow{#1}{#2}{#3}{#4}%
  \else

```

```

\@sevencheckifframebelow{#1}{#2}{#3}{#4}%
\fi
}

```

Unstarred version:

```

\newcommand*{\@checkifframebelow}[4]{%
\ifodd\c@page
\@oddcheckifframebelow{#1}{#2}{#3}{#4}%
\else
\@evencheckifframebelow{#1}{#2}{#3}{#4}%
\fi
}

```

`\oddcheckifframebelow` `\oddcheckifframebelow{<type1>}{<id1>}{<type2>}{<id2>}`

Checks if the first frame is below the second frame where the first frame is of type *<type1>* with **IDN** given by *<id1>* and the second frame is of type *<type2>* with **IDN** given by *<id2>* on odd pages. The starred version uses the **IDL** instead of the **IDN**. The first frame is not considered to be below the second frame if they overlap.

```

\newcommand*{\oddcheckifframebelow}{%
\@ifstar\@soddcheckifframebelow\@oddcheckifframebelow
}

```

The starred version

```

\newcommand*{\@soddcheckifframebelow}[4]{%
\@ifundefined{@sget#1bounds}%
{%
\PackageError{flowfram}%
{Unknown frame type ‘#1’}%
{%
Frame types may only be one of: static, dynamic or
flow%
}%
}%
{}%
\csname @sget#1bounds\endcsname{#2}%
\advance\ffareay by \ffareaheight\relax
\edef\@ff@check{\the\ffareay}%
\@ifundefined{@sget#3bounds}%
{%
\PackageError{flowfram}%
{Unknown frame type ‘#3’}%
{%
Frame types may only be one of: static, dynamic or
flow%
}%
}%
{}%
\csname @sget#3bounds\endcsname{#4}%

```



```

\expandafter\ifdim\@ff@check<\ffareay
\FLFbelowtrue
\else
\FLFbelowfalse
\fi
}

```

The unstarred version

```

\newcommand*{\@oddcheckifframebelow}[4]{%
\@ifundefined{@get#1bounds}%
{%
\PackageError{flowfram}%
{Unknown frame type '#1'}%
{%
Frame types may only be one of: static, dynamic or
flow%
}%
}%
}%
\csname @get#1bounds\endcsname{#2}%
\advance\ffareay by \ffareaheight\relax
\edef\@ff@check{\the\ffareay}%
\@ifundefined{@get#3bounds}%
{%
\PackageError{flowfram}%
{Unknown frame type '#3'}%
{%
Frame types may only be one of: static, dynamic or
flow%
}%
}%
}%
\csname @get#3bounds\endcsname{#4}%
\expandafter\ifdim\@ff@check<\ffareay
\FLFbelowtrue
\else
\FLFbelowfalse
\fi
}

```

`\checkifframeleft` `\checkifframeleft{<type1>}{<id1>}{<type2>}{<id2>}` Checks if the first frame is to the left of the second frame where the first frame is of type *<type1>* with **IDN** given by *<id1>* and the second frame is of type *<type2>* with **IDN** given by *<id2>*. The starred version uses the **IDL** instead of the **IDN**. The first frame is not considered to be to the left of the second frame if they overlap. This code checks the page number to determine whether to use `\oddcheckifframeleft` or `\evencheckifframeleft` so it should not be used in the first paragraph of the first **flow frame** on the page if the paragraph spans the page break.

```

\newcommand*{\checkifframeleft}{%

```

```

\@ifstar\@scheckifframeleft\@checkifframeleft
}

```

Starred version:

```

\newcommand*\@scheckifframeleft}[4]{%
\ifodd\c@page
\@soddcheckifframeleft{#1}{#2}{#3}{#4}%
\else
\@sevencheckifframeleft{#1}{#2}{#3}{#4}%
\fi
}

```

Unstarred version:

```

\newcommand*\@checkifframeleft}[4]{%
\ifodd\c@page
\@oddcheckifframeleft{#1}{#2}{#3}{#4}%
\else
\@evencheckifframeleft{#1}{#2}{#3}{#4}%
\fi
}

```

`\oddcheckifframeleft` `\oddcheckifframeleft{<type1>}{<id1>}{<type2>}{<id2>}`

Checks if the first frame is to the left of the second frame where the first frame is of type *<type1>* with **IDN** given by *<id1>* and the second frame is of type *<type2>* with **IDN** given by *<id2>* on odd pages. The starred version uses the **IDL** instead of the **IDN**. The first frame is not considered to be to the left of the second frame if they overlap.

```

\newcommand*\@oddcheckifframeleft{%
\@ifstar\@soddcheckifframeleft\@oddcheckifframeleft
}

```

The starred version

```

\newcommand*\@soddcheckifframeleft}[4]{%
\@ifundefined{@sget#1bounds}%
{%
\PackageError{flowfram}%
{Unknown frame type ‘#1’}%
{%
Frame types may only be one of: static, dynamic or
flow%
}%
}%
}%
\csname @sget#1bounds\endcsname{#2}%
\advance\ffareax by \ffareawidth\relax
\edef\@ff@check{\the\ffareax}%
\@ifundefined{@sget#3bounds}%
{%
\PackageError{flowfram}%
{Unknown frame type ‘#3’}%
}

```

```

    {%
      Frame types may only be one of: static, dynamic or
      flow%
    }%
  }%
  {}%
  \csname @sget#3bounds\endcsname{#4}%
  \expandafter\ifdim\@ff@check<\ffareax
    \FLFlefttrue
  \else
    \FLFleftfalse
  \fi
}

```

The unstarred version

```

\newcommand*{\@oddcheckifframeleft}[4]{%
  \@ifundefined{@get#1bounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type '#1'}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
  }%
  {}%
  \csname @get#1bounds\endcsname{#2}%
  \advance\ffareax by \ffareawidth\relax
  \edef\@ff@check{\the\ffareax}%
  \@ifundefined{@get#3bounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type '#3'}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
  }%
  {}%
  \csname @get#3bounds\endcsname{#4}%
  \expandafter\ifdim\@ff@check<\ffareax
    \FLFlefttrue
  \else
    \FLFleftfalse
  \fi
}

```

`\checkifframeright` `\checkifframeright{<type1>}{<id1>}{<type2>}{<id2>}` Checks if the first frame is to the right of the second frame where the first frame is of type *<type1>* with **IDN** given by *<id1>* and the second frame is of type *<type2>* with **IDN**

given by $\langle id2 \rangle$. The starred version uses the IDL instead of the IDN. The first frame is not considered to be to the right of the second frame if they overlap. This code checks the page number to determine whether to use `\oddcheckifframeright` or `\evencheckifframeright` so it should not be used in the first paragraph of the first flow frame on the page if the paragraph spans the page break.

```
\newcommand*\checkifframeright{%
  \@ifstar\@scheckifframeright\@checkifframeright
}
```

Starred version:

```
\newcommand*\@scheckifframeright[4]{%
  \ifodd\c@page
    \@soddcheckifframeright{#1}{#2}{#3}{#4}%
  \else
    \@sevencheckifframeright{#1}{#2}{#3}{#4}%
  \fi
}
```

Unstarred version:

```
\newcommand*\@checkifframeright[4]{%
  \ifodd\c@page
    \@oddcheckifframeright{#1}{#2}{#3}{#4}%
  \else
    \@evencheckifframeright{#1}{#2}{#3}{#4}%
  \fi
}
```

`\oddcheckifframeright` `\oddcheckifframeright{<type1>}{<id1>}{<type2>}{<id2>}`

Checks if the first frame is to the right of the second frame where the first frame is of type $\langle type1 \rangle$ with IDN given by $\langle id1 \rangle$ and the second frame is of type $\langle type2 \rangle$ with IDN given by $\langle id2 \rangle$ on odd pages. The starred version uses the IDL instead of the IDN. The first frame is not considered to be to the right of the second frame if they overlap.

```
\newcommand*\oddcheckifframeright{%
  \@ifstar\@soddcheckifframeright\@oddcheckifframeright
}
```

The starred version

```
\newcommand*\@soddcheckifframeright[4]{%
  \@ifundefined{@sget#1bounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type ‘#1’}%
    {%
      Frame types may only be one of: static, dynamic or
      flow%
    }%
  }%
}
```

```

{}%
\csname @sget#1bounds\endcsname{#2}%
\edef\@ff@check{\the\ffareax}%
\@ifundefined{@sget#3bounds}%
{%
  \PackageError{flowfram}%
  {Unknown frame type ‘#3’}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
}%
{}%
\csname @sget#3bounds\endcsname{#4}%
\advance\ffareax by \ffareawidth\relax
\expandafter\ifdim\@ff@check>\ffareax
  \FLFrightrue
\else
  \FLFrighfalse
\fi
}

```

The unstarred version

```

\newcommand*{\@oddcheckiframeright}[4]{%
  \@ifundefined{@get#1bounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type ‘#1’}%
    {%
      Frame types may only be one of: static, dynamic or
      flow%
    }%
  }%
}%
{}%
\csname @get#1bounds\endcsname{#2}%
\edef\@ff@check{\the\ffareax}%
\@ifundefined{@get#3bounds}%
{%
  \PackageError{flowfram}%
  {Unknown frame type ‘#3’}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
}%
{}%
\csname @get#3bounds\endcsname{#4}%
\advance\ffareax by \ffareawidth\relax
\expandafter\ifdim\@ff@check>\ffareax
  \FLFrightrue

```

```

\else
\FLFrightfalse
\fi
}

```

`\evencheckifframeabove` `\evencheckifframeabove{<type1>}{<id1>}{<type2>}{<id2>}` Checks if the first frame is above the second frame where the first frame is of type `<type1>` with **IDN** given by `<id1>` and the second frame is of type `<type2>` with **IDN** given by `<id2>` for even pages. The starred version uses the **IDL** instead of the **IDN**. The first frame is not considered to be above the second frame if they overlap.

```

\newcommand*{\evencheckifframeabove}{%
\@ifstar{\sevencheckifframeabove}\@evencheckifframeabove
}

```

The starred version

```

\newcommand*{\@sevencheckifframeabove}[4]{%
\@ifundefined{@sget#1evenbounds}%
{%
\PackageError{flowfram}%
{Unknown frame type ‘#1’}%
{%
Frame types may only be one of: static, dynamic or
flow%
}%
}%
}%
\csname @sget#1evenbounds\endcsname{#2}%
\edef\@ff@check{\the\ffareay}%
\@ifundefined{@sget#3evenbounds}%
{%
\PackageError{flowfram}%
{Unknown frame type ‘#3’}%
{%
Frame types may only be one of: static, dynamic or
flow%
}%
}%
}%
\csname @sget#3evenbounds\endcsname{#4}%
\advance\ffareay by \ffareaheight\relax
\expandafter\ifdim\@ff@check>\ffareay
\FLFabovetrue
\else
\FLFabovefalse
\fi
}

```

The unstarred version

```

\newcommand*{\@evencheckifframeabove}[4]{%
\@ifundefined{@get#1evenbounds}%

```

```

{%
  \PackageError{flowfram}%
  {Unknown frame type ‘#1’}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
}%
{}%
\csname @get#1evenbounds\endcsname{#2}%
\edef\@ff@check{\the\ffareay}%
\@ifundefined{@get#3evenbounds}%
{%
  \PackageError{flowfram}%
  {Unknown frame type ‘#3’}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
}%
{}%
\csname @get#3evenbounds\endcsname{#4}%
\advance\ffareay by \ffareaheight\relax
\expandafter\ifdim\@ff@check>\ffareay
  \FLFabove>true
\else
  \FLFabove=false
\fi
}

```

`\evencheckifframebelow` `\checkifframebelow{<type1>}{<id1>}{<type2>}{<id2>}` Checks if the first frame is below the second frame where the first frame is of type *<type1>* with IDN given by *<id1>* and the second frame is of type *<type2>* with IDN given by *<id2>*. The starred version uses the IDL instead of the IDN. The first frame is not considered to be below the second frame if they overlap.

```

\newcommand*{\evencheckifframebelow}{%
  \@ifstar{\sevencheckifframebelow}\evencheckifframebelow
}

```

The starred version

```

\newcommand*{\@sevencheckifframebelow}[4]{%
  \@ifundefined{@sget#1evenbounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type ‘#1’}%
    {%
      Frame types may only be one of: static, dynamic or
      flow%
    }%
  }%
}

```

```

}%
{}%
\csname @sget#1evenbounds\endcsname{#2}%
\advance\ffareay by \ffareaheight\relax
\edef\@ff@check{\the\ffareay}%
\@ifundefined{@sget#3evenbounds}%
{%
  \PackageError{flowfram}%
  {Unknown frame type '#3'}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
}%
{}%
\csname @sget#3evenbounds\endcsname{#4}%
\expandafter\ifdim\@ff@check<\ffareay
  \FLFbelowtrue
\else
  \FLFbelowfalse
\fi
}

```

The unstarred version

```

\newcommand*{\@evencheckifframebelow}[4]{%
  \@ifundefined{@get#1evenbounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type '#1'}%
    {%
      Frame types may only be one of: static, dynamic or
      flow%
    }%
  }{}%
  \csname @get#1evenbounds\endcsname{#2}%
  \advance\ffareay by \ffareaheight\relax
  \edef\@ff@check{\the\ffareay}%
  \@ifundefined{@get#3evenbounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type '#3'}%
    {%
      Frame types may only be one of: static, dynamic or
      flow%
    }%
  }%
  {}%
  \csname @get#3evenbounds\endcsname{#4}%
  \expandafter\ifdim\@ff@check<\ffareay
    \FLFbelowtrue
  \fi
}

```



```

\else
\FLFbelowfalse
\fi
}

```

`\evencheckifframeleft` `\evencheckifframeleft{<type1>}{<id1>}{<type2>}{<id2>}` Checks if the first frame is to the left of the second frame where the first frame is of type *<type1>* with IDN given by *<id1>* and the second frame is of type *<type2>* with IDN given by *<id2>*. The starred version uses the IDL instead of the IDN. The first frame is not considered to be to the left of the second frame if they overlap.

```

\newcommand*{\evencheckifframeleft}{%
\@ifstar\@sevencheckifframeleft\@evencheckifframeleft
}

```

The starred version

```

\newcommand*{\@sevencheckifframeleft}[4]{%
\@ifundefined{@sget#1evenbounds}%
{%
\PackageError{flowfram}%
{Unknown frame type ‘#1’}%
{%
Frame types may only be one of: static, dynamic or
flow%
}%
}%
}%
\csname @sget#1evenbounds\endcsname{#2}%
\advance\ffareax by \ffareawidth\relax
\edef\@ff@check{\the\ffareax}%
\@ifundefined{@sget#3evenbounds}%
{%
\PackageError{flowfram}%
{Unknown frame type ‘#3’}%
{%
Frame types may only be one of: static, dynamic or
flow%
}%
}%
}%
\csname @sget#3evenbounds\endcsname{#4}%
\expandafter\ifdim\@ff@check<\ffareax
\FLFlefttrue
\else
\FLFleftfalse
\fi
}

```

The unstarred version

```

\newcommand*{\@evencheckifframeleft}[4]{%
\@ifundefined{@get#1evenbounds}%

```

```

{%
  \PackageError{flowfram}%
  {Unknown frame type ‘#1’}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
}%
{}%
\csname @get#1evenbounds\endcsname{#2}%
\advance\ffareax by \ffareawidth\relax
\edef\@ff@check{\the\ffareax}%
\@ifundefined{@get#3evenbounds}%
{%
  \PackageError{flowfram}%
  {Unknown frame type ‘#3’}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
}%
{}%
\csname @get#3evenbounds\endcsname{#4}%
\expandafter\ifdim\@ff@check<\ffareax
  \FLFlefttrue
\else
  \FLFleftfalse
\fi
}

```

`\evencheckifframeright` `\evencheckifframeright{<type1>}{<id1>}{<type2>}{<id2>}` Checks if the first frame is to the right of the second frame where the first frame is of type *<type1>* with **IDN** given by *<id1>* and the second frame is of type *<type2>* with **IDN** given by *<id2>*. The starred version uses the **IDL** instead of the **IDN**. The first frame is not considered to be to the right of the second frame if they overlap.

```

\newcommand*{\evencheckifframeright}{%
  \@ifstar{\sevencheckifframeright}\@evencheckifframeright
}

```

The starred version

```

\newcommand*{\sevencheckifframeright}[4]{%
  \@ifundefined{@sget#1evenbounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type ‘#1’}%
    {%
      Frame types may only be one of: static, dynamic or
      flow%
    }%
  }%
}

```

```

}%
{}%
\csname @sget#1evenbounds\endcsname{#2}%
\edef\@ff@check{\the\ffareax}%
\@ifundefined{@sget#3evenbounds}%
{%
  \PackageError{flowfram}%
  {Unknown frame type ‘#3’}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
}%
{}%
\csname @sget#3evenbounds\endcsname{#4}%
\advance\ffareax by \ffareawidth\relax
\expandafter\ifdim\@ff@check>\ffareax
  \FLFrighttrue
\else
  \FLFrightfalse
\fi
}

```

The unstarred version

```

\newcommand*{\@evencheckifframeright}[4]{%
  \@ifundefined{@get#1evenbounds}%
  {%
    \PackageError{flowfram}%
    {Unknown frame type ‘#1’}%
    {%
      Frame types may only be one of: static, dynamic or
      flow%
    }%
  }%
}%
{}%
\csname @get#1evenbounds\endcsname{#2}%
\edef\@ff@check{\the\ffareax}%
\@ifundefined{@get#3evenbounds}%
{%
  \PackageError{flowfram}%
  {Unknown frame type ‘#3’}%
  {%
    Frame types may only be one of: static, dynamic or
    flow%
  }%
}%
{}%
\csname @get#3evenbounds\endcsname{#4}%
\advance\ffareax by \ffareawidth\relax
\expandafter\ifdim\@ff@check>\ffareax

```

```

\FLFrighttrue
\else
\FLFrightfalse
\fi
}

```

Textual labels used to indicate relative location of one frame to another.

```

\FFaboveleft
\newcommand*\FFaboveleft{above left}

\FFaboveright
\newcommand*\FFaboveright{above right}

\FFbelowleft
\newcommand*\FFbelowleft{below left}

\FFbelowright
\newcommand*\FFbelowright{below right}

\FFleft
\newcommand*\FFleft{on the left}

\FFbelowright
\newcommand*\FFright{on the right}

\FFabove
\newcommand*\FFabove{above}

\FFbelow
\newcommand*\FFbelow{below}

\FFoverlap
\newcommand*\FFoverlap{overlap}

```

`\relativeframelocation` `\relativeframelocation{<type1>}{<id1>}{<type2>}{<id2>}` Displays one of the above commands depending on the relative locations of the first frame to the second frame. The arguments `<id1>` and `<id2>` refer to the **IDN** for the unstarred version and to the **IDL** for the starred version.

```

\DeclareRobustCommand*\relativeframelocation{%
  \@ifstar\@srelativeframelocation\@relativeframelocation
}

```

Starred version:

```

\newcommand*\@srelativeframelocation[4]{%
  \@scheckifframeabove{#1}{#2}{#3}{#4}%
  \@scheckifframebelow{#1}{#2}{#3}{#4}%
  \@scheckifframeleft{#1}{#2}{#3}{#4}%
}

```

```

\@scheckifframeright{#1}{#2}{#3}{#4}%
\ifFLFabove
  \ifFLFleft
    \FFaboveleft
  \else
    \ifFLFright
      \FFaboveright
    \else
      \FFabove
    \fi
  \fi
\else
  \ifFLFbelow
    \ifFLFleft
      \FFbelowleft
    \else
      \ifFLFright
        \FFbelowright
      \else
        \FFbelow
      \fi
    \fi
  \else
    \ifFLFleft
      \FFleft
    \else
      \ifFLFright
        \FFright
      \else
        \FFoverlap
      \fi
    \fi
  \fi
\fi
}

```

Unstarred version:

```

\newcommand*{\@relativeframelocation}[4]{%
  \@checkifframeabove{#1}{#2}{#3}{#4}%
  \@checkifframebelow{#1}{#2}{#3}{#4}%
  \@checkifframeleft{#1}{#2}{#3}{#4}%
  \@checkifframeright{#1}{#2}{#3}{#4}%
  \ifFLFabove
    \ifFLFleft
      \FFaboveleft
    \else
      \ifFLFright
        \FFaboveright
      \else
        \FFabove
      \fi
    \fi
  \else
    \ifFLFbelow
      \ifFLFleft
        \FFbelowleft
      \else
        \ifFLFright
          \FFbelowright
        \else
          \FFbelow
        \fi
      \fi
    \else
      \ifFLFleft
        \FFleft
      \else
        \ifFLFright
          \FFright
        \else
          \FFoverlap
        \fi
      \fi
    \fi
  \fi
}

```

```

\fi
\fi
\else
\ifFLFbelow
\ifFLFleft
\FFbelowleft
\else
\ifFLFrigh
\FFbelowright
\else
\FFbelow
\fi
\fi
\else
\ifFLFleft
\FFleft
\else
\ifFLFrigh
\FFright
\else
\FFoverlap
\fi
\fi
\fi
\fi
}

```

Short cut commands for **frames** of the same type.

```

\reldynamicloc \reldynamicloc{<id1>}{<id2>}
\DeclareRobustCommand*\reldynamicloc{%
\@ifstar\@sreldynamicloc\@reldynamicloc
}

```

Starred version:

```

\newcommand*\@sreldynamicloc[2]{%
\@srelativeframelocation{dynamic}{#1}{dynamic}{#2}%
}

```

Unstarred version:

```

\newcommand*\@reldynamicloc[2]{%
\@relativeframelocation{dynamic}{#1}{dynamic}{#2}%
}

```

```

\relstaticloc \relstaticloc{<id1>}{<id2>}
\DeclareRobustCommand*\relstaticloc{%
\@ifstar\@srelstaticloc\@relstaticloc
}

```

Starred version:

```

\newcommand*\@srelstaticloc[2]{%

```

```

\@srelativeframelocation{static}{#1}{static}{#2}%
}

```

Unstarred version:

```

\newcommand*{\@relstaticloc}[2]{%
\@relativeframelocation{static}{#1}{static}{#2}%
}

```

```

\relflowloc \relflowloc{<id1>}{<id2>}
\DeclareRobustCommand*\relflowloc{%
\@ifstar\@srelflowloc\@relflowloc
}

```

Starred version:

```

\newcommand*{\@srelflowloc}[2]{%
\@srelativeframelocation{flow}{#1}{flow}{#2}%
}

```

Unstarred version:

```

\newcommand*{\@relflowloc}[2]{%
\@relativeframelocation{flow}{#1}{flow}{#2}%
}

```

1.7 Initialise Flow Frames

`\setinitialframe` Specify initial frame. This should be the first flow frame that is defined on the first page of the document. Having another **flow frame** as the initial frame is not a good idea, and may have unexpected results.

```

\newcommand*{\setinitialframe}[1]{%
\c@thisframe=#1%
\global\usedframebreaktrue
\global\setlength{\hsize}%
{%
\csname colwidth\romannumeral\c@thisframe\endcsname
}%
}

```

`\setframes` Set the initial frame.

```

\newif\if@setframes
\@setframesfalse
\newcommand*{\setframes}{%
\ifnum\c@thisframe=0\relax
\PackageWarning{flowfram}%
{Can't find a flow frame on page 1.
\MessageBreak
Attempting to find the first page with a flow frame%
}%
\@nxtcol=1\relax
\c@curpg=1\relax
\@g@tnextcol{\@nxtcol}%
}

```

Shipout pages without flow frames.

```

\advance\c@curpg by -1\relax
\whiledo{\c@curpg>0}%
{%
\advance\c@curpg by -1\relax
\setbox\@outputbox\vbox{\hbox to \textwidth{\@ff@do@allframes}}%
\@outputpage
}%
\c@thisframe=\@nxtcol
\fi
\@setcol{\c@thisframe}\relax
\@setfr@mesttrue
\edef\ff@txtcol{%
\csname @ff@txtcol@\romannumeral\c@thisframe\endcsname}%
\@s@tffttextcol
}

```

`\emulatetwocolumn` Emulate original `\twocolumn` declaration. This is provided for backward compatibility, and may be removed in later versions.

```

\newcommand{\emulatetwocolumn}[1][]{%
\finishthispage
\setallflowframes{pages=none}%
\settoheight{\@ff@staticH}{#1}%
\settodepth{\@ff@tmp@y}{#1}%
\addtolength{\@ff@staticH}{\@ff@tmp@y}%
\ifdim\@ff@staticH>0pt\relax
\twocolumnStop[\@ff@pages@countreg]{\@ff@staticH}%
\c@thisframe=\c@maxflow
\advance\c@thisframe by -1\relax
\@twocolumn[>\@ff@pages@countreg]%
\setstaticcontents{\c@maxstatic}{#1}%
\else
\@twocolumn
\c@thisframe=\c@maxflow
\advance\c@thisframe by -1\relax
\fi
\@setcol{\c@thisframe}%
\relax
}

```

`\emulateonecolumn` Emulate original `\onecolumn` declaration. This is provided for backward compatibility, and may be removed in later versions.

```

\newcommand{\emulateonecolumn}[1][]{%
\finishthispage
\setallflowframes{pages=none}%
\settoheight{\@ff@staticH}{#1}%
\settodepth{\@ff@tmp@y}{#1}%
\addtolength{\@ff@staticH}{\@ff@tmp@y}%
\ifdim\@ff@staticH>0pt\relax

```



```

\onecolumnStop[\@ff@pages@countreg]{\@ff@staticH}%
\c@thisframe=\c@maxflow
\advance\c@thisframe by -1\relax
\@onecolumn[>\@ff@pages@countreg]%
\setstaticcontents{\c@maxstatic}{#1}%
\else
\@twocolumn
\c@thisframe=\c@maxflow
\advance\c@thisframe by -1\relax
\fi
\@setcol{\c@thisframe}%
\relax
}

```

If no flow frames have been defined, create one big one the size of the **type-block**, and initialise the frames.

```

\AtBeginDocument{%
\c@absolutepage=1\relax
\ifnum\c@maxflow=0\relax
\PackageWarning{flowfram}{No flow frames, adding one}%
\@onecolumn
\fi
\setframes
\renewcommand{\onecolumn}[1][]{%
\PackageWarning{flowfram}%
{%
Ignoring \string\onecolumn\space found in document environment.
Frames must be defined in the preamble%
}%
#1%
}%
\renewcommand{\twocolumn}[1][]{%
\PackageWarning{flowfram}%
{%
Ignoring \string\twocolumn\space found in document environment.
Frames must be defined in the preamble%
#1%
}%
}
}

```

1.8 Output Routine

`\fftolerance` The flowfram package does a check to see if text has flowed between frames of different widths, which will cause a discrepancy in the line widths of the paragraph spanning the break. Before version 1.14, the output routine just checked if the widths were different, but this means that warning messages will be generated even if there's only a tiny difference that can be caused by rounding errors (for example, if the frames were created using `jpgfdraw`). So add a tolerance

and only complain if the difference exceeds this value.

```
\newlength\fftolerance
\setlength\fftolerance{2pt}
```

`\@setcol` Set up the output box so it has the correct dimensions for specified **flow frame**. This is used by the output routine.

```
\newcommand{\@setcol}[1]{%
\ifnum\c@maxflow<#1\relax
\PackageError{flowfram}%
{Can't set frame '\number#1', doesn't exist}{}%
\else
\flf@message{Switching to flow frame \number#1\space on page
\number\@ff@pages@countreg}%
\expandafter\global\expandafter\columnwidth
\csname colwidth\romannumeral#1\endcsname
\dimen@\columnwidth
\advance\dimen@ by -\hsize\relax
\ifdim\dimen@<0pt\relax
\dimen@=-\dimen@
\fi
\ifdim\dimen@>\fftolerance
\ifusedframebreak
\else
\PackageWarning{flowfram}%
{Moving to flow frame of unequal
width,\MessageBreak use of \string\framebreak\space advised,
or text might not appear correctly (difference =
\the\dimen@, tolerance = \the\fftolerance)}%
\fi
\fi
\global\usedframebreakfalse
\global\hsize\columnwidth
\expandafter\global
\expandafter\vsizes\csname colheight\romannumeral#1\endcsname
\global\@colht\vsizes
\global\@colroom\@colht
```

We may be inside an environment that has modified the line width, such as one of the list environments so we can't just set `\linewidth` to `\columnwidth`. Only modify `\linewidth` if it's larger than the new column width.

```
\ifnum\linewidth>\columnwidth
\global\linewidth\columnwidth
\fi

%\global\textwidth\columnwidth
\setmargin
\fi
\stepcounter{displayedframe}%
}
```

Modify the output routine so that it uses `\vsize` instead of `\textheight`.

```
\output={%
  \let\par\@par
  \ifnum\outputpenalty <-\@M
    \@specialoutput
  \else
    \@makecol
    \@opcol \@startcolumn
    \@whilesw \if@fcolmade \fi {\@opcol \@startcolumn }%
  \fi
  \ifnum\outputpenalty>-\@Miv
    \ifdim\@colroom<1.5\baselineskip
      \ifdim\@colroom<\vsize
        \@latex@warning@no@line{Text page \thepage \space
          contains only floats}%
        \@emptycol
      \else
        \global\vsize\@colroom
      \fi
    \else
      \global\vsize\@colroom
    \fi
  \else
    \global\vsize\maxdimen
  \fi
}
```

`\@doclearpage` Modify `\@doclearpage`, again replace `\textheight` with `\vsize`, and only use the twocolumn stuff.

```
\def\@doclearpage{%
  \ifvoid\footins
    \setbox\@tempboxa\vsplit\@cclv to\z@
    \unvbox\@tempboxa
    \setbox\@tempboxa\box\@cclv
    \xdef\@deferlist{\@toplist\@botlist\@deferlist}%
    \global\let\@toplist\@empty
    \global\let\@botlist\@empty
    \global\@colroom\@colht
    \ifx\@currlist\@empty
    \else
      \@latexerr{Float(s) lost}\@ehb
      \global\let\@currlist\@empty
    \fi
    \@makefcolumn\@deferlist
    \@whilesw \if@fcolmade \fi
  {%
    \@opcol
    \@makefcolumn\@deferlist
  }%
}
```

```

\if@firstcolumn
\xdef\@dbldeferlist{\@dbltoplist\@dbldeferlist}%
\global\let\@dbltoplist\@empty
\global\@colht\vsiz
\begingroup
\@dblfloatplacement
\@makefcolumn\@dbldeferlist
\@whilesw \if@fcolmade \fi
{%
\@outputpage
\@makefcolumn\@dbldeferlist
}%
\endgroup
\else
\vbox{}%
\clearpage
\fi
\else
\setbox\@cclv\vbox{\box\@cclv\vfil}%
\@makecol\@opcol
\clearpage
\fi
}

```

Modify \@outputpage slightly. Add provision for turning headers and footers into **dynamic frames**.

\@dothehead First define macro to do the header. This will be modified if it is turned into a **dynamic frame**.

```

\newcommand{\@dothehead}{%
\vbox to \headheight
{%
\color@hbox\normalcolor\hbox to \textwidth{\@thehead}%
\color@endbox
}%
}

```

\@dotheft Same again for the footer.

```

\newcommand{\@dotheft}{%
\color@hbox\normalcolor\hbox to \textwidth{\@theft}%
\color@endbox
}
\newcommand{\@dodynamicthehead}{}
\newcommand{\@dodynamictheft}{}

```

\@outputpage Now for the modified version of \@outputpage. The page style stuff has been moved to \@outputdblcol so that the headers and footers can be set in **dynamic frames** before the **dynamic frames** are put on the page.

```

\def\@outputpage{%
  \begingroup
    \let\protect\noexpand
    \@resetactivechars
    \global\let\@@if@newlist@if@newlist
    \global\@newlistfalse\@parboxrestore
    \shipout\vbox
    {%
      \set@typeset@protect
      \aftergroup
      \endgroup
      \aftergroup
      \set@typeset@protect
      \reset@font\normalsize\normalsfcodes
      \let\label\@gobble
      \let\index\@gobble
      \let\glossary\@gobble
      \baselineskip\z@skip
      \lineskip\z@skip
      \lineskiplimit\z@
      \vskip\topmargin\moveright\@themargin
      \vbox
      {%
        \vskip\headheight
        \vskip\headsep
        \box\@outputbox
      }%
    }%
  \global\let@if@newlist\@@if@newlist
  \stepcounter{page}%
}

```

Also increment absolute page counter.

```

\stepcounter{absolute page}%
\setcounter{displayed frame}{0}%
\let\firstmark\botmark

```

}

`\makedfheaderfooter` Make the headers and footers be in **dynamic frames**. There will initially be no difference in appearance until the settings are changed using `\setdynamicframe`. The header frame is given the **IDL** header, and the footer is given the **IDL** footer.

```

\newcommand*\makedfheaderfooter{%

```

create dynamic frames at the standard location

```

\setlength{\@ff@tmp@y}{\textheight}%
\addtolength{\@ff@tmp@y}{\headsep}%
\newdynamicframe{\textwidth}{\headheight}{0pt}{\@ff@tmp@y}[header]%
\newdynamicframe{\textwidth}{\headheight}{0pt}{-\footskip}[footer]%
\renewcommand{\@dothehead}{}%
\renewcommand{\@dothefoot}{}%

```

```

\renewcommand{\@dodynamicthehead}{%
  \@dynamicframeid{header}%
  \expandafter
    \def\csname @dynamicframe@\romannumeral\ff@id\endcsname{%
      \vfill\@thehead\vfill
    }%
}%
\renewcommand{\@dodynamicthefoot}{%
  \@dynamicframeid{footer}%
  \expandafter
    \def\csname @dynamicframe@\romannumeral\ff@id\endcsname{%
      \vfill\@thefoot\vfill
    }%
}%
}

```

This should only be done in the preamble.

```
\@onlypreamble{\makedfheaderfooter}
```

`\footnotecolor` Set footnotes in `\footnotecolor` rather than `\normalcolor` This ensures that the footnotes appear in the same colour as the text colour for the **flow frame** to which they belong.

```

\newcommand{\footnotecolor}{%
  \ifundefined{@ff@txtcol@\romannumeral\c@thisframe}%
  {%
    \normalcolor
  }%
  {%
    \edef\ff@txtcol{%
      \csname @ff@txtcol@\romannumeral\c@thisframe\endcsname
    }%
    \s@tfftextcol
  }%
}

```

`\@makecol` Modify `\@makecol` so that the footnotes, and the footnote rule are in the colour for that frame.

```

\renewcommand{\@makecol}{%
  \ifvoid\footins
    \setbox\@outputbox\box\@cc1v
  \else
    \setbox\@outputbox\vbox
    {%
      \boxmaxdepth\@maxdepth\@tempdima\dp\@cc1v
      \unvbox\@cc1v
      \vskip\skip\footins
      \color@begingroup
        \footnotecolor
        \footnoterule
      \endgroup
    }
  }

```

```

        \unvbox\footins
      \color@endgroup
    }%
  \fi
  \xdef\@freelist{\@freelist\@midlist}%
  \global\let\@midlist\@empty
  \@combinefloats
  \ifvbox\@kludgeins
    \@makespecialcolbox
  \else
    \setbox\@outputbox\vbox to\@colht{%
      \@texttop\dimen@\dp\@outputbox
      \unvbox \@outputbox
      \vskip -\dimen@\@textbottom
    }%
  \fi
  \global\maxdepth\@maxdepth
}

```

\@opcol Modify \@opcol, as \if@twocolumn is now irrelevant.

```

\def\@opcol{%
  \@outputdblcol
  \global\@mparbottom\z@
  \global\@textfloatsheight\z@
  \@floatplacement
}

```

\@ff@checkifmoreframes Check to see if there are more **flow frames** defined, and set \if@ff@moreframes as appropriate. This involves iterating through all **flow frames**, and through each frame's **page list**.

```

\newif\if@ff@moreframes
\newcommand*{\@ff@checkifmoreframes}{%
  \@ff@moreframesfalse
  \@colN=\c@thisframe
  \whiledo{\@colN<\c@maxflow}%
  {%
    \advance\@colN by 1\relax

```

Skip if this page is in this frame's exclusion list.

```

    \edef\ff@xpages{\csname @ff@xpages@\romannumeral\@colN\endcsname}%
    \@for\@ff@pp:=\ff@xpages\do
    {%
      \ifnum0\@ff@pp=\@ff@pages@countreg\relax
      \endfortrue
    }%
  \fi
  \if@endfor

```

If for loop was terminated prematurely, then this page is in this frame's exclusion list.

```

\else
\edef\ff@pages{\csname @ff@pages@\romannumeral\@colN\endcsname}%
\@ff@checkpages{\ff@pages}%

```

If found a frame, break out of loop.

```

\if@ff@moreframes
\@colN=\c@maxflow\relax
\fi
\fi
}%
\if@ff@moreframes
\else

```

```

\@ff@tmpN=\@ff@pages@countreg

```

Look ahead up to a maximum of 4 pages.

```

\count@=0\relax
\loop
\advance\@ff@tmpN by 1\relax
\@colN=0\relax
\whiledo{\@colN<\c@maxflow}%
{%
\advance\@colN by 1\relax

```

Skip if page is in this frame's exclusion list.

```

\edef\ff@xpages{\csname @ff@xpages@\romannumeral\@colN\endcsname}%
\@for\@ff@pp:=\ff@xpages\do
{%
\ifnum0\@ff@pp=\@ff@tmpN\relax
\endfortrue
\fi
}%
\if@endfor

```

If for loop was terminated prematurely, then page is in this frame's exclusion list.

```

\else
\edef\ff@pages{\csname @ff@pages@\romannumeral\@colN\endcsname}%
\@ff@checkpages[\@ff@tmpN]{\ff@pages}%

```

If found a frame, break out of loop.

```

\if@ff@moreframes
\@colN=\c@maxflow\relax
\fi
\fi
}%
\if@ff@moreframes
\count@=4\relax
\else
\advance\count@ by 1\relax
\fi

```



```

        \ifnum\count@<4
        \repeat
    \fi
}

\@ff@checkpages Check to see if the current page lies in the page list given by #1.
    \newcommand*{\@ff@checkpages}[2][\@ff@pages@countreg]{%
        \@for\@ff@pp:=#2\do{%
            \@ff@checkthispage{#1}{\@ff@pp}%
        }%
    }

\@ff@checkthispage Check to see if the current page lies in the page range given by #1. If the page
range is specified by all, odd or even then there are definitely more frames
available, otherwise check to see if the current page lies within the number
range. If the page range is none, ignore it.
    \newcommand*{\@ff@checkthispage}[2]{%
        \ifthenelse{equal{#2}{all}\or equal{#2}{even}\or equal{#2}{odd}}{%
            \%
            \@ff@moreframestrue
        }%
        {%
            \ifthenelse{equal{#2}{none}}{%
                {}%
            }%
            {\@ff@checknumrange{#1}{#2}%
            }%
        }%
    }

\@ff@checknumrange The number range could be a single number, a closed range (e.g. 2-6) or an
open range (e.g. <4 or >10). Use \@ff@getrange to find the start and end
ranges. For open ended ranges assume a maximum value of 10000. If the cur-
rent page is less than or equal to the maximum, there are still more flow frames
available.
    \newcommand*{\@ff@checknumrange}[2]{%
        \def\@ff@numstart{0}%
        \def\@ff@numend{100000}%
        \@ff@getrange{#2}%
        \ifnum\@ff@numend>#1\relax
            \@ff@moreframestrue
        \else
            \ifnum\@ff@numend=#1\relax
                \@ff@moreframestrue
            \fi
        \fi
    }

```

Work out the minimum and maximum values of a number range which could either be a single number, a closed number range or an open number range. If the first character is < or > then it is an open range, otherwise it is a closed range or a single number. Define a counter to use whilst determining the range.

```
\newcount\c@ffrangenum
```

`\@ff@getrange` Now to find out what kind of range it is. If it is a single number, e.g. 24, then it will do, e.g. `\@ff@@getrange24-\relax`. If it is a closed range, e.g. 30-40, it will do, e.g. `\@ff@@getrange30-40-\relax`. If it is an open range, e.g. >25, it will do, e.g. `\@ff@@getrange>25-\relax`.

```
\newcommand*{\@ff@getrange}[1]{%
  \expandafter\@ff@@getrange#1-\relax\end{
}
```

`\@ff@@getrange` The ranges can now be picked out. If the first character is a < or > it is an open ended range, otherwise it is either a single value, or a close ended range.

```
\def\@ff@@getrange#1#2\end{%
  \ifx#1<\relax
    \@ff@getrangeless#1#2\end
  \else
    \ifx#1>\relax
      \@ff@getrangegreater#1#2\end
    \else
      \@ff@getrange#1#2\end
    \fi
  \fi
}
```

`\@ff@getrangeless` Get the values for an open ended range with an upper bound. A minimum value of 0 is assumed.

```
\def\@ff@getrangeless<#1-\relax\end{%
  \c@ffrangenum=#1\relax
  \advance\c@ffrangenum by -1\relax
  \def\@ff@numstart{0}%
  \edef\@ff@numend{\number\c@ffrangenum}%
}
```

`\@ff@getrangegreater` Get the values for an open ended range with a lower bound. A maximum value of 100000 is assumed.

```
\def\@ff@getrangegreater>#1-\relax\end{%
  \c@ffrangenum=#1\relax
  \advance\c@ffrangenum by 1\relax
  \edef\@ff@numstart{\number\c@ffrangenum}%
  \def\@ff@numend{100000}%
}
```

`\@ff@getrange` Determine whether we have a single number or a closed range. If #2 is `\relax`, it is a single value, otherwise it is a range.

```

\def\@@ff@getrange#1-#2\end{%
  \ifx\relax#2\relax
    \def\@ff@numstart{#1}%
    \def\@ff@numend{#1}%
  \else
    \def\@ff@numstart{#1}%
    \@@@ff@getrange#2\end
  \fi
}

\@@@ff@getrange Extract the end value from the closed range.
\def\@@@ff@getrange#1-\relax\end{%
  \def\@ff@numend{#1}%
}

\@ff@output@adjustframes Provide a hook to adjust frame settings in the output routine.
\newcommand*{\@ff@output@adjustframes}{%

\flowswitchonnext Switch on the listed flow frames from the next page onwards
\newcommand*{\flowswitchonnext}{%
  \ifstar\@sflowswitchonnext\@flowswitchonnext
}

\@sflowswitchonnext The starred version uses IDLs.
\newcommand{\@sflowswitchonnext}[1]{%
  \@for\@ff@id:=#1\do{%
    \@flowframeid{\@ff@id}%

Is this frame already on?
    \@ff@chckifthispg{\@ff@pages@countreg}{\@ff@id}%
    \expandafter\toks@ \expandafter{\@ff@output@adjustframes}%
    \if@notthiscol
      \xdef\@ff@output@adjustframes{%
        \the\toks@
        \noexpand\flowsetpagelist{\number\@ff@id}{>\number\@ff@pages@countreg}%
      }%
    \else
      \xdef\@ff@output@adjustframes{%
        \the\toks@
        \noexpand\flowsetpagelist{\number\@ff@id}%
        {\number\@ff@pages@countreg,>\number\@ff@pages@countreg}%
      }%
    \fi
  }%
}

\@flowswitchonnext The unstarred version uses IDNs.
\newcommand{\@flowswitchonnext}[1]{%
  \@for\@ff@id:=#1\do{%

```

Is this frame already on?

```
\@ff@chckifthispg{\@ff@pages@countreg}{\@ff@id}%
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\if@notthiscol
  \xdef\@ff@output@adjustframes{%
    \the\toks@
    \noexpand\flowsetpagelist{\number\@ff@id}{>\number\@ff@pages@countreg}%
  }%
\else
  \xdef\@ff@output@adjustframes{%
    \the\toks@
    \noexpand\flowsetpagelist{\number\@ff@id}%
    {\number\@ff@pages@countreg,>\number\@ff@pages@countreg}%
  }%
\fi
}%
}
```

\flowswitchonnextodd Switch on the listed flow frames from the next odd page onwards

```
\newcommand*{\flowswitchonnextodd}{%
  \@ifstar\@sflowswitchonnextodd\@flowswitchonnextodd
}
```

\@sflowswitchonnextodd The starred version uses **IDLs**.

```
\newcommand{\@sflowswitchonnextodd}[1]{%
  \count@=\@ff@pages@countreg\relax
  \ifodd\count@\relax
    \advance\count@ by 1\relax
  \fi
  \@for\@ff@id:=#1\do{%
    \@flowframeid{\@ff@id}%
  }
```

Is this frame already on?

```
\@ff@chckifthispg{\@ff@pages@countreg}{\@ff@id}%
\def\@ff@prepages{}%
\if@notthiscol
\else
  \def\@ff@prepages{\number\@ff@pages@countreg,}%
\fi
```

Is this frame already switched on for the next page?

```
\@ff@chckifthispg{\count@}{\@ff@id}%
\ifnum\count@=\@ff@pages@countreg\relax
\else
  \if@notthiscol
  \else
    \edef\@ff@prepages{\@ff@prepages\number\count@,}%
  \fi
\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
}
```

```

\edef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\flowsetpagelist{\number\ff@id}%
  {\@ff@prepages>\number\count@}%
}%
}%
}

```

`\@flowswitchonnextodd` The unstarred version uses **IDNs**.

```

\newcommand{\@flowswitchonnextodd}[1]{%
  \count@=\@ff@pages@countreg\relax
  \ifodd\count@\relax
    \advance\count@ by 1\relax
  \fi
  \@for\@ff@id:=#1\do{%

```

Is this frame already on?

```

\@ff@chckifthispg{\@ff@pages@countreg}{\@ff@id}%
\def\@ff@prepages{}%
\if@notthiscol
\else
  \def\@ff@prepages{\number\@ff@pages@countreg,}%
\fi

```

Is this frame already switched on for the next page?

```

\@ff@chckifthispg{\count@}{\@ff@id}%
\ifnum\count@=\@ff@pages@countreg\relax
\else
  \if@notthiscol
  \else
    \edef\@ff@prepages{\@ff@prepages\number\count@,}%
  \fi
\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\edef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\flowsetpagelist{\number\@ff@id}%
  {\@ff@prepages>\number\count@}%
}%
}%
}

```

`\flowswitchoffnext` Switch off the listed flow frames from the next page onwards

```

\newcommand*\@flowswitchoffnext{%
  \@ifstar\@sflowswitchoffnext\@flowswitchoffnext
}

```

`\@sflowswitchoffnext` The starred version uses **IDLs**.

```

\newcommand{\@sflowswitchoffnext}[1]{%
  \@for\@ff@id:=#1\do{%

```

```
\@flowframeid{\@ff@id}%
```

Is this frame already off on this page?

```
\@ff@chckifthispg{\@ff@pages@countreg}{\ff@id}%
\if@notthiscol
  \def\@ff@pages{none}%
\else
  \def\@ff@pages{\number\@ff@pages@countreg}%
\fi
\expandafter\toks@expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\flowsetpagelist{\number\ff@id}{\@ff@pages}%
}%
}%
}
```

`\@flowswitchoffnext` The unstarred version uses **IDNs**.

```
\newcommand{\@flowswitchoffnext}[1]{%
  \@for\@ff@id:=#1\do{%
```

Is this frame already off on this page?

```
\@ff@chckifthispg{\@ff@pages@countreg}{\@ff@id}%
\if@notthiscol
  \def\@ff@pages{none}%
\else
  \def\@ff@pages{\number\@ff@pages@countreg}%
\fi
\expandafter\toks@expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\flowsetpagelist{\number\@ff@id}{\@ff@pages}%
}%
}%
}
```

`\flowswitchoffnextodd` Switch off the listed flow frames from the next odd page onwards

```
\newcommand*{\flowswitchoffnextodd}{%
  \@ifstar\@sflowswitchoffnextodd\@flowswitchoffnextodd
}
```

`\@sflowswitchoffnextodd` The starred version uses **IDLs**.

```
\newcommand{\@sflowswitchoffnextodd}[1]{%
  \count@=\@ff@pages@countreg\relax
  \ifodd\@ff@pages@countreg\relax
    \advance\count@ by 1\relax
  \fi
  \@for\@ff@id:=#1\do{%
    \@flowframeid{\@ff@id}%
```

Is this frame already off on this page?

```
\@ff@chckifthispg{\@ff@pages@countreg}{\ff@id}%  
\if@notthiscol
```

It's off on this page. Is it on or off on the next page, if this page is odd? First, is this page odd?

```
\ifnum\@ff@pages@countreg=\count@\relax
```

This page is even and the frame is off on this page, so set to none.

```
\def\@ff@nextpages{none}%  
\else
```

This page is odd. Is the frame on or off on the next page?

```
\@ff@chckifthispg{\count@}{\ff@id}%  
\if@notthiscol
```

Off on the next page as well, so set to none.

```
\def\@ff@nextpages{none}%  
\else
```

Not off on the next page, so set to next page only.

```
\def\@ff@nextpages{\number\count@}%  
\fi  
\fi  
\else
```

It's not off on this page. Is it on or off on the next page, if this page is odd? First, is this page odd?

```
\ifnum\@ff@pages@countreg=\count@\relax
```

This page is even and the frame is not off on this page, so set to this page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg}%  
\else
```

This page is odd. Is the frame on or off on the next page?

```
\@ff@chckifthispg{\count@}{\ff@id}%  
\if@notthiscol
```

Off on the next page but not off on this page. So set to just this page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg}%  
\else
```

Not off on the next page as well, so set to this page and next page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg,\number\count@}%  
\fi  
\fi  
\fi  
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%  
\xdef\@ff@output@adjustframes{%  
  \the\toks@  
  \noexpand\flowsetpagelist{\number\ff@id}{\@ff@nextpages}%  
}%
```

```
}%
}
```

`\@flowswitchhoffnextodd` The unstarred version uses **IDNs**.

```
\newcommand{\@flowswitchhoffnextodd}[1]{%
\count@=\@ff@pages@countreg\relax
\ifodd\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\fi
\@for\@ff@id:=#1\do{%
```

Is this frame already off on this page?

```
\@ff@chckifthispg{\@ff@pages@countreg}{\@ff@id}%
\if@notthiscol
```

It's off on this page. Is it on or off on the next page, if this page is odd? First, is this page odd?

```
\ifnum\@ff@pages@countreg=\count@\relax
```

This page is even and the frame is off on this page, so set to none.

```
\def\@ff@nextpages{none}%
\else
```

This page is odd. Is the frame on or off on the next page?

```
\@ff@chckifthispg{\count@}{\@ff@id}%
\if@notthiscol
```

Off on the next page as well, so set to none.

```
\def\@ff@nextpages{none}%
\else
```

Not off on the next page, so set to next page only.

```
\def\@ff@nextpages{\number\count@}%
\fi
\fi
\else
```

It's not off on this page. Is it on or off on the next page, if this page is odd? First, is this page odd?

```
\ifnum\@ff@pages@countreg=\count@\relax
```

This page is even and the frame is not off on this page, so set to this page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg}%
\else
```

This page is odd. Is the frame on or off on the next page?

```
\@ff@chckifthispg{\count@}{\@ff@id}%
\if@notthiscol
```

Off on the next page but not off on this page. So set to just this page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg}%
\else
```


Not off on the next page as well, so set to this page and next page.

```

        \def\@ff@nextpages{\number\@ff@pages@countreg,\number\count@}%
        \fi
        \fi

        \fi
        \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
        \xdef\@ff@output@adjustframes{%
            \the\toks@
            \noexpand\flowsetpagelist{\number\@ff@id}{\@ff@nextpages}%
        }%
    }%
}

```

`\flowswitchonnexonly` Switch on the listed flow frames for just the next page

```

\newcommand*{\flowswitchonnexonly}{%
    \@ifstar\@sflowswitchonnexonly\@flowswitchonnexonly
}

```

`\@sflowswitchonnexonly` The starred version uses **IDLs**.

```

\newcommand{\@sflowswitchonnexonly}[1]{%
    \count@=\@ff@pages@countreg\relax
    \advance\count@ by 1\relax
    \@for\@ff@id:=#1\do{%
        \@flowframeid{\@ff@id}%
    }
}

```

Is this frame already on?

```

\@ff@chckifthispg{\@ff@pages@countreg}{\@ff@id}%
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\if@notthiscol

```

Not, it isn't, so just set to the next page:

```

        \xdef\@ff@output@adjustframes{%
            \the\toks@
            \noexpand\flowsetpagelist{\number\@ff@id}{\number\count@}%
        }%
    \else

```

Yes, it is, so set to this page and the next page:

```

        \xdef\@ff@output@adjustframes{%
            \the\toks@
            \noexpand\flowsetpagelist{\number\@ff@id}%
            {\number\@ff@pages@countreg,\number\count@}%
        }%
    \fi
    }%
}

```

`\@flowswitchonnexonly` The unstarred version uses **IDNs**.

```

\newcommand{\@flowswitchonnexonly}[1]{%

```

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@for\@ff@id:=#1\do{%

```

Is this frame already on?

```

\@ff@chckifthispg{\@ff@pages@countreg}{\@ff@id}%
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\if@notthiscol

```

Not, it isn't, so just set to the next page:

```

\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\flowsetpagelist{\number\@ff@id}{\number\count@}%
}%
\else

```

Yes, it is, so set to this page and the next page:

```

\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\flowsetpagelist{\number\@ff@id}%
  {\number\@ff@pages@countreg,\number\count@}%
}%
\fi
}%
}

```

flowswitchonnextoddonly Switch on the listed flow frames for just the next odd page

```

\newcommand*{\flowswitchonnextoddonly}{%
  \@ifstar\@sflowswitchonnextoddonly\@flowswitchonnextoddonly
}

```

flowswitchonnextoddonly The starred version uses **IDLs**.

```

\newcommand{\@sflowswitchonnextoddonly}[1]{%
  \@for\@ff@id:=#1\do{%
    \@flowframeid{\@ff@id}%
  }
}

```

Is this frame already on?

```

\@ff@chckifthispg{\@ff@pages@countreg}{\@ff@id}%
\if@notthiscol

```

No, it isn't. If this is an odd page, is it on or off on the next page? First, is this an odd page?

```

\ifodd\@ff@pages@countreg

```

Yes, it's odd. So this frame isn't on this page, but is it on or off on the next page?

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@ff@chckifthispg{\count@}{\@ff@id}%
\if@notthiscol

```

It's not switched on either on this (odd) page or the next (even) page. So the page list should be just the next odd page after this one.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\else
```

It's not switched on for this (odd) page but it is for the next (even) page. So the page list should be the next even and odd pages after this page.

```
\edef\@ff@pages{\number\count@}%
\advance\count@ by 1\relax
\edef\@ff@pages{\@ff@pages,\number\count@}%
\fi
\else
```

No, it's even. So it's not on this (even) page, but needs to be on for the following (odd) page.

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\fi
\else
```

Frame is on this page. If this is an odd page, is it on or off on the next page? First, is this an odd page?

```
\ifodd\@ff@pages@countreg
```

Yes, it's odd. Is the frame on or off for the next (even) page?

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@ff@chckifthispg{\count@}{\ff@id}%
\if@notthiscol
```

Frame is off. So the frame is switched on for this (odd) page but is off for the next (even) page. So the page list needs to be this (odd) page and the following odd page, skipping the even page in between.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\else
```

Frame is on. So the frame is switched on for this (odd) page and the next (even) page. So the page list needs to be this (odd) page, the next even page and the following odd page.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg-\number\count@}%
\fi
\else
```

Frame is switched on for this page and this page is even. So the page list needs to be this (even) page and the next (odd) page.

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
```

```

\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\fi
\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
\the\toks@
\noexpand\flowsetpagelist{\number\ff@id}{\@ff@pages}%
}%
}%
}

```

flowswitchonnextoddone The unstarred version uses **IDNs**.

```

\newcommand{\@flowswitchonnextoddone}[1]{%
\@for\@ff@id:=#1\do{%

```

Is this frame already on?

```

\@ff@chckifthispg{\@ff@pages@countreg}{\@ff@id}%
\if@notthiscol

```

No, it isn't. If this is an odd page, is it on or off on the next page? First, is this an odd page?

```

\ifodd\@ff@pages@countreg

```

Yes, it's odd. So this frame isn't on this page, but is it on or off on the next page?

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@ff@chckifthispg{\count@}{\@ff@id}%
\if@notthiscol

```

It's not switched on either on this (odd) page or the next (even) page. So the page list should be just the next odd page after this one.

```

\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\else

```

It's not switched on for this (odd) page but it is for the next (even) page. So the page list should be the next even and odd pages after this page.

```

\edef\@ff@pages{\number\count@}%
\advance\count@ by 1\relax
\edef\@ff@pages{\@ff@pages,\number\count@}%
\fi
\else

```

No, it's even. So it's not on this (even) page, but needs to be on for the following (odd) page.

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\fi
\else

```

Frame is on this page. If this is an odd page, is it on or off on the next page?
First, is this an odd page?

```
\ifodd\@ff@pages@countreg
```

Yes, it's odd. Is the frame on or off for the next (even) page?

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@ff@chckifthispg{\count@}{\@ff@id}%
\ifnotthiscol
```

Frame is off. So the frame is switched on for this (odd) page but is off for the next (even) page. So the page list needs to be this (odd) page and the following odd page, skipping the even page in between.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\else
```

Frame is on. So the frame is switched on for this (odd) page and the next (even) page. So the page list needs to be this (odd) page, the next even page and the following odd page.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg-\number\count@}%
\fi
\else
```

Frame is switched on for this page and this page is even. So the page list needs to be this (even) page and the next (odd) page.

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\fi

\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\flowsetpagelist{\number\@ff@id}{\@ff@pages}%
}%
}%
}
```

`\flowswitchoffnextonly` Switch off the listed flow frames for just the next page

```
\newcommand*{\flowswitchoffnextonly}{%
  \@ifstar\@sflowswitchoffnextonly\@flowswitchoffnextonly
}
```

`@sflowswitchoffnextonly` The starred version uses **IDLs**.

```
\newcommand{\@sflowswitchoffnextonly}[1]{%
  \count@=\@ff@pages@countreg\relax
  \advance\count@ by 1\relax
```

```

\@for\@ff@id:=#1\do{%
  \@flowframeid{\@ff@id}%
  \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
  \xdef\@ff@output@adjustframes{%
    \the\toks@
    \noexpand\flowaddexclusion{\number\ff@id}{\number\count@}%
  }%
}%
}

\@flowswitchoffnextonly The unstarred version uses IDNs.
\newcommand{\@flowswitchoffnextonly}[1]{%
  \count@=\@ff@pages@countreg\relax
  \advance\count@ by 1\relax
  \@for\@ff@id:=#1\do{%
    \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
    \xdef\@ff@output@adjustframes{%
      \the\toks@
      \noexpand\flowaddexclusion{\number\@ff@id}{\number\count@}%
    }%
  }%
}%
}

\flowswitchoffnextoddonly Switch off the listed flow frames for just the next odd page
\newcommand*\@flowswitchoffnextoddonly{%
  \@ifstar\@sflowswitchoffnextoddonly\@flowswitchoffnextoddonly
}

\flowswitchoffnextoddonly The starred version uses IDLs.
\newcommand{\@sflowswitchoffnextoddonly}[1]{%
  \count@=\@ff@pages@countreg\relax
  \advance\count@ by 1\relax
  \ifodd\count@\relax
  \else
    \advance\count@ by 1\relax
  \fi
  \@for\@ff@id:=#1\do{%
    \@flowframeid{\@ff@id}%
    \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
    \xdef\@ff@output@adjustframes{%
      \the\toks@
      \noexpand\flowaddexclusion{\number\ff@id}{\number\count@}%
    }%
  }%
}%
}

\flowswitchoffnextoddonly The unstarred version uses IDNs.
\newcommand{\@flowswitchoffnextoddonly}[1]{%
  \count@=\@ff@pages@countreg\relax

```

```

\advance\count@ by 1\relax
\ifodd\count@\relax
\else
  \advance\count@ by 1\relax
\fi
\@for\@ff@id:=#1\do{%
  \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
  \xdef\@ff@output@adjustframes{%
    \the\toks@
    \noexpand\flowaddeexclusion{\number\@ff@id}{\number\count@}%
  }%
}%
}

```

`\dynamicsswitchonnext` Switch on the listed dynamic frames from the next page onwards

```

\newcommand*{\dynamicsswitchonnext}{%
  \@ifstar\@sdynamicsswitchonnext\@dynamicsswitchonnext
}

```

`\@sdynamicsswitchonnext` The starred version uses **IDLs**.

```

\newcommand{\@sdynamicsswitchonnext}[1]{%
  \@for\@ff@id:=#1\do{%
    \@dynamicframeid{\@ff@id}%
  }
}

```

Is this frame already on?

```

\@df@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\if@notthiscol
  \xdef\@ff@output@adjustframes{%
    \the\toks@
    \noexpand\dynamicsetpagelist{\number\ff@id}{>\number\@ff@pages@countreg}%
  }%
\else
  \xdef\@ff@output@adjustframes{%
    \the\toks@
    \noexpand\dynamicsetpagelist{\number\ff@id}%
    {\number\@ff@pages@countreg,>\number\@ff@pages@countreg}%
  }%
\fi
}%
}

```

`\@dynamicsswitchonnext` The unstarred version uses **IDNs**.

```

\newcommand{\@dynamicsswitchonnext}[1]{%
  \@for\@ff@id:=#1\do{%

```

Is this frame already on?

```

\@df@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\if@notthiscol

```

```

\edef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\dynamicsetpagelist{\number\@ff@id}{>\number\@ff@pages@countreg}%
}%
\else
\edef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\dynamicsetpagelist{\number\@ff@id}%
  {\number\@ff@pages@countreg,>\number\@ff@pages@countreg}%
}%
\fi
}%
}

```

\dynamicsswitchonnextodd Switch on the listed dynamic frames from the next odd page onwards

```

\newcommand*{\dynamicsswitchonnextodd}{%
  \@ifstar\@sdynamicsswitchonnextodd\@dynamicsswitchonnextodd
}

```

\dynamicsswitchonnextodd The starred version uses **IDLs**.

```

\newcommand{\@sdynamicsswitchonnextodd}[1]{%
  \count@=\@ff@pages@countreg\relax
  \ifodd\count@\relax
    \advance\count@ by 1\relax
  \fi
  \@for\@ff@id:=#1\do{%
    \@dynamicframeid{\@ff@id}%
  }
}

```

Is this frame already on?

```

\@df@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\def\@ff@prepages{}%
\if@notthiscol
\else
  \def\@ff@prepages{\number\@ff@pages@countreg,}%
\fi

```

Is this frame already switched on for the next page?

```

\@df@chckifthispg[\count@]{\@ff@id}%
\ifnum\count@=\@ff@pages@countreg\relax
\else
  \if@notthiscol
  \else
    \edef\@ff@prepages{\@ff@prepages\number\count@,}%
  \fi
\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\edef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\dynamicsetpagelist{\number\@ff@id}%
  {\@ff@prepages>\number\count@}%
}

```



```

    }%
  }%
}

\@dynamicsswitchonnextodd The unstarred version uses IDNs.
\newcommand{\@dynamicsswitchonnextodd}[1]{%
  \count@=\@ff@pages@countreg\relax
  \ifodd\count@\relax
    \advance\count@ by 1\relax
  \fi
  \@for\@ff@id:=#1\do{%
    Is this frame already on?
    \def\chkifthispg[\@ff@pages@countreg]{\@ff@id}%
    \def\@ff@prepages{}%
    \if@notthiscol
    \else
      \def\@ff@prepages{\number\@ff@pages@countreg,}%
    \fi

    Is this frame already switched on for the next page?
    \def\chkifthispg[\count@]{\@ff@id}%
    \ifnum\count@=\@ff@pages@countreg\relax
    \else
      \if@notthiscol
      \else
        \edef\@ff@prepages{\@ff@prepages\number\count@,}%
      \fi
    \fi
    \expandafter\toks@{\expandafter{\@ff@output@adjustframes}}%
    \xdef\@ff@output@adjustframes{%
      \the\toks@
      \noexpand\dynamicsetpagelist{\number\@ff@id}%
      {\@ff@prepages>\number\count@}%
    }%
  }%
}

\dynamicsswitchoffnext Switch off the listed dynamic frames from the next page onwards
\newcommand*{\dynamicsswitchoffnext}{%
  \@ifstar\@dynamicsswitchoffnext\@dynamicsswitchoffnext
}

\@dynamicsswitchoffnext The starred version uses IDLs.
\newcommand{\@dynamicsswitchoffnext}[1]{%
  \@for\@ff@id:=#1\do{%
    \dynamicframeid{\@ff@id}%
    Is this frame already off on this page?
    \def\chkifthispg[\@ff@pages@countreg]{\@ff@id}%

```

```

\if@notthiscol
\def\@ff@pages{none}%
\else
\def\@ff@pages{\number\@ff@pages@countreg}%
\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
\the\toks@
\noexpand\dynamicsetpagelist{\number\ff@id}{\@ff@pages}%
}%
}%
}

```

\@dynamicsswitchoffnext The unstarred version uses **IDNs**.

```

\newcommand{\@dynamicsswitchoffnext}[1]{%
\@for\@ff@id:=#1\do{%

```

Is this frame already off on this page?

```

\@df@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\if@notthiscol
\def\@ff@pages{none}%
\else
\def\@ff@pages{\number\@ff@pages@countreg}%
\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
\the\toks@
\noexpand\dynamicsetpagelist{\number\@ff@id}{\@ff@pages}%
}%
}%
}

```

dynamicsswitchoffnextodd Switch off the listed dynamic frames from the next odd page onwards

```

\newcommand*\@dynamicsswitchoffnextodd{%
\@ifstar\@sdynamicsswitchoffnextodd\@dynamicsswitchoffnextodd
}

```

dynamicsswitchoffnextodd The starred version uses **IDLs**.

```

\newcommand{\@sdynamicsswitchoffnextodd}[1]{%
\count@=\@ff@pages@countreg\relax
\ifodd\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\fi
\@for\@ff@id:=#1\do{%
\@dynamicframeid{\@ff@id}%

```

Is this frame already off on this page?

```

\@df@chckifthispg[\@ff@pages@countreg]{\ff@id}%
\if@notthiscol

```

It's off on this page. Is it on or off on the next page, if this page is odd? First, is this page odd?

```
\ifnum\@ff@pages@countreg=\count@\relax
```

This page is even and the frame is off on this page, so set to none.

```
\def\@ff@nextpages{none}%
\else
```

This page is odd. Is the frame on or off on the next page?

```
\@df@chckifthispg[\count@]{\ff@id}%
\if@notthiscol
```

Off on the next page as well, so set to none.

```
\def\@ff@nextpages{none}%
\else
```

Not off on the next page, so set to next page only.

```
\def\@ff@nextpages{\number\count@}%
\fi
\fi
\else
```

It's not off on this page. Is it on or off on the next page, if this page is odd? First, is this page odd?

```
\ifnum\@ff@pages@countreg=\count@\relax
```

This page is even and the frame is not off on this page, so set to this page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg}%
\else
```

This page is odd. Is the frame on or off on the next page?

```
\@df@chckifthispg[\count@]{\ff@id}%
\if@notthiscol
```

Off on the next page but not off on this page. So set to just this page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg}%
\else
```

Not off on the next page as well, so set to this page and next page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg,\number\count@}%
\fi
\fi
\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
\the\toks@
\noexpand\dynamicsetpagelist{\number\ff@id}{\@ff@nextpages}%
}%
}%
}
```

dynamicswitchhoffnextodd The unstarred version uses **IDNs**.

```
\newcommand{\@dynamicswitchhoffnextodd}[1]{%
\count@=\@ff@pages@countreg\relax
\ifodd\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\fi
\@for\@ff@id:=#1\do{%
```

Is this frame already off on this page?

```
\@df@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\if@notthiscol
```

It's off on this page. Is it on or off on the next page, if this page is odd? First, is this page odd?

```
\ifnum\@ff@pages@countreg=\count@\relax
```

This page is even and the frame is off on this page, so set to none.

```
\def\@ff@nextpages{none}%
\else
```

This page is odd. Is the frame on or off on the next page?

```
\@df@chckifthispg[\count@]{\@ff@id}%
\if@notthiscol
```

Off on the next page as well, so set to none.

```
\def\@ff@nextpages{none}%
\else
```

Not off on the next page, so set to next page only.

```
\def\@ff@nextpages{\number\count@}%
\fi
\fi
\else
```

It's not off on this page. Is it on or off on the next page, if this page is odd? First, is this page odd?

```
\ifnum\@ff@pages@countreg=\count@\relax
```

This page is even and the frame is not off on this page, so set to this page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg}%
\else
```

This page is odd. Is the frame on or off on the next page?

```
\@df@chckifthispg[\count@]{\@ff@id}%
\if@notthiscol
```

Off on the next page but not off on this page. So set to just this page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg}%
\else
```

Not off on the next page as well, so set to this page and next page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg,\number\count@}%
\fi
\fi
```

```

\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\dynamicsetpagelist{\number\@ff@id}{\@ff@nextpages}%
}%
}%
}

dynamicswitchonnexonly Switch on the listed dynamic frames for just the next page
\newcommand*\@dynamicswitchonnexonly{%
  \@ifstar\@sdynamicswitchonnexonly\@dynamicswitchonnexonly
}

dynamicswitchonnexonly The starred version uses IDLs.
\newcommand{\@sdynamicswitchonnexonly}[1]{%
  \count@=\@ff@pages@countreg\relax
  \advance\count@ by 1\relax
  \@for\@ff@id:=#1\do{%
    \@dynamicframeid{\@ff@id}%
  }
  Is this frame already on?
  \@df@chkifthispg[\@ff@pages@countreg]{\@ff@id}%
  \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
  \if@notthiscol
    Not, it isn't, so just set to the next page:
    \xdef\@ff@output@adjustframes{%
      \the\toks@
      \noexpand\dynamicsetpagelist{\number\@ff@id}{\number\count@}%
    }%
    \else
      Yes, it is, so set to this page and the next page:
      \xdef\@ff@output@adjustframes{%
        \the\toks@
        \noexpand\dynamicsetpagelist{\number\@ff@id}%
        {\number\@ff@pages@countreg,\number\count@}%
      }%
    \fi
  }%
}

dynamicswitchonnexonly The unstarred version uses IDNs.
\newcommand{\@dynamicswitchonnexonly}[1]{%
  \count@=\@ff@pages@countreg\relax
  \advance\count@ by 1\relax
  \@for\@ff@id:=#1\do{%
    Is this frame already on?

```

```

\@df@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\if@notthiscol

```

Not, it isn't, so just set to the next page:

```

\xdef\@ff@output@adjustframes{%
\the\toks@
\noexpand\dynamicsetpagelist{\number\@ff@id}{\number\count@}%
}%
\else

```

Yes, it is, so set to this page and the next page:

```

\xdef\@ff@output@adjustframes{%
\the\toks@
\noexpand\dynamicsetpagelist{\number\@ff@id}%
{\number\@ff@pages@countreg,\number\count@}%
}%
\fi
}%
}

```

amicswitchonnextoddonly Switch on the listed dynamic frames for just the next odd page

```

\newcommand*{\dynamicswitchonnextoddonly}{%
\@ifstar\@sdynamicswitchonnextoddonly\@dynamicswitchonnextoddonly
}

```

amicswitchonnextoddonly The starred version uses **IDLs**.

```

\newcommand{\@sdynamicswitchonnextoddonly}[1]{%
\@for\@ff@id:=#1\do{%
\@dynamicframeid{\@ff@id}%
}
}

```

Is this frame already on?

```

\@df@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\if@notthiscol

```

No, it isn't. If this is an odd page, is it on or off on the next page? First, is this an odd page?

```

\ifodd\@ff@pages@countreg

```

Yes, it's odd. So this frame isn't on this page, but is it on or off on the next page?

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@df@chckifthispg[\count@]{\@ff@id}%
\if@notthiscol

```

It's not switched on either on this (odd) page or the next (even) page. So the page list should be just the next odd page after this one.

```

\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\else

```

It's not switched on for this (odd) page but it is for the next (even) page. So the page list should be the next even and odd pages after this page.

```

\edef\@ff@pages{\number\count@}%
\advance\count@ by 1\relax
\edef\@ff@pages{\@ff@pages,\number\count@}%
\fi
\else

```

No, it's even. So it's not on this (even) page, but needs to be on for the following (odd) page.

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\fi
\else

```

Frame is on this page. If this is an odd page, is it on or off on the next page? First, is this an odd page?

```

\ifodd\@ff@pages@countreg

```

Yes, it's odd. Is the frame on or off for the next (even) page?

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@df@chckifthispg[\count@]{\ff@id}%
\if@notthiscol

```

Frame is off. So the frame is switched on for this (odd) page but is off for the next (even) page. So the page list needs to be this (odd) page and the following odd page, skipping the even page in between.

```

\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\else

```

Frame is on. So the frame is switched on for this (odd) page and the next (even) page. So the page list needs to be this (odd) page, the next even page and the following odd page.

```

\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg-\number\count@}%
\fi
\else

```

Frame is switched on for this page and this page is even. So the page list needs to be this (even) page and the next (odd) page.

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\fi
% \begin{macrocode}
\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%

```

```

\edef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\dynamicsetpagelist{\number\ff@id}{\@ff@pages}%
}%
}%
}

```

amicswitchonnexthodonly The unstarred version uses **IDNs**.

```

\newcommand{\@dynamicswitchonnexthodonly}[1]{%
  \@for\@ff@id:=#1\do{%

```

Is this frame already on?

```

\@df@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\if@notthiscol

```

No, it isn't. If this is an odd page, is it on or off on the next page? First, is this an odd page?

```

\ifodd\@ff@pages@countreg

```

Yes, it's odd. So this frame isn't on this page, but is it on or off on the next page?

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@df@chckifthispg[\count@]{\@ff@id}%
\if@notthiscol

```

It's not switched on either on this (odd) page or the next (even) page. So the page list should be just the next odd page after this one.

```

\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\else

```

It's not switched on for this (odd) page but it is for the next (even) page. So the page list should be the next even and odd pages after this page.

```

\edef\@ff@pages{\number\count@}%
\advance\count@ by 1\relax
\edef\@ff@pages{\@ff@pages,\number\count@}%
\fi
\else

```

No, it's even. So it's not on this (even) page, but needs to be on for the following (odd) page.

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\fi
\else

```

Frame is on this page. If this is an odd page, is it on or off on the next page?

First, is this an odd page?

```

\ifodd\@ff@pages@countreg

```


Yes, it's odd. Is the frame on or off for the next (even) page?

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@df@chckifthispg[\count@]{\@ff@id}%
\if@notthiscol
```

Frame is off. So the frame is switched on for this (odd) page but is off for the next (even) page. So the page list needs to be this (odd) page and the following odd page, skipping the even page in between.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\else
```

Frame is on. So the frame is switched on for this (odd) page and the next (even) page. So the page list needs to be this (odd) page, the next even page and the following odd page.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg-\number\count@}%
\fi
\else
```

Frame is switched on for this page and this page is even. So the page list needs to be this (even) page and the next (odd) page.

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\fi

\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\dynamicsetpagelist{\number\@ff@id}{\@ff@pages}%
}%
}%
}
```

`\dynamicsswitchoffnextonly` Switch off the listed dynamic frames for just the next page

```
\newcommand*{\dynamicsswitchoffnextonly}{%
  \@ifstar\@sdynamicsswitchoffnextonly\@dynamicsswitchoffnextonly
}
```

`\dynamicsswitchoffnextonly` The starred version uses **IDLs**.

```
\newcommand{\@sdynamicsswitchoffnextonly}[1]{%
  \count@=\@ff@pages@countreg\relax
  \advance\count@ by 1\relax
  \@for\@ff@id:=#1\do{%
    \@dynamicframeid{\@ff@id}%
    \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
    \xdef\@ff@output@adjustframes{%
```

```

\the\toks@
\noexpand\dynamicaddexclusion{\number\ff@id}{\number\count@}%
}%
}%
}

\newcommand{\@dynamicswitchoffnextonly}[1]{%
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@for\@ff@id:=#1\do{%
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
\the\toks@
\noexpand\dynamicaddexclusion{\number\ff@id}{\number\count@}%
}%
}%
}

\newcommand*\@dynamicswitchoffnextoddoneonly{%
\@ifstar\@sdynamicswitchoffnextoddoneonly\@dynamicswitchoffnextoddoneonly
}

\newcommand{\@sdynamicswitchoffnextoddoneonly}[1]{%
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\ifodd\count@\relax
\else
\advance\count@ by 1\relax
\fi
\@for\@ff@id:=#1\do{%
\@dynamicframeid{\@ff@id}%
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
\the\toks@
\noexpand\dynamicaddexclusion{\number\ff@id}{\number\count@}%
}%
}%
}

\newcommand{\@dynamicswitchoffnextoddoneonly}[1]{%
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\ifodd\count@\relax
\else
\advance\count@ by 1\relax

```

The unstarred version uses **IDNs**.

Switch off the listed dynamic frames for just the next odd page

The starred version uses **IDLs**.

The unstarred version uses **IDNs**.

```

\fi
\@for\@ff@id:=#1\do{%
  \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
  \xdef\@ff@output@adjustframes{%
    \the\toks@
    \noexpand\dynamicaddexclusion{\number\@ff@id}{\number\count@}%
  }%
}%
}

```

`\staticswitchonnext` Switch on the listed static frames from the next page onwards

```

\newcommand*{\staticswitchonnext}{%
  \@ifstar\@sstaticswitchonnext\staticswitchonnext
}

```

`\@sstaticswitchonnext` The starred version uses **IDLs**.

```

\newcommand{\@sstaticswitchonnext}[1]{%
  \@for\@ff@id:=#1\do{%
    \@staticframeid{\@ff@id}%
  }%
}

```

Is this frame already on?

```

\@sf@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\if@notthiscol
  \xdef\@ff@output@adjustframes{%
    \the\toks@
    \noexpand\staticsetpagelist{\number\ff@id}{>\number\@ff@pages@countreg}%
  }%
\else
  \xdef\@ff@output@adjustframes{%
    \the\toks@
    \noexpand\staticsetpagelist{\number\ff@id}%
    {\number\@ff@pages@countreg,>\number\@ff@pages@countreg}%
  }%
\fi
}%
}

```

`\@staticswitchonnext` The unstarred version uses **IDNs**.

```

\newcommand{\@staticswitchonnext}[1]{%
  \@for\@ff@id:=#1\do{%

```

Is this frame already on?

```

\@sf@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\if@notthiscol
  \xdef\@ff@output@adjustframes{%
    \the\toks@
    \noexpand\staticsetpagelist{\number\@ff@id}{>\number\@ff@pages@countreg}%
  }%
}

```

```

        \else
        \xdef\@ff@output@adjustframes{%
        \the\toks@
        \noexpand\staticsetpagelist{\number\@ff@id}%
        {\number\@ff@pages@countreg,>\number\@ff@pages@countreg}%
        }%
        \fi
    }%
}

\staticswitchonnextodd Switch on the listed static frames from the next odd page onwards
    \newcommand*{\staticswitchonnextodd}{%
        \@ifstar\@sstaticswitchonnextodd\@staticswitchonnextodd
    }

@sstaticswitchonnextodd The starred version uses IDLs.
    \newcommand{\@sstaticswitchonnextodd}[1]{%
        \count@=\@ff@pages@countreg\relax
        \ifodd\count@\relax
            \advance\count@ by 1\relax
        \fi
        \@for\@ff@id:=#1\do{%
            \@staticframeid{\@ff@id}%

Is this frame already on?
            \@sf@chkifthispg[\@ff@pages@countreg]{\@ff@id}%
            \def\@ff@prepages{}%
            \if@notthiscol
            \else
                \def\@ff@prepages{\number\@ff@pages@countreg,}%
            \fi

Is this frame already switched on for the next page?
            \@sf@chkifthispg[\count@]{\@ff@id}%
            \ifnum\count@=\@ff@pages@countreg\relax
            \else
                \if@notthiscol
                \else
                    \edef\@ff@prepages{\@ff@prepages\number\count@,}%
                \fi
            \fi
            \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
            \xdef\@ff@output@adjustframes{%
                \the\toks@
                \noexpand\staticsetpagelist{\number\@ff@id}%
                {\@ff@prepages>\number\count@}%
            }%
        }%
    }
}

```

```

\@staticswitchonnextodd The unstarred version uses IDNs.
\newcommand{\@staticswitchonnextodd}[1]{%
  \count@=\@ff@pages@countreg\relax
  \ifodd\count@\relax
    \advance\count@ by 1\relax
  \fi
  \@for\@ff@id:=#1\do{%
    Is this frame already on?
    \sf@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
    \def\@ff@prepages{}%
    \if@notthiscol
    \else
      \def\@ff@prepages{\number\@ff@pages@countreg,}%
    \fi
    Is this frame already switched on for the next page?
    \sf@chckifthispg[\count@]{\@ff@id}%
    \ifnum\count@=\@ff@pages@countreg\relax
    \else
      \if@notthiscol
      \else
        \edef\@ff@prepages{\@ff@prepages\number\count@,}%
      \fi
    \fi
    \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
    \xdef\@ff@output@adjustframes{%
      \the\toks@
      \noexpand\staticsetpagelist{\number\@ff@id}%
      {\@ff@prepages>\number\count@}%
    }%
  }%
}

\staticswitchoffnext Switch off the listed static frames from the next page onwards
\newcommand*{\staticswitchoffnext}{%
  \@ifstar\@sstaticswitchoffnext\@staticswitchoffnext
}

\@sstaticswitchoffnext The starred version uses IDLs.
\newcommand{\@sstaticswitchoffnext}[1]{%
  \@for\@ff@id:=#1\do{%
    \@staticframeid{\@ff@id}%
    Is this frame already off on this page?
    \sf@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
    \if@notthiscol
      \def\@ff@pages{none}%
    \else
      \def\@ff@pages{\number\@ff@pages@countreg}%
    \fi
  }%
}

```

```

\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\staticsetpagelist{\number\ff@id}{\@ff@pages}%
}%
}%
}

\@staticswitchoffnext The unstarred version uses IDNs.
\newcommand{\@staticswitchoffnext}[1]{%
  \@for\@ff@id:=#1\do{%
    Is this frame already off on this page?
    \sf@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
    \if@notthiscol
      \def\@ff@pages{none}%
    \else
      \def\@ff@pages{\number\@ff@pages@countreg}%
    \fi
    \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
    \xdef\@ff@output@adjustframes{%
      \the\toks@
      \noexpand\staticsetpagelist{\number\@ff@id}{\@ff@pages}%
    }%
  }%
}

\staticswitchoffnextodd Switch off the listed static frames from the next odd page onwards
\newcommand*\@staticswitchoffnextodd{%
  \@ifstar\@sstaticswitchoffnextodd\@staticswitchoffnextodd
}

@sstaticswitchoffnextodd The starred version uses IDLs.
\newcommand{\@sstaticswitchoffnextodd}[1]{%
  \count@=\@ff@pages@countreg\relax
  \ifodd\@ff@pages@countreg\relax
    \advance\count@ by 1\relax
  \fi
  \@for\@ff@id:=#1\do{%
    \@staticframeid{\@ff@id}%
    Is this frame already off on this page?
    \sf@chckifthispg[\@ff@pages@countreg]{\ff@id}%
    \if@notthiscol
      It's off on this page. Is it on or off on the next page, if this page is odd? First, is
      this page odd?
      \ifnum\@ff@pages@countreg=\count@\relax

```

This page is even and the frame is off on this page, so set to none.

```
\def\@ff@nextpages{none}%  
\else
```

This page is odd. Is the frame on or off on the next page?

```
\@sf@chckifthispg[\count@]{\ff@id}%  
\if@notthiscol
```

Off on the next page as well, so set to none.

```
\def\@ff@nextpages{none}%  
\else
```

Not off on the next page, so set to next page only.

```
\def\@ff@nextpages{\number\count@}%  
\fi  
\fi  
\else
```

It's not off on this page. Is it on or off on the next page, if this page is odd? First, is this page odd?

```
\ifnum\@ff@pages@countreg=\count@\relax
```

This page is even and the frame is not off on this page, so set to this page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg}%  
\else
```

This page is odd. Is the frame on or off on the next page?

```
\@sf@chckifthispg[\count@]{\ff@id}%  
\if@notthiscol
```

Off on the next page but not off on this page. So set to just this page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg}%  
\else
```

Not off on the next page as well, so set to this page and next page.

```
\def\@ff@nextpages{\number\@ff@pages@countreg,\number\count@}%  
\fi  
\fi  
\fi  
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%  
\xdef\@ff@output@adjustframes{%  
  \the\toks@  
  \noexpand\staticsetpagelist{\number\ff@id}{\@ff@nextpages}%  
}%  
}%  
}
```

@staticswitchoffnextodd The unstarred version uses **IDNs**.

```
\newcommand{\@staticswitchoffnextodd}[1]{%  
  \count@=\@ff@pages@countreg\relax  
  \ifodd\@ff@pages@countreg\relax
```

```

\advance\count@ by 1\relax
\fi
\@for\@ff@id:=#1\do{%
Is this frame already off on this page?
\@sf@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\if@notthiscol

It's off on this page. Is it on or off on the next page, if this page is odd? First, is
this page odd?
\ifnum\@ff@pages@countreg=\count@\relax
This page is even and the frame is off on this page, so set to none.
\def\@ff@nextpages{none}%
\else
This page is odd. Is the frame on or off on the next page?
\@sf@chckifthispg[\count@]{\@ff@id}%
\if@notthiscol

Off on the next page as well, so set to none.
\def\@ff@nextpages{none}%
\else
Not off on the next page, so set to next page only.
\def\@ff@nextpages{\number\count@}%
\fi
\fi
\else
It's not off on this page. Is it on or off on the next page, if this page is odd? First,
is this page odd?
\ifnum\@ff@pages@countreg=\count@\relax
This page is even and the frame is not off on this page, so set to this page.
\def\@ff@nextpages{\number\@ff@pages@countreg}%
\else
This page is odd. Is the frame on or off on the next page?
\@sf@chckifthispg[\count@]{\@ff@id}%
\if@notthiscol

Off on the next page but not off on this page. So set to just this page.
\def\@ff@nextpages{\number\@ff@pages@countreg}%
\else
Not off on the next page as well, so set to this page and next page.
\def\@ff@nextpages{\number\@ff@pages@countreg,\number\count@}%
\fi
\fi
\fi
\expandafter\toks@expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%

```



```

        \the\toks@
        \noexpand\staticsetpagelist{\number\@ff@id}{\@ff@nextpages}%
    }%
}
}

\staticswitchonnexonly Switch on the listed static frames for just the next page
    \newcommand*\staticswitchonnexonly{%
        \@ifstar\@sstaticswitchonnexonly\staticswitchonnexonly
    }

@sstaticswitchonnexonly The starred version uses IDLs.
    \newcommand{\@sstaticswitchonnexonly}[1]{%
        \count@=\@ff@pages@countreg\relax
        \advance\count@ by 1\relax
        \@for\@ff@id:=#1\do{%
            \@staticframeid{\@ff@id}%
        }
    }

    Is this frame already on?
        \@sf@chkifthispg[\@ff@pages@countreg]{\@ff@id}%
        \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
        \if@notthiscol

    Not, it isn't, so just set to the next page:
        \xdef\@ff@output@adjustframes{%
            \the\toks@
            \noexpand\staticsetpagelist{\number\@ff@id}{\number\count@}%
        }%
        \else

    Yes, it is, so set to this page and the next page:
        \xdef\@ff@output@adjustframes{%
            \the\toks@
            \noexpand\staticsetpagelist{\number\@ff@id}%
            {\number\@ff@pages@countreg,\number\count@}%
        }%
        \fi
    }%
}

@sstaticswitchonnexonly The unstarred version uses IDNs.
    \newcommand{\@staticswitchonnexonly}[1]{%
        \count@=\@ff@pages@countreg\relax
        \advance\count@ by 1\relax
        \@for\@ff@id:=#1\do{%
            \@staticframeid{\@ff@id}%
        }
    }

    Is this frame already on?
        \@sf@chkifthispg[\@ff@pages@countreg]{\@ff@id}%
        \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
        \if@notthiscol

```

Not, it isn't, so just set to the next page:

```
\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\staticsetpagelist{\number\@ff@id}{\number\count@}%
}%
\else
```

Yes, it is, so set to this page and the next page:

```
\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\staticsetpagelist{\number\@ff@id}%
  {\number\@ff@pages@countreg,\number\count@}%
}%
\fi
}%
}
```

staticswitchonnextoddone Switch on the listed static frames for just the next odd page

```
\newcommand*\staticswitchonnextoddone{%
  \@ifstar\@sstaticswitchonnextoddone\staticswitchonnextoddone
}
```

staticswitchonnextoddone The starred version uses **IDLs**.

```
\newcommand*\@sstaticswitchonnextoddone[1]{%
  \@for\@ff@id:=#1\do{%
    \@staticframeid{\@ff@id}%
  }
}
```

Is this frame already on?

```
\@sf@chckifthispg[\@ff@pages@countreg]{\ff@id}%
\if@notthiscol
```

No, it isn't. If this is an odd page, is it on or off on the next page? First, is this an odd page?

```
\ifodd\@ff@pages@countreg
```

Yes, it's odd. So this frame isn't on this page, but is it on or off on the next page?

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@sf@chckifthispg[\count@]{\ff@id}%
\if@notthiscol
```

It's not switched on either on this (odd) page or the next (even) page. So the page list should be just the next odd page after this one.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\else
```

It's not switched on for this (odd) page but it is for the next (even) page. So the page list should be the next even and odd pages after this page.

```
\edef\@ff@pages{\number\count@}%
\advance\count@ by 1\relax
```

```

\edef\@ff@pages{\@ff@pages,\number\count@}%
\fi
\else

```

No, it's even. So it's not on this (even) page, but needs to be on for the following (odd) page.

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\fi
\else

```

Frame is on this page. If this is an odd page, is it on or off on the next page?
First, is this an odd page?

```

\ifodd\@ff@pages@countreg

```

Yes, it's odd. Is the frame on or off for the next (even) page?

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@sf@chckifthispg[\count@]{\ff@id}%
\if@notthiscol

```

Frame is off. So the frame is switched on for this (odd) page but is off for the next (even) page. So the page list needs to be this (odd) page and the following odd page, skipping the even page in between.

```

\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\else

```

Frame is on. So the frame is switched on for this (odd) page and the next (even) page. So the page list needs to be this (odd) page, the next even page and the following odd page.

```

\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg-\number\count@}%
\fi
\else

```

Frame is switched on for this page and this page is even. So the page list needs to be this (even) page and the next (odd) page.

```

\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\fi
\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\edef\@ff@output@adjustframes{%
\the\toks@
\noexpand\staticsetpagelist{\number\ff@id}{\@ff@pages}%
}%
}%
}

```

aticswitchonnexthodonly

The unstarred version uses **IDNs**.

```
\newcommand{\@staticswitchonnexthodonly}[1]{%
\@for\@ff@id:=#1\do{%
```

Is this frame already on?

```
\@sf@chckifthispg[\@ff@pages@countreg]{\@ff@id}%
\if@notthiscol
```

No, it isn't. If this is an odd page, is it on or off on the next page? First, is this an odd page?

```
\ifodd\@ff@pages@countreg
```

Yes, it's odd. So this frame isn't on this page, but is it on or off on the next page?

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@sf@chckifthispg[\count@]{\@ff@id}%
\if@notthiscol
```

It's not switched on either on this (odd) page or the next (even) page. So the page list should be just the next odd page after this one.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\else
```

It's not switched on for this (odd) page but it is for the next (even) page. So the page list should be the next even and odd pages after this page.

```
\edef\@ff@pages{\number\count@}%
\advance\count@ by 1\relax
\edef\@ff@pages{\@ff@pages,\number\count@}%
\fi
\else
```

No, it's even. So it's not on this (even) page, but needs to be on for the following (odd) page.

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\count@}%
\fi
\else
```

Frame is on this page. If this is an odd page, is it on or off on the next page? First, is this an odd page?

```
\ifodd\@ff@pages@countreg
```

Yes, it's odd. Is the frame on or off for the next (even) page?

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\@sf@chckifthispg[\count@]{\@ff@id}%
\if@notthiscol
```

Frame is off. So the frame is switched on for this (odd) page but is off for the next (even) page. So the page list needs to be this (odd) page and the following odd page, skipping the even page in between.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\else
```

Frame is on. So the frame is switched on for this (odd) page and the next (even) page. So the page list needs to be this (odd) page, the next even page and the following odd page.

```
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg-\number\count@}%
\fi
\else
```

Frame is switched on for this page and this page is even. So the page list needs to be this (even) page and the next (odd) page.

```
\count@=\@ff@pages@countreg\relax
\advance\count@ by 1\relax
\edef\@ff@pages{\number\@ff@pages@countreg,\number\count@}%
\fi

\fi
\expandafter\toks@\expandafter{\@ff@output@adjustframes}%
\xdef\@ff@output@adjustframes{%
  \the\toks@
  \noexpand\staticsetpagelist{\number\@ff@id}{\@ff@pages}%
}%
}%
}
```

staticswitchoffnextonly Switch off the listed static frames for just the next page

```
\newcommand*\staticswitchoffnextonly{%
  \@ifstar\@sstaticswitchoffnextonly\@staticswitchoffnextonly
}
```

staticswitchoffnextonly The starred version uses **IDLs**.

```
\newcommand{\@sstaticswitchoffnextonly}[1]{%
  \count@=\@ff@pages@countreg\relax
  \advance\count@ by 1\relax
  \@for\@ff@id:=#1\do{%
    \@staticframeid{\@ff@id}%
    \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
    \xdef\@ff@output@adjustframes{%
      \the\toks@
      \noexpand\staticaddexclusion{\number\@ff@id}{\number\count@}%
    }%
  }%
}%
}
```

staticswitchoffnextonly The unstarred version uses **IDNs**.

```

\newcommand{\@staticswitchoffnextonly}[1]{%
  \count@=\@ff@pages@countreg\relax
  \advance\count@ by 1\relax
  \@for\@ff@id:=#1\do{%
    \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
    \xdef\@ff@output@adjustframes{%
      \the\toks@
      \noexpand\staticaddexclusion{\number\@ff@id}{\number\count@}%
    }%
  }%
}

```

staticswitchoffnextoddonly Switch off the listed static frames for just the next odd page

```

\newcommand*{\staticswitchoffnextoddonly}{%
  \@ifstar\@sstaticswitchoffnextoddonly\@staticswitchoffnextoddonly
}

```

staticswitchoffnextoddonly The starred version uses **IDLs**.

```

\newcommand{\@sstaticswitchoffnextoddonly}[1]{%
  \count@=\@ff@pages@countreg\relax
  \advance\count@ by 1\relax
  \ifodd\count@\relax
  \else
    \advance\count@ by 1\relax
  \fi
  \@for\@ff@id:=#1\do{%
    \@staticframeid{\@ff@id}%
    \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
    \xdef\@ff@output@adjustframes{%
      \the\toks@
      \noexpand\staticaddexclusion{\number\ff@id}{\number\count@}%
    }%
  }%
}

```

staticswitchoffnextoddonly The unstarred version uses **IDNs**.

```

\newcommand{\@staticswitchoffnextoddonly}[1]{%
  \count@=\@ff@pages@countreg\relax
  \advance\count@ by 1\relax
  \ifodd\count@\relax
  \else
    \advance\count@ by 1\relax
  \fi
  \@for\@ff@id:=#1\do{%
    \expandafter\toks@\expandafter{\@ff@output@adjustframes}%
    \xdef\@ff@output@adjustframes{%
      \the\toks@
      \noexpand\staticaddexclusion{\number\@ff@id}{\number\count@}%
    }%
  }%
}

```

```

    }%
  }%
}

ffaddtoadjustframeshook Add stuff to the output hook.
    \newcommand*{\ffaddtoadjustframeshook}[1]{%
        \@ff@addtolist\@ff@output@adjustframes\entry{#1}%
    }

\@g@tnextcol Find the next flow frame. If there are no more flow frames, define a new one
the size of the typeblock. (Otherwise the remaining document text will be lost.)
    \newif\if@notthiscol
    \newif\if@ff@nwpg
    \newcount\c@curpg
    \newcommand*{\@g@tnextcol}[1]{%
        Do any frame adjustments
        \@ff@output@adjustframes
        Now clear the hook
        \global\let\@ff@output@adjustframes\@empty
        Now check for any more frames.
        \@ff@checkifmoreframes
        \if@ff@moreframes
        \else
        No more frames, add new frame
        \PackageWarning{flowfram}%
        {Run out of flows frames on page \number\@ff@pages@countreg, adding new one}%
        \flf@doifverbose
        {%
            \def\flf@messinfo{Here's the list of flow frames:}%
            \count@=0\relax
            \loop
            \advance\count@ by 1\relax
            \expandafter\toks@\expandafter{\flf@messinfo\MessageBreak}%
            \edef\flf@messinfo{\the\toks@
                \number\count@.
                Pages: \csname @ff@pages@\romannumeral\count@\endcsname.
                Exclusions: \csname @ff@xpages@\romannumeral\count@\endcsname.
            }%
            \ifnum\count@<\c@maxflow
            \repeat
            \PackageInfo{flowfram}{\flf@messinfo\@gobbletwo}%
        }%
        \@onecolumn
        #1=\c@maxflow
    \fi
    \@notthiscoltrue
    \@ff@nwpgfalse

```

```

\@colN=#1\relax

\c@curpg=\@ff@pages@countreg
\loop
  \ifnum\@colN=\c@maxflow

```

Reached the end of the page. Try the next one.

```

  \@colN=1\relax
  \@ff@nwpgtrue
  \advance\c@curpg by 1\relax
\else

```

Move on to the next flow frame on this page.

```

  \advance\@colN by 1\relax
\fi
\@ff@chckifthispg{\c@curpg}{\@colN}%
\if@notthiscol
\repeat
#1=\@colN\relax
}

```

`\@ff@chckifthispg` This is used to determine the next **flow frame**, since not all **flow frames** may be defined on every page. Checks to see if **flow frame** #2 is defined on page #1. First set up some variables.

```

\newcommand*{\@ff@chckifthispg}[2]{%
  \@notthiscolfalse
  \edef\ff@xpages{\csname @ff@xpages@romannumeral#2\endcsname}%
  \@for\@ff@pp:=\ff@xpages\do
  {%
    \ifnum0\@ff@pp=#1\relax
    \@notthiscoltrue
    \@endfortrue
  }
\fi
}%
\if@notthiscol
\else
  \@notthiscoltrue
  \edef\ff@pages{\csname @ff@pages@romannumeral#2\endcsname}%
  \@ff@chckifthispg{#1}%
\fi
}

```

`\@@ff@chckifthispg` Now go ahead and check.

```

\newcommand*{\@@ff@chckifthispg}[1]{%
  \ifthenelse{\equal{\ff@pages}{none}}{%
    {}%
  }%
  \ifthenelse{\equal{\ff@pages}{all}}{%
    {}%
  }%
  \@notthiscolfalse
}

```



```

}%
{%
  \ifthenelse{\equal{\ff@pages}{odd}}{%
    {%
      \ifodd#1\@notthiscolfalse\fi
    }%
  }%
  {%
    \ifthenelse{\equal{\ff@pages}{even}}{%
      {%
        \ifodd#1\else\@notthiscolfalse\fi
      }%
    }%
  }%
}

```

check through list of page numbers

```

  \@for\@ff@pp:=\ff@pages\do{%
    \def\@ff@numstart{0}%
    \def\@ff@numend{0}%
    \@ff@getrange{\@ff@pp}%
    \ifthenelse{#1<\@ff@numstart \or #1>\@ff@numend}%
    {}%
    {%
      \@notthiscolfalse
    }%
  }%
}%
}%
}%
}%
}%
}

```

`\@sf@chckifthispg` Checks to see if **static frame** #1 is defined on the current page (or the page given by the optional argument).

```

\newcommand*{\@sf@chckifthispg}[2][\@ff@pages@countreg]{%
  \@notthiscoltrue
  \edef\ff@pages{\csname @sf@pages@\romannumeral#2\endcsname}%

  \@ff@chckifthispg{#1}%
}

```

`\@df@chckifthispg` Checks to see if **dynamic frame** #1 is defined on the current page (or the page given by the optional argument).

```

\newcommand*{\@df@chckifthispg}[2][\@ff@pages@countreg]{%
  \@notthiscoltrue
  \edef\ff@pages{\csname @df@pages@\romannumeral#2\endcsname}%

  \@ff@chckifthispg{#1}%
}

```

`\@setcolbox` Sets the T_EX box defining the **flow frame** to the output box. This saves the output until the page is shipped out after all the **flow frames** have been filled for

that page.

```
\newcommand*{\@setcolbox}[1]{%
  \flf@message{Setting contents of box for flow frame \number#1}%
  \expandafter\global\expandafter\setbox
    \csname column\romannumeral#1\endcsname\box\@outputbox
}
```

\@docolbox Put **flow frame** on the page with the correct border, if it has one.

```
\newcommand*{\@docolbox}[1]{%
  \flf@message{Doing flow frame \number#1\space
    (page \number\@ff@pages@countreg)}%
  \edef\ff@frametype{%
    \csname @ff@frametype@\romannumeral#1\endcsname}%
  Frame colour
    \edef\ff@col{\csname @ff@col@\romannumeral#1\endcsname}%
  Text colour
    \edef\ff@txtcol{\csname @ff@txtcol@\romannumeral#1\endcsname}%
  Background colour
    \edef\ff@backcol{\csname @ff@backcol@\romannumeral#1\endcsname}%
  Compute offset for this frame
    \@ff@setoffset{#1}%
  Rotate frame if required
    \rotateframe{\csname @ff@angle@\romannumeral#1\endcsname}%
    {%
  Check if frame has a border
    \ifthenelse{\boolean{columnframe\romannumeral#1}}{%
      {%
    % \end{macrocode}
    % Put the required border around the frame
    % \begin{macrocode}
      \@ff@fbox
        {\csname colwidth\romannumeral#1\endcsname}%
        {\csname colheight\romannumeral#1\endcsname}%
        {%
          \expandafter\box\csname column\romannumeral#1\endcsname
        }%
        {%
          \csname\ff@frametype\endcsname
        }%
      }%
    }%
  }
```

Frame colour

```
\edef\ff@col{\csname @ff@col@\romannumeral#1\endcsname}%
```

Text colour

```
\edef\ff@txtcol{\csname @ff@txtcol@\romannumeral#1\endcsname}%
```

Background colour

```
\edef\ff@backcol{\csname @ff@backcol@\romannumeral#1\endcsname}%
```

Compute offset for this frame

```
\@ff@setoffset{#1}%
```

Rotate frame if required

```
\rotateframe{\csname @ff@angle@\romannumeral#1\endcsname}%
{%
```

Check if frame has a border

```
\ifthenelse{\boolean{columnframe\romannumeral#1}}{%
  {%
% \end{macrocode}
% Put the required border around the frame
% \begin{macrocode}
    \@ff@fbox
      {\csname colwidth\romannumeral#1\endcsname}%
      {\csname colheight\romannumeral#1\endcsname}%
      {%
        \expandafter\box\csname column\romannumeral#1\endcsname
      }%
      {%
        \csname\ff@frametype\endcsname
      }%
    }%
  }%
  }
```

Do the frame without a border

```
\@ff@box
  {\csname colwidth\romannumeral#1\endcsname}%
  {\csname colheight\romannumeral#1\endcsname}%
}
```

```

        {%
        \expandafter\box\csname column\romannumeral#1\endcsname
        }%
    }%
}%
}

```

`\@docolbbox` Do the **bounding box** for given **flow frame**.

```

\newcommand*\@docolbbox}[1]{%
  \@ff@setoffset{#1}%
  \def\ff@col{}\def\ff@txtcol{}%
  \@fr@meifdraft
  {%
    \@ff@box
    {\csname colwidth\romannumeral#1\endcsname}%
    {\csname colheight\romannumeral#1\endcsname}%
    {%
      \expandafter\box\csname column\romannumeral#1\endcsname
    }%
  }%
  {F:\number#1;\csname @col@id@\romannumeral#1\endcsname}%
}

```

`\@ff@fbox` Put the T_EX box #3 of width #1 and height #2, and frame making command specified by #4.

```

\newcommand*\@ff@fbox}[4]{%
  {%
    \fboxsep=\flowframesep
    \fboxrule=\flowframerule
    \@s@tffcol
    \kern\@ff@offset
    #4{\@ff@box{#1}{#2}{#3}}%
  }%
}

```

`\@ff@box` Put the T_EX box #3 of width #1 and height #2 on the page.

```

\newcommand*\@ff@box}[3]{%
  {%
    \@ffbackground
    {%
      \vbox to#2 {\hb@xt@ #1{\hss{\@s@tffttextcol #3}\hss}\vss\kern\z@}%
    }%
  }%
}

```

`\@putcolbox` Display the **flow frame** on the page, at its given position. If the document is two-sided, need to check whether the current page is odd or even to determine the correct location.

```

\newcommand*\@putcolbox}[1]{%

```

```

\@ff@chckifthispg{\@ff@pages@countreg}{#1}%

\if@notthiscol
\expandafter\ifvoid\csname column\romannumeral#1\endcsname
\else
\PackageWarning{flowfram}{Box \number#1\space is not void.
Dumping. This page: \number\@ff@pages@countreg.
Page list: "\csname @ff@pages@\romannumeral#1\endcsname".
Exclusion list: "\csname @ff@xpages@\romannumeral#1\endcsname".
(Maybe the page list was changed after this frame was
selected or maybe you should use package option pages=absolute)}}%
\@notthiscolfalse
\fi
\fi
\if@notthiscol
\flf@message{Flow frame \number#1\space is not required on page
\number\@ff@pages@countreg}%
\else
\@killglue
\if@twoside
\ifodd\c@page
\expandafter\raise\csname col@\romannumeral#1@posy\endcsname
\hb@xt@\z@
{%
\expandafter\kern\csname col@\romannumeral#1@posx\endcsname
\@docolbox{#1}\hss
}%
\else
\expandafter\raise\csname col@\romannumeral#1@eveny\endcsname
\hb@xt@\z@
{%
\expandafter\kern\csname col@\romannumeral#1@evenx\endcsname
\@docolbox{#1}\hss
}%
\fi
\else
\expandafter\raise\csname col@\romannumeral#1@posy\endcsname
\hb@xt@\z@
{%
\expandafter\kern\csname col@\romannumeral#1@posx\endcsname
\@docolbox{#1}\hss
}%
\fi
\fi
}

```

\@putcolbbox Same for **flow frame bounding box**:

```

\newcommand*{\@putcolbbox}[1]{%
\@ff@chckifthispg{\@ff@pages@countreg}{#1}%

```

```

\if@notthiscol
\else
  \@killglue
  \if@twoside
    \ifodd\c@page
      \expandafter\raise\csname col@\romannumeral#1@posy\endcsname
      \hb@xt@\z@
      {%
        \expandafter\kern \csname col@\romannumeral#1@posx\endcsname
        \@docolbbox{#1}\hss
      }%
    \else
      \expandafter\raise\csname col@\romannumeral#1@eveny\endcsname
      \hb@xt@\z@
      {%
        \expandafter\kern \csname col@\romannumeral#1@evenx\endcsname
        \@docolbbox{#1}\hss
      }%
    \fi
  \else
    \expandafter\raise\csname col@\romannumeral#1@posy\endcsname
    \hb@xt@\z@
    {%
      \expandafter\kern \csname col@\romannumeral#1@posx\endcsname
      \@docolbbox{#1}\hss
    }%
  \fi
\fi
}

```

If an offset hasn't been specified, compute it. If the frame making command is known (e.g. doublebox), compute the offset according to known specifications, otherwise set the negative offset to `\flowframesep` plus `\flowframerule`, which may or may not be correct.

```

\@ff@s@t@doubleboxoffset Compute offset for \doublebox:
  \newcommand*{\@ff@s@t@doubleboxoffset}{%
    \setlength{\@ff@offset}{-\flowframesep}%
    \addtolength{\@ff@offset}{-3.75\flowframerule}%
    \addtolength{\@ff@offset}{-.5pt}%
  }

```

```

\@ff@s@t@ovalboxoffset Compute offset for \ovalbox:
  \newcommand*{\@ff@s@t@ovalboxoffset}{%
    \@ff@offset=-\fontdimen 8\tenln\relax
    \advance\@ff@offset by -\flowframesep\relax
  }

```

```

\@ff@s@t@ovalboxoffset Compute offset for \ovalbox:

```

```

\newcommand*{\@ff@s@t@Ovalboxoffset}{%
  \@ff@offset=-\fontdimen 8\tenlnw\relax
  \advance\@ff@offset by -\flowframesep\relax
}

```

\@ff@s@t@defaultoffset Compute default offset:

```

\newcommand*{\@ff@s@t@defaultoffset}{%
  \@ff@offset=-\flowframesep\relax
  \addtolength{\@ff@offset}{-\flowframerule}%
}

```

\@ff@setoffset Compute offset for **flow frame** #1. Stores offset value in \@ff@offset.

```

\newcommand*{\@ff@setoffset}[1]{%
  \ifthenelse
    {\equal{\csname @ff@offset@\romannumeral#1\endcsname}{compute}}{%
    {%
      \ifthenelse{\boolean{columnframe\romannumeral#1}}{%
        {%
          \ifthenelse
            {%
              \equal{\csname @ff@frametype@\romannumeral#1\endcsname}%
                {doublebox}%
            }%
            {%
              \@ff@s@t@doubleboxoffset
            }%
            {%
              \ifthenelse
                {%
                  \equal{\csname @ff@frametype@\romannumeral#1\endcsname}%
                    {ovalbox}%
                }%
                {%
                  \@ff@s@t@ovalboxoffset
                }%
                {%
                  \ifthenelse
                    {%
                      \equal{\csname @ff@frametype@\romannumeral#1\endcsname}%
                        {Ovalbox}%
                    }%
                    {%
                      \@ff@s@t@Ovalboxoffset
                    }%
                    {%
                      \@ff@s@t@defaultoffset
                    }%
                }%
            }%
        }%
      }%
    }%
  }%
}

```

```

    }%
    {}%
  }%
  {%
    \setlength{\@ff@offset}{%
      {\csname @ff@offset@\romannumeral#1\endcsname}%
    }%
  }
}

```

\@sf@setoffset Compute offset for **static frame** #1. Stores offset value in \@ff@offset.

```

\newcommand*{\@sf@setoffset}[1]{%
  \ifthenelse
  {%
    \equal{\csname @sf@offset@\romannumeral#1\endcsname}%
    {compute}%
  }%
  {%
    \ifthenelse{\boolean{staticframe\romannumeral#1}}%
    {%
      \ifthenelse
      {%
        \equal{\csname @sf@frametype@\romannumeral#1\endcsname}%
        {doublebox}%
      }%
      {%
        \@ff@s@t@doubleboxoffset
      }%
      {%
        \ifthenelse
        {%
          \equal{\csname @sf@frametype@\romannumeral#1\endcsname}%
          {ovalbox}%
        }%
        {%
          \@ff@s@t@ovalboxoffset
        }%
        {%
          \ifthenelse
          {%
            \equal{\csname @sf@frametype@\romannumeral#1\endcsname}%
            {Ovalbox}%
          }%
          {%
            \@ff@s@t@Ovalboxoffset
          }%
          {%
            \@ff@s@t@defaultoffset
          }%
        }%
      }%
    }%
  }%
}

```

```

    }%
  }%
  {}%
}%
{%
  \setlength{\@ff@offset}{%
    {\csname @sf@offset@romannumeral#1\endcsname}%
  }%
}
}

```

\@df@setoffset Compute offset for **dynamic frame** #1. Stores offset value in \@ff@offset.

```

\newcommand*{\@df@setoffset}[1]{%
  \ifthenelse
  {%
    \equal{\csname @df@offset@romannumeral#1\endcsname}%
    {compute}%
  }%
  {%
    \setlength{\@ff@offset}{0pt}%
    \ifthenelse{\boolean{dynamicframe\romannumeral#1}}{%
      {%
        \ifthenelse
        {%
          \equal{\csname @df@frametype@romannumeral#1\endcsname}%
          {doublebox}%
        }%
        {%
          \@ff@s@t@doubleboxoffset
        }%
        {%
          \ifthenelse
          {%
            \equal{\csname @df@frametype@romannumeral#1\endcsname}%
            {ovalbox}%
          }%
          {%
            \@ff@s@t@ovalboxoffset
          }%
          {%
            \ifthenelse
            {%
              \equal{\csname @df@frametype@romannumeral#1\endcsname}%
              {ovalbox}%
            }%
            {%
              \@ff@s@t@ovalboxoffset
            }%
            {%
              \@ff@s@t@defaultoffset
            }%
          }%
        }%
      }%
    }%
  }%
}

```



```

    }%
  }%
} %
} %
{} %
} %
{ %
  \setlength{\@ff@offset}%
  {\csname @df@offset@romannumeral#1\endcsname}%
} %
}

```

`\@putmarginbox` Draw box representing the margin for **flow frame #1**.

```

\newcommand*{\@putmarginbox}[1]{%
  \@ff@chckifthispg{\@ff@pages@countreg}{#1}%
  \if@notthiscol
  \else
    \@killglue
    \if@twoside
      \ifodd\c@page
        \edef\ff@x{\csname col@romannumeral#1@posx\endcsname}%
        \edef\ff@y{\csname col@romannumeral#1@posy\endcsname}%
      \else
        \edef\ff@x{\csname col@romannumeral#1@evenx\endcsname}%
        \edef\ff@y{\csname col@romannumeral#1@eveny\endcsname}%
      \fi
    \else
      \edef\ff@x{\csname col@romannumeral#1@posx\endcsname}%
      \edef\ff@y{\csname col@romannumeral#1@posy\endcsname}%
    \fi
    \setlength{\@ff@tmp@x}{\ff@x}%
    \setlength{\@ff@tmp@y}{\ff@y}%
    \@getmarginpos{\csname @ff@margin@romannumeral#1\endcsname}%
    \ifthenelse{\equal{\ff@margin}{left}}%
    {%
      \addtolength{\@ff@tmp@x}{-\marginparwidth}%
      \addtolength{\@ff@tmp@x}{-\marginparsep}%
      \ifthenelse{\boolean{columnframe\romannumeral#1}}%
      {}%
    }%
  }%
  {%
    \addtolength{\@ff@tmp@x}%
    {\csname colwidth\romannumeral#1\endcsname}%
    \addtolength{\@ff@tmp@x}{\marginparsep}%
    \ifthenelse{\boolean{columnframe\romannumeral#1}}%
    {}%
  }%
} %

```

```

\raise\@ff@tmp@y
\hb@xt@\z@
{%
\expandafter\kern\@ff@tmp@x
\@fr@meifdraft{\@ff@box{\marginparwidth}%
{\csname colheight\romannumeral#1\endcsname}{}}%
{M:\number#1}\hss
}%
\fi
\ignorespaces
}

```

`\@ff@drawmargins` Draw all the margins associated with the **flow frames** defined on the current page.

```

\newcommand*{\@ff@drawmargins}{%
\@colN=0\relax
\whiledo{\@colN<\c@maxflow}%
{%
\advance\@colN by 1\relax
\makebox[Opt][l]{\@putmarginbox{\@colN}}%
}%
}

```

`\@ff@getstaticpos` Extract the width and height for static or **dynamic frame** specified in the form `[\langle c \rangle][\langle height \rangle][\langle valign \rangle]{\langle width \rangle}`

```

\def\@ff@getstaticpos[#1][#2][#3]#4{%
\@ff@tmp@x=#4\relax
\@ff@tmp@y=#2\relax
\def\ff@valign{#3}%
}

```

`\@dostaticbox` Display the savebox associated with **static frame** #1

```

\newcommand*{\@dostaticbox}[1]{%
\edef\ff@frametype{%
\csname @sf@frametype@\romannumeral#1\endcsname
}%
\edef\ff@col{\csname @sf@col@\romannumeral#1\endcsname}%
\edef\ff@backcol{\csname @sf@backcol@\romannumeral#1\endcsname}%
\@sf@setoffset{#1}%
\expandafter\expandafter\expandafter
\@ff@getstaticpos\csname @sf@dim@\romannumeral#1\endcsname
\rotateframe
{\csname @sf@angle@\romannumeral#1\endcsname}%
{%
\ifthenelse{\boolean{staticframe\romannumeral#1}}%
{%
\@ff@fbox{\@ff@tmp@x}{\@ff@tmp@y}%
}%
\expandafter\usebox\csname @staticframe@\romannumeral#1\endcsname
}

```

```

    }
    {\csname\ff@frametype\endcsname}%
  }%
  {%
    \ff@box{\ff@tmp@x}{\ff@tmp@y}%
    {%
      \expandafter\usebox\csname @staticframe@\romannumeral#1\endcsname
    }%
  }%
}
}

```

\@dostaticbbox Now for the **bounding box**:

```

\newcommand*{\@dostaticbbox}[1]{%
  \edef\ff@col{%
    \sf@setoffset{#1}%
    \expandafter\expandafter\expandafter
    \ff@getstaticpos\csname @sf@dim@\romannumeral#1\endcsname
    \@fr@meifdraft
  }%
  \ff@box{\ff@tmp@x}{\ff@tmp@y}%
  {%
    \expandafter\usebox\csname @staticframe@\romannumeral#1\endcsname
  }%
}%
{S:\number#1;\csname @sf@id@\romannumeral#1\endcsname}%
}

```

\@putstaticbox Put the static box #1 at its given position, with its associated border.

```

\newcommand*{\@putstaticbox}[1]{%
  %\changes{2014-06-04}{1.16}{added check for 'hide' and 'hidethis'}
  %attributes}
  % Check the 'hide' and 'hidethis' attributes
  % \begin{macrocode}
  \ifthenelse{\boolean{@sf@hidethis@\romannumeral#1}}{%
    {%
      \@notthiscoltrue
      \global\csletcs{if@sf@hidethis@\romannumeral#1}{iffalse}%
    }%
  }%
  \ifthenelse{\boolean{@sf@hide@\romannumeral#1}}{%
    {%
      \@notthiscoltrue
    }%
  }%
}

```

Neither 'hide' nor 'hidethis' have been set so check the page list.

```

  \sf@chkifthispg{#1}%
}%
}

```

```

\if@notthiscol
\else
  \@killglue
  \if@twoside
    \ifodd\c@page
      \expandafter\raise\csname @sf@romannumeral#1@posy\endcsname
      \hb@xt@\z@
      {%
        \expandafter\kern \csname @sf@romannumeral#1@posx\endcsname
        \@dostaticbox{#1}\hss
      }%
    \else
      \expandafter\raise\csname @sf@romannumeral#1@eveny\endcsname
      \hb@xt@\z@
      {%
        \expandafter\kern \csname @sf@romannumeral#1@evenx\endcsname
        \@dostaticbox{#1}\hss
      }%
    \fi
  \else
    \expandafter\raise\csname @sf@romannumeral#1@posy\endcsname
    \hb@xt@\z@
    {%
      \expandafter\kern \csname @sf@romannumeral#1@posx\endcsname
      \@dostaticbox{#1}\hss
    }%
  \fi
\fi
}

```

\@putstaticbbox Now for the **bounding box**:

```

\newcommand*{\@putstaticbbox}[1]{%
  \@sf@chckifthispg{#1}%
  \if@notthiscol
  \else
    \@killglue
    \if@twoside
      \ifodd\c@page
        \expandafter\raise\csname @sf@romannumeral#1@posy\endcsname
        \hb@xt@\z@
        {%
          \expandafter\kern \csname @sf@romannumeral#1@posx\endcsname
          \@dostaticbbox{#1}\hss
        }%
      \ignorespaces
    \else
      \expandafter\raise\csname @sf@romannumeral#1@eveny\endcsname
      \hb@xt@\z@
      {%

```

```

\expandafter\kern \csname @sf@romannumeral#1@evenx\endcsname
\@dostaticbbox{#1}\hss
}%
\ignorespaces
\fi
\else
\expandafter\raise\csname @sf@romannumeral#1@posy\endcsname
\hb@xt@z@
{%
\expandafter\kern \csname @sf@romannumeral#1@posx\endcsname
\@dostaticbbox{#1}\hss
}%
\ignorespaces
\fi
\fi
}

```

`\@resetst@tics` Clear the contents of all the **static frames** that have the clear option set.

```

\newcommand*{\@resetst@tics}{%
\@colN=0\relax
\whiledo{\@colN<\c@maxstatic}%
{%
\advance\@colN by 1\relax
Has the clear flag been set?
\ifthenelse{\boolean{@sf@clear@romannumeral\@colN}}%
{%
Set the contents of the box to empty
\global\sbox
{%
\csname @staticframe@romannumeral\@colN\endcsname
}%
{}}%
}%
}%
}

```

`\@resetdyn@mics` Clear the contents of the **dynamic frames** that have the clear option set.

```

\newcommand*{\@resetdyn@mics}{%
\@colN=0\relax
\whiledo{\@colN<\c@maxdynamic}%
{%
\advance\@colN by 1\relax
\ifthenelse{\boolean{@df@clear@romannumeral\@colN}}%
{%
\expandafter\global\expandafter
\gdef\csname @dynamicframe@romannumeral\@colN\endcsname{%
}%
}
}

```

```

    {}%
  }%
}

```

\@dodfparbox Display contents of dynamic box (contents stored in \ff@contents, style given by \ff@style):

```

\newcommand*{\@dodfparbox}[1]{%
  \expandafter\let\expandafter
    \@ff@parshape\csname @df@shape@\romannumeral#1\endcsname
  \expandafter\@ff@getshape\@ff@parshape\relax
  \ifcase\ff@shape

```

no shape

```

    \expandafter\expandafter\expandafter
    \parbox\csname @df@dim@\romannumeral#1\endcsname
    {%
      \setlength\parindent\sdfparindent
      \csname\ff@style\endcsname{\ff@contents}%
    }%

```

\or

\parshape

```

    \expandafter\expandafter\expandafter
    \parbox\csname @df@dim@\romannumeral#1\endcsname
    {%
      \setlength\parindent\sdfparindent
      \csname\ff@style\endcsname
      {%
        \let\oldpar=\par
        \let\par=\ffpshpar
        \@ff@setsecthead
        \@ff@parshape
        \ff@contents\oldpar
      }%
    }%

```

\or

\shapepar

```

    \expandafter\expandafter\expandafter
    \parbox\csname @df@dim@\romannumeral#1\endcsname
    {%
      \setlength\parindent\sdfparindent
      \csname\ff@style\endcsname
      {%
        \@ff@disablesec\@ff@parshape
        \ff@contents\par
      }%
    }%

```

}%

\fi

```

}

```

`\@dodynamicbox` Typeset the dynamic box with its associated border.

```
\newcommand*{\@dodynamicbox}[1]{%
  \edef\ff@frametype{%
    \csname @df@frametype@\romannumeral#1\endcsname
  }%
  \edef\ff@col{\csname @df@col@\romannumeral#1\endcsname}%
  \edef\ff@txtcol{\csname @df@txtcol@\romannumeral#1\endcsname}%
  \edef\ff@backcol{\csname @df@backcol@\romannumeral#1\endcsname}%
  \edef\ff@style{\csname @df@style@\romannumeral#1\endcsname}%
  \def\ff@contents{\csname @dynamicframe@\romannumeral#1\endcsname}%
  \df@setoffset{#1}%
  \expandafter\expandafter\expandafter
    \ff@getstaticpos\csname @df@dim@\romannumeral#1\endcsname
  \rotateframe{\csname @df@angle@\romannumeral#1\endcsname}%
  {%
    \ifthenelse{\boolean{dynamicframe\romannumeral#1}}{%
      {%
        \ff@fbox{\ff@tmp@x}{\ff@tmp@y}%
        {\@dodfparbox{#1}}%
        {\csname\ff@frametype\endcsname}%
      }%
    }%
    \ff@box{\ff@tmp@x}{\ff@tmp@y}%
    {%
      \@dodfparbox{#1}%
    }%
  }%
}
```

`\@dodynamicbbox` Now for the **bounding box**:

```
\newcommand*{\@dodynamicbbox}[1]{%
  \edef\ff@col{%
    \@df@setoffset{#1}%
  }%
  \expandafter\expandafter\expandafter
    \ff@getstaticpos\csname @df@dim@\romannumeral#1\endcsname
  \@fr@meifdraft
  {%
    \ff@box{\ff@tmp@x}{\ff@tmp@y}%
    {%
      \expandafter\expandafter\expandafter
        \parbox\csname @df@dim@\romannumeral#1\endcsname
      {}%
    }%
  }%
  {D:\number#1;\csname @df@id@\romannumeral#1\endcsname}%
}
```

`\@putdynamicbox` Put the **dynamic frame** #1 at its given position

```
\newcommand*{\@putdynamicbox}[1]{%
```

Check the ‘hide’ and ‘hidethis’ attributes

```
\ifthenelse{\boolean{@df@hidethis@romannumeral#1}}%
{%
  \@notthiscoltrue
  \global\csletcs{if@df@hidethis@romannumeral#1}{iffalse}%
}%
{%
  \ifthenelse{\boolean{@df@hide@romannumeral#1}}%
  {%
    \@notthiscoltrue
  }%
  {%
```

Neither ‘hide’ nor ‘hidethis’ have been set so check the page list.

```
\@df@chckifthispg{#1}%
}%
}%
\if@notthiscol
\else
  \@killglue
  \if@twoside
    \ifodd\c@page
      \expandafter\raise\csname @df@romannumeral#1@posy\endcsname
      \hb@xt@{z@
      {%
        \expandafter\kern \csname @df@romannumeral#1@posx\endcsname
        \@dodynamicbox{#1}\hss
      }%
      \ignorespaces
    \else
      \expandafter\raise\csname @df@romannumeral#1@eveny\endcsname
      \hb@xt@{z@
      {%
        \expandafter\kern \csname @df@romannumeral#1@evenx\endcsname
        \@dodynamicbox{#1}\hss
      }%
      \ignorespaces
    \fi
  \else
    \expandafter\raise\csname @df@romannumeral#1@posy\endcsname
    \hb@xt@{z@
    {%
      \expandafter\kern \csname @df@romannumeral#1@posx\endcsname
      \@dodynamicbox{#1}\hss
    }%
    \ignorespaces
  \fi
\fi
```


}

\@putdynamicbbox Bounding box:

```
\newcommand*{\@putdynamicbbox}[1]{%
  \@df@chckifthispg{#1}%
  \if@notthiscol
  \else
    \@killglue
    \if@twoside
      \ifodd\c@page
        \expandafter\raise\csname @df@\romannumeral#1@posy\endcsname
        \hb@xt@\z@
        {%
          \expandafter\kern \csname @df@\romannumeral#1@posx\endcsname
          \@dodynamicbbox{#1}\hss
        }%
        \ignorespaces
      \else
        \expandafter\raise\csname @df@\romannumeral#1@eveny\endcsname
        \hb@xt@\z@
        {%
          \expandafter\kern \csname @df@\romannumeral#1@evenx\endcsname
          \@dodynamicbbox{#1}\hss
        }%
        \ignorespaces
      \fi
    \else
      \expandafter\raise\csname @df@\romannumeral#1@posy\endcsname
      \hb@xt@\z@
      {%
        \expandafter\kern \csname @df@\romannumeral#1@posx\endcsname
        \@dodynamicbbox{#1}\hss
      }%
      \ignorespaces
    \fi
  \fi
}
```

\@@doheader Do standard header in the standard place.

```
\newcommand*{\@@doheader}{%
  \setlength\@ff@tmp@y{\textheight}%
  \addtolength\@ff@tmp@y{\headsep}%
  \def\ff@col{}%
  \def\ff@txtcol{}%
  \def\ff@backcol{{none}}%
  \@ff@box{0pt}{\@ff@tmp@y}{\makebox[0pt][l]{\@@dothehead}}%
}
```

\@@dofooter Do standard footer in the standard place.

```

\newcommand*{\@@dofooter}{%
  \setlength\@ff@tmp@y{-\footskip}%
  \def\ff@col{%
    \def\ff@txtcol{%
      \def\ff@backcol{{none}}}%
    \ff@box{0pt}{\@ff@tmp@y}{\makebox[0pt][l]{\@dothefoot}}}%
}

```

\@s@tfr@mes This is a modified version of the way the picture environment works:

```

\newcommand{\@s@tfr@mes}[1]{%
  {%
    \@picht\textheight
    \setbox\@picbox\hb@xt@ \textwidth
    \bgroup
      \hbox
        \bgroup
          #1\relax
        \egroup
      \hss
    \egroup
    \ht\@picbox\@picht
    \dp\@picbox\z@
    \mbox{\box\@picbox}%
  }%
}

```

\@ff@doallflowframes Puts all the **flow frames** defined on the current page

```

\newcommand*{\@ff@doallflowframes}{%
  \@colN=0\relax
  \whiledo{\@colN<\c@maxflow}%
  {%
    \advance\@colN by 1\relax
    \@putcolbox{\@colN}%
  }%
}

```

\@ff@doallflowframesbbox Flow frame **bounding boxes**:

```

\newcommand*{\@ff@doallflowframesbbox}{%
  \@colN=0\relax
  \whiledo{\@colN<\c@maxflow}%
  {%
    \advance\@colN by 1\relax
    \@putcolbbox{\@colN}%
  }%
}

```

\@ff@doallstatics Puts all **static frames** defined on the current page

```

\newcommand*{\@ff@doallstatics}{%
  \@colN=0\relax

```

```

\whiledo{\@colN<\c@maxstatic}%
{%
  \advance\@colN by 1\relax
  \@putstaticbox{\@colN}%
}%
}

```

`\@ff@doallstaticsbbbox` Static frame **bounding boxes**:

```

\newcommand*{\@ff@doallstaticsbbbox}{%
  \@colN=0\relax
  \whiledo{\@colN<\c@maxstatic}%
  {%
    \advance\@colN by 1\relax
    \@putstaticbbox{\@colN}%
  }%
}

```

`\@ff@doalldynamics` Puts all the **dynamic frames** defined on the current page

```

\newcommand*{\@ff@doalldynamics}{%
  \@colN=0\relax
  \whiledo{\@colN<\c@maxdynamic}%
  {%
    \advance\@colN by 1\relax
    \@putdynamicbox{\@colN}%
  }%
}

```

`\@ff@doalldynamicsbbbox` Dynamic frame **bounding boxes**:

```

\newcommand*{\@ff@doalldynamicsbbbox}{%
  \@colN=0\relax
  \whiledo{\@colN<\c@maxdynamic}%
  {%
    \advance\@colN by 1\relax
    \@putdynamicbbox{\@colN}%
  }%
}

```

`\@ff@dotypeblock` Draw **typeblock** frame if draft.

```

\newcommand*{\@ff@dotypeblock}{%
  \makebox[0pt][l]{%
    {%
      \@fr@meifdraft[\setffdrafttypeblockcolor]%
      {%
        \vbox to \textheight{\hbox to \textwidth{}}%
      }%
    }%
  }%
}

```

`\@ff@do@allframes` Put all frames defined on the current page.

```

\newlength\ffevenoffset
\newcommand*{\@ff@do@allframes}{%
  \ffevenoffset=0pt\relax
  \if@twoside
    \ifodd\c@page
    \else
      \ffevenoffset=-\oddsidemargin\relax
      \advance\ffevenoffset by \evensidemargin\relax
      \kern\ffevenoffset\relax
    \fi
  \fi
  \setlength{\@ff@tmp@x}{\textwidth}%
  \advance\@ff@tmp@x by -\ffevenoffset\relax
  \makebox[\@ff@tmp@x][l]%
  {%
    \@s@tfr@mes
    {%
      \@ff@do@allstatics
      \@@doheader
      \@@dofooter
      \@ff@do@allflowframes
      \@ff@do@alldynamics
      \ifshowtypeblock
        \@ff@dotypeblock
      \fi
      \ifshowframebbox
        \@ff@do@allstaticsbbox
        \@ff@do@allflowframesbbox
        \@ff@do@alldynamicsbbox
      \fi
      \ifshowmargins
        \@ff@drawmargins
      \fi
    }%
  }%
}
```

`\@outputdblcol` This was modified from the output routine for standard two column format. After `\@g@tnextcol`, the register `\c@curpg` contains the page that the next **flow frame** is on. If `\c@curpg` minus `\c@page` is greater than 1, then there is at least one page without a **flow frame**. These pages will have to be shipped before \TeX can continue with the rest of the document.

```

\newcount\@nxtcol
\def\@outputdblcol{%
  \@nxtcol=\c@thisframe

  \c@curpg=\@ff@pages@countreg
  \@g@tnextcol{\@nxtcol}%
}
```

```
\if@ff@nwpg
```

Next flow frame starts on new page.

```
\global\@firstcolumntrue
\setcolbox\c@thisframe
\if@specialpage
  \global\@specialpagefalse
  \nameuse{ps@\@specialstyle}\relax
\fi
\if@twoside
  \ifodd\count\z@
    \let\@thehead\@oddhead
    \let\@thefoot\@oddfoot
  \else
    \let\@thehead\@evenhead
    \let\@thefoot\@evenfoot
  \fi
\else
  \let\@thehead\@oddhead
  \let\@thefoot\@oddfoot
\fi
\@begindvi
\@dodynamicthehead\@dodynamicthefoot
\badness=\@M
\setbox\@outputbox\vbox{\hbox to \textwidth{\@ff@do@allframes}}}%
\@combinedblfloats
\@outputpage
```

Shipout pages without flow frames.

```
\advance\c@curpg by -\@ff@pages@countreg\relax
\whiledo{\c@curpg>0}%
{%
  \advance\c@curpg by -1\relax
  \setbox\@outputbox\vbox{\hbox to \textwidth{\@ff@do@allframes}}}%
  \@outputpage
}
\begingroup
\@dblfloatplacement
\@startdblcolumn
\@whilesw \if@fcolmade \fi
  {\@outputpage \@startdblcolumn }%
\endgroup
\@resetst@tics
\@resetdyn@mics
\else
```

Still on same page, save contents of box255

```
\global\@firstcolumnfalse
\setcolbox\c@thisframe
\fi
```

```

\global\c@thisframe=\nxtcol
\@setcol{\c@thisframe}\relax
\global\@colht\vsize
}

```

```

\@dblfloatplacement Modify \@dblfloatplacement replacing \textheight with \vsize.
\def\@dblfloatplacement{%
\global\@dbltopnum\c@dbltopnumber
\global\@dbltoproom\dbltopfraction\@colht\@textmin
\@colht\advance\@textmin -\@dbltoproom
\@fpmin\dblfloatpagefraction\vsize
\@fptop \@dblftop \@fpsep \@dblfpsep \@fpbot \@dblfpbot
}

```

1.9 Static versions of floats

Floats can not go in saveboxes or minipages, so define static versions to go in static and **dynamic frames**. These just set \@capytype so that the \caption command may be used.

```

statictable
\newenvironment{statictable}{\def\@capytype{table}}{}

staticfigure
\newenvironment{staticfigure}{\def\@capytype{figure}}{}

```

1.10 Standard Layouts

1.10.1 Column Styles

Redefine \twocolumn and \onecolumn to set up **flow frames** from the dimensions of the **typeblock**. Ignore the optional argument. The **flow frame** height will be adjusted to make sure that it is an integer multiple of \baselineskip, unless \ffvajdustfalse is used.

```

\newif\iffvadjust
\ffvadjusttrue

```

```

\onecolumn \onecolumn will make a single flow frame that takes up the entire area of the
typeblock (adjusted according to \iffvadjust.) Frames should only be cre-
ated in the preamble, otherwise the next flow frame may not be detected by
the output routine. The exception to this is when the output routine can't find
any more flow frames to use, in which case it creates a single flow frame us-
ing \@onecolumn. Therefore, make \onecolumn use \@onecolumn, and then
set \onecolumn as a preamble command, so it can't be used in the document,
but the output routine can use \@onecolumn. Syntax: \onecolumn[⟨pages⟩],
where ⟨pages⟩ is the page list for which the new flow frame is defined.
\renewcommand*{\onecolumn}{\@onecolumn}

```

`\@onecolumn`

```
\newcommand*\@onecolumn}[1][all]{%
  \@onecolumninarea[#1]{\textwidth}{\textheight}{0pt}{0pt}%
}
```

Need a length to store the height of the **flow frame** so that it can be adjusted.

```
\newlength\columnheight
```

`\onecolumninarea` `\onecolumn` is in fact a special case of `\onecolumninarea` which sets up one **flow frame** in the specified area, given by bottom left corner ($\langle x \rangle$, $\langle y \rangle$), relative to the **typeblock**, with width $\langle w \rangle$ and height $\langle h \rangle$. The only difference between `\onecolumninarea` and explicitly creating the **flow frame** using `\newflowframe` is the `\onecolumninarea` will adjust the vertical height to ensure it is a multiple of `\baselineskip`. There is also no starred version, so if you want a border, you will need to set it explicitly using `\setflowframe`. Syntax:

```
\onecolumninarea[ $\langle pages \rangle$ ]{ $\langle w \rangle$ }{ $\langle h \rangle$ }{ $\langle x \rangle$ }{ $\langle y \rangle$ }.
\newcommand*\onecolumninarea{\@onecolumninarea}
\@onlypreamble{\onecolumninarea}
```

`\@onecolumninarea`

```
\newcommand*\@onecolumninarea}[5][all]{%
  \setlength{\columnheight}{#3}%
  \ifffvadjust
    \adjustheight{\columnheight}%
  \fi
  \@n@wflowframe[#1]{#2}{\columnheight}{#4}{#5}%
}
```

`\twocolumn` Set up two **flow frames** parallel to each other with a distance of `\columnsep` between them, to fill the entire **typeblock** (although the frames may end up marginally shorter than `\textheight` after they have been adjusted.) Again, these commands may only be used in the preamble. Note that unlike the standard `\twocolumn` command, this one has an optional argument that indicates which pages the two **flow frames** should appear on. Syntax: `\twocolumn[$\langle pages \rangle$]`.

```
\renewcommand*\twocolumn{\@twocolumn}
```

`\@twocolumn`

```
\newcommand*\@twocolumn}[1][all]{%
  \@twocolumninarea[#1]{\textwidth}{\textheight}{0pt}{0pt}%
}
```

`\twocolumninarea` Again, `\twocolumn` is actually a special case of `\twocolumninarea`. Syntax:

```
\twocolumninarea[ $\langle pages \rangle$ ]{ $\langle w \rangle$ }{ $\langle h \rangle$ }{ $\langle x \rangle$ }{ $\langle y \rangle$ }.
\newcommand*\twocolumninarea{\@twocolumninarea}
\@onlypreamble{\twocolumninarea}
```

\@twocolumninarea

```
\newcommand*{\@twocolumninarea}[5][all]{%
  \setlength{\columnheight}{#3}%
  \iffvadjust
    \adjustheight{\columnheight}%
  \fi
  \setlength{\columnwidth}{#2}%
  \addtolength{\columnwidth}{-\columnsep}%
  \divide\columnwidth by 2\relax
  \setlength{\@ff@tmp@x}{#4}%
  \addtolength{\@ff@tmp@x}{\columnwidth}%
  \addtolength{\@ff@tmp@x}{\columnsep}%
  \iflefttorightcolumns
    \@n@wflowframe[#1]{\columnwidth}{\columnheight}{#4}{#5}%
    \setflowframe{\c@maxflow}{margin=left}%
  \else
    \@n@wflowframe[#1]{\columnwidth}{\columnheight}{\@ff@tmp@x}{#5}%
    \setflowframe{\c@maxflow}{margin=right}%
  \fi
  \iflefttorightcolumns
    \@n@wflowframe[#1]{\columnwidth}{\columnheight}{\@ff@tmp@x}{#5}%
    \setflowframe{\c@maxflow}{margin=right}%
  \else
    \@n@wflowframe[#1]{\columnwidth}{\columnheight}{#4}{#5}%
    \setflowframe{\c@maxflow}{margin=left}%
  \fi
}
```

\Ncolumn Again for an arbitrary number of columns ($\langle n \rangle$). Syntax: \Ncolumn[$\langle pages \rangle$]{ $\langle n \rangle$ }.

```
\newcommand*{\Ncolumn}[2][all]{%
  \Ncolumninarea[#1]{#2}{\textwidth}{\textheight}{0pt}{0pt}%
}
\@onlypreamble{\Ncolumn}
```

\Ncolumninarea Check the number of **flow frames** requested, and do one of the special cases if available. Syntax:

```
\Ncolumninarea[ $\langle pages \rangle$ ]{ $\langle n \rangle$ }{ $\langle w \rangle$ }{ $\langle h \rangle$ }{ $\langle x \rangle$ }{ $\langle y \rangle$ }.
\newcommand*{\Ncolumninarea}[6][all]{%
  \ifnum#2>2\relax
    \@Ncolumninarea[#1]{#2}{#3}{#4}{#5}{#6}%
  \else
    \ifcase#2\relax
      \PackageError{flowfram}%
      {%
        You have requested 0 flowframes!%
      }%
    \fi
    It does not make much sense to ask to create 0 flow frames%
  }%
```



```

\or
\onecolumninarea[#1]{#3}{#4}{#5}{#6}%
\or
\twocolumninarea[#1]{#3}{#4}{#5}{#6}%
\else
\PackageError{flowfram}%
{%
Can't create a negative number of flow frames!%
}%
{%
You have asked for \number#2 \space flow frames
which really doesn't make sense%
}%
\fi
\fi
}

```

```

\@onlypreamble{\Ncolumninarea}

```

`\Ncolumninarea` Set up $\langle n \rangle$ columns in the area specified. There is a horizontal distance of `\columnsep` between them all.

```

\newcommand*{\@Ncolumninarea}[6][all]{%
\@colN=#2\relax
\advance\@colN by -1\relax
\setlength{\columnwidth}{#3}%
\addtolength{\columnwidth}{-\@colN\columnsep}%
\divide\columnwidth by #2\relax
\setlength{\@ff@tmp@x}{#5}%
\iflefttorightcolumns
\else
\addtolength{\@ff@tmp@x}{#3}%
\addtolength{\@ff@tmp@x}{-\columnwidth}%
\fi
\setlength{\columnheight}{#4}%
\iffvadjust\adjustheight{\columnheight}\fi%
\@colN=0\relax
\loop
\advance\@colN by 1\relax
\newflowframe[#1]{\columnwidth}{\columnheight}{\@ff@tmp@x}{#6}%
\iflefttorightcolumns
\addtolength{\@ff@tmp@x}{\columnwidth}%
\addtolength{\@ff@tmp@x}{\columnsep}%
\else
\addtolength{\@ff@tmp@x}{-\columnwidth}%
\addtolength{\@ff@tmp@x}{-\columnsep}%
\fi
\ifnum\@colN<#2
\repeat
}

```

Set up something similar but have another frame (of type *<type>*) at the top of the other frames.

- `\vcolumnsep` The vertical distance between the top frames and column flow frames when created using `\Ncolumnstop` etc is given by:
- ```
\newlength{\vcolumnsep}
\setlength{\vcolumnsep}{\columnsep}
```
- `\onecolumnstop` `\onecolumnstop` makes one **flow frame**, and one *<type>* frame in the area specified, where the *<type>* frame is *<H>* high. The distance between the top frame and the column **flow frame** will be approximately `\vcolumnsep`. (The height of **flow frame** may be adjusted to make it an integer multiple of `\baselineskip`.)
- First the special case where the area is the **typeblock**. Syntax:
- ```
\onecolumnstop[<pages>]{<type>}{<H>}
\newcommand*{\onecolumnstop}[3][all]{%
  \onecolumnstopinarea[#1]{#2}{#3}{\textwidth}{\textheight}{0pt}{0pt}%
}
\@onlypreamble{\onecolumnstop}
```
- `\onecolumnstop` Special case for **static frame**. Syntax: `\onecolumnstop[<pages>]{<H>}`
- ```
\newcommand*{\onecolumnstop}[2][all]{%
 \onecolumnstopinarea[#1]{static}{#2}{\textwidth}{\textheight}{0pt}{0pt}%
}
```
- `\onecolumnDtop` Special case for **dynamic frame**. Syntax: `\onecolumnDtop[<pages>]{<H>}`
- ```
\newcommand*{\onecolumnDtop}[2][all]{%
  \onecolumnstopinarea[#1]{dynamic}{#2}{\textwidth}{\textheight}{0pt}{0pt}%
}
```
- `\newframe` Create a frame of given type. Syntax:
- ```
\newframe[<pages>]{<type>}{<w>}{<h>}{<x>}{<y>}.
\newcommand*{\newframe}[6][all]{%
 \ifthenelse{\equal{#2}{flow}}{%
 {%
 \@n@wflowframe[#1]{#3}{#4}{#5}{#6}%
 }%
 }%
 \ifthenelse{\equal{#2}{dynamic}}{%
 {%
 \@n@wdynamicframe[#1]{#3}{#4}{#5}{#6}%
 }%
 }%
 \ifthenelse{\equal{#2}{static}}{%
 {%
 \@n@wstaticframe[#1]{#3}{#4}{#5}{#6}%
 }%
 }%
 \PackageError{flowfram}%
}
```

```

 {Unknown frame type '#2'}%
 {%
 Available frame types are: 'flow', 'static' and 'dynamic'%
 }%
}%
}%
}%
}

```

`\onecolumnntopinarea` Now for a specified area. Syntax:

```

\onecolumnntopinarea[⟨pages⟩]{⟨type⟩}{⟨H⟩}{⟨w⟩}{⟨h⟩}{⟨x⟩}{⟨y⟩}.
\newlength\@ff@staticH

```

```

\newcommand*{\onecolumnntopinarea}[7][all]{%
 \setlength{\@ff@staticH}{#3}%
 \setlength{\@ff@tmp@y}{#5}%
 \addtolength{\@ff@tmp@y}{-\@ff@staticH}%
 \setlength{\columnheight}{\@ff@tmp@y}%
 \addtolength{\columnheight}{-\vcolumnsep}%
 \iffvadjust
 \adjustheight{\columnheight}%
 \fi
 \addtolength{\@ff@tmp@y}{#7}%
 \newframe[#1]{#2}{#4}{\@ff@staticH}{#6}{\@ff@tmp@y}%
 \on@wflowframe[#1]{#4}{\columnheight}{#6}{#7}%
}

\@onlypreamble{\onecolumnntopinarea}

```

`\onecolumnStopinarea` Special case for **static frame**. Syntax:

```

\onecolumnStopinarea[⟨pages⟩]{⟨H⟩}{⟨w⟩}{⟨h⟩}{⟨x⟩}{⟨y⟩}.
\newcommand*{\onecolumnStopinarea}[6][all]{%
 \onecolumnntopinarea[#1]{static}{#2}{#3}{#4}{#5}{#6}%
}

```

`\onecolumnDtopinarea` Special case for **dynamic frame**. Syntax:

```

\onecolumnDtopinarea[⟨pages⟩]{⟨H⟩}{⟨w⟩}{⟨h⟩}{⟨x⟩}{⟨y⟩}.
\newcommand*{\onecolumnDtopinarea}[6][all]{%
 \onecolumnntopinarea[#1]{dynamic}{#2}{#3}{#4}{#5}{#6}%
}

```

`\twocolumntop` Now for two **flow frames**, with a single `⟨type⟩` frame above both of them. Syntax:

```

\twocolumntop[⟨pages⟩]{⟨type⟩}{⟨H⟩}
 First the special case where the area is the entire typeblock:
\newcommand*{\twocolumntop}[3][all]{%
 \twocolumntopinarea[#1]{#2}{#3}{\textwidth}{\textheight}{0pt}{0pt}%
}
\@onlypreamble{\twocolumntop}

```

`\twocolumnStop` Special case for **static frame**.  
`\newcommand*{\twocolumnStop}[2][all]{%`  
`\@twocolumntopinarea[#1]{static}{#2}{\textwidth}{\textheight}{0pt}{0pt}%`  
`}`

`\twocolumnDtop` Special case for **dynamic frame**.  
`\newcommand*{\twocolumnDtop}[2][all]{%`  
`\twocolumntop[#1]{dynamic}{#2}%`  
`}`

Now for a general area.

`\twocolumntopinarea` Syntax:  
`\twocolumntopinarea[<pages>]{<type>}{<H>}{<w>}{<h>}{<x>}{<y>}.%`  
`\newcommand*{\twocolumntopinarea}{\@twocolumntopinarea}`  
`\newcommand*{\@twocolumntopinarea}[7][all]{%`  
`\setlength{\@ff@staticH}{#3}%`

work out where to put the static frame

```
\setlength{\@ff@tmp@y}{#5}%
\addtolength{\@ff@tmp@y}{-\@ff@staticH}%
\setlength{\columnheight}{\@ff@tmp@y}%
\addtolength{\@ff@tmp@y}{#7}%
\newframe[#1]{#2}{#4}{\@ff@staticH}{#6}{\@ff@tmp@y}%
```

work out height of the flow frames

```
\addtolength{\columnheight}{-\vcolumnsep}%
\iffvadjust\adjustheight{\columnheight}\fi
```

work out the widths of the flow frames

```
\setlength{\columnwidth}{#4}%
\addtolength{\columnwidth}{-\columnsep}%
\divide\columnwidth by 2\relax
```

work out the offset of the right column

```
\setlength{\@ff@tmp@x}{\columnwidth}%
\addtolength{\@ff@tmp@x}{\columnsep}%
\addtolength{\@ff@tmp@x}{#6}%
\iflefttorightcolumns
\@n@wflowframe[#1]{\columnwidth}{\columnheight}{#6}{#7}%
\setflowframe{\c@maxflow}{margin=left}%
\else
\@n@wflowframe[#1]{\columnwidth}{\columnheight}{\@ff@tmp@x}{#7}%
\setflowframe{\c@maxflow}{margin=right}%
\fi
\iflefttorightcolumns
\@n@wflowframe[#1]{\columnwidth}{\columnheight}{\@ff@tmp@x}{#7}%
\setflowframe{\c@maxflow}{margin=right}%
\else
\@n@wflowframe[#1]{\columnwidth}{\columnheight}{#6}{#7}%
\setflowframe{\c@maxflow}{margin=left}%
```

```

\fi
}
\@onlypreamble{\twocolumntopinarea}

\twocolumnStopinarea Special case for static frame.
\newcommand*\twocolumnStopinarea[6][all]{%
 \twocolumntopinarea[#1]{static}{#2}{#3}{#4}{#5}{#6}%
}

\twocolumnDtopinarea Special case for dynamic frame.
\newcommand*\twocolumnDtopinarea[6][all]{%
 \twocolumntopinarea[#1]{dynamic}{#2}{#3}{#4}{#5}{#6}%
}

\Ncolumnntop Similarly for an arbitrary number of flow frames. Special case where the area is
the typeblock.
Syntax:
\Ncolumnntop[<pages>]{<type>}{<n>}{<H>}
\newcommand*\Ncolumnntop[4][all]{%
 \Ncolumntopinarea[#1]{#2}{#3}{#4}{\textwidth}{\textheight}{0pt}{0pt}%
}
\@onlypreamble{\Ncolumnntop}

\NcolumnStop Special case for static frame.
\newcommand*\NcolumnStop[3][all]{%
 \Ncolumnntop[#1]{static}{#2}{#3}%
}

\NcolumnDtop Special case for dynamic frame.
\newcommand*\NcolumnDtop[3][all]{%
 \Ncolumnntop[#1]{dynamic}{#2}{#3}%
}

\Ncolumntopinarea Again test to make sure the user requested a sensible number.
\newcommand*\Ncolumntopinarea[8][all]{%
 \ifnum#3>2\relax
 \@Ncolumntopinarea[#1]{#2}{#3}{#4}{#5}{#6}{#7}{#8}%
 \else
 \ifcase#3\relax
 \PackageError{flowfram}%
 {%
 You have requested 0 flowframes!%
 }%
 \ifcase#3\relax
 It does not make much sense to ask to create 0 flow frames%
 \or
 \onecolumntopinarea[#1]{#2}{#4}{#5}{#6}{#7}{#8}%

```

```

\or
\twocolumntopinarea[#1]{#2}{#4}{#5}{#6}{#7}{#8}%
\else
\PackageError{flowfram}%
{%
Can't create a negative number of flow frames!%
}%
{%
You have asked for \number#3 \space flow frames
which really doesn't make sense%
}%
\fi
\fi
}
\@onlypreamble{\Ncolumntopinarea}

```

\Ncolumntopinarea Fit the frames into specified area. Syntax:

```

\Ncolumntopinarea[<pages>]{<type>}{<n>}{<H>}{<w>}{<h>}{<x>}{<y>}.
\newcommand*{\@Ncolumntopinarea}[8][all]{%
\setlength{\@ff@staticH}{#4}%

```

work out where to put the static frame

```

\setlength{\@ff@tmp@y}{#6}%
\addtolength{\@ff@tmp@y}{-\@ff@staticH}%
\setlength{\columnheight}{\@ff@tmp@y}%
\addtolength{\@ff@tmp@y}{#8}%
\newframe[#1]{#2}{#5}{\@ff@staticH}{#7}{\@ff@tmp@y}%

```

work out height of the flow frames

```

\addtolength{\columnheight}{-\vcolumnsep}%

```

adjust the flow frame height so that it is a multiple of \baselineskip

```

\iffvadjust
\adjustheight{\columnheight}%
\fi

```

work out the widths of the flow frames

```

\@colN=#3\relax
\advance\@colN by -1\relax
\setlength{\columnwidth}{#5}%
\addtolength{\columnwidth}{-\@colN\columnsep}%
\divide\columnwidth by #3\relax

```

Set the  $x$  position of the first frame

```

\setlength{\@ff@tmp@x}{#7}%
\iflefttorightcolumns
\else
\addtolength{\@ff@tmp@x}{#5}%
\addtolength{\@ff@tmp@x}{-\columnwidth}%
\fi
\@colN=0\relax

```

```

\loop
\advance\@colN by 1\relax
\newflowframe[#1]{\columnwidth}{\columnheight}{\@ff@tmp@x}{#8}%
work out the offset for the next column
\iflefttorightcolumns
\addtolength{\@ff@tmp@x}{\columnwidth}%
\addtolength{\@ff@tmp@x}{\columnsep}%
\else
\addtolength{\@ff@tmp@x}{-\columnwidth}%
\addtolength{\@ff@tmp@x}{-\columnsep}%
\fi
\ifnum\@colN<#3
\repeat
}

```

`\NcolumnStopinarea` Specific case for **static frame**.

```

\newcommand*\NcolumnStopinarea[7][all]{%
\Ncolumnstopinarea[#1]{static}{#2}{#3}{#4}{#5}{#6}{#7}%
}

```

`\NcolumnDtopinarea` Specific case for **dynamic frame**.

```

\newcommand*\NcolumnDtopinarea[7][all]{%
\NcolumnDtopinarea[#1]{dynamic}{#2}{#3}{#4}{#5}{#6}{#7}%
}

```

Now the same kind of thing but with the *<type>* frame at the bottom. Firstly, a single **flow frame** with a *<type>* frame below it.

`\onecolumnbottom` Syntax:

```

\onecolumnbottom[<pages>]{<type>}{<H>}
\newcommand*\onecolumnbottom[3][all]{%
\onecolumnbottominarea[#1]{#2}{#3}{\textwidth}{\textheight}{Opt}{Opt}%
}

```

This command may only be used in the preamble.

```

\@onlypreamble{\onecolumnbottom}

```

`\onecolumnSbottom` Special case for **static frame**.

```

\newcommand*\onecolumnSbottom[2][all]{%
\onecolumnbottom[#1]{static}{#2}%
}

```

`\onecolumnDbottom` Special case for **dynamic frame**.

```

\newcommand*\onecolumnDbottom[2][all]{%
\onecolumnbottom[#1]{dynamic}{#2}%
}

```

General case of the above, but fit in specified area.

`\onecolumnbottominarea` Syntax:  
`\onecolumnbottominarea[⟨pages⟩]{⟨type⟩}{⟨H⟩}{⟨w⟩}{⟨h⟩}{⟨x⟩}{⟨y⟩}`,  
 where  $\langle H \rangle$  is the  $\langle type \rangle$  frame's height. The area is defined by bottom left co-ordinates  $(\langle x \rangle, \langle y \rangle)$  width  $\langle w \rangle$ , and height  $\langle h \rangle$ .

```

\newcommand*{\onecolumnbottominarea}[7][all]{%
 \setlength{\@ff@staticH}{#3}%
 \setlength{\columnheight}{#5}%
 \addtolength{\columnheight}{-\@ff@staticH}%
 \addtolength{\columnheight}{-\vcolumnsep}%
 \iffvadjust
 \adjustheight{\columnheight}%
 \fi
 \setlength{\@ff@tmp@y}{#5}%
 \addtolength{\@ff@tmp@y}{-\columnheight}%
 \addtolength{\@ff@tmp@y}{#7}%
 \newframe[#1]{#2}{#4}{\@ff@staticH}{#6}{#7}%
 \newflowframe[#1]{#4}{\columnheight}{#6}{\@ff@tmp@y}%
}

```

Again, this command may only be used in the preamble.

```

\@onlypreamble{\onecolumnbottominarea}

```

`\onecolumnSbottominarea` Special case for **static frame**.

```

\newcommand*{\onecolumnSbottominarea}[6][all]{%
 \onecolumnbottominarea[#1]{static}{#2}{#3}{#4}{#5}{#6}%
}

```

`\onecolumnDbottominarea` Special case for **dynamic frame**.

```

\newcommand*{\onecolumnDbottominarea}[6][all]{%
 \onecolumnbottominarea[#1]{dynamic}{#2}{#3}{#4}{#5}{#6}%
}

```

`\twocolumnbottom` Now for two **flow frames** side by side with a static frame underneath both of them. Firstly, the specific case where the area is the entire **typeblock**. Syntax:

```

\twocolumnbottom[⟨pages⟩]{⟨type⟩}{⟨H⟩}.
\newcommand*{\twocolumnbottom}[3][all]{%
 \twocolumnSbottominarea[#1]{#2}{#3}{\textwidth}{\textheight}{0pt}{0pt}%
}
\@onlypreamble{\twocolumnbottom}

```

`\twocolumnSbottom` Special case for **static frame**.

```

\newcommand*{\twocolumnSbottom}[2][all]{%
 \twocolumnbottom[#1]{static}{#2}%
}

```

`\twocolumnDbottom` Special case for **dynamic frame**.

```

\newcommand*{\twocolumnDbottom}[2][all]{%
 \twocolumnbottom[#1]{dynamic}{#2}%
}

```



`\twocolumnbottominarea` Now for a general area. Syntax:

```

\twocolumnbottominarea[{pages}]{{type}}{{H}}{{w}}{{h}}{{x}}{{y}}.
 \newcommand*{\twocolumnbottominarea}[7][all]{%
 \setlength{\off@staticW}{#4}%
 \setlength{\off@staticH}{#3}%

work out height of the flow frames
 \setlength{\columnheight}{#5}%
 \addtolength{\columnheight}{-\off@staticH}%
 \addtolength{\columnheight}{-\vcolumnsep}%
 \iffvadjust\adjustheight{\columnheight}\fi%
 \newframe[#1]{#2}{\off@staticW}{\off@staticH}{#6}{#7}%

work out the y position of the flow frames
 \setlength{\off@tmp@y}{#5}%
 \addtolength{\off@tmp@y}{-\columnheight}%
 \addtolength{\off@tmp@y}{#7}%

work out the widths of the flow frames
 \setlength{\columnwidth}{\off@staticW}%
 \addtolength{\columnwidth}{-\columnsep}%
 \divide\columnwidth by 2\relax

work out the x offset of the right column
 \setlength{\off@tmp@x}{\columnwidth}%
 \addtolength{\off@tmp@x}{\columnsep}%
 \addtolength{\off@tmp@x}{#6}%

Define the frames
 \iflefttorightcolumns
 \newflowframe[#1]{\columnwidth}{\columnheight}{#6}{\off@tmp@y}%
 \setflowframe{\c@maxflow}{margin=left}%
 \else
 \newflowframe[#1]{\columnwidth}{\columnheight}%
 {\off@tmp@x}{\off@tmp@y}%
 \setflowframe{\c@maxflow}{margin=right}%
 \fi
 \iflefttorightcolumns
 \newflowframe[#1]{\columnwidth}{\columnheight}%
 {\off@tmp@x}{\off@tmp@y}%
 \setflowframe{\c@maxflow}{margin=right}%
 \else
 \newflowframe[#1]{\columnwidth}{\columnheight}{#6}{\off@tmp@y}%
 \setflowframe{\c@maxflow}{margin=left}%
 \fi
 }
 \@onlypreamble{\twocolumnbottominarea}

```

`\twocolumnSbottominarea` Special case for **static frame**.

```

\newcommand*{\twocolumnSbottominarea}[6][all]{%
 \twocolumnbottominarea[#1]{static}{#2}{#3}{#4}{#5}{#6}%

```

}

`\twocolumnDbottominarea` Special case for **dynamic frame**.

```
\newcommand*{\twocolumnDbottominarea}[6][all]{%
 \twocolumnbottominarea[#1]{dynamic}{#2}{#3}{#4}{#5}{#6}%
}
```

Now for an arbitrary number of parallel **flow frames** with a **static frame** beneath all of them.

`\Ncolumnbottom` First make them fill the entire **typeblock**. Syntax:

```
\Ncolumnbottom[<pages>]{<type>}{<H>}.
\newcommand*{\Ncolumnbottom}[4][all]{%
 \Ncolumnbottominarea[#1]{#2}{#3}{#4}{\textwidth}{\textheight}{0pt}{0pt}%
}
\@onlypreamble{\Ncolumnbottom}
```

`\NcolumnSbottom` Special case for **static frame**.

```
\newcommand*{\NcolumnSbottom}[3][all]{%
 \Ncolumnbottom[#1]{static}{#2}{#3}%
}
```

`\NcolumnDbottom` Special case for **dynamic frame**.

```
\newcommand*{\NcolumnDbottom}[3][all]{%
 \Ncolumnbottom[#1]{dynamic}{#2}{#3}%
}
```

`\Ncolumnbottominarea` Again check the user has requested a sensible number.

```
\newcommand*{\Ncolumnbottominarea}[8][all]{%
 \ifnum#3>2\relax
 \@Ncolumnbottominarea[#1]{#2}{#3}{#4}{#5}{#6}{#7}{#8}%
 \else
 \ifcase#3\relax
 \PackageError{flowfram}{%
 You have requested 0 flowframes!}%
 It does not make much sense to ask to create 0 flow frames}
 \or
 \onecolumnbottominarea[#1]{#2}{#4}{#5}{#6}{#7}{#8}%
 \or
 \twocolumnbottominarea[#1]{#2}{#4}{#5}{#6}{#7}{#8}%
 \else
 \PackageError{flowfram}{%
 {%
 Can't create a negative number of flow frames!%
 }%
 }%
 You have asked for \number#3 \space flow frames
 which really doesn't make sense%
```

```

 }%
 \fi
\fi
}
\@onlypreamble{\Ncolumnbottominarea}

```

\NcolumnSbottominarea An arbitrary number of columns with a **static frame** underneath them all, filling the specified area.

```

\newcommand*{\NcolumnSbottominarea}[8][all]{%
 \setlength{\@ff@staticH}{#4}%

```

work out height of the flow frames

```

 \setlength{\columnheight}{#6}%
 \addtolength{\columnheight}{-\@ff@staticH}%
 \addtolength{\columnheight}{-\vcolumnsep}%

```

adjust the flow frame height so that it is a multiple of \baselineskip

```

 \iffvadjust
 \adjustheight{\columnheight}%
 \fi
 \newframe[#1]{#2}{#5}{\@ff@staticH}{#7}{#8}%

```

work out the y offset of the flow frames

```

 \setlength{\@ff@tmp@y}{#6}%
 \addtolength{\@ff@tmp@y}{-\columnheight}%
 \addtolength{\@ff@tmp@y}{#8}%

```

work out the widths of the flow frames

```

 \@colN=#3\relax
 \advance\@colN by -1\relax
 \setlength{\columnwidth}{#5}%
 \addtolength{\columnwidth}{-\@colN\columnsep}%
 \divide\columnwidth by #3\relax

```

Set the x offset of the first frame.

```

 \setlength{\@ff@tmp@x}{#7}%
 \iflefttorightcolumns
 \else
 \addtolength{\@ff@tmp@x}{#5}%
 \addtolength{\@ff@tmp@x}{-\columnwidth}%
 \fi
 \@colN=0\relax
 \loop
 \advance\@colN by 1\relax
 \newflowframe[#1]{\columnwidth}{\columnheight}%
 {\@ff@tmp@x}{\@ff@tmp@y}%
 \repeat

```

work out the offset for the next column

```

 \iflefttorightcolumns
 \addtolength{\@ff@tmp@x}{\columnwidth}%
 \addtolength{\@ff@tmp@x}{\columnsep}%
 \fi

```

```

\else
\addtolength{\@ff@tmp@x}{-\columnwidth}%
\addtolength{\@ff@tmp@x}{-\columnsep}%
\fi
\ifnum\@colN<#3
\repeat
}

```

`\NcolumnSbottominarea` Specific case for **static frame**.

```

\newcommand*{\NcolumnSbottominarea}[1][all]{%
\Ncolumnbottominarea[#1]{static}%
}

```

`\NcolumnDbottominarea` Specific case for **dynamic frame**.

```

\newcommand*{\NcolumnDbottominarea}[1][all]{%
\Ncolumnbottominarea[#1]{dynamic}%
}

```

`\adjustheight` Given a height #1 (a length), adjust it so that it is a multiple of `\baselineskip`.

```

\newcount\@ff@adjh
\newcommand*{\adjustheight}[1]{%
convert to an integer
\@ff@adjh=#1\relax
\divide\@ff@adjh by \baselineskip\relax
#1=\baselineskip\relax
\multiply#1 by \@ff@adjh\relax
}

```

`\adjustcolsep` Adjust the value of `\columnsep` so that the margins will fit between columns.

```

\newcommand*{\adjustcolsep}{%
\multiply\columnsep by 2\relax
\addtolength{\columnsep}{\marginparwidth}%
}

```

### 1.10.2 Backdrop Effects

Set up some commands to make **static frames** for different styles of backdrop.

`\vtwotone` Syntax:

`\vtwotone[⟨pages⟩][⟨xoffset⟩]{⟨W1⟩}{⟨C1⟩}{⟨L1⟩}{⟨W2⟩}{⟨C2⟩}{⟨L2⟩}`  
 where the first frame has width `⟨W1⟩` with background colour `⟨C1⟩` and label `⟨L1⟩`. The second frame has width `⟨W2⟩` with background colour `⟨C2⟩` and label `⟨L2⟩`. Unlike earlier commands, the *x*-offset is relative to the left page edge *not* the **typeblock**. This is because they are designed for backdrops, which tend to span the entire page. Note that the colour specs must be completely enclosed in braces. e.g. `{[gray]{0.5}}` *not* `[gray]{0.5}`.

Need a length to store the width of the **static frame**.

```

\newlength\@ff@staticW

```

Vertical two tone effect where the height of the static frames is equal to the paper height.

```
\newcommand*{\vtwotone}[1][all]{%
 \def\ff@pages{#1}%
 \@vtwotone
}

\newcommand*{\@vtwotone}[1][0pt]{\@@vtwotonebottom{#1}{\paperheight}}
```

`\vtwotonebottom` Vertical two tone effect along the bottom of the page, of height  $\langle H \rangle$ . Syntax:  
`\vtwotonebottom[ $\langle pages \rangle$ ][ $\langle xoffset \rangle$ ]{ $\langle H \rangle$ }{ $\langle W1 \rangle$ }{ $\langle C1 \rangle$ }{ $\langle L1 \rangle$ }{ $\langle W2 \rangle$ }{ $\langle C2 \rangle$ }{ $\langle L2 \rangle$ }`  
 where the first frame starts at  $\langle xoffset \rangle$ .

```
\newcommand*{\@vtwotonebottom}[8]{%
 \computeleftedgeodd{\ff@tmp@x}%
 \if@twoside
 \computeleftedgeeven{\ff@tmp@x@even}%
 \else
 \setlength{\ff@tmp@x@even}{\ff@tmp@x}%
 \fi
 \computebottomedge{\ff@tmp@y}%
 \addtolength{\ff@tmp@x}{#1}%
 \addtolength{\ff@tmp@x@even}{#1}%
 \@nextvband{\ff@pages}{#2}{#3}{#4}{#5}%
 \@nextvband{\ff@pages}{#2}{#6}{#7}{#8}%
}

\@onlypreamble{\vtwotone}
```

`\vtwotonebottom` Border strip along the bottom of the page

```
\newcommand*{\vtwotonebottom}[1][all]{%
 \def\ff@pages{#1}%
 \@vtwotonebottom
}

\@onlypreamble{\vtwotonebottom}

\newcommand*{\@vtwotonebottom}[2][0pt]{\@@vtwotonebottom{#1}{#2}}
```

`\vtwotonetop` Border strip along the top of the page

```
\newcommand*{\vtwotonetop}[1][all]{%
 \def\ff@pages{#1}%
 \@vtwotonetop
}

\newcommand*{\@vtwotonetop}[2][0pt]{\@@vtwotonetop{#1}{#2}}

\newcommand*{\@vtwotonetop}[8]{%
 \computeleftedgeodd{\ff@tmp@x}%
 \if@twoside
 \computetopedgeeven{\ff@tmp@x@even}%
 \else
 \setlength{\ff@tmp@x@even}{\ff@tmp@x}%
 \fi
 \compu...
```

```

\if@twoside
 \computeleftedgeeven{\@ff@tmp@x@even}%
\else
 \setlength{\@ff@tmp@x@even}{\@ff@tmp@x}%
\fi
\computetopedge{\@ff@tmp@y}%
\addtolength{\@ff@tmp@y}{-#2}%
\addtolength{\@ff@tmp@x}{#1}%
\addtolength{\@ff@tmp@x@even}{#1}%
\@nextvband{\ff@pages}{#2}{#3}{#4}{#5}%
\@nextvband{\ff@pages}{#2}{#6}{#7}{#8}%
}

```

`\@nextvband` Make next **static frame**. Syntax:

```

\@nextvband{<pages>}{<height>}{<width>}{<colour specs>}{<label>}
x and y offsets are given by \@ff@tmp@x and \@ff@tmp@y. On exit, \@ff@tmp@x
is set to the right border.

\newcommand*{\@nextvband}[5]{%
 \setlength{\@ff@staticW}{#3}%
 \ifthenelse{equal{#5}{}}{%
 \newstaticframe[#1]{\@ff@staticW}{#2}{\@ff@tmp@x}{\@ff@tmp@y}%
 }%
 \newstaticframe[#1]{\@ff@staticW}{#2}{\@ff@tmp@x}{\@ff@tmp@y}[#5]%
}%
\expandafter\global\expandafter\setlength
\csname @sf@romannumeral@c@maxstatic @evenx\endcsname{%
 \@ff@tmp@x@even}%
\@setframecol#4\end{\c@maxstatic}{backcol}{sf}%
\addtolength{\@ff@tmp@x}{\@ff@staticW}%
\addtolength{\@ff@tmp@x@even}{\@ff@staticW}%
}

```

`\vNtone` Similarly for N colours. Syntax:

```

\vNtone[<pages>][<xoffset>]{<n>}{<W1>}{<C1>}{<L1>}\dots{<Wn>}{<Cn>}{<Ln>}
where the first frame has width <W1> with background colour <C1> and label
<L1> all the way up to the <n>th frame which has width <Wn>, background colour
<Cn> and IDL <Ln>.

```

Keep track of which strip we are doing.

```

\newcount\@thisstrip

```

This command needs two optional arguments, so store first optional argument, and look for the next.

```

\newcommand*{\vNtone}[1][all]{%
 \def\ff@pages{#1}%
 \@vNtone
}

```

`\@vNtone` Got the first argument, now get the next.

```

\newcommand*{\@vNtone}[2][Opt]{%
 \@vNtone{#1}{#2}{\paperheight}%
}

```

`\@@vNtone` Vertical  $\langle n \rangle$  tone aligned along the bottom of the page with height #3.

```

\newcommand*{\@@vNtone}[3]{%
 \computeleftedgeodd{\@ff@tmp@x}%
 \if@twoside
 \computeleftedgeeven{\@ff@tmp@x@even}%
 \else
 \setlength{\@ff@tmp@x@even}{\@ff@tmp@x}%
 \fi
 \computebottomedge{\@ff@tmp@y}%
 \addtolength{\@ff@tmp@x}{#1}%
 \addtolength{\@ff@tmp@x@even}{#1}%
 \@thisstrip=#2\relax
 \setlength{\@ff@staticH}{#3}%
 \@nextvNband
}

```

`\@nextvNband` Recursively do the next strip.

```

\newcommand*{\@nextvNband}{%
 \ifnum\@thisstrip>0\relax
 \let\flf@next\@nextvNband
 \else
 \let\flf@next\relax
 \fi
 \advance\@thisstrip by -1\relax
 \flf@next
}

```

`\@@nextvNband` Do current strip, and go on to next one.

```

\newcommand*{\@@nextvNband}[3]{%
 \@nextvband{\ff@pages}{\@ff@staticH}{#1}{#2}{#3}%
 \@nextvNband
}

\@onlypreamble{\vNtone}

```

`\vNtonebottom` Border strip along the bottom of the page. Same as above but user specifies the height.

```

\newcommand*{\vNtonebottom}[1][all]{%
 \def\ff@pages{#1}%
 \vNtonebottom
}

\@onlypreamble{\vNtonebottom}

```

```

\@vNtonebottom
 \newcommand*{\@vNtonebottom}[3][Opt]{%
 \@vNtone{#1}{#2}{#3}%
 }

\@vNtonetop
 Border strip along the top of the page. Again two optional arguments are re-
 quired. Get first optional argument.
 \newcommand*{\@vNtonetop}[1][all]{%
 \def\ff@pages{#1}%
 \@vNtonetop
 }
 \@onlypreamble{\@vNtonetop}

\@vNtonetop
 Get next optional argument.
 \newcommand*{\@vNtonetop}[3][Opt]{%
 \@vNtonetop{#1}{#2}{#3}%
 }

\@@vNtonetop
 Now get on with it. Again, it has to be done recursively.
 \newcommand*{\@@vNtonetop}[3]{%
 \computeleftedgeodd{\@ff@tmp@x}%
 \if@twoside
 \computeleftedgeeven{\@ff@tmp@x@even}%
 \else
 \setlength{\@ff@tmp@x@even}{\@ff@tmp@x}%
 \fi
 \computetopedge{\@ff@tmp@y}%
 \addtolength{\@ff@tmp@y}{-#3}%
 \addtolength{\@ff@tmp@x}{#1}%
 \addtolength{\@ff@tmp@x@even}{#1}%
 \@thisstrip=#2\relax
 \setlength{\@ff@staticH}{#3}%
 \@nextvNband%
 }

\@htwotone
 Now do horizontal strips. Syntax:
 \htwotone[<pages>][<y offset>]{<H1>}{<C1>}{<L1>}{<H2>}{<C2>}{<L2>}
 \newcommand*{\@htwotone}[1][all]{%
 \def\ff@pages{#1}%
 \@htwotone
 }

\@htwotone
 \newcommand*{\@htwotone}[1][Opt]{\@htwotoneleft{#1}{\paperwidth}}

\@@htwotoneleft
 This is all done in much the same way as the vertical strips.
 \newcommand*{\@@htwotoneleft}[8]{%
 \computeleftedgeodd{\@ff@tmp@x}%

```



```

\if@twoside
 \computeleftedgeeven{\@ff@tmp@x@even}%
\else
 \setlength{\@ff@tmp@x@even}{\@ff@tmp@x}%
\fi
\computebottomedge{\@ff@tmp@y}%
\addtolength{\@ff@tmp@y}{#1}%
\@nexthband{\ff@pages}{#2}{#3}{#4}{#5}%
\@nexthband{\ff@pages}{#2}{#6}{#7}{#8}%
}

```

```

\@onlypreamble{\htwotone}

```

`\htwotoneleft` Two tone horizontal strips along left border Syntax: `\htwotoneleft` [*<pages>*] [*<y offset>*] [*<width>*] [*<H1>*] [*<CI>*] [*<LI>*] [*<H2>*] [*<C2>*] [*<L2>*]

```

\newcommand*{\htwotoneleft}[1][all]{%
 \def\ff@pages{#1}%
 \@htwotoneleft
}
\@onlypreamble{\htwotoneleft}

```

`\@htwotoneleft`

```

\newcommand*{\@htwotoneleft}[2][0pt]{\@@htwotoneleft{#1}{#2}}

```

`\htwotoneright` Two tone horizontal strips along right border

```

\newcommand*{\htwotoneright}[1][all]{%
 \def\ff@pages{#1}%
 \@htwotoneright
}
\@onlypreamble{\htwotoneright}

```

`\@htwotoneright`

```

\newcommand*{\@htwotoneright}[2][0pt]{\@@htwotoneright{#1}{#2}}

```

`\@@htwotoneright`

```

\newcommand*{\@@htwotoneright}[8]{%
 \computerightedgeodd{\@ff@tmp@x}%
 \if@twoside
 \computerightedgeeven{\@ff@tmp@x@even}%
 \else
 \setlength{\@ff@tmp@x@even}{\@ff@tmp@x}%
 \fi
 \computebottomedge{\@ff@tmp@y}%
 \addtolength{\@ff@tmp@y}{#1}%
 \addtolength{\@ff@tmp@x}{-#2}%
 \addtolength{\@ff@tmp@x@even}{-#2}%
 \@nexthband{\ff@pages}{#2}{#3}{#4}{#5}%
 \@nexthband{\ff@pages}{#2}{#6}{#7}{#8}%
}

```

```

\hNtone Now for $\langle N \rangle$ coloured horizontal strips
\newcommand*{\hNtone}[1][all]{%
 \def\ff@pages{#1}%
 \hNtone
}
\@onlypreamble{\hNtone}

\@hNtone
\newcommand*{\@hNtone}[2][Opt]{%
 \@@hNtone{#1}{#2}{\paperwidth}%
}

\@@hNtone
\newcommand*{\@@hNtone}[3]{%
 \computeleftedgeodd{\@ff@tmp@x}%
 \if@twoside
 \computeleftedgeeven{\@ff@tmp@x@even}%
 \else
 \setlength{\@ff@tmp@x@even}{\@ff@tmp@x}%
 \fi
 \computebottomedge{\@ff@tmp@y}%
 \addtolength{\@ff@tmp@y}{#1}%
 \@thisstrip=#2\relax
 \setlength{\@ff@staticW}{#3}%
 \@nexthNband
}

\hNtoneleft Now for the N tone strips along the left border
\newcommand*{\hNtoneleft}[1][all]{%
 \def\ff@pages{#1}%
 \hNtoneleft
}
\@onlypreamble{\hNtoneleft}

\@hNtoneleft
\newcommand*{\@hNtoneleft}[3][Opt]{%
 \@@hNtone{#1}{#2}{#3}%
}

\hNtoneright Border strip along the right border
\newcommand*{\hNtoneright}[1][all]{%
 \def\ff@pages{#1}%
 \hNtoneright
}
\@onlypreamble{\hNtoneright}

\@hNtoneright
\newcommand*{\@hNtoneright}[3][Opt]{%

```

```

\@@hNtoneright{#1}{#2}{#3}%
}

\@@hNtoneright
\newcommand*{\@@hNtoneright}[3]{%
 \computerightedgeodd{\@ff@tmp@x}%
 \if@twoside
 \computerightedgeeven{\@ff@tmp@x@even}%
 \else
 \setlength{\@ff@tmp@x@even}{\@ff@tmp@x}%
 \fi
 \computebottomedge{\@ff@tmp@y}%
 \addtolength{\@ff@tmp@y}{#1}%
 \addtolength{\@ff@tmp@x}{-#3}%
 \addtolength{\@ff@tmp@x@even}{-#3}%
 \@thisstrip=#2\relax
 \setlength{\@ff@staticW}{#3}%
 \@nexthNband
}

\@nexthband Make next static frame. Syntax:
\@nexthband{<pages>}{<width>}{<height>}{<colour specs>}{<label>}
x and y offsets are given by \@ff@tmp@x and \@ff@tmp@y. On exit, \@ff@tmp@y
is set to the top border.
\newcommand*{\@nexthband}[5]{%
 \setlength{\@ff@staticH}{#3}%
 \ifthenelse{\equal{#5}{}}{%
 %
 \newstaticframe[#1]{#2}{\@ff@staticH}{\@ff@tmp@x}{\@ff@tmp@y}%
 }%
 %
 \newstaticframe[#1]{#2}{\@ff@staticH}{\@ff@tmp@x}{\@ff@tmp@y}[#5]%
}%
\expandafter\global\expandafter
\setlength\csname @sf@romannumeral\c@maxstatic @evenx\endcsname
{\@ff@tmp@x@even}%
\@setframecol#4\end{\c@maxstatic}{backcol}{sf}%
\addtolength{\@ff@tmp@y}{\@ff@staticH}%
}

\@nexthNband Get next horizontal strip recursively.
\newcommand*{\@nexthNband}{%
 \ifnum\@thisstrip>0\relax
 \let\flf@next\@nexthNband
 \else
 \let\flf@next\relax
 \fi
 \advance\@thisstrip by -1\relax
 \flf@next
}

```

}

\@@nexthNband

```
\newcommand*{\@@nexthNband}[3]{%
 \@@nexthband{\ff@pages}{\@ff@staticW}{#1}{#2}{#3}%
 \@@nexthNband
}
```

`\makebackgroundframe` Make one big **static frame** that covers the entire page. This command should come before all other commands that create **static frames**, otherwise it will obscure all the ones defined before it. Syntax:

`\makebackgroundframe[⟨pages⟩][⟨label⟩]`.

```
\newcommand*{\makebackgroundframe}[1][all]{%
 \ifnum\c@maxstatic>0\relax
 \PackageWarning{flowfram}%
 {%
 Background frame is not first static frame to be
 defined. All previously defined static frames may be
 obscured.%
 }%
 \fi
 \computeleftedgeodd{\@ff@tmp@x}%
 \if@twoside
 \computeleftedgeeven{\@ff@tmp@x@even}%
 \else
 \setlength{\@ff@tmp@x@even}{\@ff@tmp@x}%
 \fi
 \computebottomedge{\@ff@tmp@y}%
 \newstaticframe[#1]{\paperwidth}{\paperheight}{\@ff@tmp@x}%
 {\@ff@tmp@y}%
 \expandafter\global\expandafter
 \setlength\csname @sf@romannumeral\c@maxstatic @evenx\endcsname
 {\@ff@tmp@x@even}%
}
```

### 1.10.3 Lines Between Frames

`\insertvrule` Insert a **static frame** between two frames with a vertical rule that goes from the maximum height of the highest to the minimum height of the lowest, equidistant from both frames. Syntax:

`\insertvrule[⟨y top⟩][⟨y bottom⟩]{⟨frame1 type⟩}{⟨IDN1⟩}{⟨frame2 type⟩}{⟨IDN2⟩}`.

The starred version uses **IDLs** instead of **IDNs**. The optional arguments indicate to continue above the highest point by `⟨y top⟩` or continue below the lowest point by `⟨y bottom⟩`.

`\ffcolumseprule` This has changed in v1.09. Define `\ffcolumseprule` and use instead of `\columnseprule`

```

\newlength\ffcolumseprule
\setlength{\ffcolumseprule}{2pt}

```

`\ffruleddeclarations` This can be redefined to use declarations that affect how the rule appears. For example, it can be used to set the colour of the rule.

```

\newcommand*\ffruleddeclarations{}

```

`\insertvrule` Determine whether or not the starred version is being used.

```

\newcommand*\insertvrule{\@ifstar\@sinsertvrule\insertvrule}

```

`\@insertvrule` Two optional arguments required.

```

\newcommand*\@insertvrule[1][Opt]{%
 \@ifnextchar[{\@@insertvrule[#1]}{\@@insertvrule[#1][Opt]}%
}

```

Need some lengths:

```

\newlength\@ff@left@x
\newlength\@ff@left@y
\newlength\@ff@left@evenx
\newlength\@ff@left@eveny
\newlength\@ff@left@width
\newlength\@ff@left@height

```

`\@@insertvrule` Arguments all accounted for. Convert the frame type into a number to make life easier

```

\def\@@insertvrule[#1][#2]#3#4#5#6{%
 \ifthenelse{\equal{#3}{flow}}{%
 {%
 \def\@ff@type@i{1}%
 }%
 {%
 \ifthenelse{\equal{#3}{static}}{%
 {%
 \def\@ff@type@i{2}%
 }%
 {%
 \ifthenelse{\equal{#3}{dynamic}}{%
 {%
 \def\@ff@type@i{3}%
 }%
 {%
 \PackageError{flowfram}%
 {Unknown frame type '#3'}%
 {
 Available frame types are: 'flow', 'static'
 or 'dynamic'%
 }%
 }%
 }%
 }%
 }%
 }%
 }%
}

```

```

 }%
 }%
 \ifthenelse{\equal{#5}{flow}}%
 {%
 \def\@ff@type@ii{1}%
 }%
 {%
 \ifthenelse{\equal{#5}{static}}%
 {%
 \def\@ff@type@ii{2}%
 }%
 {%
 \ifthenelse{\equal{#5}{dynamic}}%
 {%
 \def\@ff@type@ii{3}%
 }%
 {%
 \PackageError{flowfram}%
 {Unknown frame type '#5'}%
 {%
 Available frame types are: 'flow', 'static'
 or 'dynamic'%
 }%
 }%
 }%
 }%
 }%
 }%
 @@insert@vrule{#1}{#2}{\@ff@type@i}{#4}{\@ff@type@ii}{#6}%
}

```

\@@insert@vrule Insert a new **static frame** between the two specified frames. Check to make sure which one is on the left and which one is on the right. Syntax:  
 \@@insert@vrule{<y top>}{<y bottom>}{<type ID>}{<IDN>}{<type ID>}{<IDN>}.

```

\newcommand*{\@@insert@vrule}[6]{%
 \@ff@getdim{#3}{#4}%
 \setlength{\@ff@left@x}{\ffareax}%
 \setlength{\@ff@left@y}{\ffareay}%
 \setlength{\@ff@left@width}{\ffareawidth}%
 \setlength{\@ff@left@height}{\ffareaheight}%
 \@ff@getdim{#5}{#6}%
 \ifnum\@ff@left@x>\ffareax\relax
 \@ff@swaplen{\@ff@left@x}{\ffareax}%
 \@ff@swaplen{\@ff@left@y}{\ffareax}%
 \@ff@swaplen{\@ff@left@evenx}{\ffareaevenx}%
 \@ff@swaplen{\@ff@left@eveny}{\ffareaevenx}%
 \@ff@swaplen{\@ff@left@width}{\ffareawidth}%
 \@ff@swaplen{\@ff@left@height}{\ffareaheight}%
 \fi
 \setlength{\@ff@tmp@x}{\@ff@left@x}
 \addtolength{\@ff@tmp@x}{\@ff@left@width}%

```

```

\setlength{\@ff@staticW}{\ff@areax}%
\addtolength{\@ff@staticW}{-\@ff@tmp@x}%
\setlength{\@ff@staticH}{\@ff@left@y}%
\addtolength{\@ff@staticH}{\@ff@left@height}%
\setlength{\@ff@tmp@y}{\ff@areay}%
\addtolength{\@ff@tmp@y}{\ff@areaheight}%
\ifnum\@ff@tmp@y>\@ff@staticH
 \setlength{\@ff@staticH}{\@ff@tmp@y}%
\fi
\ifnum\@ff@left@y<\ff@areay\relax
 \setlength{\@ff@tmp@y}{\@ff@left@y}%
\else
 \setlength{\@ff@tmp@y}{\ff@areay}%
\fi
\addtolength{\@ff@staticH}{-\@ff@tmp@y}%
\newstaticframe{\@ff@staticW}{\@ff@staticH}%
 {\@ff@tmp@x}{\@ff@tmp@y}%
\addtolength{\@ff@staticH}{#1}%
\addtolength{\@ff@staticH}{#2}%
\setstaticcontents{\c@maxstatic}{%
\ffruledeclarations
\ffvrule{#2}{\ffcolumnseprule}{\@ff@staticH}}%
\ifcase#3\relax
 \or \edef\@ff@pages{\csname @ff@pages@\romannumeral#4\endcsname}%
 \or \edef\@ff@pages{\csname @sf@pages@\romannumeral#4\endcsname}%
 \or \edef\@ff@pages{\csname @df@pages@\romannumeral#4\endcsname}%
\fi
\setstaticframe{\c@maxstatic}{pages=\@ff@pages}%

```

Check the difference between odd and even page co-ordinates and shift new frame in same direction. (Assumes the two original frames stay in the same relative position.)

```

\addtolength{\@ff@tmp@x}{\@ff@left@evenx}%
\addtolength{\@ff@tmp@x}{-\@ff@left@x}%
\addtolength{\@ff@tmp@y}{\@ff@left@eveny}%
\addtolength{\@ff@tmp@y}{-\@ff@left@y}%
\setstaticframe{\c@maxstatic}{evenx=\@ff@tmp@x,eveny=\@ff@tmp@y}%
}

```

`\ffvrule` `\ffvrule{<offset>}{<width>}{<height>}`

Draws the rule for `\insertvrule`

```

\newcommand*{\ffvrule}[3]{%
 \hfill \rule[-#1]{#2}{#3}\hfill\mbox{}%
}

```

`\@sininsertvrule` Starred version. Two optional arguments required.

```

\newcommand*{\@sininsertvrule}[1][0pt]{%
 \@ifnextchar[{\@sininsertvrule[#1]}{\@sininsertvrule[#1][0pt]}%
}

```

\@@sinsertvrule Find out the frame types and their IDN.

```

\def\@@sinsertvrule[#1][#2]#3#4#5#6{%
 \ifthenelse{\equal{#3}{flow}}{%
 {%
 \def\@ff@type@i{1}%
 \@flowframeid{#4}%
 \@ff@tmpN=\ff@id
 }%
 {%
 \ifthenelse{\equal{#3}{static}}{%
 {%
 \def\@ff@type@i{2}\@staticframeid{#4}\@ff@tmpN=\ff@id
 }%
 {%
 \ifthenelse{\equal{#3}{dynamic}}{%
 {%
 \def\@ff@type@i{3}%
 \@dynamicframeid{#4}%
 \@ff@tmpN=\ff@id
 }%
 {%
 \PackageError{flowfram}%
 {Unknown frame type '#3'}%
 {%
 Available frame types are: 'flow', 'static'
 or 'dynamic'%
 }%
 }%
 }%
 }%
 }%
 }%
 \ifthenelse{\equal{#5}{flow}}{%
 {%
 \def\@ff@type@ii{1}\@flowframeid{#6}%
 }%
 {%
 \ifthenelse{\equal{#5}{static}}{%
 {%
 \def\@ff@type@ii{2}%
 \@staticframeid{#6}%
 }%
 {%
 \ifthenelse{\equal{#5}{dynamic}}{%
 {%
 \def\@ff@type@ii{3}%
 \@dynamicframeid{#6}%
 }%
 {%
 \PackageError{flowfram}%
 {Unknown frame type '#5'}%

```



```

 {%
 Available frame types are: 'flow', 'static'
 or 'dynamic'%
 }%
 }%
}%
}%
\@@insert@vrule{#1}{#2}{\@ff@type@i}{\@ff@tmpN}%
 {\@ff@type@ii}{\ff@id}%
}

\inserthrule Now for a horizontal rule. Syntax similar to \insertvrule. Determine whether
or not the starred version is being used.
 \newcommand*{\inserthrule}{\@ifstar\@sinserthrule\@inserthrule}

\@inserthrule Two optional arguments required.
 \newcommand*{\@inserthrule}[1][Opt]{%
 \@ifnextchar[{\@@inserthrule[#1]}{\@@inserthrule[#1][Opt]}}%
 }

\@@inserthrule Arguments all accounted for. Convert the frame type into a number to make
life easier
 \def\@@inserthrule[#1][#2]#3#4#5#6{%
 \ifthenelse{\equal{#3}{flow}}{%
 {%
 \def\@ff@type@i{1}%
 }%
 {%
 \ifthenelse{\equal{#3}{static}}{%
 {%
 \def\@ff@type@i{2}%
 }%
 {%
 \ifthenelse{\equal{#3}{dynamic}}{%
 {%
 \def\@ff@type@i{3}}%
 {%
 \PackageError{flowfram}%
 {Unknown frame type '#3'}%
 {%
 Available frame types are: 'flow', 'static'
 or 'dynamic'%
 }%
 }%
 }%
 }%
 \ifthenelse{\equal{#5}{flow}}{%
 {%
 \def\@ff@type@ii{1}%

```

```

}%
{%
 \ifthenelse{\equal{#5}{static}}%
 {%
 \def\@ff@type@ii{2}%
 }%
 {%
 \ifthenelse{\equal{#5}{dynamic}}%
 {%
 \def\@ff@type@ii{3}%
 }%
 {%
 \PackageError{flowfram}%
 {Unknown frame type '#5'}%
 {%
 Available frame types are: 'flow', 'static'
 or 'dynamic'%
 }%
 }%
 }%
}%
\@@insert@hrule{#1}{#2}{\@ff@type@i}{#4}{\@ff@type@ii}{#6}%
}

```

\@@insert@hrule Insert a new **static frame** between the two specified frames. Check to make sure which one is on the top and which one is on the bottom. Syntax:

\@@insert@hrule{<*x left*>}{<*x right*>}{<*type ID*>}{<*IDN*>}{<*type ID*>}{<*IDN*>}.

```

\newcommand*{\@@insert@hrule}[6]{%
 \@ff@getdim{#3}{#4}%
 \setlength{\@ff@left@x}{\ffareax}%
 \setlength{\@ff@left@y}{\ffareay}%
 \setlength{\@ff@left@width}{\ffareawidth}%
 \setlength{\@ff@left@height}{\ffareaheight}%
 \@ff@getdim{#5}{#6}%
 \ifnum\@ff@left@y>\ffareay\relax
 \@ff@swaplen{\@ff@left@x}{\ffareax}%
 \@ff@swaplen{\@ff@left@y}{\ffareay}%
 \@ff@swaplen{\@ff@left@width}{\ffareawidth}%
 \@ff@swaplen{\@ff@left@height}{\ffareaheight}%
 \fi
 \setlength{\@ff@tmp@y}{\@ff@left@y}%
 \addtolength{\@ff@tmp@y}{\@ff@left@height}%
 \setlength{\@ff@staticH}{\ffareay}%
 \addtolength{\@ff@staticH}{-\@ff@tmp@y}%
 \setlength{\@ff@staticW}{\@ff@left@x}%
 \addtolength{\@ff@staticW}{\@ff@left@width}%
 \setlength{\@ff@tmp@x}{\ffareax}%
 \addtolength{\@ff@tmp@x}{\ffareawidth}%
 \ifnum\@ff@tmp@x>\@ff@staticW\relax

```

```

\setlength{\@ff@staticW}{\@ff@tmp@x}%
\fi
\ifnum\@ff@left@x<\ffareax\relax
\setlength{\@ff@tmp@x}{\@ff@left@x}%
\else
\setlength{\@ff@tmp@x}{\ffareax}%
\fi
\addtolength{\@ff@staticW}{-\@ff@tmp@x}%
\newstaticframe{\@ff@staticW}{\@ff@staticH}{%
\@ff@tmp@x}{\@ff@tmp@y}%
\addtolength{\@ff@staticW}{#1}%
\addtolength{\@ff@staticW}{#2}%
\setstaticcontents{\c@maxstatic}%
}%
\ffruledeclarations
\ffhrule{#1}{\@ff@staticW}{\ffcolumnseprule}%
}%
\ifcase#3\relax
\or \edef\@ff@pages{\csname @ff@pages@romannumeral#4\endcsname}%
\or \edef\@ff@pages{\csname @sf@pages@romannumeral#4\endcsname}%
\or \edef\@ff@pages{\csname @df@pages@romannumeral#4\endcsname}%
\fi
\setstaticframe{\c@maxstatic}{pages=\@ff@pages}%
\addtolength{\@ff@tmp@x}{\@ff@left@evenx}%
\addtolength{\@ff@tmp@x}{-\@ff@left@x}%
\addtolength{\@ff@tmp@y}{\@ff@left@eveny}%
\addtolength{\@ff@tmp@y}{-\@ff@left@y}%
\setstaticframe{\c@maxstatic}{evenx=\@ff@tmp@x,eveny=\@ff@tmp@y}%
}

```

`\ffhrule` `\ffhrule{<offset>}{<width>}{<height>}`

Draws the rule for `\inserthrule`

```

\newcommand*{\ffhrule}[3]{%
\hspace*{#1}\rule{#2}{#3}%
}

```

`\@sinserthrule` Starred version. Two optional arguments required.

```

\newcommand*{\@sinserthrule}[1][0pt]{%
\@ifnextchar[{\@sinserthrule[#1]}{\@sinserthrule[#1][0pt]}%
}

```

`\@@sinserthrule` Find out the frame types and their IDN.

```

\def\@@sinserthrule[#1][#2]#3#4#5#6{%
\ifthenelse{equal{#3}{flow}}{%
{%
\def\@ff@type@i{1}%
\@flowframeid{#4}%
\@ff@tmpN=\ffid
}%
}
}

```

```

{%
 \ifthenelse{\equal{#3}{static}}{%
 {%
 \def\@ff@type@i{2}%
 \@staticframeid{#4}%
 \@ff@tmpN=\ff@id
 }%
 {%
 \ifthenelse{\equal{#3}{dynamic}}{%
 {%
 \def\@ff@type@i{3}%
 \@dynamicframeid{#4}%
 \@ff@tmpN=\ff@id
 }%
 {%
 \PackageError{flowfram}%
 {Unknown frame type '#3'}%
 {%
 Available frame types are: 'flow', 'static'
 or 'dynamic'%
 }%
 }%
 }%
 }%
 }%
 \ifthenelse{\equal{#5}{flow}}{%
 {%
 \def\@ff@type@ii{1}%
 \@flowframeid{#6}%
 }%
 {%
 \ifthenelse{\equal{#5}{static}}{%
 {%
 \def\@ff@type@ii{2}%
 \@staticframeid{#6}%
 }%
 {%
 \ifthenelse{\equal{#5}{dynamic}}{%
 {%
 \def\@ff@type@ii{3}%
 \@dynamicframeid{#6}%
 }%
 {%
 \PackageError{flowfram}%
 {Unknown frame type '#5'}%
 {%
 Available frame types are: 'flow', 'static'
 or 'dynamic'%
 }%
 }%
 }%
 }%
 }%
 }%
 }%

```

```

 }%
 }%
 @@insert@hrule{#1}{#2}{\@ff@type@i}{\@ff@tmpN}%
 {\@ff@type@ii}{\ff@id}%
}

```

## 1.11 Putting Chapter Headings in Dynamic Frames

`\dfchaphead` Provide facility to make chapter headings appear in specified **dynamic frame**. I originally called this macro `\putchapterheadingsindynamicframe` which was descriptive, but overly long, so I changed it to the rather more cryptic name `\dfchaphead`. If the starred form is used, the frame is identified by **IDL**, the unstarred form identifies the frame **IDN**.

```

\newcommand*{\dfchaphead}{%
 \@ifstar\@sdynamicchap\@dynamicchap
}

```

Define style for the chapter heading. These commands are should only be used when `\dfchaphead` has been used.

```

\DFchapterstyle
\newcommand{\DFchapterstyle}[1]{#1}

```

```

\DFschapterstyle
\newcommand{\DFschapterstyle}[1]{#1}

```

`\@dynamicchap` Unstarred version.

```

\newcommand{\@dynamicchap}[1]{%
 \@ifundefined{chapter}%
 {%
 \PackageError{flowfram}%
 {Chapters aren't defined}%
 {%
 The document class you are using does not
 define chapters%
 }%
 }%
 {%

```

Store current chapter head definitions for starred and unstarred versions

```

\let\@ff@OLDmakechapterhead\@makechapterhead
\let\@ff@OLDmakeschapterhead\@makeschapterhead

```

Define user commands that can be redefined to modify the chapter head style (in the event that the user is using a class that doesn't provide an easy means to do this.)

```

\renewcommand{\DFchapterstyle}[1]{\@ff@OLDmakechapterhead{##1}}%
\renewcommand{\DFschapterstyle}[1]{\@ff@OLDmakeschapterhead{##1}}%

```

Redefine chapter heads so that they put their contents in the requested dynamic frame. First the unstarred version:

```
\xdef\@makechapterhead##1{%
 \noexpand\@setdynamiccontents{\number#1}%
 {%
 \noexpand\DFchapterstyle{##1}%
 }%
}%
```

Now the starred version:

```
\xdef\@makeschapterhead##1{%
 \noexpand\@setdynamiccontents{\number#1}%
 {%
 \noexpand\DFschapterstyle{##1}%
 }%
}%
}
```

`\@sdynamicchap` Starred form.

```
\newcommand{\@sdynamicchap}[1]{%
 \@dynamicframeid{#1}%
 \@dynamicchap{\ff@id}%
}
```

There is no facility for placing other sectional types in **dynamic frames**. This is because, either (1) the sectioning command does not start a new page, in which case there is no way of telling where exactly the new section will start, and having a section title in some other location on the page is ambiguous, and would really confuse the reader, or (2) in the case of `\part` in report or book class files, the title appears on a page of its own, so where is the point in putting it in a **dynamic frame**?

## 1.12 Thumbtabs

Define counter to keep track of total number of thumbtabs.

```
\newcounter{maxthumbtabs}
```

`\defaultthumbtabtype` Check to see if chapters are defined, if they are make thumbtabs correspond to chapters, otherwise make thumbtabs correspond to sections.

```
\@ifundefined{chapter}%
{%
 \newcommand*{\defaultthumbtabtype}{section}%
}%
{%
 \newcommand*{\defaultthumbtabtype}{chapter}%
}
```

`\@ttb@type` Section type to assign to thumbtabs.  
`\newcommand*{\@ttb@type}{\defaultthumbtabtype}`

`\makethumbtabs` Make the thumbtabs. Read in information from .ttb file, and open it for output. Syntax:  
`\makethumbtabs[\langle y offset \rangle][\langle height \rangle][\langle sec type \rangle]`.  
First check to see if there is a second optional argument.  
`\newcommand*{\makethumbtabs}[2][0pt]{%`  
`\@ifnextchar[%`  
`{\@makethumbtabs[#1]{#2}}%`  
`{%`  
`\@makethumbtabs[#1]{#2}[\defaultthumbtabtype]%`  
`}%`  
`}`

`\@makethumbtabs` Now all arguments are known, first redefine the appropriate sectioning command, then input the ttb file, and create the thumbtabs.  
`\def\@makethumbtabs[#1]#2[#3]{%`  
`\@ifundefined{#3}%`  
`{%`  
`\PackageError{flowfram}%`  
`{%`  
`Unknown section type '#3'%`  
`}%`  
`{}%`  
`{%`  
`\renewcommand{\@ttb@type}{#3}%`  
`\ifthenelse{\equal{#3}{chapter}}%`  
`{%`  
`\@makethumbchapter`  
`}%`  
`{%`  
`\ifthenelse{\equal{#3}{part}}%`  
`{\@makethumbpart}%`  
`{%`  
`\@makethumbsection{#3}%`  
`}%`  
`}%`  
`\@starttoc{ttb}%`  
`\@dothumbtabs{#1}{#2}%`  
`}`

`\@makethumbchapter` If thumbtabs correspond to chapters, redefine `\@chapter` so that each unstarred chapter writes an entry to the .ttb file.  
`\newcommand{\@makethumbchapter}{%`  
`\let\@ttb@old@chapter\@chapter`

```

\def\@chapter[##1]##2{%
 \@ttb@old@chapter[##1]{##2}%
 \addtocontents{ttb}{\protect\thumbtab
 {\thepage}{\thechapter}{##1}{chapter.\thechapter}}%
 \@afterheading
}%
}

```

`\@makethumbpart` For parts in books or reports, the thumbtab needs to be saved after the part counter has been incremented, but before the page break so that the page number and part numbers are correct. If `\@endpart` is not defined, then the document class probably does not start a new page after `\part`. (This can't be guaranteed for non standard class files, but there's nothing that can be done about that.) If this happens, just redefine `\@part`, and hope for the best.

```

\newcommand{\@makethumbpart}{%
 \let\@ttb@old@part\@part
 \@ifundefined{endpart}{%
 {%
 \def\@part[##1]##2{%
 \@ttb@old@part[##1]{##2}%
 \addtocontents{ttb}{\protect\thumbtab
 {\thepage}{\thepart}{##1}{part.\thepage}}%
 \@afterheading
 }%
 }%
 {%
 \let\@ttb@old@endpart\@endpart
 \def\@part[##1]##2{%
 \def\@parttitle{##1}%
 \@ttb@old@part[##1]{##2}%
 }%
 \def\@endpart{%
 \addtocontents{ttb}{%
 \protect\thumbtab{\thepage}%
 {\thepart}{\@parttitle}{part.\thepage}%
 }%
 \@ttb@old@endpart
 }%
 }%
 }
}

```

`\@makethumbsection` Thumbtabs defined for one of the remaining standard sectioning commands. Since these commands use `\@startsection`, it is necessary to redefine `\@sect` to add the thumbtab information to the .ttb file.

```

\newcommand*{\@makethumbsection}[1]{%
 \let\@ttb@old@sect=\@sect
 \def\@sect##1##2##3##4##5##6[##7]##8{%

```



```

\@ttb@old@sect{##1}{##2}{##3}{##4}{##5}{##6}[##7]{##8}%
\ifthenelse{\equal{##1}{#1}}%
{%
 \addtocontents{ttb}%
 {%
 \protect\thumbtab{\thepage}{\csname the#1\endcsname}%
 {##7}{#1.\csname the#1\endcsname}%
 }%
 \@afterheading
}%
{}%
}%
}

```

`\thumbtab` The thumbtab file, .ttb, will have a series of `\thumbtab` commands, when this file is read in, just store the information for now.

```

\newcommand{\thumbtab}[4]{%
 \stepcounter{maxthumbtabs}%
 \expandafter
 \gdef\csname thumbtab@pages@\romannumeral\c@maxthumbtabs\endcsname{#1}%
 \expandafter
 \gdef\csname thumbtab@num@\romannumeral\c@maxthumbtabs\endcsname{#2}%
 \expandafter
 \gdef\csname thumbtab@title@\romannumeral\c@maxthumbtabs\endcsname{#3}%
 \expandafter
 \gdef\csname thumbtab@link@\romannumeral\c@maxthumbtabs\endcsname{#4}%
}

```

`\@dothumbtabs` Once the thumbtab information has been read in and stored in the thumbtab macros, create the thumbtabs using this information. First need to work out the **page ranges** between each thumbtab. If the following thumbtab starts on the same page as the previous one, leave the page variable as a single number (this may happen if the thumbtabs correspond to sections rather than chapters). If the following thumbtab starts on a different page to the one before it, the preceding thumbtab page variable so be a range from its own initial page up to the page before the next thumbtab starts. The final thumbtab has an open ended range. This final thumbtab will continue to be displayed until cancelled by `\disablethumbtabs`.

Syntax: `\@dothumbtabs{<y offset>}{<height>}`.

```

\newcommand*{\@dothumbtabs}[2]{%
 \@colN=0\relax
 \whiledo{\@colN<\c@maxthumbtabs}%
 {%
 \advance\@colN by 1\relax
 \edef\ff@pages{%
 \csname thumbtab@pages@\romannumeral\@colN\endcsname}%
 \ifnum\@colN=\c@maxthumbtabs
 \expandafter

```

```

\edef\csname thumbtab@pages@\romannumeral\@colN\endcsname{%
 \ff@pages,>\ff@pages}%
\else
 \advance\@colN by 1\relax
 \edef\ff@endpage{%
 \csname thumbtab@pages@\romannumeral\@colN\endcsname}%
 \advance\@colN by -1\relax
 \@ff@tmpN=\ff@endpage\relax
 \advance\@ff@tmpN by -1\relax
 \ifnum\@ff@tmpN>\ff@pages
 \expandafter
 \xdef\csname thumbtab@pages@\romannumeral\@colN\endcsname{%
 \ff@pages-\number\@ff@tmpN}%
 \fi
\fi
}%
\@@dothumbtabs{#1}{#2}%
}

\thumbtabwidth Default thumbtab width.
\newlength{\thumbtabwidth}
\setlength{\thumbtabwidth}{1cm}

\thumbtabindexformat Thumbtab format. If hyperlinks have been defined, use a hyperlink in the
thumbtab index. Syntax: \thumbtabindexformat{<link>}{<text>}{<height>}
\@ifundefined{hyperlink}%
{%
 \newcommand{\thumbtabindexformat}[3]{%
 \thumbtabformat{#2}{#3}%
 }%
}%
{%
 \newcommand{\thumbtabindexformat}[3]{%
 \hyperlink{#1}{\thumbtabformat{#2}{#3}}%
 }%
}

\thumbtabformat Individual thumbtab format. If rotating has been disabled, stack the letters ver-
tically (this doesn't look very good). Syntax: \thumbtabformat{<text>}{<height>}
\newcommand{\thumbtabformat}[2]{%
 \if@ttb@rotate
 \rotatebox{-90}%
 {%
 \parbox[c][\thumbtabwidth]{#2}{%
 \centering#1%
 }%
 }%
 \else
 \parbox[c][#2][\thumbtabwidth]{%

```

```

\centering\@ttb@stack{#1}%
}%
\fi
}

```

`\@flf@subsp` Substitute spaces for `\space`. Stores resulting text in `\@flf@subsptext` which should be set to empty before use.

```

\def\@flf@subsp#1 #2{%
\expandafter\flf@ta\expandafter{\@flf@subsptext}%
\flf@tb{#1}%
\edef\@flf@subsptext{\the\flf@ta\the\flf@tb}%
\def\@flf@tmp{#2}%
\ifx\@flf@tmp\@nnil
\let\@flf@donextsubsp=\@gobble
\else
\expandafter\flf@ta\expandafter{\@flf@subsptext}%
\edef\@flf@subsptext{\the\flf@ta\noexpand\space}%
\let\@flf@donextsubsp=\@flf@subsp
\fi
\@flf@donextsubsp{#2}%
}

```

`\@ttb@stack` Stack letters vertically. Any spaces first need to be substituted with `\space`, otherwise they will be ignored.

```

\newcommand{\@ttb@stack}[1]{%
\def\@flf@subsptext{}%
\expandafter\@flf@subsp#1 \@nil\relax
\begin{tabular}{l}%
\expandafter\@ttb@stack\@flf@subsptext\@nil\relax
\end{tabular}%
}

```

`\@@ttb@stack`

```

\def\@@ttb@stack#1#2{%
\def\@flf@tmp{#1}%
\ifx\@flf@tmp\@nnil
\let\flf@next\relax
\else
#1\\%
\def\@flf@tmp{#2}%
\ifx\@nnil#2\relax
\let\flf@next\@gobble
\else
\let\flf@next\@@ttb@stack
\fi
\fi
\flf@next{#2}%
}

```

\@greyscale Count register to compute the grey scale.

\newcount\@greyscale

\@dothumbtabs Once the **page range** have been sorted, create the **dynamic frames** associated with each thumbtab. Thumbtabs will initially have a grey background, but this can be changed by the user. Each thumbtab is given an **IDL** thumbtab<n> where <n> is the index of the thumbtab (starting from 1 for the topmost thumbtab.) Each frame in the thumbtab index is given an **IDL** thumbtabindex<n>, where <n> is as before.

```
\newcommand{\@dothumbtabs}[2]{%
 \setlength{\@ff@tmp@y}{\textheight}%
 \addtolength{\@ff@tmp@y}{-#2}%
 \addtolength{\@ff@tmp@y}{-#1}%
 \computerightedgeodd{\@ff@tmp@x}%
 \addtolength{\@ff@tmp@x}{-\thumbtabwidth}%
 \computeleftedgeeven{\@ff@tmp@x@even}%
 \@ff@tmpN=0\relax
 \whiledo{\@ff@tmpN<\c@maxthumbtabs}%
 {%
 \advance\@ff@tmpN by 1\relax
 \@greyscale=\@ff@tmpN\relax
 \multiply\@greyscale by 60\relax
 \divide\@greyscale by \c@maxthumbtabs
 \advance\@greyscale by 25\relax
 \edef\@ff@greyscale{0.\number\@greyscale}%
```

Thumbtab

```
\newdynamicframe[none]{\thumbtabwidth}{#2}%
 {\@ff@tmp@x}{\@ff@tmp@y}[thumbtab\number\@ff@tmpN]%
\expandafter\global\expandafter
 \setlength\csname @df@romannumeral\c@maxdynamic @evenx\endcsname
 {\@ff@tmp@x@even}%
```

set the contents of the dynamic frame

```
\ifthenelse{\boolean{@ttb@title}}{\and\boolean{@ttb@num}}{%
 {%
 \expandafter
 \xdef\csname @dynamicframe@\romannumeral\c@maxdynamic\endcsname{%
 \noexpand\thumbtabformat
 {%
 \csname thumbtab@num@\romannumeral\@ff@tmpN\endcsname\
 \csname thumbtab@title@\romannumeral\@ff@tmpN\endcsname
 }%
 }%
 }%
 {%
 \if@ttb@title
 \expandafter
```

```

\edef\csname @dynamicframe@\romannumeral\c@maxdynamic\endcsname{%
 \noexpand\thumbtabformat
 {%
 \csname thumbtab@title@\romannumeral\@ff@tmpN\endcsname
 }%
 {#2}%
}%
\fi
\if@ttb@num
\expandafter
\edef\csname @dynamicframe@\romannumeral\c@maxdynamic\endcsname{%
 \noexpand\thumbtabformat
 {%
 \csname thumbtab@num@\romannumeral\@ff@tmpN\endcsname
 }%
 {#2}%
}%
\fi
}%
\expandafter
\edef\csname @df@backcol@\romannumeral\c@maxdynamic\endcsname
{[gray]{\@ff@greyscale}}

```

#### Thumbtab index

```

\newdynamicframe[none]{\thumbtabwidth}{#2}%
{\@ff@tmp@x}{\@ff@tmp@y}[thumbtabindex\number\@ff@tmpN]%
\expandafter\global\expandafter
\setlength\csname @df@\romannumeral\c@maxdynamic @evenx\endcsname
{\@ff@tmp@x@even}%
\expandafter

```

#### set the contents of the dynamic frame

```

\ifthenelse{\boolean{@ttb@title}\and\boolean{@ttb@num}}%
{%
 \expandafter
 \edef\csname @dynamicframe@\romannumeral\c@maxdynamic\endcsname{%
 \noexpand\thumbtabindexformat
 {%
 \csname thumbtab@link@\romannumeral\@ff@tmpN\endcsname
 }%
 {%
 \csname thumbtab@num@\romannumeral\@ff@tmpN\endcsname\
 \csname thumbtab@title@\romannumeral\@ff@tmpN\endcsname
 }%
 {#2}%
 }%
}%
{%
 \if@ttb@title
 \expandafter

```

```

\edef\csname @dynamicframe@\romannumeral\c@maxdynamic\endcsname{%
 \noexpand\thumbtabindexformat
 {%
 \csname thumbtab@link@\romannumeral\@ff@tmpN\endcsname
 }%
 {%
 \csname thumbtab@title@\romannumeral\@ff@tmpN\endcsname
 }%
 {#2}%
}%
\fi
\if@ttb@num
\expandafter
\edef\csname @dynamicframe@\romannumeral\c@maxdynamic\endcsname{%
 \noexpand\thumbtabindexformat
 {%
 \csname thumbtab@link@\romannumeral\@ff@tmpN\endcsname
 }%
 {%
 \csname thumbtab@num@\romannumeral\@ff@tmpN\endcsname
 }%
 {#2}%
}%
\fi
}%
\expandafter
\edef\csname @df@backcol@\romannumeral\c@maxdynamic\endcsname
{[gray]{\@ff@greyscale}}
\addtolength{\@ff@tmp@y}{-#2}%
}%
}%

```

`\enablethumbtabs` Enable thumbtabs. Once the **IDN** is obtained for the first thumbtab, the rest can be found by incrementing the number by 2 (the frames in between correspond to the thumbtab index.)

```

\newcommand*{\enablethumbtabs}{%
 \ifnum\c@maxthumbtabs>0\relax
 \@ff@tmpN=0\relax
 \@dynamicframeid{thumbtab1}%
 \whiledo{\@ff@tmpN<\c@maxthumbtabs}%
 {%
 \advance\@ff@tmpN by 1\relax
 }
 }

```

thumbtab

```

\edef\@ff@pages{\csname thumbtab@pages@\romannumeral\@ff@tmpN\endcsname}%
\@@setdynamicframe{\ff@id}{pages=\@ff@pages}%
\advance\ff@id by 2\relax
}%
\else

```

```

 \PackageWarning{flowfram}{No thumb tabs defined}%
 \fi
}

\disablethumbtabs Disable all thumbtabs.
\newcommand*{\disablethumbtabs}{%
 \ifnum\c@maxthumbtabs>0\relax
 \@ff@tmpN=0\relax
 \@dynamicframeid{thumbtab1}%
 \whiledo{\@ff@tmpN<\c@maxthumbtabs}%
 {%
 \advance\@ff@tmpN by 1\relax
 }
 }

Thumbtab:
 \expandafter\xdef\csname @df@pages@\romannumeral\ff@id\endcsname
 {none}%
 \advance\ff@id by 1\relax

Thumbtab index:
 \expandafter\xdef\csname @df@pages@\romannumeral\ff@id\endcsname
 {none}%
 \advance\ff@id by 1\relax
}%
\fi
}

\thumbtabindex Show thumbtab index on current page. The \@ff@doafter bit circumvents the
problem of duplicate page numbers, as the table of contents is quite frequently
on page i while the first chapter starts on page 1.
\newcommand*{\thumbtabindex}{%
 \ifnum\c@maxthumbtabs>0\relax
 \@ff@tmpN=0\relax
 \@dynamicframeid{thumbtabindex1}%
 \whiledo{\@ff@tmpN<\c@maxthumbtabs}%
 {%
 \advance\@ff@tmpN by 1\relax
 \expandafter
 \xdef\csname @df@pages@\romannumeral\ff@id\endcsname{\c@page}%
 \edef\@ff@doafter{%
 \noexpand\afterpage
 {%
 \noexpand\setdynamicframe{\number\ff@id}{pages=none}%
 }%
 }%
 \@ff@doafter
 \advance\ff@id by 2\relax
 }%
 }
\fi
}

```

`\setthumtab` Modify the settings for all the thumbtabs (including thumbtab index). Since the thumbtabs are **dynamic frames** you could just use `\setdynamicframe`, however, the thumbtabs will not be generated on the first run, as there will be no information in the ttb file, so `\setdynamicframe` would generate an error. `\setthumtab` will only give a warning message if it can not find the thumbtab. The argument #1 is the index of the thumbtab (starting from 1), the second argument #2 is the frame settings.

```
\newcommand{\setthumtab}[2]{%
 \ifthenelse{\equal{#1}{all}}{%
 {%
 \@ff@tmpN=0\relax
 \whiledo{\@ff@tmpN<\c@maxthumbtabs}%
 {%
 \advance\@ff@tmpN by 1\relax
 \@setthumtab{\@ff@tmpN}{#2}%
 }%
 }%
 }%
 }%
 \for\@ttb@id:=#1\do{\@setthumtab{\@ttb@id}{#2}}%
}%
}
```

`\@setthumtab` Set individual thumbtab and its index tab.

```
\newcommand{\@setthumtab}[2]{%
 Check if this thumbtab exists
 \ifthenelse{(\c@maxthumbtabs<#1\)\ or \(#1<1\)}%
 {%
 \PackageWarning{flowfram}%
 {%
 Can't find thumbtab number '#1', ttb file may not be
 up-to-date%
 }%
 }%
 {%
 \@dynamicframeid{thumbtab\number#1}%
 \@setdynamicframe{\ff@id}{#2}%
 \@dynamicframeid{thumbtabindex\number#1}%
 \@setdynamicframe{\ff@id}{#2}%
 }%
 }
}
```

`\setthumbtabindex` Only change settings for the thumbtab index. This can take a comma-separated number list.

```
\newcommand{\setthumbtabindex}[2]{%
 \ifthenelse{\equal{#1}{all}}{%
 {%
 \@ff@tmpN=0\relax
```



```

\whiledo{\@ff@tmpN<\c@maxthumtbs}%
{%
 \advance\@ff@tmpN by 1\relax
 \@setthumtbsindex{\@ff@tmpN}{#2}%
}%
}%
{%
 \@for\@ttb@id:=#1\do{\@setthumtbsindex{\@ttb@id}{#2}}%
}%
}

```

`\@setthumtbsindex` Change setting for individual thumtbs index entry.

```

\newcommand{\@setthumtbsindex}[2]{%
 Check if this thumtbs exists
 \ifthenelse{(\c@maxthumtbs<#1)\ or \(#1<1)}%
 {%
 \PackageWarning{flowfram}%
 {%
 Can't find thumtbs number '\number#1',
 tbs file may not be up-to-date%
 }%
 }%
 {%
 \@dynamicframeid{thumtbsindex\number#1}%
 \@setdynamicframe{\ff@id}{#2}%
 }%
}

```

`\tocandthumtbsindex` Do both the table of contents and the thumtbs index

```

\newcommand*\@tocandthumtbsindex{%
 \aligntoctrue
 \tableofcontents
 \thumtbsindex
 \aligntofalse
}

```

### 1.13 Minitocs

`\@ttb@minitoc` Sectioning type for the minitoc, by default it is the same as the thumtbs

```

\newcommand*\@ttb@minitoc{\@ttb@type}

```

`\@starttoc` In order to align the table of contents with the thumtbs, or to use minitocs, the toc information must be stored, rather than simply input. Therefore, modify `\@starttoc` so that it can store the contents of the file. `\if@storetoc` is used to determine whether to store the contents, or act as normal.

```

\let\@ttb@old@starttoc\@starttoc
\newif\if@storetoc

```

```

\@storetocfalse
\renewcommand*{\@starttoc}[1]{%
 \if@storetoc
 \@ttb@storetoc{#1}%
 \else
 \@ttb@old@starttoc{#1}%
 \fi
}

\@ttb@storetoc store the contents of the file with the given extension
\newcommand*{\@ttb@storetoc}[1]{%
 \begingroup
 \makeatletter
 \@storefileconts{\jobname.#1}%
 \if@files
 \expandafter\newwrite\csname tf@#1\endcsname
 \immediate\openout\csname tf@#1\endcsname\jobname.#1\relax
 \fi
 \@nobreakfalse
\endgroup
}

\@storefileconts Store the contents of named file, if it exists.
\newcommand*{\@storefileconts}[1]{%
 \IfFileExists{#1}%
 {%
 \@@storefileconts\@filef@und
 }%
 {%
 \PackageInfo{flowfram}{No file #1.}%
 }%
}

store the number of units corresponding to the thumbtab type, and minitoc
units. These will usually have the same value, but this is not always guaranteed.

\c@maxtocunits Total number of toc units
\newcount\c@maxtocunits

\c@maxminitoc Total number of minitoc units
\newcount\c@maxminitoc

\@@storefileconts Read each line in from the file, and add to the contents list.
\newcommand{\@@storefileconts}[1]{%
 \@ifundefined{\@ttb@minitoc type}%
 {%
 \@ttb@minitoclevel=6\relax
 }%
 {%

```

```

\expandafter\@ttb@minitoclevel\expandafter
=\csname @ttb@\@ttb@minitoclevel\endcsname
}%
\newread\@ttb@toc
\openin\@ttb@toc=#1\relax
\c@maxtocunits=0\relax
\c@maxminitoc=0\relax
\whiledo{\not\boolean{eof}}\@ttb@toc}%
{%
\read\@ttb@toc to\tocline
\addtotoclist{\tocline}{\c@maxtocunits}%
}%
\closein\@ttb@toc
}

```

`\@addtotoclist` Before each line is added to the contents list, it is first checked to see whether the line starts with `\contentsline`. If it does, then check to see if the sectioning type corresponds to the thumbtab level. If it does, then start a new list. There will be `\c@maxtocunits` lists, each one corresponding to each thumbtab group. In addition, each contents line needs to be added to the minitoclists, but only if the sectioning type level is greater than `\@ttb@minitoclevel`. The number of minitoc lists is given by `\c@maxminitoc`.

```

\newif\if@contsline
\newcount\@ttb@level
\newcount\@ttb@minitoclevel

\newcommand{\@addtotoclist}[2]{%
\expandafter\@checkcontentsline#1\end
\if@contsline
\expandafter\@gettype#1\end
\ifthenelse{\equal{\@ttb@contstype}{\@ttb@type}}{%
{%
\global\advance#2 by 1\relax
}%
}%
\fi
\@ifundefined{toc@\romannumeral#2}%
{%
\flf@ta=\expandafter{#1}%
\expandafter\xdef\csname @toc@\romannumeral#2\endcsname{\the\flf@ta}%
}%
{%
\flf@ta=\expandafter{#1}%
\flf@tb=\expandafter\expandafter\expandafter
{\csname @toc@\romannumeral#2\endcsname}%
\expandafter\xdef\csname @toc@\romannumeral#2\endcsname{%
\the\flf@tb\the\flf@ta}%
}%
}

```

now do minitoc stuff. If the sectioning type is unknown, assume it comes last

```

\if@minitoc
\if@contentsline
\@ifundefined{\@ttb@contstype}%
{\@ttb@level=6}%
{%
\@ttb@level=\csname @ttb@\@ttb@contstype @level\endcsname
}%
\relax
\ifnum\@ttb@level=\@ttb@minitoclevel
\global\advance\c@maxminitoc by 1\relax
\expandafter
\gdef\csname @minitoc@\romannumeral\c@maxminitoc\endcsname{%
\else
\ifnum\@ttb@level>\@ttb@minitoclevel
\flf@ta=\expandafter{#1}\relax
\flf@tb=\expandafter\expandafter\expandafter
{\csname @minitoc@\romannumeral\c@maxminitoc\endcsname}\relax
\expandafter
\xdef\csname @minitoc@\romannumeral\c@maxminitoc\endcsname{%
\the\flf@tb\the\flf@ta}
\fi
\fi
\fi
\fi
}

```

Is there already a way of determining the sectioning level from its name?

```

\def\@ttb@part@level{-1}
\def\@ttb@chapter@level{0}
\def\@ttb@section@level{1}
\def\@ttb@subsection@level{2}
\def\@ttb@subsubsection@level{3}
\def\@ttb@paragraph@level{4}
\def\@ttb@subparagraph@level{5}

```

\@checkcontentsline Check to see if line starts with \contentsline

```

\long\def\@checkcontentsline#1#2\end{%
\ifx#1\contentsline
\@contsline>true
\else
\@contsline>false
\fi
}

```

\@gettype Given that the line starts with \contentsline, extract the first argument of \contentsline to get the sectioning type.

```

\def\@gettype\contentsline#1#2\end{%
\def\@ttb@contstype{#1}%

```

```

 }

\tableofcontents Modify \tableofcontents. It first stores the contents of the toc file, and then,
 either simply prints it on the page (so it appears no different to the standard
 \tableofcontents), or it prints it out so that each thumbtab unit has the same
 height as the thumbtabs. Note: this assumes that the actual table of contents
 starts at the same height as the thumbtabs. The thumbtab vertical position may
 need to be adjusted to compensate for space taken up by the contents title.

 \newif\ifaligntoc
 \aligntocfalse

Save original definition of \tableofcontents
\let\@ttb@old@tableofcontents\tableofcontents

Redefine \tableofcontents
\renewcommand{\tableofcontents}{%
 \@storetoctrue
 \@ttb@old@tableofcontents
 \ifaligntoc
 \@printalignedtoc
 \else
 \@printtoc
 \fi
 \@storetocfalse
 \global\c@minitoc=0\relax
}

\beforeminitocskip Vertical space to add before minitoc.
\newlength\beforeminitocskip
\setlength{\beforeminitocskip}{0pt}

\afterminitocskip Vertical space to add after minitoc.
\newlength\afterminitocskip
\setlength{\afterminitocskip}{\baselineskip}

\dominitoc Do the minitoc for unit #1. Check first that minitocs have been enabled.
\newcommand*{\dominitoc}[1]{%
 \if@minitoc
 \@dominitoc{#1}%
 \fi
}
\newcommand*{\@dominitoc}[1]{\@@dominitoc{#1}}

\minitocstyle Style in which to display the minitoc.
\newcommand{\minitocstyle}[1]{%
 \normalfont\normalsize\normalcolor
 #1%
}

```

`\@@dominitoc` Now do the actual minitoc for unit #1.

```

\newcommand*{\@@dominitoc}[1]{%
 {%
 \minitocstyle
 {%
 \vskip\beforeminitocskip
 \csname @minitoc@romannumeral#1\endcsname
 }%
 }%
 \vskip\afterminitocskip
}

```

`\appenddfminitoc` Modify `\dominitoc` so that the minitoc is appended to specified **dynamic frame**. Starred version uses **dynamic frame IDL**, unstarred version uses **dynamic frame IDN**. I originally called this macro `\appendminitocdynamicframe` but decided it was too long, for I've opted instead for a slightly more cryptic name.

```

\newcommand*{\appenddfminitoc}{%
 \renewcommand{\beforeminitocskip}{\baselineskip}%
 \@ifstar\@sappendminitocdf\@appendminitocdf
}

```

`\@sappendminitocdf` Starred version

```

\newcommand*{\@sappendminitocdf}[1]{%
 \renewcommand{\@dominitoc}[1]{%
 \@sappenddynamic{#1}{\@@dominitoc{##1}}%
 }%
}

```

`\@appendminitocdf` Unstarred version

```

\newcommand*{\@appendminitocdf}[1]{%
 \renewcommand{\@dominitoc}[1]{%
 \@appenddynamic{#1}{\@@dominitoc{##1}}%
 }%
}

```

`\@printtoc` Do the table of contents, which has been stored in `\c@maxtocunits` macros. (or possibly `\c@maxtocunits + 1`, if information was added before the first group—which corresponds to `\@colN=0`.)

```

\newcommand*{\@printtoc}{%
 \@colN=0\relax
 \csname @toc@romannumeral\@colN\endcsname
 \whiledo{\@colN<\c@maxtocunits}%
 {%
 \advance\@colN by 1\relax
 \csname @toc@romannumeral\@colN\endcsname
 }%
}

```

`\@printalignedtoc` Print the table of contents so that each unit is has vertical height the same as the height of the thumbtabs. Note that you may have to adjust the vertical offset of the thumbtabs (in `\makethumbtabs`) in order to make them correctly aligned.

```

\newcommand{\@printalignedtoc}{%
 \@ff@tmpN=0\relax
 \@ifundefined{toc@\romannumeral\@ff@tmpN}%
 {}%
 {%
 \csname @toc@\romannumeral\@ff@tmpN\endcsname
 \par\noindent\hrulefill
 }%
 \whiledo{\@ff@tmpN<\c@maxtocunits}%
 {%
 \advance\@ff@tmpN by 1\relax
 \ifnum\@ff@tmpN>\c@maxthumbtabs
 \csname @toc@\romannumeral\@ff@tmpN\endcsname
 \else
 \@dynamicframeid{thumbtabindex\@ff@tmpN}%
 \expandafter\expandafter\expandafter
 \@ff@getstaticpos\csname @df@dim@\romannumeral\@ff@tmpN\endcsname
 \vbox to \@ff@tmpNpt{
 {%
 \noindent\parbox{\linewidth}{
 {%
 \csname @toc@\romannumeral\@ff@tmpN\endcsname
 }%
 \vfill
 }%
 }%
 }
 \fi
 }%
}

```

`\enableminitoc` Make mini tocs appear at the start of given sectional unit.

```

\newcounter{minitoc}
\newif\if@minitoc
\@minitocfalse

\newcommand*{\enableminitoc}[1][\@ttb@type]{%
 \@minitoctrue
 \setcounter{minitoc}{0}%
 \@ifundefined{#1}%
 {%
 \PackageError{flowfram}{Sectioning type ‘#1’ not defined}{}%
 }%
 {%
 \renewcommand{\@ttb@minitoc}{{#1}}%
 \ifthenelse{\equal{#1}{chapter}}{}{}%
 }%
}

```

```

 \@makeminitocchapter
 }%
 {%
 \ifthenelse{\equal{#1}{part}}{%
 {\@makeminitocpart}%
 }%
 \@makeminitocsection{#1}%
 }%
}%
}%
}

```

This command should only appear in the preamble. (This ensures that it is used before `\tableofcontents`.)

```
\@onlypreamble{\enableminitoc}
```

`\@makeminitocchapter` If minitocs are associated with chapters, redefine `\@chapter` so that the minitoc appears after the chapter heading.

```

\newcommand{\@makeminitocchapter}{%
 \let\@mtoc@old@chapter\@chapter
 \def\@chapter[##1]##2{%
 \@mtoc@old@chapter[##1]{##2}%
 \stepcounter{minitoc}%
 \dominitoc{\c@minitoc}%
 \@afterheading
 }%
}

```

`\@makeminitocpart` Again, for parts. As before, need to redefine `\@endpart` if it exists, otherwise redefine `\@part`.

```

\newcommand{\@makeminitocpart}{%
 \@ifundefined{@endpart}{%
 {%
 \let\@mtoc@old@part\@part
 \def\@part[##1]##2{%
 \@mtoc@old@part[##1]{##2}%
 \stepcounter{minitoc}%
 \dominitoc{\c@minitoc}%
 \@afterheading
 }%
 }%
 }%
 {%
 \let\@mtoc@old@endpart\@endpart
 \def\@endpart{%
 \stepcounter{minitoc}%
 \dominitoc{\c@minitoc}%
 \@mtoc@old@endpart
 }%
 }%
}%

```



}

\@makeminitocsection    Now for the remaining sectional units.

```
\newcommand{\@makeminitocsection}[1]{%
 \let\@mtoc@old@sect=\@sect
 \def\@sect##1##2##3##4##5##6[##7]##8{%
 \@mtoc@old@sect{##1}{##2}{##3}{##4}{##5}{##6}[##7]{##8}%
 \ifthenelse{\equal{##1}{#1}}{%
 {%
 \stepcounter{minitoc}%
 \dominitoc{\c@minitoc}%
 \@afterheading
 }%
 }%
 }%
}
```

## Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the definition; numbers in *roman* refer to the pages where the entry is used.

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