

# Tips, tricks and extended features of LyX/L<sup>A</sup>T<sub>E</sub>X

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1st February 2024

## 1 Introduction

This paper is mostly about L<sup>A</sup>T<sub>E</sub>X features which go beyond the typesetting and maths features which are covered in *LyX 2.4: from writing to typesetting*; so it will also be useful for L<sup>A</sup>T<sub>E</sub>X users moving beyond the basics. LyX implements many L<sup>A</sup>T<sub>E</sub>X packages as modules (Document▷Settings▷Modules) which avoids the need to use Document▷Settings▷L<sup>A</sup>T<sub>E</sub>X Preamble in order to make use of L<sup>A</sup>T<sub>E</sub>X packages not automatically loaded by LyX. The American Mathematical Society (AMS) maths modules automatically loaded are listed in the Document▷Settings▷Math options dialog.

L<sup>A</sup>T<sub>E</sub>X users should normally add

```
\usepackage{amsmath}
```

to the L<sup>A</sup>T<sub>E</sub>X Preamble, not least because `amsmath` is required for some of the tips, tricks and extended features described in this paper anyway.

LyX users will need to select **Insert▷TeX Code** to insert the T<sub>E</sub>X code (in the `typewriter` font in this paper) needed to activate some of the extended features described in this paper, more so if they are using older versions of LyX.

In addition to consulting the documentation referred to in this paper, L<sup>A</sup>T<sub>E</sub>X users may find it worthwhile to consult the LyX *Additional Features* and *Embedded Objects Help* documentation which contain numerous L<sup>A</sup>T<sub>E</sub>X tips.

## 2 Documents

Before trying to create a particular type of document, it is worth checking the available document classes; apart from the AMS classes, there are classes which support a wider range of base sizes — useful for large print documents, classes suitable for a range of publications, classes for more traditional layouts, for recipes and, only in LyX, for drama scripts.

## 2.1 KOMA-Script

The KOMA-Script bundle offers a wider range of font sizes and a wide range of pre-defined options for managing the layout of your text which simplify the document class options (`\documentclass[...]{}`) in  $\LaTeX$  and the `Custom` option under `Document`  $\triangleright$  `Settings`  $\triangleright$  `Document Class` in  $\text{LyX}$ ; these include:

<code>bibliography=totoc</code>	include bibliography in table of contents <sup>1</sup>
<code>index=totoc</code>	include index in table of contents
<code>numbers=enddot</code>	add a full stop after chapter and section numbers
<code>toc=flat</code>	left justify all entries in the table of contents

The full list is in the [KOMA-Script](#) documentation.

## 2.2 Books

Publishers think of books as having three parts:

- front matter: everything up to the start of chapter 1, in which ‘chapters’ like the foreword, preface and introduction are unnumbered and the pages are numbered using Roman numerals
- main matter: the real content of the book, in which chapters are numbered and pages are numbered using Arabic numerals
- back matter: additional information, in which the chapters are again unnumbered (bibliographies and indices are part of the back matter, which is why they are always unnumbered).

The  $\LaTeX$  book classes respect this if you insert `\frontmatter` at the very start of the document (after `\begin{document}` in  $\LaTeX$ ), `\mainmatter` before the start of chapter 1 and `\backmatter` after the end of the last numbered chapter (in  $\text{LyX}$  see `File`  $\triangleright$  `Open Example`  $\triangleright$  `Books`  $\triangleright$  `KOMA-Script Book`). You then use the numbered `Chapter` style throughout the book and  $\LaTeX$  takes care of everything; however, the  $\text{LyX}$  chapter numbers will be wrong even though everything will be fine in the preview and final document.

$\text{LyX}$  and  $\LaTeX$  also offer the option of having appendices (in  $\text{LyX}$  `Document`  $\triangleright$  `Start Appendix here`), that is, chapters numbered in a different style from the main chapters. They can be used as an alternative to having chapters in the back matter or in addition, in which case they should come in the main matter before the start of the back matter.

## 2.3 Chapter and section title fonts

The sizes of chapter and section title fonts are calculated by reference to the default font size. However, these sizes may be overpowering in a smaller page size. Rather than expecting the user to change these sizes individually, KOMA-Script offers the option to change their relative sizes by inserting one of the options

```
headings=normal
headings=small
```

---

<sup>1</sup>Alternatively, select `Add bibliography to TOC` when inserting a `BibTeX` bibliography.

in the `\documentclass[...]{}` options in L<sup>A</sup>T<sub>E</sub>X or in the **Custom** option under **Document** > **Settings** > **Document Class** in L<sub>Y</sub>X. The default size is **big**.

## 2.4 Chapter numbering within parts

Normally chapter numbers increase across the parts within the `\mainmatter` of a book; if you want chapter numbers to restart within each part, add

```
\usepackage{chngcntr}
\counterwithin*{chapter}{part}
```

to the L<sup>A</sup>T<sub>E</sub>X Preamble.

## 2.5 Unnumbered chapters and sections

By default, L<sup>A</sup>T<sub>E</sub>X only adds numbered chapters and sections to the table of contents; KOMA-Script offers `\addpart`, `\addchap` and `\addsec` in the book and report document classes which enable you to use unnumbered parts, chapters or sections in the `\mainmatter` of a book or report and still have them appear in a table of contents (numbered chapters in the `\frontmatter` or `\backmatter` of a book appear unnumbered in the table of contents anyway).

## 2.6 Sectioned bibliographies

To have more than one set of references in a document, for example, after each chapter, you need to load `bibtopic` by checking **Document** > **Settings** > **Bibliography** > **Subdivided bibliography** in L<sub>Y</sub>X or adding

```
\usepackage[dot]{bibtopic}
```

to the L<sup>A</sup>T<sub>E</sub>X Preamble in L<sup>A</sup>T<sub>E</sub>X.

You then insert the L<sup>A</sup>T<sub>E</sub>X code `\begin{btUnit}` at the start of each chapter or section and `\end{btUnit}` after its bibliography. The `bibtopic` package does not automatically insert something like ‘References’ before each bibliography; so you will have to add a **Section\*** paragraph style with whatever heading you want before the bibliography in each chapter or section.

You cannot nest `btUnits`; so, if you want a separate bibliography at the end of the document, you will also have to put this in a `btUnit`.

This is a reference to my published article on L<sub>Y</sub>X placed in a sectioned bibliography (Hudson, 2009).

### Reference

Hudson, J. R. (2009, April). Lyx: for superior documents. *LinuxFormat* (117), 92–95.

## 2.7 End notes

To collect the notes to the end of a chapter or section, select Document▷Settings▷Modules▷Foot- and Endnotes in LyX. You then have the choice of Basic or Extended modules to add an endnote list or make all footnotes into endnotes. In L<sup>A</sup>T<sub>E</sub>X you add `\usepackage{endnotes}` or `\usepackage{enotez}` to the L<sup>A</sup>T<sub>E</sub>X Preamble depending on whether you want to use the Basic or the Extended package. Then in LyX Insert▷List/Contents/References▷Endnotes and in L<sup>A</sup>T<sub>E</sub>X add the L<sup>A</sup>T<sub>E</sub>X code:

```
\theendnotes
```

where you want the notes to appear.

## 2.8 Glossary

By default, a glossary will be called ‘Nomenclature;’ to change it to ‘List of terms,’ put

```
\renewcommand{\nomname}{List of terms}
```

in the L<sup>A</sup>T<sub>E</sub>X Preamble.

## 3 Page layouts

### 3.1 Page dimensions

Page dimensions are dependent on the Document Class you have chosen; KOMA-Script calculates the type area of a page by division, that is, the page is imagined as divided into columns; in one sided documents both margins are the same width; in two sided documents, the outer margin is double the width of the inner margin so that the two inner margins are together the same width as each of the outer margins. The default factor is 9; by increasing this by adding, for example, `DIV=11` in Documents▷Settings▷Document Class▷Class options▷Custom in LyX or in `(\documentclass[...]{})` in L<sup>A</sup>T<sub>E</sub>X the width of the margins reduces and the width of the type area increases.

### 3.2 Two sided documents

When Two-sided document is selected in Documents▷Settings▷Page Layout in LyX or the `twoside` option in `(\documentclass[...]{})` in L<sup>A</sup>T<sub>E</sub>X,

- the outside page margin becomes double the inside page margin so that the two inside page margins equal the width of each outside page margin;
- if the document is to be bound, you can add a binding correction in Documents▷Settings▷Document Class▷Class options▷Custom in LyX or in `(\documentclass[...]{})` in L<sup>A</sup>T<sub>E</sub>X such as `BCOR=4mm` so that 4mm is added to each inside page margin to compensate for the amount of paper concealed by the binding;
- the default page numbers and any running headers appear on the outside of the page though you can adjust this by using Fancy headers and footers as described on page 10;

- chapters begin on the right hand page in the book classes; however, in the report classes, they begin on the next available page.

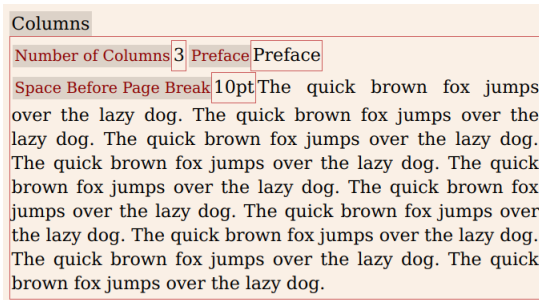
### 3.3 Multiple columns

You can set up a two column document throughout by checking `Two-column document` in `Document > Settings > Text layout` in LyX or adding the option `twocolumn` to `(\documentclass[...]{})` in L<sup>A</sup>T<sub>E</sub>X but, in order to insert columns in a document or switch between different numbers of columns within a single document, in LyX you need to load the Multiple Columns module in `Document > Settings > Modules > Page Layout` or in L<sup>A</sup>T<sub>E</sub>X add the command

```
\usepackage{multicol}
```

to the L<sup>A</sup>T<sub>E</sub>X Preamble.

`Insert > Custom Insets > Multiple columns` in LyX provides an inset within which to place the content. This gives a simple two column layout; for a three or four column layout use `Insert > Number of columns` from within the inset. You can also insert a `Preface` to the columns or specify the `Space Before Page Break` in points.



However, the Multiple Columns module does not support images or a number of other paragraph styles such as `Verse` or `Quote`. For

these you need to insert the TeX code as L<sup>A</sup>T<sub>E</sub>X rather than inserting the Custom Inset.

You can begin a two column layout in all versions of LyX or L<sup>A</sup>T<sub>E</sub>X with

```
\begin{multicols}{2}
```

and end it with

```
\end{multicols}
```

You can also embed multiple column commands within the columns as newspaper original pair of multiple column commands. nesting another pair of multiple column commands.

Note how L<sup>A</sup>T<sub>E</sub>X spaces out the available text in the columns in order to ensure, if at all possible, that both columns are the same length.

If you want to create space before and after or between two columns:

```
\setlength{\multicolsep}{36 pt}
```

before the Custom Inset or `\begin{multicols}{2}` puts half an inch above and below the columns while

```
\setlength{\columnsep}{36 pt}
```

puts a half inch gap between them. To add a column rule between the columns use

```
\setlength{\columnseprule}{2pt}
```

which will give you a line 2 pts wide between the columns. To restore the defaults, use

```
\setlength{\multicolsep}{13pt}
\setlength{\columnsep}{10pt}
\setlength{\columnseprule}{0pt}
```

If you want to break a column at a particular point, insert

```
\columnbreak{}
```

where you want the break to occur.

### 3.3.1 Footnotes in columns

Footnotes are normally placed at the foot of the column to which they relate. To place them all at the foot of the right hand column add

```
\usepackage{ftnright}
```

to the  $\LaTeX$  Preamble.

## 3.4 Minipages

Minipages (`\insert > Box` in  $\LaTeX$ ) can stand in-line This is an in-line Minipage. or in a paragraph of their own.

This Minipage is in a paragraph of its own.

By default in-line Minipages hang down from the line while those in their own paragraph are left justified but you can change their settings ( $\LaTeX$ ) in a variety of ways by right clicking on the grey Minipage icon which, in  $\LaTeX$ , opens the new Minipage dialog (figure 1) or extend their options ( $\LaTeX$ ). The only fiddly bit in the Minipage dialog is deciding the correct percentage width.

You can have an in-line Minipage that stands proud or a Minipage in its own paragraph that

is centred and has a drop shadow.

The  $\LaTeX$  code for the first is:

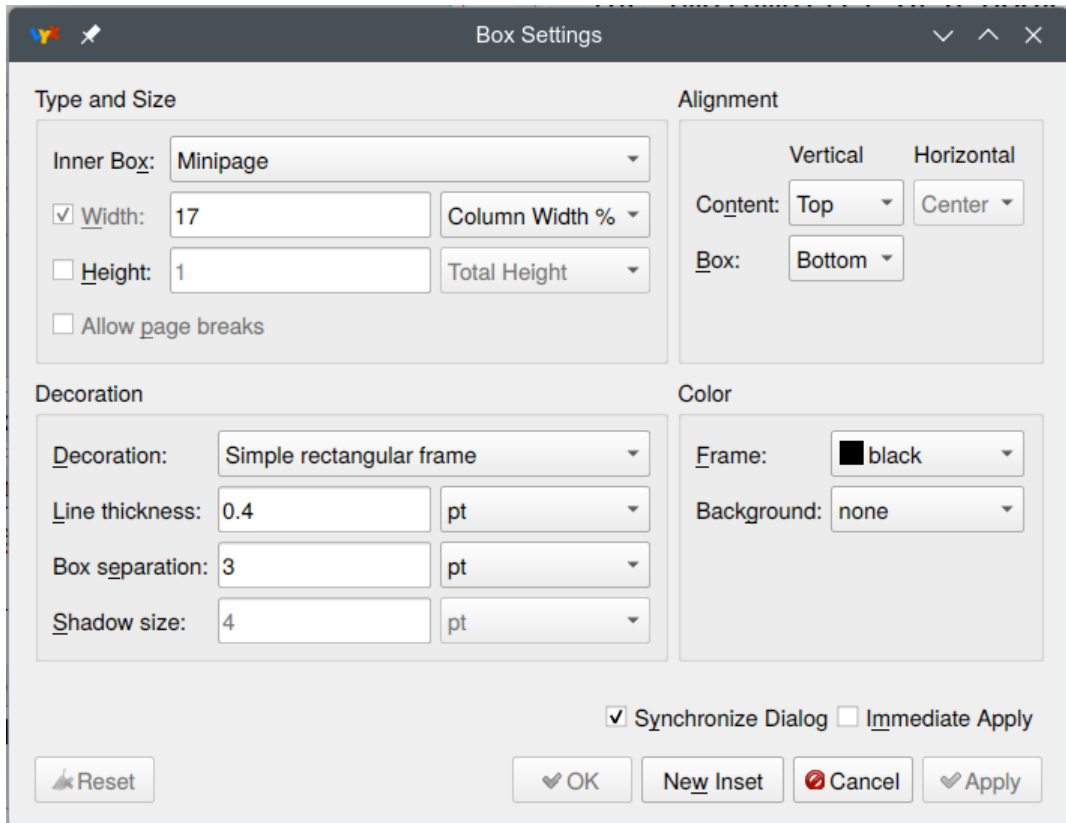


Figure 1: The Minipage dialog

```
% \framebox{\begin{minipage}[b][1\totalheight][t]{0.17\columnwidth}%
\begin{flushleft}
an in-line minipage that stands proud
\par\end{flushleft}}%
\end{minipage}}
```

and for the second

```
\begin{center} %
\shadowbox{\begin{minipage}[t]{0.2\columnwidth}%
is centred and has a drop shadow.%
\end{minipage}}
\par\end{center}
```

In both these cases, height is calculated from the text but width has been entered as a fraction (percentage in  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ ) of the total column width. See section 8.1 for how to colour the drop shadow.

Minipages can also be set side by side with space between them, in their own paragraph on a page or within a float (section 6.4), without a frame, with different styles of frame or with a shaded background:

*This is a frameless Minipage with the text emphasised.*

This is a Minipage with a red background.

Among the options for frames in  $\text{\LaTeX}$  are:

`\framebox` a rectangular box  
`\doublebox` a rectangular box with a double rectangular frame  
`\ovalbox` a box with oval corners  
`\Ovalbox` a box with oval corners and a thicker frame  
`\shadowbox` a box with a drop shadow

$\text{\LyX}$  users can change the line thickness, box separation and shadow size in the new Minipage dialog (Figure 1).  $\text{\LaTeX}$  users can change the default thickness of the frame (0.4pt) to, for example, 2pts with

```
\setlength{\fboxrule}{2pt}
```

The default space around the text (3 pts) can be changed, for example, to 10 pts with

```
\setlength{\fboxsep}{10pt}
```

The size of the drop shadow can be changed, for example, to 5 pts with

```
\setlength{\shadowsize}{5pt}
```

Both  $\text{\LyX}$  and  $\text{\LaTeX}$  users wanting to change the rounding of the corners of an oval box have to use `\cornersize` either absolutely by setting a diameter with

```
\cornersize*{36pts}
```

or relatively by entering a fraction which will be used against the shorter of height or width to calculate the diameter

```
\cornersize{0.4}
```

$\text{\LyX}$  users can also change the background colour<sup>2</sup> using the Minipage dialog while  $\text{\LaTeX}$  users need to enter:

```
\definecolor{shadecolor}{colour model}{colour values}
```

This Minipage has a 2 pt frame and 12 pt separation ...

... while this has a background colour defined with

```
\definecolor{shadecolor}{rgb}{1,0.5,0.5}
```

---

<sup>2</sup>See section 8.3 for further information on changing colours.



### 3.4.1 Footnotes in a Minipage

Minipages can have their own footnotes; these are numbered separately and appear at the bottom of the Minipage. If you want the footnote to appear at the bottom of the page instead, see section 6.2.

An example table	
An entry	A comment <sup>a</sup>
Another entry	Another comment <sup>3</sup>

---

<sup>a</sup>A footnote to a table in a Minipage

### 3.4.2 Variable width Minipages

To insert a variable width Minipage, select Document▷Settings▷Modules▷Boxes▷Variable-width Minipages. You can then insert a Minipage which adjusts to the width of its contents with Insert▷Custom Inset▷Minipage (Var. Width) and adjust its maximum width and its vertical adjustment with Insert▷Max. Width and Insert▷Vert. Adjustment.

You cannot however use any of the box or colour features which are available with standard Minipages. You can only limit its width and vertical adjustment.

LaTeX users need to enter (in this instance)

```
\begin[t]{varwidth}{3in}
```

before the contents of the variable width Minipage and

```
\end{varwidth}
```

after it.

## 3.5 Parboxes

think of it as a way of

A parbox is an alternative to a Minipage: enclosing a paragraph In L<sub>Y</sub>X you select Insert▷Box▷in a box.

Box but change the Inner Box setting to Parbox. In L<sup>A</sup>T<sub>E</sub>X you use

```
\parbox[] {options} {<your text>}
```

You can use most of the same settings (L<sub>Y</sub>X) or options (L<sup>A</sup>T<sub>E</sub>X) as you have for Minipages but parboxes cannot have footnotes.

---

<sup>3</sup>A footnote to a table at the bottom of the page

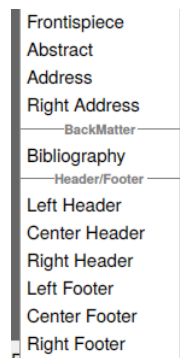
### 3.6 Fancy headers and footers

You can replace the standard headers and footers with your own by loading `fancyhdr`.<sup>4</sup> In LyX you select the module Custom Header/Footer Text in Document▷Settings▷Modules▷Page Layout and then Document▷Settings▷Page Layout change the Page style to fancy; in L<sup>A</sup>T<sub>E</sub>X add:

```
\usepackage{fancyhdr}
\pagestyle{fancy}
```

to the L<sup>A</sup>T<sub>E</sub>X Preamble.

You can then use the commands `\lhead{}`, `\chead{}`, `\rhead{}`, `\lfoot{}`, etc. in L<sup>A</sup>T<sub>E</sub>X to add your own headers and footers to each page. In LyX you use the six equivalent paragraph styles in the paragraph styles dropdown:



If you want your company logo to appear in the top left hand corner, the page number in the top right hand corner and the date in the bottom right hand corner of each page, enter in L<sup>A</sup>T<sub>E</sub>X:

```
\lhead{\resizebox{1in}{!}{\includegraphics{logo.eps}}}
\rhead{\thepage}
\rfoot{\today}
```

The first of these depends on having the L<sup>A</sup>T<sub>E</sub>X `graphicx` package installed.

See section 5.3.3 for how to generate the `Resizebox` to hold the logo in the first paragraph style and enter the TeX code:

```
\thepage
\today
```

into the second and third paragraph styles.

If you want to say ‘page *n* of so many pages,’ you need to add

```
\usepackage{lastpage}
```

to the L<sup>A</sup>T<sub>E</sub>X Preamble and then replace `\thepage` with

---

<sup>4</sup>KOMA-Script also provides the `scrpage2` package as an alternative to `fancyhdr`

```
\thepage\ of \pageref{LastPage}
```

By default, a title page is `empty` or `plain` depending on the document class. To add your logo to the title page, enter `\thispagestyle{fancy}` after `\maketitle`. If you do not want the headers or footers to appear on a later page, enter `\pagestyle{empty}` or `\pagestyle{plain}`, which will give you the standard page numbers, and then `\pagestyle{fancy}` if you want them back again.

To make the headers and footers alternate so that they are always on the inside or outside of the page in a two-sided document in LaTeX or any version of LyX use something like:

```
\fancyhead{} % clear all header fields
\fancyhead[LE,RO]{\resizebox{1in}{!}{\includegraphics{logo.eps}}}
\fancyfoot{} % clear all footer fields
\fancyfoot[LE,RO]{\thepage}
\renewcommand{\headrulewidth}{0.4pt}
\renewcommand{\footrulewidth}{0.4pt}
```

LE stands for Left Even page, RO for Right Odd page and C for Centre. By default you get a thin rule below the headers and above the footers but, after resetting them, you need to redefine the rule. You can change the thickness of each rule by issuing the last two commands with a changed value; a value of 0 turns them off.

You can remove headers and footers from pages of floats or from pages which contain a top or bottom float with `\iffloatpage{<float page value>}{<other pages value>}` or `\iftopfloat` and `\ifbotfloat` which take similar parameters. For more information, download the [fancyhdr](#) documentation.

### 3.7 Short titles

By default the chapter and section headings generated for the headers are simply the text of the chapter or section title. But, if this is long or if you want to identify a chapter by its author rather than its title, for example, in an edited collection, you can add a short/alternative title in LyX with `Insert > Short Title` which is displayed in the running headers and as the bookmark in a PDF.

To create a short title for a section in LaTeX enter

```
\section[short title]{long title that goes on and on and on ...}
```

## 4 Paragraph options

### 4.1 Hanging paragraphs

To have hanging paragraphs in LyX, go to `Document > Settings > Modules > Paragraph Styles`, select `Hanging Paragraphs` and press `Add`. You then get a new paragraph style — `Hanging` — which you can use wherever you want to have a hanging paragraph. (Note that the hanging paragraph is indented in LyX and only appears as a hanging paragraph in the output.)

L<sub>Y</sub>X uses the `hanging` package to define a single hanging paragraph style for L<sub>Y</sub>X; L<sub>A</sub>T<sub>E</sub>X users need to use the same package but read the documentation to determine how they wish to use it.

## 4.2 Mini-sections

Sometimes you want to add a heading to some text without starting a new section or subsection. For example, you might want to split a recipe into the list of ingredients followed by the method. KOMA-Script offers the `Minisec` paragraph style to enable you to achieve this. Unlike the `Paragraph` and `Subparagraph` styles, it is not merged with the subsequent paragraph.

### Ingredients

6 oz. margarine  
6 oz. caster sugar  
Few drops of vanilla essence  
3 large eggs  
6 oz. self-raising flour  
1–2 tblsp. hot water

### Method

Beat margarine and caster sugar until light and fluffy; add vanilla. Whisk eggs, add to mixture and beat; add flour and beat. Add 1–2 tblsp. hot water to form soft dropping consistency.

Makes 24 cakes; bake at 190°C/375°F/Gas 5 for 15–20 minutes.

## 4.3 Bullets and numbering

In L<sub>A</sub>T<sub>E</sub>X you can change the default bullets by redefining `\labelitemi-iv` with a command like

```
\renewcommand\labelitemi[0]{\small\(\diamond\)}
```

In L<sub>Y</sub>X you can make a permanent change with Document▷Settings▷Bullets and, for example, selecting the diamond shape so that

◊ you get a diamond bullet.

To make a temporary change, as I have done here, enter:

```
\let\savelabelitemi=\labelitemi  
\renewcommand\labelitemi[0]{\small\(\diamond\)}
```

before the example and

```
\renewcommand\labelitemi[0]{\savelabelitemi}
```

after the example in order to restore the default bullet. Note that, to obtain a wider choice of symbols, you may have to install additional, normally maths, packages; see [The comprehensive LaTeX symbol list](#).

In both LyX and L<sup>A</sup>T<sub>E</sub>X you have to use L<sup>A</sup>T<sub>E</sub>X code to change the default enumerators 1., a), i), A. You have a choice of five, Arabic numerals, upper and lower case Roman numerals and upper and lower case Roman letters, signified by `\arabic{}`, `\Roman{}`, `\roman{}`, `\Alph{}` and `\alph{}`. The four levels are `enumi` to `enumiv`; so altering the sequence to 1., (i), (a), I. can be achieved with:

```
\renewcommand{\labelenumi}{\arabic{enumi}.}
\renewcommand{\labelenumii}{(\roman{enumii})}
\renewcommand{\labelenumiii}{(\alph{enumiii})}
\renewcommand{\labelenumiv}{\Roman{enumiv}.}
```

in both LyX and LaTeX.

- 4.1. You can also obtain paragraph numbering within a section by adding `\thesection.` to the top level numbering style; for example,

```
\renewcommand{\labelenumi}{\thesection.\arabic{enumi}.}
```

- 4.2. Like the other custom numbering styles, this will not show in LyX.

- 4.3. In this example, the first 4 in the PDF output refers to section 4. Normally, you would start such paragraph numbering at the start of the section rather than near the end!

## 5 Text enhancements

Text in boxes can also be manipulated in a variety of ways. L<sup>A</sup>T<sub>E</sub>X users may need to add the `graphicx` package with

```
\usepackage{graphicx}
```

It is normally added whenever a LyX user chooses an enhancement which requires it but users can check whether it has already been added with View▷Code Preview Pane; select Preamble only to inspect the list of packages at the start of the document. If it is not present, go to Document▷Settings▷Modules▷Boxes, select the GraphicBoxes module and Add it to the document.

### 5.1 Drop capitals

**T**O add drop capitals in LyX, go to Document▷Settings▷Modules▷Paragraph Styles, select Initials (Drop Caps) and press Add. You then get a new paragraph style — Initial — which you can use wherever you want to have drop capitals. You then have three more items in the Insert menu:

- Initial which creates an inset for the drop capital
- Rest of initial which creates an inset for the rest of the word

- Options which allow you configure the formatting of the drop capital.

$\LaTeX$  users should add `\usepackage{lettrine}` to the  $\LaTeX$  Preamble and then specify the drop capital — using the example above — with

```
\lettrine{T}{o}{add drop capitals in ... menu:}
```

## 5.2 Fancy coloured boxes

In LyX select **Document**  $\triangleright$  **Settings**  $\triangleright$  **Modules**  $\triangleright$  **Boxes**  $\triangleright$  **Fancy Colored Boxes** and you can draw a box around `Great Western Railway`, `highlight` text or put a frame around the `highlighted` text using the **Insert**  $\triangleright$  **Box** dialog (figure 1).

The first is created in  $\LaTeX$  with

```
\fbox{Great Western Railway}
```

The second and third are created with `\colorbox{yellow}{highlight}` and `\fcolorbox{green}{yellow}{highlighted}`.

## 5.3 Rotating, scaling, reflecting and resizing text

Text can be rotated in  $\LaTeX$  with

```
\rotatebox[rotation origin]{rotation angle}{box content}
```

where the `origin` is specified as `c`, `l`, `r`, `b`, `t` or meaningful combinations of these and the counterclockwise rotation angle is expressed in degrees.

In LyX select **Document**  $\triangleright$  **Settings**  $\triangleright$  **Modules**  $\triangleright$  **GraphicBoxes** and once you have installed the module, select **Insert**  $\triangleright$  **Custom Inset**  $\triangleright$  **Rotatebox** where you want the rotated box to appear and **Insert**  $\triangleright$  **Origin** to add an Origin option. Entering ‘`origin=c`’ in the Origin box, ‘`30`’ in the Angle box and ‘`Great Western Railway`’ after the Angle box looks like this in LyX:



and produces:

*Great Western Railway*

$\LaTeX$  users should enter

```
\rotatebox[origin=c]{30}{Great Western Railway}
```

where they want the box to appear.

This also offers a way of rotating figures and tables outside a float:



An example table	
An entry	A comment
Another entry	Another comment

### 5.3.1 Scaling text

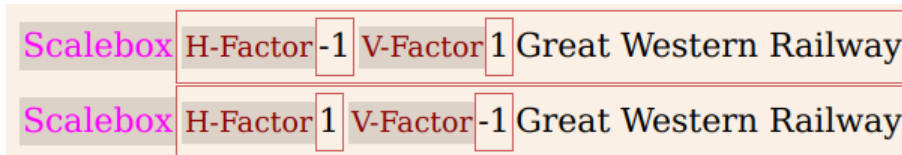
Text can be scaled in  $\LaTeX$  with

```
\scalebox{h-factor}[v-factor]{box content}
```

If the vertical factor is omitted, the horizontal is used. So `\scalebox{2}{Great Western Railway}` gives **Great Western Railway**. Adding different horizontal and vertical values creates distortion as in `\scalebox{2}[1.5]{Great Western Railway}` which gives **Great Western Railway**.

A negative horizontal value reverses the text and a negative vertical value inverts it so that you get  $\text{\textbackslash scalebox{-1}[1]{Great Western Railway}}$  and  $\text{\textbackslash scalebox{1}[-1]{Great Western Railway}}$ .

To achieve this in LyX select **Insert**  $\triangleright$  **Custom Insets**  $\triangleright$  **Scalebox** and **Insert**  $\triangleright$  **V-Factor** to add a V-Factor option and by entering '-1' in the H-Factor box, '1' in the V-Factor box and 'Great Western Railway' after the V-Factor box in the first inset and the opposite values in the second — which looks like this in LyX:



$\LaTeX$  users should enter

```
\scalebox{-1}[1]{Great Western Railway}
\scalebox{1}[-1]{Great Western Railway}
```

Had the vertical value not been added to the first, it would have taken the horizontal value and been inverted as well.

### 5.3.2 Reflecting text

A simpler way of reversing text without any other enhancement is to use the **Reflectbox** which is inserted with **Insert**  $\triangleright$  **Custom Insets**  $\triangleright$  **Reflectbox**:  $\text{\textbackslash reflectbox{Great Western Railway}}$ .

$\LaTeX$  users should enter


```
\reflectbox{Great Western Railway}
```

### 5.3.3 Resizing text

For more precise scaling use a `Resizebox` which is inserted in LyX with `Insert > Custom Insets > Resizebox` or in L<sup>A</sup>T<sub>E</sub>X with `\resizebox{width}{height}{box content}`. This allows you to specify the dimensions of the text or image; if you substitute `{!}` for `{height}` it scales by the width factor.

These commands can be combined so that, for example,

```
\rotatebox[origin=c]{-15}{\resizebox{4cm}{!}{\reflectbox{Great Western Railway}}}
```

produces: 

In LyX this looks like:



## 6 Floats

### 6.1 Altering the type-style of captions

To change the type-style of captions to bold add the command

```
\usepackage[labelfont=bf]{caption}
```

to the L<sup>A</sup>T<sub>E</sub>X Preamble unless you are using KOMA-Script in which case the command is:

```
\setkomafont{captionlabel}{\bfseries}
```

For more information on these options look at the [caption](#) or [KOMA-Script](#) documentation.

### 6.2 Footnotes in floats

Strictly speaking you cannot use footnotes in a float but there are a number of workarounds:

- put the table or image in a `Minipage` (section 3.4.1)
- use a `Multi-Page` table instead of a table float (section 7.6)
- add L<sup>A</sup>T<sub>E</sub>X code to achieve your objective (table 1).

To do the third, enter `\footnotemark{}` where you want the footnote number to appear and enter `\footnotetext{<your text>}` after the table. In LyX this will look like:

```
\footnotetext{<your text>}
```

You may also have to enter `Insert > Formatting > Clear Page` in LyX to make sure the footnote appears on the same page as the float.



Table 1: Putting footnotes in a float using  $\text{T}_{\text{E}}\text{X}$  code

An example table	
An entry	A comment
Another entry	Another comment <sup>5</sup>

$$\sum_{i=1}^n \text{ in-line, } \quad \sum_{i=1}^n$$

(a) In-line formula                      (b) Display formula

Figure 2: A pair of sub-floats each with their captions

### 6.3 Table captions

$\text{T}_{\text{E}}\text{X}$  does not support the convention that table captions in floats appear above tables and figure captions beneath figures; so it does not insert a gap between the table caption and the table. To ensure that it does, enter

```
\usepackage[tableposition=top]{caption}
```

in the  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$  Preamble unless you are using a KOMA-Script document class. In this case, add `captions=tableheading` to `\Document▷Settings▷Document class▷Class Options▷Custom` in  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$  or use

```
\documentclass[captions=tableheading, ...]{}
```

in  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ .

### 6.4 Sub-floats

You can place two images in a float by using sub-floats (Figure 2) or by using two Minipages (Figure 5). In each case, they have been collectively centred and one quad of space has been placed between them. Note that, whether containing figures or tables, sub-floats are numbered at the second level whereas Minipage captions (created using the `\captionabove` and `\captionbelow` environments which are available in the  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$  drop down list) have top level numbering (Table 2).

You can also put a table and its graph inside the same float by putting them inside two Minipages. If you put them in subfloats, they will have second level numbering (Table 2).

---

<sup>5</sup>A footnote to table 1

$$\sum_{i=1}^n \text{ in-line,}$$

$$\sum_{i=1}^n$$

Figure 3: In-line formula

Figure 4: Display formula

Figure 5: A pair of Minipages each with their captions

Table 2: Development of ethnic awareness in pakeha and Maori children

(a) stages in development

	pakeha (white)	Maori
self identification	4 years old	9–10 years old
discrimination	5–6 years old	5–10 years old
classification	7–12 years old	7–12 years old

(b) Own group preferences

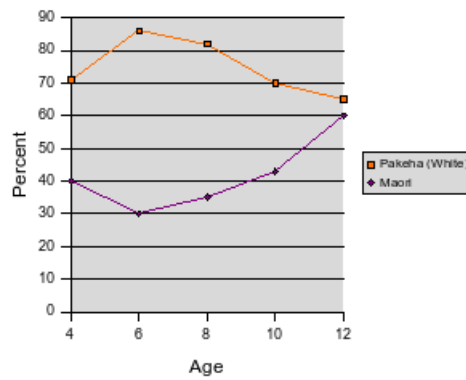


Table 3: This is a formal table

	Name	Email
1	James	jimmy287@bigphoneco.com
2	Andrew	andy3@littlephone.co.uk
3	Margaret	mags.forrest@mylocalip.co.uk
4	Jean	jean15@mylocalip.co.uk
5	Rose	rose.smith@littlephone.co.uk
6	David	davyjones3@bigphoneco.com

Table 4: Thick lines

	Name	Email
1	James	jimmy287@bigphoneco.com
2	Andrew	andy3@littlephone.co.uk
3	Margaret	mags.forrest@mylocalip.co.uk
4	Jean	jean15@mylocalip.co.uk
5	Rose	rose.smith@littlephone.co.uk
6	David	davyjones3@bigphoneco.com

## 7 Tables

### 7.1 Formal tables

Formal tables (Table 3) are obtained in  $\text{L}\text{y}\text{X}$  by checking Settings  $\triangleright$  Borders  $\triangleright$  Syle  $\triangleright$  Formal and in  $\text{L}\text{A}\text{T}\text{E}\text{X}$  by substituting `\midrule` for `\hline` in the table description.

### 7.2 Changing the line attributes of tables

How you change the line attributes of tables varies depending on the change you want to make. If you want to change the width of all the lines in a table to 1.5pt as in Table 4, you can do this by entering

```
\setlength{\arrayrulewidth}{1.5pt}
```

before the table and

```
\setlength{\arrayrulewidth}{0.4pt}
```

(which is the default) after it.

However, if you want to make different changes to the vertical and horizontal lines, you have to remove the default vertical lines and replace them with newly defined lines whereas you can simply change the attributes of the default horizontal lines.

Table 5: Changing vertical line attributes

	Name	Email
1	James	jimmy287@bigphoneco.com
2	Andrew	andy3@littlephone.co.uk
3	Margaret	mags.forrest@mylocalip.co.uk
4	Jean	jean15@mylocalip.co.uk
5	Rose	rose.smith@littlephone.co.uk
6	David	davyjones3@bigphoneco.com

### 7.2.1 Vertical<sup>6</sup>

You can define as many different vertical lines as you want in the  $\text{\LaTeX}$  Preamble with

```
\newcolumntype{<name>}{!{<definition>}}
```

So, for example, you might want the vertical lines in a table to be thicker or coloured. To achieve the first, you need a definition like

```
\newcolumntype{E}{!{\vrule width 1.5pt}}
```

and, to achieve the second, a definition like

```
\newcolumntype{B}{!{\color{blue}\vline}}
```

You can then use E and B in the  $\text{\LaTeX}$  arguments of the table definition. For Table 5 in  $\text{\LyX}$  clear the vertical lines from the table, put the cursor in the first cells of the columns and enter Bc Ec and BcB respectively in Settings > Table settings >  $\text{\LaTeX}$  argument. In this case, the tabular argument in  $\text{\LaTeX}$  is {BcEcBcB}.

### 7.2.2 Horizontal

To change only the horizontal line attributes of a table such as Table 6, place  $\text{\TeX}$  code similar to this before the table

```
\let\myHlineC\hline
\renewcommand{\hline}{\arrayrulecolor{red}\myHlineC\arrayrulecolor{black}}
```

and  $\text{\TeX}$  code similar to this after the table

```
\renewcommand{\hline}{\myHlineC}
```

---

<sup>6</sup>Thanks to the  $\text{\LyX}$  Documentation Team for the examples in this and the next section and for being the inspiration to explore several of the other tricks in this paper.

Table 6: Coloured horizontal lines

	Name	Email
1	James	jimmy287@bigphoneco.com
2	Andrew	andy3@littlephone.co.uk
3	Margaret	mags.forrest@mylocalip.co.uk
4	Jean	jean15@mylocalip.co.uk
5	Rose	rose.smith@littlephone.co.uk
6	David	davyjones3@bigphoneco.com

Table 7: Multirow table

Row 1 Column 1	Row 1 Column 2
Row 2 Column 1	Row 2 Column 2
	Row 3 Column 2

### 7.3 Multirow tables

Multirow tables are supported in L<sub>A</sub>T<sub>E</sub>X (Table 7); L<sup>A</sup>T<sub>E</sub>X users need to add

```
\usepackage{multirow}
```

in the L<sup>A</sup>T<sub>E</sub>X Preamble and, for example, insert

```
\multirow{2}{2.8cm}{<your text>}
```

in the table cell.

By default `multirow` formats the cell ragged right; you can change this behaviour with

```
\renewcommand{\multirowsetup}{\centering}
```

Replace `\centering` with `\raggedleft` or `\raggedright` as appropriate.

### 7.4 Long words in narrow cells

If you give a column a fixed width, L<sup>A</sup>T<sub>E</sub>X will wrap the contents of the cell. However, T<sub>E</sub>X will not hyphenate the very first word in a cell:

Narrow column	Column with undefined width
exceptionally long word	other words

You can get round this by inserting a space of 0 length before the word with `\_Insert> Formatting> Horizontal space> Custom> 0` in L<sub>A</sub>T<sub>E</sub>X:

Narrow column	Column with undefined width
exceptionally long word	other words

`\hspace{0in}`

in  $\LaTeX$  will do fine.<sup>7</sup>

## 7.5 Captions in Multi-Page tables

You can insert a caption in a Multi-Page table using Settings  $\triangleright$  Multi-Page Table  $\triangleright$  Caption in  $\LaTeX$  and `\caption{}` in  $\LaTeX$ .

Table 8: This is my Multi-Page table caption

	NAME	EMAIL
1	James	jimmy287@bigphoneco.com
2	Andrew	andy3@littlephone.co.uk
3	Margaret	mags.forrest@mylocalip.co.uk
4	Jean	jean15@mylocalip.co.uk
5	Rose	rose.smith@littlephone.co.uk
6	David	davyjones3@bigphoneco.com

**Note:**  $\LaTeX$  increments the table counter for each Multi-Page table; if you do not want Multi-Page tables without captions to be counted add

`\addtocounter{table}{-1}`

after each Multi-Page table that you do not want counted.

Also, the caption width will be set to the lesser of the column/page width and the caption width; if you do not want the caption to spill over the width of the table, you need to enter a suitable value with

`\setlength{\LTcapwidth}{width}`

---

<sup>7</sup>The same trick works with margin notes that begin with a long word.

Table 9: This long caption would have filled the whole column width if I had not used `\setlength{\LTcapwidth}{8 cm}`

	NAME	EMAIL
1	James	jimmy287@bigphoneco.com
2	Andrew	andy3@littlephone.co.uk
3	Margaret	mags.forrest@mylocalip.co.uk
4	Jean	jean15@mylocalip.co.uk
5	Rose	rose.smith@littlephone.co.uk
6	David	davyjones3@bigphoneco.com

## 7.6 Footnotes in Multi-Page tables

As you cannot, strictly speaking, use footnotes in floats, one option is to use a Multi-Page table instead (table 10).

Table 10: This is a Multi-Page table with a footnote

	NAME	EMAIL <sup>8</sup>
1	James	jimmy287@bigphoneco.com
2	Andrew	andy3@littlephone.co.uk
3	Margaret	mags.forrest@mylocalip.co.uk
4	Jean	jean15@mylocalip.co.uk
5	Rose	rose.smith@littlephone.co.uk
6	David	davyjones3@bigphoneco.com

## 8 Colour

### 8.1 Coloured text

The `color` package offers red, green, yellow, blue, cyan, magenta, black and white. It is automatically added to the  $\LaTeX$  Preamble by  $\text{LyX}$  if you create any coloured text using Edit  $\triangleright$  Text properties  $\triangleright$  Customize...  $\triangleright$  Color but  $\LaTeX$  users need to add

```
\usepackage{color}
```

to the  $\LaTeX$  Preamble. In  $\LaTeX$  the coloured text above can be created with

```
\textcolor{red}{any} \textcolor{green}{coloured}
\textcolor{blue}{text}
```

---

<sup>8</sup>This is my Multi-Page table footnote

From LyX 2.2 the following additional colours are predefined in LyX: brown, darkgray, gray, lightgray, lime, olive, orange, pink, purple, teal and violet. L<sup>A</sup>T<sub>E</sub>X users need to define these themselves — see subsection 8.3.

You can also use `\textcolor{red}` before a box with drop shadow and `\]` after it in both LyX and L<sup>A</sup>T<sub>E</sub>X to create a red drop shadow box.

## 8.2 Changing the colour of hyperlinks

Full support for hyperlinks is provided by the L<sup>A</sup>T<sub>E</sub>X `hyperref` package; LyX users can enable this by selecting **Use Hyperref Support** in **Document**▷**Settings**▷**PDF Properties** and L<sup>A</sup>T<sub>E</sub>X users by adding `\usepackage{hyperref}` to the L<sup>A</sup>T<sub>E</sub>X Preamble.

In LyX **Insert**▷**Hyperlink** allows you to set a target and the name of the link separately so that, unlike URLs, all the gory detail is hidden. In L<sup>A</sup>T<sub>E</sub>X this is achieved by adding one of a web address, an email or a filename before the name of the link which will appear in the text:

```
\href{http://www...}{name}
\href{mailto:<email address>}{name}
\href{file:<filename>}{name}
```

To alter the default settings LyX users go to **Document**▷**Settings**▷**PDF Properties**▷**Hyperlinks** where they can opt to break links over lines, remove the default boxes around each link and use colour links. L<sup>A</sup>T<sub>E</sub>X users add the relevant options to the list of parameters in `\hypersetup`; the first is enabled with `breaklinks=true`, the second with `pdfborder=0 0 0` and the third with `colorlinks=true`.

To change the default colours of links, LyX users select the **Additional Options** tab and enter the colours they want to use in **Hypersetup** while L<sup>A</sup>T<sub>E</sub>X users add them to the list of parameters in `\hypersetup`; the default colours are:

<code>linkcolor</code>	<b>red</b>	normal internal links
<code>citecolor</code>	<b>green</b>	bibliographical citations <sup>9</sup>
<code>filecolor</code>	<b>cyan</b>	URLs which open local files
<code>menucolor</code>	<b>red</b>	PDF menu items
<code>urlcolor</code>	<b>magenta</b>	external URLs

For example, the options in this document are:

```
linkcolor=black,citecolor=black,urlcolor=blue
```

For more information, see the [hyperref](#) documentation.

## 8.3 Extending the available colours

If you want to extend the available colours, you can define your own colours by adding

```
\usepackage{colortbl}
```

---

<sup>9</sup>It is recommended that you use the `natbib` citation styles with `hyperref`.



Table 11: Background colours

	Name	Email
1	James	jimmy287@bigphoneco.com
2	Andrew	andy3@littlephone.co.uk
3	Margaret	mags.forrest@mylocalip.co.uk
4	Jean	jean15@mylocalip.co.uk
5	Rose	rose.smith@littlephone.co.uk
6	David	davyjones3@bigphoneco.com

and one of the following to the L<sup>A</sup>T<sub>E</sub>X Preamble for each of the colours you want to define:

```
\definecolor{colour name}{cmyk}{colour values}
\definecolor{colour name}{rgb}{colour values}
\definecolor{colour name}{gray}{colour value}
```

The colour values are comma separated in the range 0–1.<sup>10</sup>

This is an example of a centred Minipage with a light grey background defined in the L<sup>A</sup>T<sub>E</sub>X Preamble with `\definecolor{light grey}{gray}{0.85}`.

## 8.4 Colour in tables

Text in a table can be coloured as described in section 8.1. To colour backgrounds, you can place the entire table in a frameless Minipage which has a background colour (section 5.2) or install the `colortbl` package. You can then change the background colour with `\columncolor{}`, `\rowcolor{}` or `\cellcolor{}` where the colour options are those available with the `color` package as well as those set out in section 8.3.

To colour the first column in Table 11 I put the cursor in the first cell of the column, selected **Settings**▷**Table settings**▷**L<sup>A</sup>T<sub>E</sub>X argument** in L<sup>y</sup>X and entered

```
>{\columncolor{cyan}}c
```

In L<sup>A</sup>T<sub>E</sub>X it goes in the arguments after `\begin{tabular}`. The full L<sup>A</sup>T<sub>E</sub>X argument for the three columns is:

```
{|>{\columncolor{cyan}}c|>{\columncolor{yellow}}c|>{\columncolor{green}}c|}
```

which L<sup>A</sup>T<sub>E</sub>X users enter as a single command and L<sup>y</sup>X users as three separate commands in the L<sup>A</sup>T<sub>E</sub>X arguments for the first cells of each column. Row colours override column colours and cell colours column and row colours. I entered the row and cell colours directly in each cell with `\rowcolor{red}` in the first cell of the first row and `\cellcolor{magenta}` in the last cell of the last row.

---

<sup>10</sup>For more information, download [colortbl.pdf](#).

LyX users need to beware that changing the text colour needs to be done last so as not to create L<sup>A</sup>T<sub>E</sub>X syntax errors. This means that, if a coloured table is the first coloured element you are entering in a document, you either cannot preview the table until you have inserted some coloured text (and LyX has inserted the `color` package) or you have to enter `\usepackage{color}` in the L<sup>A</sup>T<sub>E</sub>X Preamble to view the table and then delete this entry before you insert the first coloured text.

## 9 Checking the typesetting

In KOMA-Script adding the option `draft=true` to Document▷Settings▷Document Class▷Class Options▷Custom in LyX or `\documentclass[...]{}` in L<sup>A</sup>T<sub>E</sub>X will create a PDF without the graphics but with black rectangles at the ends of lines needing manual attention.

## 10 Printing

If you have prepared an A5 two sided book or booklet, check that the total number of pages is a multiple of four and, if necessary, add blank pages at the end to make sure that it is. You can then send the PDF off to a printer who will make sure that the pages are in the correct order when the book is printed.

If you want to print a booklet yourself, create an A5 PDF and then reorder the pages yourself with `pdfjam` which is normally included in a L<sup>A</sup>T<sub>E</sub>X distribution. Open a console, navigate to the folder where the A5 PDF is and enter, for a sixteen page PDF:

```
pdfjam <filename>.pdf '16,1,2,15,14,3,4,13,12,5,6,11,10,7,8,9' --landscape --nup 2x1
```

This will generate an A4 PDF with the pages correctly sorted so that they can be printed on any A4 printer and then folded to create an A5 booklet. The filename will contain your instructions and you can rename it as your A4 version.

As long as you match the sequence of page numbers correctly, you can use this expression to create A4 pages of any A5 PDF with a multiple of four pages for printing on an A4 printer.

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