

The LyX User's Guide

by the LyX Team*

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*If you have comments or error corrections, please send them to the LyX Documentation mailing list: lyx-docs@lists.lyx.org

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1 Getting Started

1.1 What is LyX?

LyX is a document preparation system. It is a tool for producing beautiful manuscripts, publishable books, business letters and proposals, and even poetry. It is unlike most other “word processors” in the sense that it uses the paradigm of a markup language as its core editing style. That means that when you type a section header, you mark it as a “Section”, not “Bold, 17 pt type, left justified, 5 mm space below”. LyX takes care of the typesetting for you, so you deal only with concepts, not the mechanics.

This philosophy is explained in much greater detail in the “*Introduction*”. If you haven’t read it yet, you need to. Yes, we mean now.

The “*Introduction*” describes several things in addition to LyX’s philosophy: most importantly, the format of all of the manuals. If you don’t read it, you’ll have a bear of a time navigating this manual. You might also be better served looking in one of the other manuals instead of this one. “*Introduction*” describes that, too.

1.2 How LyX Looks

Like most applications, LyX has the familiar menu bar across the top of its window. Below it is a toolbar with a pulldown box and various buttons. There is, of course, a vertical scrollbar and a main work area for editing documents. Near the bottom of the window is a small window containing a single line of text. This is the *minibuffer*, which really means “command buffer”. Type M-x when you need to type a command in the minibuffer.

Note that there is no horizontal scroll bar. This is not a bug or an oversight, but intentional. When you read a book, you expect the end of a line to wrap around to the next line. Text overflows onto new pages in a vertical fashion, hence the need for only a vertical scrollbar. There are three cases where you might want a horizontal scrollbar. The first case is large figures, displayed WYSIWYG. This, however, is due to a flaw in the routine that displays graphics on the LyX screen in a WYSIWYG fashion; it should rescale the graphics to fit in the window, just as you’d need to rescale graphics to fit on a page. The second and third cases are tables and equations which are wider than the LyX window. You can use the arrow keys to scroll horizontally through the table, but this doesn’t work for equations yet.

For a brief description of all LyX menus and toolbar buttons, have a look at Appendix A. Most of them are self-explanatory and you’ll find them listed in the corresponding sections of this documentation.

1.3 HELP

The help system consists of the LyX manuals. You can read *all* of the manuals from inside LyX. Just select the manual you want read from the **Help** menu.

1.4 Basic LyX Setup

There are several features of LyX that can be configured from inside LyX, without resorting to configuration files. First, LyX is able to inspect your system to see what programs, L^AT_EX document classes and L^AT_EX packages are available. It uses this knowledge to give reasonable defaults to several **Preferences** settings. Although this configuration has already been done when LyX was installed on your system, you might have some items that you installed locally, e.g. new L^AT_EX classes, and which are not seen by LyX. To force LyX to re-inspect your system, you should use **Tools**▷**Reconfigure**. You should then restart LyX to ensure that the changes are taken into account.

1.5 L^AT_EX Setup

LyX needs several L^AT_EX packages to work properly. The packages found on the system by LyX are listed in the file *LaTeX Configuration* that will be created when using the menu **Help**▷**LaTeX Configuration**. You should install the required missing packages and then reconfigure LyX.

2 How to work with LyX

2.1 Basic File Operations

Under the File menu are basic operations for any word processor in addition to some more advanced operations:

- New
- New from_Template
- Open
- Close
- Save
- Save As
- Revert to saved
- Version Control
- Import
- Export
- Print
- Exit

They all do pretty much the same thing as in other word processors, with a few minor differences. The File>New from_Template command not only prompts you for a name for the new file, but also prompts you for a template to use. Selecting a template will automatically set certain layout features for the document, features you would otherwise need to change manually. They can be of use for certain classes, especially those for writing letters (see section 3.1.2).

Note: There is no “default file” or document named “Untitled” or “scratch.” Unless you tell LyX to open a file or create a new one, that big, blank space is just that — a big, blank space.

Revert to saved and Version Control are useful if more people work on the same document at the same time¹. Revert to saved will reload the document from disk. You can of course also use it if you regret that you changed a document and want to restore it to the last save. With Version Control you can there register the changes you made to a document so that others can identify this as your changes.

2.2 Basic Editing Features

Like most modern word processors, LyX can perform cut and paste operations on blocks of text, can move by character, word, or screenful of text, and can delete whole words as well as individual characters. The next four sections cover the basic LyX editing features and how to access them. We'll start with cut and paste.

As you might expect, the Edit menu has the cut and paste commands, along with various other editing features. Some of these are special and covered in later sections. The basic ones are:

- Cut
- Copy
- Paste
- Paste Recent
- Paste Special
- Find & Replace

The first three are self-explanatory. One thing to note: whenever you delete a block of text that you've selected, it's automatically placed in the clipboard. That is, the Delete and Backspace keys also functions as the Cut command. Also, if you've selected text, be careful: If you hit a key, LyX will completely delete the selected text and replace it with what you just typed. You'll have to do an Undo to get back the lost text.

You can also copy text between LyX and other programs by cut, copy and paste. The submenu of Paste Recent shows you a list with the last strings you have pasted.

The menu Edit▷Paste Special▷Plain Text, Join Lines will insert the text in the clipboard so that the whole text is inserted as *one* paragraph. A new paragraph is started when there is a blank line in the file. Without Join Lines, the text is inserted as Paragraphs, where the line breaks of the text will start a new paragraph.

The Edit▷Find & Replace item opens the Find and Replace dialog. Once you've found a word or expression, LyX selects it. Hitting the Replace button replaces the selected text with the contents of the Replace with field. You can click the Find Next

¹If you plan to do this, you should check out the Version Control feature in LyX also. Read *Extended Features*.

button to skip the current word. Hit **Replace All** to replace all occurrences of the text in the document automatically. The **Case sensitive** option can be used if you want the search to consider the case of the search word. If the toggle is set, searching for “**Test**” will not match the word “**test**”. The **Match whole words only** option can be used to force LyX to only find complete words. I.e., searching for “**star**” will not match “**starlet**”.

Things like notes, floats, etc., the so called insets can be dissolved. This means that the inset is deleted and its content is left as normal text. Dissolving an inset is done by setting the cursor to the beginning of an inset and pressing **Backspace** or by setting the cursor to the end and pressing **Delete**.

2.3 Undo and Redo

If you make a mistake, you can easily recover from it. LyX has a large-capacity undo/redo buffer. Select **Edit**▷**Undo** to undo some mistake. If you accidentally undo too much, use **Edit**▷**Redo** to “undo the undo.” The undo mechanism is currently limited to 100 steps to minimize memory overhead.

Notice that if you revert back all changes to arrive to the document as it was last saved, the “changed” status of the document is unfortunately not reset. This is a consequence of the 100 step undo limit, above.

The **Undo** and **Redo** work on almost everything in LyX. They have some quirks, too. They won’t **Undo** or **Redo** text character by character, but by blocks of text. That can take some getting used to; you’ll have to play with **Undo** and **Redo** to get a feel for just how much they’ll undo/redo, and after time, you’ll surely appreciate how it works.

2.4 Mouse Operations

This are the most basic mouse operations.

1. Motion

- Click the *left mouse button* once anywhere in the edit window. The cursor moves to the text under the mouse.

2. Selecting Text

- Hold down the *left mouse button* and drag the mouse. LyX marks the text between the old and new mouse positions. Use **Edit**▷**Copy** to create a copy of the text in LyX’s buffer (and the clipboard).
- Re-position the cursor and then paste the text back into LyX using **Edit**▷**Paste**.

3. Insets (Footnotes, Notes, Floats, etc.)

Single click the left mouse button to open or close any of these. Right-click on them to set its properties. Also check the appropriate section of this manual for more details.

4. Tables

Single click the right mouse button to open a dialog that will allow you to manipulate the table.

2.5 Basic Key Bindings

We're not going to cover all of the keybindings. Be aware that there are at least two different primary binding maps: CUA and Emacs. LyX's default is CUA.

Some keys, like **Page Up**, **Page Down**, **Left**, **Right**, **Up**, and **Down**, do exactly what you expect them to do. Other keys don't:

Tab There is no such thing as a tab stop in LyX. If you don't understand this, go read sections 3.2.1 and 3.3, especially section 3.3.6, right now. Yes, right now. If you're still confused, look in the *Tutorial*.

Esc This is the "cancel key." It's used, generically, to cancel operations. Other parts of the manual will go into greater detail about this.

Home and **End** These move the cursor, respectively, to the beginning and end of a line, unless you are using the Emacs bindings where they jump to the beginning or end of the file.

There are three modifier keys:

Control (Denoted by "C" in the documentation files) This has a couple of different uses, depending on which keys it's used in combination with:

- With **Backspace** or **Delete**, it deletes an entire word instead of a single character.
- With **Left** and **Right**, it moves by words instead of characters.
- With **Home** and **End**, it moves to the beginning and the end of the document, respectively.

Shift (Denoted by "S" in the documentation files) Use this with any of the motion keys to select the text between the old and new cursor positions.

Meta (Denoted by "M" in the documentation files) This is the Alt key on many keyboards, unless your keyboard has a distinct Meta key. If you have both keys, you will need to try out which one actually performs the **Meta**-function. This key does many different things, but it also activates the

menu accelerator keys. If you use this in combination with any of the underlined letters in a menu or menu item, it selects that menu item.

For example, the sequence “M e s c” brings up the “Text Style” menu. Typing “M f” opens the File menu.

There are also other things bound to the **Meta**- key, but you’ll have to check in the *Reference manual* for more info.

You’ll learn more and more keybindings and short-cut keys as you use LyX, because most actions will prompt a small message in the status bar at the bottom of LyX’s main window which describe the name of the action, you’ve just triggered, and any existing keybindings for that action. The notation for the keybindings is very similar to the notation used in this documentation, so you should not have any problems understanding it. However, notice that Shift-modifiers are explicitly mentioned, so “M-p S-A” means Meta-p followed by a capital A. “S-C-s” means Shift-Control-s.

3 LyX Basics

3.1 Document Types

3.1.1 Introduction

Before you do anything else, before you ever start writing a document, you need to decide what type of document you want to edit. Different types of documents use different types of spacing, headings, numbering schemes, and so on. Additionally, different documents use different paragraph environments, and format the title of your document differently.

A *document class* describes a group of properties common to a particular set of documents. By setting the document class, you automatically select these properties, making it easier to create the type of document you want. If you don't choose a document class, LyX picks one for you by default. So, it behooves you to change the class of your document.

Read on for info about the document classes you can choose from LyX, and how to adjust their properties.

3.1.2 Document Classes

3.1.2.1 Overview

There are four standard document classes in LyX. They are:

Article for basic articles

Report for basic reports

Book for writing a book

Letter for US-style letters

There are also some non-standard classes, which LyX only uses if you have installed them. Here are some of the classes, the full list with detailed explanations can be found in chapter *Special Document Classes* in the *Extended Features* manual:

A&A Journal articles in the style and format used in Astronomy & Astrophysics

AAS_TTeX For submissions to the journals published by the American Astronomical Society

AMS Layouts for articles and books in the style and format used by the American Mathematical Society (AMS). There are three article layouts available. The standard one uses a typical numbering scheme for theorems etc., that prepends the section number to the number of the result. All result-type statements (propositions, corollaries, and so on) are sequenced together, but definitions, examples, and the like have their own sequence. The “sequential numbering” scheme does not place the section number with each result, but numbers them throughout the article in a single sequence. Each type of result gets its own sequence. There is also a layout that dispenses with numbering of statements altogether.

Beamer Layout for presentations

broadway Layout for writing plays. It is not an existing L^AT_EX document class, but a new one which is distributed with L^AX.

curriculum vitae classes to create curriculum vitae

Dinbrief Letters in format of the DIN (German industry norm)

dtk Layout for *Die TeXnische Komödie*, the journal of the German T_EX user Group (Dante)

Elsevier Layout for journals of the Elsevier publishing group

Foils Used to make transparencies

g-brief Letters in format of the DIN (German industry norm)

hollywood Used to type spec scripts for the US film industry. It is not an existing L^AT_EX document class, but a new one which is distributed with L^AX.

IEEEtran Layout for the journals published by the Institute of Electrical and Electronics Engineers (IEEE)

IOP Layout for journals of the Institute of Physics publishing group

Kluwer Layout for journals of the Kluwer publishing group

koma-script a replacement for the standard classes, offers many useful features like caption formatting, automatic print space calculation etc.

Memoir another replacement for the standard classes

paper Used with the **paper** L^AT_EX document class

Powerdot Layout for presentations

REVTeX is used to write articles for the publications of the American Physical Society (APS), American Institute of Physics (AIP), and Optical Society of America (OSA). This class is not completely compatible with all LyX features.

Slides Used to make transparencies

SPIE Proceedings Layout for the journals published by The International Society for Optical Engineering (SPIE)

Springer Layouts for journals of the Springer publishing group

TUGboat Layout for TUGboat, the journal of the international T_EX user Group (TUG)

We won't go into any detail about how to use these different document classes here. You can find all the details about the non-standard classes in the *Extended Editing* manual. Here, we will settle with a list of some of the common properties of all of the document classes.

3.1.2.2 Selecting a Class

You can select a class using the Document▷Settings dialog. Select the class you want to use, and make any fine tunings of the options you may need.

3.1.2.3 Properties

Each class has a default set of options. Here's a quick table describing them:

	Pagestyle	Sides	Columns	Max. sectioning level
article	Plain	One	One	Section
report	Plain	One	One	Chapter
book	Headings	Two	One	Chapter
letter	Plain	One	One	none

You're probably also wondering what "Max. sectioning level" means. There are several paragraph environments used to create section headings. Different document classes allow different types of section headings. Only two use the **Chapter** heading; the rest do not and begin instead with the **Section** heading. Some document classes, such as the ones for letters, don't use any section headings. In addition to **Chapter** and **Section** headings, there are also **Subsection** headings, **Subsubsection** headings, and so on. We'll describe these headings fully in section 3.3.4.

3.1.3 Document Layout

The most important properties of documents classes are set in the menu **Document**▷**Settings**. There in the **Options** field under **Documents classes**, you can enter special options for your document class in a comma-separated list. This is only necessary if LyX doesn't support special options you want to use for your document. To learn more about your favorite L^AT_EX-class and its options, you have to read its manual.

Under **Page Layout** the **Pagestyle** controls what sorts of headings and page numbers go on a page. You can choose between the following five options:

Default	Use default pagestyle of current class.
Empty	No page numbers or headings.
Plain	Page numbers only.
Headings	Page numbers and either the current chapter or section title and number. Whether LyX uses the current chapter or the current section depends on the maximum sectioning level of the class.
Fancy	This allows you to create fully customizable headers and footers if you have the fancyhdr package installed. At the moment, support in LyX is limited to this setting. To use the full power of this package, you have to add code to your document preamble. Check the documentation for the fancyhdr package for more details, [9].

The Separation of paragraphs is described in section 3.2.1.

3.1.4 Paper Size and Orientation

You'll find the following options in the menu **Page Layout** of the dialog of the **Document**▷**Settings** menu:

Papersize What size paper to print on. The choices are

- Default
- A3, A4, A5
- B3, B4, B5
- US letter
- US legal
- US executive
- Custom

Orientation Two toggle buttons choose whether to print the output as Landscape or as Portrait.

Two-sided document Adjusts the print space to print both sides of paper. That means that the print space for odd- and even-numbered pages is different.

3.1.5 Margins

Paper margins are set in the menu Document▷Settings.

If you use a koma-script document class, you can use the default settings. Because koma-script calculates then the printspace automatically by taking the paper format and the font size into account.

3.1.6 Important Note

If you change a document class, LyX has to convert *everything* into the new class. That includes the paragraph environments. Some paragraph environments are standard; all of the document classes have them; but some classes have special paragraph environments. If this is the case, and you change the document class, LyX sets the missing paragraph environments to **Standard** and places an error box at the beginning of the paragraph. Just click on them and you'll get a message dialog that tells you about the conversion and why it failed.

3.2 Paragraph Indentation and Separation

3.2.1 Introduction

Before describing all of the various paragraph environments, we'd like to say a word or two about paragraph indentation.

Everyone seems to have their own convention for separating paragraphs. Most Americans indent the first line of a paragraph. Others don't indent but put extra space between the paragraphs. If you choose indentation for paragraphs the *first* paragraph of a section, or after a figure, an equation, a table, a list, etc., is *not* indented. Only a paragraph following another paragraph gets indented. Note that the indentation behavior is different when you use another document language than English. L^AT_EX takes care that the indentation follows the rules of the used language.

The space between paragraphs, like the line spacing, the space between headings and text — in fact, all of the spacings for just about everything are pre-coded into LyX. As we said, you don't worry about how much space to add between what. LyX takes care of that. In fact, these pre-coded vertical spacings aren't a single number but a range. That way, LyX can squish or stretch the space between lines to make sure figures fit on a page with text, so that sections don't start at the bottom of a page, and so on.¹ However, pre-coded doesn't mean you can't change them. LyX

¹L^AT_EX does this when LyX goes to produce a printable file.

gives you the ability to globally change *all* of these pre-coded spacings. We'll explain more later.

3.2.2 Paragraph Separation

To separate paragraphs, select **Indent** or **Skip** in the submenu **Text Layout** of the dialog **Document▷Settings** to indent paragraphs or add extra space between paragraphs, respectively. The size of the skips can be defined in the dialog, for the indentation you have to add this line to your document preamble:

```
\setlength{\parindent}{Length}
```

where *length* is a value in one of the units listed in Appendix C.1. The default length is 30 pt.

3.2.3 Fine-Tuning

You can also change the separation method of a single paragraph. Open the **Edit▷Paragraph Settings** dialog and toggle the **Indent Paragraph** option to change the state of the current paragraph. If paragraphs have no indentation but use extra space for separation, this button will be ignored (you can't indent a single paragraph by toggling this).

You should only need to change the indentation method for a single paragraph if you need to do some fine-tuning.

3.2.4 Line Spacing

In the **Document▷Settings** dialog you can set the line spacing in the submenu **Text Layout**.²

3.3 Paragraph Environments

3.3.1 Overview

The paragraph environments correspond to the various

```
\begin{environment} ... \end{environment}
```

command sequences in an ordinary L^AT_EX file. If you don't know L^AT_EX, or the concept of a paragraph environment is totally alien to you, we urge you to read the *Tutorial*. The *Tutorial* also contains many more examples than this section does.

A paragraph environment is simply a “container” for a paragraph which gives that paragraph certain properties. This can include a particular style of font, different margins, a numbering scheme, labels, and so on. Additionally, you can “nest” the different environments inside one another, allowing one environment to inherit some of the properties of another. The different paragraph environments totally replace

²You need to have the L^AT_EX-package **setspace** installed to use this feature.

the need for messy tab stops, on the fly margin adjustment, and other hold-overs from the days of typewriters. There are several paragraph environments which are specific to a particular document type. We'll only be covering the most common ones here.

To choose a new paragraph environment, use the pull-down box on the left end of the toolbar. LyX will change the environment of the *entire* paragraph in which the cursor sits. You can also change the environment of an entire group of paragraphs if you select them before choosing the new environment.

Note that hitting **Return** will *typically* create a new paragraph using the **Standard** paragraph environment. We say “typically” because if you are in one of these environments:

- Quote
- Quotation
- Verse
- Itemize
- Enumerate
- Description
- List

LyX keeps the old paragraph environment when you hit **Return**, rather than resetting it to **Standard**. LyX will still reset the nesting depth, however. Usually, starting a new paragraph resets both the paragraph environment and the nesting depth (for more on nesting see section 3.4). At the moment, all this is context-specific; you're better off expecting **Return** to reset the paragraph environment and depth. If you want a new paragraph to keep the current environment and depth, use **M-Return** instead.

3.3.2 Standard

The default paragraph environment is **Standard** for most classes. It creates a plain paragraph. If LyX resets the paragraph environment, this is the one it chooses. In fact, the paragraph you're reading right now (and most of the ones in this manual) are in the **Standard** environment.

You can nest a paragraph using the **Standard** environment in just about anything else, but you can't really nest anything in a **Standard** environment.

3.3.3 Document Title

A L^AT_EX title page has three parts: the title itself, the name(s) of the author(s) and a “footnote” for thanks or contact information. For certain types of documents, L^AT_EX places all of this on a separate page along with today’s date. For other types of documents, the title “page” goes at the top of the first page of the document.

LyX provides an interface to the title page commands through the paragraph environments **Title**, **Author**, and **Date**. Here’s how you use them:

- Put the title of your document in the **Title** environment.
- Put the author name in the **Author** environment.
- If you want the date to have a certain appearance, want to use a fixed date, or want other text to appear in place of today’s date, put that text in the **Date** environment. Note that using this environment is optional. If you don’t provide any, L^AT_EX will automatically insert today’s date. If you don’t want any date, add the line
`\date{}`
to the preamble of your document (menu **Document**▷**Settings**)

You can use footnotes to insert “thanks” or contact informations.

3.3.4 Headings

There are several paragraph environments for producing section headings. LyX takes care of the numbering for you.

3.3.4.1 Numbered Headings

There are 7 numbered types of section headings. They are:

1. Part
2. Chapter
3. Section
4. Subsection
5. Subsubsection
6. Paragraph
7. Subparagraph

LyX labels each heading with a series of numbers, separated by periods. The numbers describe where in the document you are. Unlike the other headings, parts are numbered with Latin letters.

Headings all subdivide your document into different pieces of text. For example, suppose you're writing a book. You group the book into chapters. LyX does similar grouping:

- Part is divided in either Chapter or Section
- Chapters are divided into Sections
- Sections are divided into Subsections
- Subsections are divided into Subsubsections
- Subsubsections are divided into Paragraphs
- Paragraphs are divided into Subparagraphs

Note: Not all document types use the Chapter heading as the maximum sectioning level. In that case the Section is the top-level heading.

So, if you use the Subsubsection environment to label a new sub-subsection, LyX labels it with its number, along with the number of the subsection, section, and, if applicable, chapter that it's in. For example: the fifth section of the second chapter of this book has the label "2.5".

3.3.4.2 Unnumbered Headings

There are 5 types of unnumbered section headings. They are:

1. Part*line spacing
2. Chapter*
3. Section*
4. Subsection*
5. Subsubsection*

The "*" after each name means that these headings are not numbered. They work the same as their numbered counterparts but won't appear in the table of contents, see section 6.2.

3.3.4.3 Changing the Numbering

You can also alter which sectioning levels get numbered and which ones appear in the Table of Contents. Now, this doesn't remove any of the levels; that's preset in the document class. Certain classes start with **Chapter** and go down to the **Subparagraph** level. Others start at **Section**. Similarly, not all document classes number all sectioning levels. Most don't number **Paragraph** or **Subparagraph**. This is something you can change.

Open the Document▷Settings dialog. Under **Numbering & TOC** you'll see two counters. The one named **Numbering** controls how far down in the sectioning hierarchy LyX numbers a section heading. The other one controls the appearance of the section headings in the table of contents.

3.3.4.4 Short Titles of Headings

Some section or chapter titles, such as this one, can get quite long. This can cause troubles when there is limited horizontal space. For example, if the header of the page is set to show the current section title, a long title will protrude over the page margins and look awful.

LaTeX allows you to specify a short title for section headings. This short title is used in the header and in the actual table of contents, avoiding the problem mentioned. To specify a short title, use the menu Insert▷Short Title. This will insert a box labeled "opt" (stands for "optional") which you can use to enter the short title text. This also works for captions inside floats.

The title of this section is a good example of using this feature.

3.3.4.5 Special Information

The following information applies to all section headings:

- You cannot do any nesting with these environments.
- You cannot use a margin note in any of these environments.
- You can only use inline math in these environments.
- You can use labels and cross-references to refer to their numbers.

3.3.5 Quotes and Poetryline spacing

LyX has three paragraph environments for writing poetry and quotations. They are **Quote**, **Quotation**, and **Verse**. Forget the days of changing line spacing and twiddling with margins. These three paragraph environments already have those changes built-in. They all widen the left margin and add a bit of extra space above and below the text they contain. They also allow nesting, so you can put a **Verse** in a **Quotation**, as well as in some other paragraph environments.

There is another feature of these three paragraph environments: they do *not* reset to **Standard** when you start a new paragraph. So, you can type in that poem and merrily hit **Return** without worrying about the paragraph environment changing on you. Of course, that means that, once you're done typing in that poem, you have to change back to the **Standard** environment yourself.

3.3.5.1 Quote and Quotation

Now that we've described the similarities of these three environments, it's time for the differences. **Quote** and **Quotation** are identical except for one difference: **Quote** uses extra spacing to separate paragraphs and never indents the first line. **Quotation** *always* indents the first line of a paragraph and uses the same line spacing throughout.

Here's an example of the **Quote** environment:

This is in the **Quote** environment. I can keep writing, extending this line out further and further until it wraps. See – no indentation!

Here's the second paragraph of this quote. Again, there's no indentation, but there is extra space between me and the other paragraph.

Here's another example, this time in the **Quotation** environment:

This is in the **Quotation** environment. If I keep writing, you'll see the indentation. If your country uses a writing style that shows off new paragraphs by indenting the first line, then **Quotation** is the environment for you! Well, you'd use it *if* you were quoting other text.

Here's a new paragraph. I could ramble on and on, like a politician at election time. If I did that, though, you'd get bored.

As the examples show, **Quote** is for those people who use extra space to separate paragraphs. They should put quotes in the **Quote** environment. Those who use indentation to mark a new paragraph should use the **Quotation** paragraph environment for quoted text.

3.3.5.2 Verse

Verse is a paragraph environment for poetry, rhymes, verses, and so on. Here's an example:

This is in Verse
Which I did not rehearse!

It could be much worse. This line could be long, very long, oh so long, so very long that it wraps around. It looks okay on screen, but in the printed version, the extra lines are indented a bit more than the first. Okay, so it's turned to prose and doesn't rhyme anymore. So sue me.

To break a line
And make things look fine
Use C-Return.

As you can see, Verse does not indent both margins. Each stanza of the verse or poem is in its own paragraph. To separate the individual lines of a stanza, use the `break-line` function C-Return.

3.3.6 Lists

LyX has four different paragraph environments for creating different kinds of lists. In the `Itemize` and `Enumerate` environments, LyX labels your list items with bullets or numbers, respectively. In the `Description` and `List` environments, LyX lets you provide your own label. We'll present the individual details of each type of list next after describing some general features of all four of them.

3.3.6.1 General Features

The four paragraph environments for lists differ from the other environments in several ways. First, LyX treats each paragraph as a list item. Hitting `Return` does *not* reset the environment to `Standard` but keeps the current environment and creates a new list item. The nesting depth is typically reset, however. If you want to keep both the current nesting depth and paragraph environment, you should use `M-Return` to break paragraphs.

You can nest lists of any type inside one another. In fact, LyX changes the labels on some list items depending on how it is nested. If you intend to use any of the list paragraph environments, we suggest you read all of section 3.4.

3.3.6.2 Itemize

The first type of list we'll describe in detail is the `Itemize` paragraph environment. It has the following properties:

- Each item has a particular bullet or symbol as its label.
 - LyX uses the same symbol for all of the items in a given nesting level.
 - The symbol appears at the beginning of the first line.
- The items can have any length. LyX automatically offsets the left margin of each item. The offset is always relative to whatever environment the `Itemize` list may be in.
- If you nest an `Itemize` environment inside another `Itemize` environment, the label changes to a new symbol.
 - There are four different symbols for up to a four-fold nesting.

- LyX always shows the same symbol on screen.
- See section 3.4 for a full explanation of nesting.

Of course, that explanation was also an example of an `Itemize` list. The `Itemize` environment is best suited for lists where the order doesn't matter.

We said that different levels use different symbols as their label. Here's an example of all four possible symbols. Note that those of you reading this manual within LyX won't see any difference.

- The label for the first level `Itemize` is a large black dot, or bullet.
 - The label for the second level is a dash.
 - * The label for the third is an asterisk.
 - The label for the fourth is a centered dot.
 - * Back out to the third level.
 - Back to the second level.
- Back to the outermost level.

These are the default labels for an `Itemize` list. You can customize these labels in the **Document**▷**Settings** dialog in the submenu **Bullets**.

Notice how the space between items decreases with increasing depth. We'll explain nesting and all the tricks you can do with different depths in section 3.4.

3.3.6.3 Enumerate

The `Enumerate` environment is used to create numbered lists and outlines. It has these properties:

1. Each item has a numeral as its label.
 - a) The type of numeral depends on the nesting depth.
2. LyX automatically counts the items for you and updates the label as appropriate.
3. Each new `Enumerate` environment resets the counter to one.
4. Like the `Itemize` environment, the `Enumerate` environment:
 - a) Offsets the items relative to the left margin. Items can have any length.
 - b) Reduces the space between items as the nesting depth increases.
 - c) Uses different types of labels depending on the nesting depth.
 - d) Allows up to a four-fold nesting.

Unlike the `Itemize` environment, `Enumerate` shows the different labels for each item in LyX. Here is how LyX labels the four different levels in an `Enumerate`:

1. The first level of an **Enumerate** uses Arabic numerals followed by a period.
 - a) The second level uses lower case letters surrounded by parentheses.
 - i. The third level uses lower-case Roman numerals followed by a period.
 - A. The fourth level uses capital letters followed by a period.
 - B. Again, notice the decrease in the spacing between items as the nesting depth increases.
 - ii. Back to the third level
 - b) Back to the second level.
 2. Back to the outermost level.

Once again, you can customize the type of numbering used in the **Enumerate** environment. It involves adding commands to the L^AT_EX preamble (see the *Extended Features* manual). As stated earlier, such customization only shows up in the printed version, not in LyX.

There is more to nesting **Enumerate** environments than we've stated here. You should read section 3.4 to learn more about nesting.

3.3.6.4 Description

Unlike the previous two environments, the **Description** list has no fixed label. Instead, LyX uses the first “word” of the first line as the label. Here's an example:

Example: This is an example of the **Description** environment.

LyX typesets the label in boldface and puts extra space between it and the rest of the line.

With the first “word” it is meant that the first hit of the **Space** key ends the label if you are at the beginning of the first line of an item. If you need to use more than one word in the label use a **Protected Blank**. (Use either **C-Space** or the menu **Insert**▷**Formatting**▷**Protected Space**, see section 3.5.6.2 for more info.) Here is an example:

Second Example: This one shows how to use a **Protected Blank** in the label of a **Description** list item.

Usage: You should use the **Description** environment for things like definitions and theorems. Use it when you need to make one word in particular stand out in the text that describes it. It's not a good idea to use a **Description** environment when you have an entire sentence that you want to describe. You're better off using **Itemize** or **Enumerate** and nesting several **Standard** paragraphs into them.

Nesting: You can nest **Description** environments inside one another, nest them in other types of lists, and so on.

Notice that after the first line, LyX indents subsequent lines, offsetting them from the first line.

3.3.6.5 The LyX List

The List environment is a LyX extension to L^AT_EX.

Like the Description environment the List environment has user-defined labels for each list item. There are the following properties of this list environment:

item labels LyX uses the first “word” of each line as the item label. The first Space after the beginning of the first line of an item marks the end of the label. If you need to use more than one word in an item label, use a protected blank as described above.

margins As you can see, LyX uses different margins for the item label and the body of the item text. The body of the text has a larger left margin, which is equal to the default label width plus a little extra space.

label width LyX uses the width of the label, or the default width, whatever is larger. If the label width is larger, the label “extends” into the first line. In other words, the text of the first line isn’t aligned with the left margin of the rest of the item text.

default width You can set the default label width to ensure that the text of all items in a List environment have the same left margin.

To change the default width, select all items in the list. Now open the Edit▷Paragraph Settings dialog. The text in the box Longest label determines the default label width. You can use the text of your largest label here, but you can also use the letter “M” multiple times instead. The M is the widest character and is a standard unit of widths in L^AT_EX. By using “M” as the unit of width you don’t need to keep changing the contents of Longest label every time you alter a label in a List environment.

The predefined default width is the length of “00.00.0000” (equal to 6 M).

Note: Setting the cursor into a list item to change only its label width will only change the width inside LyX but not in the output.

You should use the List environment the same way like the Description list: When you need one word to stand out from the text that describes it. The List environment gives you another way to do this, using a different overall layout.

You can nest List environments inside one another, nest them in other types of lists, and so on. They work just like the other list paragraph environments. Read section 3.4 to learn about nesting.

There is yet another feature of the List environment: As you can see in the examples, LyX left-justifies the item labels by default. You can use additional HFills to change how LyX justifies the item label. We’ll document HFills later in section 3.5.1. Here are some examples:

Left The default for List item labels.

Right One HFill at the beginning of the label right justifies it.

Center One HFill at the beginning of the label and one at the end centers it.

3.3.7 Letters

3.3.7.1 Address and Right Address: An Overview

Although LyX has document classes for letters, we've also created two paragraph environments called **Address** and **Right Address**. To use the letter class, you need to use specific paragraph environments in a specific order, otherwise L^AT_EX gags on the document. In contrast, you can use the **Address** and **Right Address** paragraph environments anywhere with no problem. You can even nest them inside other environments, though you can't nest anything in them.

Of course, you're not limited to using **Address** and **Right Address** for letters only. **Right Address**, in particular, is useful for creating article titles like those used in some European academic papers.

3.3.7.2 Usage

The **Address** environment formats text in the style of an address, which is also used for the opening and signature in some countries. Similarly, the **Right Address** environment formats text in the style of a right-justified address, which is used for the sender's address and today's date in some countries. Here's an example of each:

Right Address
Who I am
Where I am
When is it? What is today?

That was **Right Address**. Notice that the lines all have the same left margin, which LyX sets to fit the largest block of text on a single line. Here's an example of the **Address** environment:

Who are you
Where do I send this
Your post office and country

As you can see, both **Address** and **Right Address** add extra space between themselves and the next paragraph. If you hit **Return** in either of these environments, LyX resets the nesting depth and sets the environment to **Standard**. This makes sense, since **Return** is the **break-paragraph** function, and the individual lines of an address are not paragraphs. Thus, you have to use **break-line** (C-Return or Formatting Character▷ Line Break from the Insert menu) to start a new line in an **Address** or **Right Address** environment.

Abstract

This is an abstract. As you can see, it is printed in a smaller font size than the other paragraph types.

Also several paragraphs are possible in the abstract.

This is a “Standard” paragraph to visualize the differences in the font size.

Figure 3.1: Paragraph in the Abstract environment

3.3.8 Academic Writing

Most academic writing begins with an abstract and ends with a bibliography or list of references. LyX contains paragraph environments for both of these.

3.3.8.1 Abstract

The **Abstract** environment is used for the abstract of an article. Technically, you could use this environment anywhere, but you really should only use it at the beginning of the document, after the title. Also, don't bother trying to nest **Abstract** in anything else or vice versa. It won't work. The **Abstract** environment is only useful in the article and report document classes. The book document class ignores the **Abstract** completely, and it's utterly silly to use **Abstract** in a letter document class.

The **Abstract** environment does several things for you. First, it puts the centered label “Abstract” above the text. The label and the text of the abstract are separated by some extra vertical space. Second, it typesets everything in a smaller font, just as you'd expect. Lastly, it adds a bit of extra vertical space between the abstract and the subsequent text. Well, that's how it will appear on the LyX screen. The appearance in the output depends on the used article or report class.

Starting a new paragraph by hitting **Return** does not reset the paragraph environment. The new paragraph will still be in the **Abstract** environment. So, you will have to change the paragraph environment yourself when you finish entering the abstract of your document.

We'd love to give you directly an example of the **Abstract** environment, but since this document is in the “book” class, we can't do this. We inserted it therefore as figure 3.1. If you've never heard of an “abstract” before, you can safely ignore this environment.

3.3.8.2 Bibliography

The **Bibliography** environment is used to list references. Technically, you could use this environment anywhere, but you really should only use it at the end of the document.

Nesting Bibliography in anything else or vice versa won't work.

When you first open a Bibliography environment, LyX add a large vertical space, followed by the heading "Bibliography" or "References," depending on the document class. The heading is in a large boldface font. Each paragraph of the Bibliography environment is a bibliography entry. Thus, hitting Return does not reset the paragraph environment. Each new paragraph is still in the Bibliography environment.

For a detailed description of LyX's bibliography handling, have a look at in section 6.5.

3.3.9 LyX-Code

The LyX-Code environment is another LyX extension. It type-sets text in a typewriter-style font. It also treats the Space key as a fixed whitespace;³ this is the only case in which you can type multiple whitespaces in LyX. If you need to insert blank lines, you'll still need to use C-Return (the `break-line` function). Return breaks paragraphs. Note, however, that Return does not reset the paragraph environment. So, when you finish using the LyX-Code environment, you'll need to change the paragraph environment yourself. Also, you can nest the LyX-Code environment inside of others.

There are a few quirks with this environment:

- You cannot use C-Return at the beginning of a new paragraph (i.e. you can't follow Return with a C-Return).
- You can't follow a C-Return with a Space.
 - Use a Return to begin a new paragraph, then you can use a Space.
 - Or: use C-Space instead.
- You can't have an empty paragraph or an empty line. You must put at least one Space in any line you want blank. Otherwise, L^AT_EX generates errors.
- You cannot get the typewriter double quotes by typing " since that will insert *real* quotes. You get the typewriter double quotes with C-" (or C-q if you use Emacs-like key bindings).

Here's an example:

```
#include <stdio.h>

int main(void)
{
    printf("Hello World!\n");
    return 0;
}
```

³In the LyX-Code environment, the Space key is treated as a Protected Blank instead of an end-of-word marker.

This is just the standard “Hello world!” program.

LyX-Code has one purpose: to typeset code, such as program source, shell scripts, rc-files, and so on. Use it only in those very special cases where you need to generate text as if you used a typewriter.



3.4 Nesting Environments

3.4.1 Introduction

LyX treats text as a unified block with a particular context and specific properties. This allows you to create blocks that inherits some of the properties of another block. For example you have three main points in an outline, but point #2 also has two subpoints. In other words, you have a list inside of another list, with the inner list “attached” to item #2:

1. one
2. two
 - a) sublist - item #1
 - b) sublist - item #2
3. three

You put a list inside of a list by nesting one list inside the other. Nesting an environment is quite simple: Select **Increase List Depth** or **Decrease List Depth** from the **Edit** menu to change the nesting depth of the current paragraph (the status bar will tell you how far you are nested). Instead of the menu, you can also use the toolbar buttons

 and  or the convenient key bindings **S-M-Right** and **S-M-Left** to change the nesting level. The change will work on the current selection if you have made one (allowing you to change the nesting of several paragraphs at once), or the current paragraph.

Note that LyX only changes the nesting depth if it can. If it’s invalid to do so, nothing happens if you try to change the depth. Additionally, if you change the depth of one paragraph, it affects the depth of every paragraph nested inside of it.

Nesting isn’t limited to lists. In LyX, you can nest just about anything inside anything else, as you’re about to find out. This is the real power of nesting paragraph environments.

3.4.2 What You Can and Can’t Nest

Before we fire a list of paragraph environments at you, we need to tell you a little bit more about how nesting works.

The question if nesting a paragraph environment is possible, is a bit more complicated than a simple yes or no. There are three types of paragraph environments:

- Completely unstable
- Fully nestable, you can nest them inside of things and you can also nest other things inside of them.
- A third type, you can nest them into other environments, but you can't nest anything into them.

Here's a list of the three types of nesting behavior, and which paragraph environments have them:

Unnestable Can't nest them. Can't nest into them.

- Part
- Chapter
- Section
- Subsection
- Subsubsection
- Paragraph
- Subparagraph
- Part*
- Chapter*
- Section*
- Subsection*
- Subsubsection*
- Bibliography
- Abstract
- Title
- Author
- Date

Fully Nestable You can nest them. You can nest other things into them.

- Verse
- Quote
- Quotation
- Itemize
- Enumerate
- Description
- List
- LyX-Code

Nestable-Inside You can nest them inside of other things. You can't nest anything into them.

- Standard
- Right Address
- Address

The `Caption` environment doesn't really fit anywhere, since it's only used inside of `Table Floats` and `Figure Floats`.

3.4.3 Nesting Other Things: Tables, Math, Floats, etc.

There are several things that aren't paragraph environments, but which are affected by nesting anyhow. They are:

- equations
- tables
- figures

(**Note:** If you put a figure or a table in a `Float`, this is no longer true. Have a look at section 4.6 for more informations about `Floats`.)

LyX can treat these three objects as either a word or as a paragraph. If a figure, table, or an equation is inline, it goes wherever the paragraph it is in goes.

On the other hand, if you have an equation, figure or table in a “paragraph” of its own, it behaves just like a “nestable-inside” paragraph environment. You can nest it into any environment, but you obviously can't nest anything into it.

Here's an example with a table:

1. Item One

a) This is (a) and it's nested.

a	b
c	d

b) This is (b). The table is actually nested inside (a).

2. Back out again.

If we hadn't nested the table at all, the list would look like this:

1. Item One

a) This is (a) and it's nested.

a	b
c	d

1. This is (b). The table is *not* nested inside (a). In fact, it's not nested at all.
2. Back out again.

Notice how item (b) is not only no longer nested, but is also the first item of a new list!

There's another trap you can fall into: Nesting the table, but not going deep enough. L^AT_EX then turns anything after the table into a new sublist.

1. Item One
 - a) This is (a) and it's nested.

a	b
c	d

- a) This is (b). The table is actually nested inside Item One, but *not* inside (a).
2. Back out again.

As you can see, item (b) turned into the first item of a new list, but a new list *inside* item 1. The same thing would have happened to a figure or an equation. So, if you nest tables, figures or equations, make sure you go to the right depth!

3.4.4 Usage and General Features

Speaking of levels, L^AT_EX can perform up to a six-fold nesting. In other words, “level #6” is the innermost possible depth. Here's an example to display what we mean:

1. level #1 - outermost
 - a) level #2
 - i. level #3
 - A. level #4
 - level #5
 - level #6

There are two exceptions to the six-fold nesting limit, and you can see both of them in the example. Unlike the other fully-nestable environments, you can only perform a four-fold nesting with the `Enumerate` and `Itemize` environments. For example, if we tried to nest another `Enumerate` list inside of item “A.”, we'd get errors.

3.4.5 Some Examples

The best way to explain just what you can do with nesting is by illustration. We have several examples of nested environments. In them, we explain how we created the example, so that you can reproduce them.

3.4.5.1 Example 1: The Six-fold Way and Mixed Nesting

- #1-a This is the outermost level. It's a List environment.
 - #2-a This is level #2. We created it by using M-Return followed by S-M-Right.
 - #3-a This is level #3. This time, we just hit Return, then used S-M-Right twice in a row. We could have also created it the same way as we did the previous level, by hitting M-Return followed by S-M-Right.

This is actually a **Standard** environment, nested inside of “#3-a”. So, it's at level #4. We did this by hitting M-Return, then S-M-Right, then changing the paragraph environment to **Standard**. Do this to create list items with more than one paragraph - it also works for the Description, Enumerate, and Itemize environments!

Here's another **Standard** paragraph, also at level #4, made with just a M-Return.
 - #4-a This is level #4. We hit M-Return and changed the paragraph environment back to List. Remember - we can't nest anything inside of a **Standard** environment, which is why we're still at level #4. However, we *can* keep nesting things inside of “#3-a”.
 - #5-a This is level #5...
 - #6-a ...and this is level #6. By now, you should know how we made these two.
 - #5-b Back to level #5. Just hit M-Return followed by a S-M-Left.
 - #4-b After another M-Return followed by a S-M-Left, we're back at level #4.
 - #3-b Back to level #3. By now it should be obvious how we did this.
 - #2-b Back to level #2.
- #1-b And last, back to the outermost level, #1. After this sentence, we'll hit Return and change the paragraph environment back to **Standard** to end the list.

We could have also used the Description, Quote, Quotation, or even the Verse environment in place of the List environment. The example would have worked exactly the same.

3.4.5.2 Example 2: Inheritance

This is the LyX-Code environment, at level #1, the outermost level. Now we'll hit Return, then S-M-Right, after which, we'll change to the Enumerate environment.

1. This is the Enumerate environment, at level #2.
2. Notice how the nested Enumerate not only inherits its margins from its parent environment (LyX-Code), but also inherits its font and spacing!

We ended this example by hitting Return. After that, we needed to reset the paragraph environment to Standard and resetting the nesting depth by using S-M-Left once.

3.4.5.3 Example 3: Labels, Levels, and the Enumerate and Itemize Environments

1. This is level #1, in an Enumerate paragraph environment. We're actually going to nest a bunch of these.
 - a) This is level #2. We used M-Return followed by S-M-Right. Now, what happens if we nest an Itemize environment inside of this one? It will be at level #3, but what will its label be? An asterisk?
 - No! It's a bullet. This is the *first* Itemize environment, even though it's at level #3. So, its label is a bullet. (We got here by using M-Return, then S-M-Right, then changing the environment to Itemize.)
 - Here's level #4, produced using M-Return, then S-M-Right. We'll do that again...
 - i. ...to get to level #5. This time, however, we also changed the paragraph environment back to Enumerate. Notice the type of numbering, it is *lowercase Roman*, because we are in the *thirdfold* Enumerate environment (i.e. it is an Enumerate inside an Enumerate inside an Enumerate).
 - ii. What happens if we *don't* change the paragraph environment, but decrease the nesting depth? What type of numbering does LyX use?
 - iii. Oh, as if you couldn't guess by now, we're just using M-Return to keep the current environment and depth but create a new item.
 - iv. Let's use S-M-Left to decrease the depth after the next M-Return.
 - i. This is level #4. Look what type of label LyX is using!
2. This is level #3. Even though we've changed levels, LyX is still using a lowercase Roman numeral as the label. Why?

- ii. Because, even though the nesting depth has changed, the paragraph is *still* a thirdfold **Enumerate** environment. Notice, however, that LyX *did* reset the counter for the label.
 - b) Another **M-Return S-M-Left** sequence, and we're back to level #2. This time, we not only changed the nesting depth, but we also moved back into the twofold-nested **Enumerate** environment.
2. The same thing happens if we do another **M-Return S-M-Left** sequence and return to level #1, the outermost level.

Lastly, we reset the environment to **Standard**. As you can see, the level number doesn't correspond to what type of labeling LyX uses for the **Enumerate** and **Itemize** environments. The number of other **Enumerate** environments surrounding it determines what kind of label LyX uses for an **Enumerate** item. The same rule applies for the **Itemize** environment, as well.

3.4.5.4 Example 4: Going Bonkers

1. We're going to go totally nuts now. We won't nest as deep as in the other examples, nor will we go into the same detail with how we did it. (level #1: **Enumerate**)

(Return, **S-M-Right**, **Standard**: level #2) We'll stick an encapsulated description of how we created the example in parentheses someplace. For example, the two keybindings are how we changed the depth. The environment name is the name of the current environment. Either before or after this, we'll put in the level.

2. (Return, **Enumerate**: level #1) This is the next item in the list.

Now we'll add verse.

It will get much worse.

(Return, **S-M-Right**, **Verse**: level #2)

Fiddle dee, Fiddle doo.

Bippitey boppitey boo!

(M-Return)

Here comes a table:

one-fish	two-fish
red-fish	blue-fish

(M-Return, **Table**, **S-M-Right** 3 times, **M-Return**, **Verse**, **S-M-Left**)

3. (Return, **Enumerate**: level #1) This is another item. Note that selecting a **Table** resets the nesting depth to level #1, so we increased the nesting depth 3 times to put the table inside the **Verse** environment.

We're now ending the `Enumerate` list and changing to `Quotation`. We're still at level #1. We want to show you some of the things you can do by mixing environments. The next set of paragraphs is a "quoted letter." We'll nest both the `Address` and `Right Address` environments inside of this one, then use another nested `Quotation` for the letter body. We'll use `M-Return` to preserve the depth. Remember that you need to use `C-Return` to create multiple lines inside the `Address` and `Right Address` environments. Here it goes:

1234 Nowhere Rd.
Moosegroin, MT 00100
9-6-96

Dear Mr. Fizzlewitz:

We regret to inform you that we cannot fill your order for 50 L of compressed methane gas due to circumstances beyond our control. Unfortunately, several of our cows have mysteriously exploded, creating a backlog in our orders for methane. We will place your name on the waiting list and try to fill your order as soon as possible. In the meantime, we thank you for your patience.

We do, however, now have a special on beef. If you are interested, please return the enclosed pricing and order form with your order, along with payment.

We thank you again for your patience.

Sincerely,
Bill Hick

That ends that example!

As you can see, nesting environments in LyX gives you a lot of power with just a few keystrokes. We could have easily nested an `Itemize` list inside of a `Quotation` or `Quote`, or put a `Quote` inside of an `Itemize` list. You have a huge variety of options at your disposal.

3.5 Spacing, pagination and line breaks

3.5.1 Horizontal Space

3.5.1.1 Horizontal Fills

Horizontal Fills (HFills) are a special LyX feature for adding extra space in a uniform fashion. An HFill is actually a variable length space, whose length always equals the

remaining space between the left and right margins. If there is more than one HFill on a line, they divide the available space equally between themselves.

Hfills can be inserted with `Insert ▷ Formatting Character ▷ Horizontal Fill`. Here a few examples what you can do with them:

This is on the left side		This is on the right	
Left	Middle		Right
Left	1/3 Left		Right

That was an example in the `Quote` environment. Here \leftarrow is one in a standard paragraph. It may or may not be apparent in the printed text, but it *is* sitting in-between the two arrows.

There may be more than one set of margins on a line. Here's an example with the `List` environment.

one	two	:three	four	five	six
-----	-----	--------	------	------	-----

The “.” marks the beginning of the item. (There is actually a “hidden” HFill inside of the label of the `List` environment; it's put at the end of the label automatically.) Hfills work similarly in other “multi-margin” situations, like two-column mode.

Note: If an HFill is at the beginning of a line, and *not* in the first line in a paragraph, `LyX` ignores it. This prevents Hfills from accidentally being wrapped onto a new line. If you need space in this case anyway, you have to use the `LATEX`-command `\hspace*{\fill}` in ERT. (ERT is explained in section 6.9.)

3.5.1.2 Other space variants

The following two sorts of spaces are not yet supported by `LyX`, so that you have to use ERT, see section 6.9. That they are not supported is a hint that you need them very seldom in `LyX`. So use them only if it is really necessary (remind the WYSIWYM concept).

Defined space Sometimes one needs space with a defined length, e.g for forms and questionnaires. This can be inserted by using the `LATEX`-command `\hspace` in ERT. For example the command `\hspace{2cm}` produces 2 cm space within the following line:

This is a line with \rightarrow \leftarrow 2 cm space between the arrows.
 You can use all length units listed in Appendix C.

Phantom space Sometimes you want to insert space with exactly the length of a phrase. E.g. you want to create the following multiple choice question:

What is correct English?:

Mr. Edge would have been jumps the gun.

has to be jumped

jumps

So that the choices appear exactly after the phrase “Mr. Edge ”. To get this, you can use the L^AT_EX-command `\phantom` in ERT. In our case write the command `` (note the space after “Edge”) at the beginning of the last two lines. The command prints out the phrase within the the two braces, but invisible. That is why it is named “phantom”.⁴

3.5.2 Vertical Space

To add extra vertical space above or below a paragraph, use the **Insert**▷**Formatting**▷**Vertical Space** dialog. There you find the following sizes:

SmallSkip, **MedSkip** and **BigSkip** are L^AT_EX sizes which depends on the font size of the document. **DefSkip** is the skip adjusted in the dialog **Document**▷**Settings** for the paragraph separation. If you use indentation to separate paragraphs **DefSkip** is equal to **MedSkip**.

VFill is a variable space, set so that the space is maximal within one page. An example: You have only two short paragraphs on one page with a **vfill** between them. Then the first paragraph is placed at the top of the page and the second one at the bottom, because the space between them is then maximal. **VFills** work like **HFills**: they fill the remaining vertical space on a page with blank space.⁵ If there are several **VFills** on a page, they divide the remaining vertical space equally between themselves. You can therefore use **VFills** to center text on a page, or even place text 2/3 down a page.

Custom are custom spaces in units explained in Appendix C.

Note: When the extra vertical space would be in the output at the top/bottom of a page, the space is only added if you have also checked the option **Protect**.

3.5.3 Paragraph Alignment

You can change the paragraph alignment with the **Edit**▷**Paragraph Settings** dialog. There are four possibilities:

- Justified
- Left
- Right
- Center

⁴There exists also the commands `\hphantom` and `\vphantom`, but this too special for the L^AT_EX Userguide. If you are interested in knowing more about this, have a look at [1, 2].

⁵**HFills** are described in section 3.5.1.

The default in most cases is justified alignment, in which the inter-word spacing is variable and each line of a paragraph fills the region between the left and right margins. The other three alignments should be self-explanatory, and look like this:

This paragraph is right aligned,

this one is centered,

this one is left aligned.

3.5.4 Forced Pagebreaks

If you don't like the way L^AT_EX does the pagebreaks in your document, you can force a pagebreak where you want one. Normally this will not be necessary, because L^AT_EX is good at pagebreaking. Only if you use many Floats, L^AT_EX's page breaking algorithm can fail.

We recommend not to use forced pagebreaks until the text is finished, and until you have checked in the preview to see if you *really* have to change the pagebreaking.

There are two types of pagebreaks: One that ends the page without any special action. This can be inserted above or below a paragraph by the menu **Insert > Formatting > Page Break**. The second type ends a page, but stretches the content of the page, so that it fills out the complete page. This type is useful to avoid white-space when a pagebreak produces a page on which only the last few lines are absent. This type is not yet supported by LyX, so that you have to use the L^AT_EX command `\pagebreak[number]` in ERT⁶. The number can vary between 0 and 4. If 4 or no number is used, it will always be created a pagebreak⁷. The numbers 0 to 3 stand for the increasing priority level – L^AT_EX decides, concerning the priority, if a pagebreak is created or not.

You might try to use a pagebreak to ensure that a figure or table appears at the top of a page. This is, of course, the wrong way to do it. LyX gives you a way of automatically ensuring that your figures and tables appear at the top of a page (or the bottom, or on their own page) without having to worry about what precedes or follows your figure or table. See chapter 4 to learn more about Floats.

3.5.4.1 Clear Pagebreaks

Differently to forced pagebreaks where the content behind the break is directly placed at the next page, pages can also be cleared while breaking them. That means that the current paragraph is terminated and all, perhaps not yet processed floats from previous document parts are placed behind it, if necessary by adding pages.

You can insert a clear pagebreak with the menu **Insert > Formatting > Clear Page**. When you have a two-sided document like a book, you can use the menu **Insert > Formatting > Clear Double Page** to insert a clear pagebreak that assures that the next page is a right-hand page (odd-numbered), if necessary by adding a page.

⁶For more about ERT see section 6.9.

⁷normally one uses simply `\pagebreak` without a number

3.5.5 Forced Linebreaks

Similar to pagebreaks there are two types of linebreaks: One that simply breaks the line. You can force this line break within a paragraph by selecting **Insert▷Formatting▷Line Break** or with **C-Return**. The other type breaks the line and stretches it so that it fills out the whole space between the page margins. This is necessary to avoid “fringes” in justified paragraphs due to whitespace introduced by linebreaks. This type is not yet supported by **LyX**, so that you have to use the **L^AT_EX**-command **\linebreak[number]** in **ERT**. The syntax is similar to the command **\pagebreak**, described in the previous section.

You shouldn't use forced linebreaks to correct **L^AT_EX**'s linebreaking, as **L^AT_EX** is very good at linebreaking. There are, however, a number of situations where it is necessary to actively set a linebreak, e.g. in a poem or for an address (see sections 3.3.5.1, 3.3.5.2 and 3.3.7.2).

3.5.6 Blanks / Spaces

A blank is a blank? Not in good typography. While you might be used to press the space key anytime you want to separate two words in ordinary word processors, **LyX** offers you more spaces: Spaces of different width and spaces which can or cannot be broken at the end of a line. The following sections will show you some examples where those spaces are useful.

3.5.6.1 Inter-word Space

Some languages (e.g. English) have the typographical convention to add extra space after an end-of-sentence punctuation mark, and **LyX** honors those conventions (see section 3.8.3.1). Sometimes, you want a normal space nevertheless. In this case, insert one with **Insert▷Special Formatting▷Inter-word Space** (shortcut **C-M-Space**).

3.5.6.2 Protected Space

The protected space: It is used to tell **LyX** (and **L^AT_EX**) not to break the line at that point. This may be necessary to avoid unlucky linebreaks, like in:

Further documentation is given in section
6.5.

Obviously, it would be a good thing to put a protected space between “section” and “6.5”. A protected space is set with **Insert▷Special Formatting▷Protected_Space** (shortcut **C-Space**).

3.5.6.3 Thin Space

A “thin space” is a blank which has half the size of a normal space (and it is also “protected”). The typographical conventions in a lot of languages propose the use

of thin spaces in cases where normal spaces would be too wide, for instance inside abbreviations:

D.E. Knuth has developed our beloved typesetting program, i. e. T_EX.

or between values and units. Compare for example this:

10 kg (thin space)

10 kg (normal space)

You can insert thin spaces with the menu Insert▷Special Formatting▷Thin Space (shortcut C-S-Space).

3.5.6.4 More Spaces

Apart from the ones described, there are still some more spaces. Although L_AT_EX supports them natively, they can only be reached via a formula as described in section 5.1.8 or via the command buffer toolbar. The latter means to type **space-insert <command>**

into the command buffer, where **<command>** is one of the following:⁸

command	width	protected?
normal	1/3 em	no
protected	1/3 em	yes
thin	1/6 em	yes
enspace	0.5 em	yes
enskip	0.5 em	no
quad	1 em	no
qquad	2 em	no
negthinspace	-1/6 em	yes

3.5.7 Horizontal Lines

In the dialog Insert▷Formatting▷Horizontal Line you can insert horizontal lines that spans over the whole document columns width.

3.6 Fonts and Text Styles

3.6.1 Font Types

There are two types of fonts:

⁸The unit “em” is explained in Appendix C.

Vector fonts are fonts, built from outlines of the single glyphs (i.e. characters) in the font. This means that each glyph is defined using mathematical curves that are well suited for scaling to any requested size. This mathematical definition is interpreted by the font renderer and the curve is filled out with pixels according to the size and glyph. This means that outline fonts will look pretty good in all sizes. Only at very small sizes it might be hard to provide a good rendering at very small sizes, where each pixel has to be very carefully computed to provide a good image.

One could mean that one only needs to define one font size and scale them. But to achieve a better quality, many fonts define several font sizes. That improves the appearance, because you need more details at large font sizes than at small ones.

The font types `TrueType`, `OpenType`, and `Type 1 PostScript` are vector fonts.

Bitmap fonts on the other hand, are defined by bitmap graphics from the start, so they will look good at all the sizes they are meant for. However, they don't scale well, because in order to scale a glyph, each pixel is enlarged into several pixels. It is the same effect that happens if you try to enlarge a picture in a picture manipulation program. In order to relieve this effect, bitmap fonts are typically provided in several fixed sizes typically from around 8 pixels high up to 34 pixels or so high in steps according to what is believed to be useful. The advantage of bitmap fonts is that no complicated computations are necessary to display each glyph, so bitmap fonts are thus faster displayed than scalable fonts. The disadvantage is that sizes that don't exist as fixed versions have to be scaled by doubling pixels, and thus look bad.

Bitmap fonts are named `Type 3` in PostScript- and PDF-documents.

The result of all this, is that bitmap fonts are best for the size they are designed for, while scalable fonts are good for nearly all sizes. So one needs less font size definitions for scalable fonts. That's the reason why nearly all text render and typesetting programs use scalable fonts.

To test which fonts are used in a PDF-document, you can have a look into its document properties.

Many modern typesetting and markup languages have begun to move towards specifying character styles rather than specifying a particular font. For example, instead of changing to an italicized version of the current font to emphasize text, you use an “emphasized style” instead. This concept fits in perfectly with LyX. In LyX, you do things based on contexts, rather than focusing on typesetting details.

3.6.2 Document Font and Font size

You can set the document fonts in the `Document > Settings` dialog. There you can specify which font should be used for the three different font shapes `roman` (serif), `sans serif`, and `typewriter` and its scalings.

The possible options for the font include `default` and a list of fonts available on your system. `default` uses the standard T_EX fonts, known as “Computer Modern” (`cm`) or “European Computer Modern” (`ec`).

As `cm` and `ec` are bitmap fonts, they often look pixelated in PDF output, especially when you read the PDF in a zoomed size.⁹ To get rid of pixelated fonts, you have to use a vector font. There are three ways to use one:

- One way is to use the `AE` fonts. `AE` is a virtual font. Virtual means that it “steals” outline `cm`-glyphs from other fonts. This has the disadvantage that some characters are missing, like the French guillemets (“«” and “»”)¹⁰ and that accented characters are not *one* glyph, they are built of *two* characters, the accent and the letter. Therefore you can’t search in documents using the `AE` fonts for words with accented characters. If you search for example for the French word “rève” in a PDF, you won’t get any result, because the PDF-viewer searches for the glyph “è” and not for the glyph “e + `”.
- Another possibility is to use three different outline fonts¹¹: Times Roman as roman font, Helvetica scaled to 92 or 95% as sans serif font, and courier as typewriter font. The differences between roman, sans serif, and typewriter fonts are explained in section 3.6.4. The font Times Roman was originally designed for newspapers. That means its glyphs are smaller than the one from other fonts to fit into the small newspaper columns. Therefore Times Roman is not the optimal choice for larger documents like books.
- The best solution is to use the `Latin Modern` fonts. These fonts are developed in order of the L^AT_EX community to replace `cm` as default font.

For the font size there are four possible values: `default`, 10, 11, and 12. The size of `default` depends on your L^AT_EX-system, normally it is equal to the font size 10.

The font sizes are the *base size*. L^AT_EX actually scales all other possible font sizes (such as those used in footnotes, super-, and subscripts) by this value. You can fine-tune the font size of text parts via the Text Style dialog if needed. The possible font sizes for text parts are explained in section 3.6.4.

Note: When you choose a new font or font size, L^AT_EX does *not* change the screen font! You will only see a difference in the printed output; this is part of the WYSI-

⁹This problem doesn’t appear if you read PDFs in Adobe Reader version 6 or later, because this program includes a special bitmap font renderer.

¹⁰Loading the L^AT_EX-package `aeguill` with the document preamble line

```
\usepackage[ec]{aeguill}
```

will fix the guillemet problem.

¹¹Other fonts, like `Latin Modern` or `Computer Modern`, consists of these three main font types sans serif, typewriter, and serif.

WYM concept. LyX’s screen fonts can be adjusted in the Tools▷Preferences dialog, see section B.1.2.

3.6.3 Using Different Character Styles

As we’ve already seen, LyX automatically changes the character style for certain paragraph environments. LyX supports two character styles, **Emphasized** and **Noun**. You can activate both of these styles via keybindings, the menus, and the toolbar.

To activate the **Noun** style, do one of the following:

- click on the toolbar button
- use the keybinding M-c c

These commands are all toggles. That is, if **Noun** style is already active, they deactivate it.

One typically uses the **Noun** style for proper names. For example: “MATTHIAS ETTRICH is the original author of LyX.”

A more widely used character style is the **Emphasized** style. You can activate (or deactivate - it’s also a toggle) the **Emphasized** style by:

- clicking on the toolbar button
- using the keybindings M-c e

Normally the **Emphasized** style is equivalent to an italic font but some document classes or L^AT_EX-packages use a different font.

We’ve been using the **Emphasized** style all over the place in this document. Here’s one more example:

Don’t overuse character styles!

It’s also a warning in addition to an example. One’s writing should parallel ordinary conversation. Since we don’t all constantly scream at each other, we should also avoid the common tendency to overuse character style.

You can always reset to the default font using the keybinding M-c Space or the dialog Edit▷Text Style.

3.6.4 Fine-Tuning with the Text Style dialog

There are always occasions when you’ll need to do some fine-tuning, so LyX gives you a way to create custom character style. For example, an academic journal or a corporation may have a style sheet requiring a sans-serif font be used in certain situations. Also, writers sometimes use a different font to offset a character’s thoughts from ordinary dialog.

Before we document how to use custom character style, we want to issue a warning yet again: Don't overuse character styles!

Documents that overuse different fonts and sizes are not well readable and tend to look like someone has knocked huge holes in it.

To use custom character styles, open the **Edit>Text Style** dialog. There are several boxes on this dialog, each corresponding to a different font property which you can choose. You can choose an option for one of these properties, or select **No change**, which keeps the current state of that property. The item **Reset** will reset the property to whatever is the default. You can use this to reset attributes across a bunch of different paragraph environments in a snap.

The font properties, and their options (in addition to **No change** and **Reset**) are:

Family	The “overall look” of the font. The possible options are:
Roman	This is the Roman font family. Normally a serif font. It's also the default family. (keybinding M-c r)
Sans Serif	This is the Sans Serif font family. (keybinding M-c s)
Typewriter	This is the Typewriter font family. (keybinding M-c p)
Series	This corresponds to the print weight. Options are:
Medium	This is the Medium font series. It's also the default series.
Bold	This is the Bold font series. (keybinding M-c b)
Shape	As the name implies. Options are:
Upright	This is the Upright font shape. It's also the default shape.
Italic	<i>This is the Italic font shape.</i>
Slanted	<i>This is the Slanted font shape</i> (although it might not be visible in L ^A T _E X, this is different from italic).
Small Caps	THIS IS THE SMALL CAPS FONT SHAPE.
Size	Alters the size of the font. You'll find no numerical values here; all possible sizes are actually proportional to the document font size. Once again, you don't feed L ^A T _E X the details, but a general description of what you want to do. The options are:
Tiny	This is the “Tiny” font size. (keybinding M-s t or M-s 1)
Smallest	This is the “Smallest” font size. (keybinding M-s 2)
Smaller	This is the “Smaller” font size. (keybinding M-s S or M-s 3)
Small	This is the “Small” font size. (keybinding M-s s or M-s 4)
Normal	This is the “Normal” font size. It's also the default size. (keybinding M-s n or M-s 5)
Large	This is the “Large” font size. (keybinding M-s l or M-s 6)

Larger	This is the “Larger” font size. (keybinding M-s S-L or M-s 7)
Largest	This is the “Largest” font size. (keybinding M-s 8)
Huge	This is the “Huge” font size. (keybinding M-s h or M-s 9)
Huger	This is the “Huger” font size. (keybinding M-s H or M-s 0)

We'll warn you *yet again*: don't go crazy with this feature. You should almost never need to change the font size. LyX automatically changes the font size for different paragraph environments - use that instead. This is here for fine-tuning only!

Misc Here you can change a few other things at the character level. Options are:

Emph *This is text with emphasize on.* This might seem like the same as *Italic*, but it is actually a bit different. Emphasized is a *logical* attribute. That means every document class can define its own font used for emphasized text. Normally this font is equal to italic.


Underbar This is text with Underbar on. (keybinding M-c u)
Avoid using underbar if you can! It's a holdover from the typewriter days, when you couldn't change fonts. We no longer need to emphasize text by underscoring characters. It's only included in LyX because some people *may* need it in order to follow style sheets for journal submissions.

Noun THIS IS TEXT WITH NOUN ON. Like **Emph**, this is a logical attribute. Normally it's equivalent to **Small Caps**.

Color You can adjust the color of the text with this control. Notice that not all dvi-viewers are able to display colors. Besides **No color**, which is the default “color” and means normally black, you can choose between **Black**, **White**, **Red**, **Green**, **Blue**, **Cyan**, **Magenta** and **Yellow** text.

Language This is used to mark regions of text as having a different language from the language of the document. Text marked in this way will be underlined in blue to indicate the change (only within LyX).

So you have a huge number of combinations to choose from. Once you've chosen a new character style via the **Edit▷Text Style** dialog, the settings are saved. You can

activate them using the toolbar button . The button lets you toggle the state of your custom character style even when the dialog isn't visible.

To completely reset the character style to the default, use **M-c Space**. If you want to toggle only those properties that you have just changed (suppose you just set the shape to “slanted” and the series to “bold”), set the **Toggle all** switch and press **Apply**.

You should also know something about the differences between the three main font types **serif**, **sans serif**, and **typewriter**:

- **Typewriter** is a so called “monospaced” font, that means every character has the same width, the “i” is as wide as the “m”. Here is an example

```
typewriter text
no typewriter text
```

- **Serif** fonts use characters with serifs. These are the small “appendices” at all ends of the streaks that form the character. The following example will show the difference:

text with serifs

text without serifs

Serifs facilitates an easy and fast reading. They are therefore used as default font (named **roman**).

- **Sans serif** don’t use serifs. This font type is therefore often used for headings and short texts. We use it in this document to highlight menu names.

We conclude with the same warning once again: Don’t overuse the fonts. They are, more often than not, a kludge and a bad substitute for good writing.

3.7 Printing and Previewing

3.7.1 Overview

Now that we’ve covered some of the basic features of document preparation using **LyX**, you probably want to know how to print out your masterpiece. Before we tell you that, we want to give you a quick explanation of what goes on behind-the-scenes. We cover these informations in much greater detail in the *Extended Features* manual as well.

LyX uses the program **L^AT_EX** as its backend. **L^AT_EX** is just a macro package for the **T_EX** typesetting system, but to prevent confusion, we’ll only refer to **L^AT_EX**. **LyX** is what you use to do your actual writing. Then, **LyX** calls **L^AT_EX** to turn your writing into printable output. This happens in two stages:

1. First, **LyX** converts your document to a series of text commands for **L^AT_EX**, generating a file with the extension, “**.tex**”.
2. Next, **L^AT_EX** uses the commands in the **.tex** file to produce printable output.

3.7.2 Output file formats

3.7.2.1 ASCII

This file type has the extension “`.txt`”. It contains your document as plain text following the rules of the “American Standard Code for Information Interchange” (ASCII).

You can export your document to ASCII by the menu `File▷Export▷ASCII`.

3.7.2.2 \LaTeX

This file type has the extension “`.tex`” and contains all commands that are necessary for the \LaTeX program to process your document. If you know \LaTeX , you can use it to find out \LaTeX -Errors or to process it manually with console commands. The \LaTeX -file is automatically created in \LyX ’s temporary directory whenever you view or export your document.

You can export your document as \LaTeX -file using the menu `File▷Export▷LaTeX`.

3.7.2.3 DVI

This file type has the extension “`.dvi`”. It is called “device-independent” (DVI), because it is completely portable; you can move them from one machine to another without needing to do any sort of conversion. At the time when this file-format was developed, this was no matter of course. DVIs are used for quick previews and as pre-stage for other output formats, like PostScript.

Note: The DVI file doesn’t contain images, they will only be a linked. So don’t forget to deliver the images together with your DVIs. This property can also slow down your computer when you view the DVI. Because the DVI-viewer has to convert the image in the background to make it visible when you scroll in the DVI. So we recommend to use PDF for files with many images.

You can export your document to DVI by the menu `File▷Export▷DVI`.

3.7.2.4 PostScript

This file type has the extension “`.ps`”. PostScript was developed by the company Adobe as printer language. The file contains therefore commands that the printer uses to print the file. PostScript can be seen as “programming language”; you can calculate with it and draw diagrams and images.¹² Due to this ability, the files are often bigger than PDFs.

PostScript can only contain images in the format “Encapsulated PostScript” (EPS, file extension “`.eps`”). As \LyX allows you to use any known image format in your document, it has to convert them in the background to EPS. If you have e.g 50 images in your document, \LyX has to do 50 conversions whenever you view or export your

¹²If you are interested to learn more about this, have a look at the \LaTeX -package `psstricks`.

document. This will slow down your workflow with LyX drastically. So if you plan to use PostScript, you can insert your images directly as EPS to avoid this problem.

You can export your document to PostScript using the menu **File**▷**Export**▷**PostScript**.

3.7.2.5 PDF

This file type has the extension “**.pdf**”. The “Portable Document Format” (PDF) is developed by **Adobe** as derivative from PostScript. It is more compressed and it uses much less commands than PostScript. As the name “portable” implies, it can be processed at any computer system and the printed output looks exactly the same.

PDF can contain images in its own PDF format and in the formats “Joint Photographic Experts Group” (JPG, file extension “**.jpg**” or “**.jpeg**”) and “Portable Network Graphics” (PNG, file extension “**.png**”). You can although use any other image format, because LyX converts them in the background to one of these formats. But as described in the section about PostScript, the image conversion will slow down your workflow. So we recommend to use images in one of the three mentioned formats.

You can export your document to PDF via the menu **File**▷**Export** in three different ways:

PDF This uses the program **ps2pdf** that creates a PDF from a PostScript-version of your file. The PostScript-version is produced by the program **dvips** which uses a DVI-version as intermediate step. So this export variant consist of three conversions.



PDF (dvipdfm) This uses the program **dvipdfm** that converts your file in the background to DVI and in a second step to PDF.

PDF (pdflatex) This uses the program **pdftex** that converts your file directly to PDF.

We recommend to use PDF (**pdflatex**) because **pdftex** supports all features of actual PDF-versions, is quick and works stable without problems. The program **dvipdfm** is no more under development and therefore a bit outdated.

3.7.3 Previewing

To get a look at the final version of your document, with all of the pagebreaks in place, the footnotes correctly numbered, and so on, use the menu **View** and choose a file type. A viewing program will popup showing the output. For **View**▷**DVI** you can

use the toolbar button  (shortcut **C-d**), for **View**▷**PDF (pdflatex)** you can use the toolbar button .

If you have changed your document, you can refresh the output in the same viewer window using the menu **View**▷**Update**.

When you preview a file, the output file is only generated in LyX’s temporary directory. To have a real output, export your document.

3.7.4 Printing the File from within LyX

Instead of exporting your file and then printing them, you can also print it directly from within LyX. To print a file, select the menu **File**▷**Print** or click on the toolbar



button. LyX will internally call \LaTeX to produce a DVI. This file is then processed by the program **dvips** to PostScript-file, which is finally printed using the program **Ghostsript**. Due to these steps in the background, this method is not the fastest.

You can choose to print only even-numbered or odd-numbered pages - this is useful for printing on two sides: You can re-insert the pages after printing one set to print on the other side. Some printers spit out pages face-up, others, face-down. By choosing a particular order to print in, you can take the entire stack of pages out of the printer without needing to reorder them.

You can set the parameters in the **Print Destination** box as follows:

Printer	This is the name of the printer to print to. ¹³ The printer should understand PostScript.
File	The name of a file to print to. The output will be a PostScript file. It will be written in LyX's working directory unless you specify the full path.

3.8 A few Words about Typography

3.8.1 Hyphens

In LyX, the “-“ character comes in three lengths, often called the *hyphen*, the *en dash*, and the *em dash*:

1. hyphen	-	made with “-“
2. en dash	–	made with “--“
3. em dash	—	made with “---“
4. minus sign	−	a “-“ in math mode

You generate them by inserting the “-“ character multiple times in a row. They are automatically converted to the appropriate length dash in the final output, but not in LyX.

The three dash types are distinct from the minus sign, which appears in math mode and has a length of its own. Here are some examples of the “-“ in use:

1. line- and page-breaks	(<i>hyphen</i>)
--------------------------	-------------------

¹³Note that this printer name is for the program **dvips**. That means **dvips** has to be configured for this printer name. The default printer can be set in LyX's preferences dialog, see section B.5.1.

2. From A–Z (*en dash*)
3. Oh — there’s a dash. (*em dash*)
4. $x^2 - y^2 = z^2$ (*minus sign*)

3.8.2 Hyphenation

Words aren’t hyphenated within L^AT_EX but automatically in the output. Hyphenation is done by the L^AT_EX-package **babel** following the rules of the document language¹⁴.

L^AT_EX hyphenates nearly perfectly, it has only problems with text in the font **typewriter** and with unusual constructs, like “h3knix/m0n0wall”. If L^AT_EX can’t break a word correctly, you can set hyphenation points manually. This is done with the menu **Insert▷Formatting▷Hyphenation Point**. These extra hyphenation points are only recommendations to L^AT_EX. If no hyphenation is necessary, L^AT_EX will ignore them.

Sometimes you want to prevent words or constructs to be hyphenated. The key-bindings/shortcuts in this document consists of three letters with a hyphen and a space in the form “A-b c”. L^AT_EX finds there the hyphen “-” as hyphenation possibility. Hyphenating at this point would look ugly. To prevent the shortcut from being hyphenated, we can put it in the argument of the L^AT_EX-box-command `\mbox`, because text within L^AT_EX-boxes can’t be hyphenated. As L^AT_EX doesn’t support `\mbox`, we have to use ERT. The result looks in L^AT_EX like:

```
\mbox{ A-b c }
```

To learn more about ERT, have a look at section 6.9.

3.8.3 Punctuation Marks

3.8.3.1 Abbreviations and End of Sentence

When L^AT_EX calls L^AT_EX to generate the final version of your document, L^AT_EX automatically distinguishes between words, sentences, and abbreviations. L^AT_EX then adds the “appropriate amount of space”. That means sentences get a little bit more space between the period and the next word. Abbreviations get the same amount of space after the period as a word uses.

Unfortunately, the algorithm for figuring out what’s an abbreviation works not for all cases. If a “.” is at the end of a lowercase letter, it’s the end of a sentence; if it’s at the end of a capitalized letter, it’s an abbreviation.

Here are some examples of *correct* abbreviations and the end of a sentence:

- M. Butterfly
- Don’t worry. Be happy.

¹⁴For German readers: That’s one of the main differences between the languages German and German (new spelling) in the **Document▷Settings** dialog.

And here's an example of the algorithm going wrong:

- e. g. this is too much space!
- This is I. It's okay.

You won't see anything wrong until you view a final version of your document.

To fix this problem, use one of the following:

1. Use an **Inter-word Space** after lowercase abbreviations (see section 3.5.6.1).
2. Use a **Thin Space** between two tokens of an abbreviation (see section 3.5.6.3).
3. Use an **End of sentence period** found under the **Insert**▷**Special Character** menu to force the use of inter-sentence spacing. This function is also bound to **C-period** for easy access.

With the corrections, our earlier examples look like this:

- e.g. this is too much space!
- This is I. It's okay.

Some languages don't use extra spacing between sentences. If your language is such a language, you don't need to worry, because the \LaTeX will care about this.

For those that do need to bother, there is help to catch those sneaky errors: check out the **Tools**▷**Check \TeX** feature described in section *Checking \TeX* of the *Extended Features* manual.

3.8.3.2 Quotes

\LaTeX usually sets quotes correctly. Specifically, it will use an opening quote at the beginning of quoted text, and use a closing quote at the end. For example, “open close”. The keyboard character, `"`, generates this automatically.

You can change the behavior of the `"` key using the submenu **Language** of the dialog **Document**▷**Settings** dialog.

You can also select quotes for different languages in the box **Type** option. There are six choices:

“Text” Use quotes like this “double” or ‘single’

”Text” Use quotes like ”this” or ’this’

„Text“ Use quotes like „this“ or ‚this‘

„Text” Use quotes like „this” or ‚this’

«Text» Use quotes like «this» or <this>

»Text« Use quotes like »this« or >this<

These settings affects what character the `"` key produces.

3.8.4 Ligatures

It is standard typesetting practice to group certain letters together and print them as single characters. These groups are known as *ligatures*. Since L^AT_EX knows about ligatures, your documents will contain them too in the output. Here are the standard ligatures:

- ff
- fi
- fl
- ffi
- ffl

Some languages use other ligatures if the document font supports them.

Sometimes, you don't want a ligature in a word. While a ligature may be okay in the word, "graffiti," it looks really weird in compound words, such as "cufflink" or the German "Dorffest." To break a ligature, use `Insert > Formatting > Ligature Break`. This changes "cufflinks" to "cufflinks" and "Dorffest" to "Dorffest".

3.8.5 L^AX's Proper Names

You have surely noticed, that the word "L^AT_EX" appears always with characters in different size and height. L^AT_EX is the name of the program used by L^AX and is therefore recognized as proper name when you type it in L^AX as "LaTeX". Note the order of the upper-and lowercase letters! L^AX recognizes the following proper names:


L^AX The name of the game, write "LyX" to produce it.

T_EX The program used by L^AT_EX, write "TeX" to produce it.

L^AT_EX The program used by L^AX, write "LaTeX" to produce it.

L^AT_EX 2_ε The actual version of L^AT_EX, write "LaTeX2e" to produce it.

You might wonder why the L^AT_EX-version is "2_ε". It's an old tradition in the T_EX-world to give programs geek version numbers. For example the version number of T_EX converges to the number π : The actual version is "T_EX-3.141592", the previous one was "T_EX-3.14159".

If you don't want to use proper names, e.g. in section headings, you can insert two empty braces in ERT in the word. This will look in L^AX like:  eX
For more about ERT, look at section 6.9.

3.8.6 Units

Generally the space between units and the number is smaller than the normal space between two words. As you can see in the example below, it looks better when the space is smaller. To get such a “half space” for units use the menu **Insert**▷**Formatting**▷**Thin Space** (shortcut **C-S-Space**).

Here’s an example to show the differences:

24 kW·h space between number and unit

24 kW·h half space between number and unit

3.8.7 Widows and Orphans

In the early days of word processors, page breaks went wherever the page happened to end. There was no regard for what was actually going on in the text. You may remember once printing out a document, only to find the heading for a new section printed at the very bottom of the page, the first line of a new paragraph all alone at the bottom of a page, or the last line of a paragraph at the top of a new page. These dangly-bits of text became known as *widows* and *orphans*.

Clearly, LyX can avoid breaking pages after a section heading. That’s part of the advantage of paragraph environments. But what about widows and orphans, where the page breaks leave one line of a paragraph all alone at the top or bottom of a page? There are rules built into L^AT_EX governing page breaks, and some of those rules are there to specifically prevent widows and orphans. This is the advantage LyX has in using L^AT_EX as its backend.

There’s no way we can go into how T_EX and L^AT_EX decide to break a page, or how you can tweak that behavior. Some L^AT_EX books listed in the bibliography [such as [1] or [2]] may have more information. You will almost never need to worry about this, however.

4 Notes, Graphics, Tables, and Floats

The issues of this chapter are described in detail in the *Embedded Objects* manual. There you'll also find tips and tricks for special cases.

4.1 Notes

LyX offers you a few types of notes to add to your document:

LyX Note This note type is for internal notes that won't appear in the output.

Comment This note also doesn't appear in the output but it appears as L^AT_EX-comment, when you export the document to L^AT_EX via the menu File▷Export▷L^AT_EX (pdflatex) / (plain).

Greyed Out This note will appear in the output as grey text.

This is text¹ of a comment that appears in the output as grey text.

As you can see in the example, the first line of greyed out notes is a bit indented and greyed out notes can have footnotes.

Framed This note will appear in the output as framed text.

This is text in a note box that appears framed in the output.


In contrary to framed boxes like the one in section 6.9.1, the frame uses always the whole text width and the note is set into its own paragraph.

Shaded This note will appear in the output with red background color.



¹This is an example footnote within a greyed out note. In this document the greyed out note color is redefined to blue. How this can be done is explained in the *Embedded Objects* manual.

This text in a note box appears in the output with red background.

In contrary to colored boxes, the note uses always the whole text width and the note is set into its own paragraph.

Notes are inserted with the toolbar button  or the menu Insert▷Note. Right-click on the appearing note box to select the note type.


4.2 Footnotes

LyX uses boxes to display footnotes: When you insert a footnote using the menu Insert▷Footnote or the toolbar button , you'll see the following box: . This box is LyX's representation of your footnote. If you left-click on the “foot” label, the box will be opened and you can enter the footnote text into it. Clicking on the box label again, will close the box. If you want to turn existing text into a footnote, simply mark it and click on the footnote toolbar button.

Here's an example footnote:²

The footnote will appear in the output as a superscript number at the text position where the footnote box is placed. The footnote text is placed at the bottom of the current page. The footnote number is calculated by LyX, the numbers are consecutive, no matter in which chapter the footnote is in. LyX doesn't support other numbering schemes yet, but you can get another scheme using special L^AT_EX-commands. They are described in the *Embedded Objects* manual.


4.3 Marginal Notes

Marginal notes look and behave just like footnotes in LyX. When you insert a marginal note via the menu Insert▷Marginal Note or the toolbar button , you'll see a grey box with a red label “margin” appearing within your text. This box is LyX's representation of your marginal note.

This is a marginal note.

Marginal notes appear at the right side in single-sided documents. In double-sided documents they appear in the outer margin – left on even pages, right on odd pages.

4.4 Graphics and Images

To insert an image in your document, place the cursor at the text position you want and click on the toolbar icon  or select Insert▷Graphics from the menu. Then a

²To close a footnote, click on the red box at the top left.

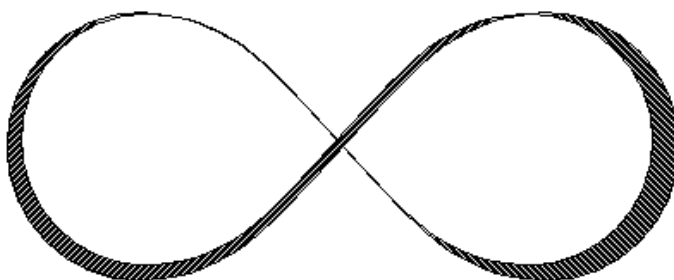
dialog will appear to choose the file to load.

This dialog has numerous mostly self-explanatory parameters. The **Graphics** tab allows you to choose your image file. The appearance of the image inside LyX and in the output is adjusted separately. The image can be transformed by setting a rotation angle and a scaling factor. The scaling units are explained in Appendix C.

In the tab **Clipping** it is possible to set image coordinates to adjust the height and width of the image in the output. The coordinates can also be calculated automatically by pressing the button **Get from file**. The option **Clip to bounding box** will only print the image region within the given coordinates. Normally you don't need to take care about image coordinates and can ignore the tab **Clipping**.

L^AT_EX experts can specify additional L^AT_EX options in the **Extras** tab. You can also set the **Subfigure** option here if the image is inside a figure float. This option is explained in section 4.6.1.1. The option **Draft mode** effects that the image don't appear in the output, only a frame with the image size is printed.

The graphics dialog can be called at any time by right-clicking on an image. The image will appear in the output exactly at the position where it is in the text. This is an example image in the PDF format within a separate, horizontally centered paragraph:



If you need image captions and want to reference images, you have to put the image into a float, see section 4.6.1.1.

4.4.1 Image Formats

You can insert images in any known file format. But as we explained in section 3.7.2, every output document format allows only a few image formats. LyX uses therefore the program **Imagemagick** in the background to convert the images to the right format. To increase your workflow by avoiding these conversions in the background, you can use only the image formats listed in the subsections of section 3.7.2.


Similar to fonts there are two types of image formats:

Bitmap images consist of pixel values, often in a compressed form. They are therefore not fully scalable and look pixelated in large zooms. Well-known bitmap image formats are “Graphics Interchange Format” (GIF, file extension “.gif”), “Portable Network Graphics” (PNG, file extension “.png”), and “Joint Photographic Experts Group” (JPG, file extension “.jpg” or “.jpeg”).

Scalable images consist of vectors and can therefore be scaled to any size without data loss. The scaling ability is necessary if you want to create presentations, because presentations are always scaled by the beamer. Scaling is also useful for online documents to let the user zoom into diagrams. Scalable image formats can be “Scalable Vector Graphics” (SVG, file extension “.svg”), “Encapsulated PostScript” (EPS, file extension “.eps”), and “Portable Document Format” (PDF, file extension “.pdf”). We say it can be, because you can convert any bitmap image format to PDF or EPS and the result won’t be scalable. In this cases only a header with the image properties is added to the original image³.

Normally one can’t convert a bitmap image into a scalable one, only vice versa.

4.5 Tables

You can insert a table using either the toolbar button  or the menu Insert>Table. A dialog will appear, asking you for the number of rows and columns. The default table has lines around any cell and the first row appears separated from the rest of the table. This separation appears due to a double line: The cells of the first row have a line below them and the cells of the second row have a line above them. Here’s an example table:

	1	2	3
A			
B			
C			

4.5.1 The Table dialog

You can alter a table by clicking on it with the right mouse button, which brings up the table dialog. Here you can adjust the settings of the cell and row/column respectively where the cursor is placed currently. Most of the dialog options also work on selections. This means that if you select more cells, columns or rows the action is done on all of your selection.

Additionally to the table dialog the **table toolbar**, that appears when the cursor is inside a table, helps you in setting table properties. It is for example currently only possible to add/delete lines via the table toolbar.

In the tab **Table Settings** of the table dialog you can set the alignment for the current row. If you add a row or column, it will be inserted right beside or below the current cell respectively. The vertical alignment of a column can only be adjusted when a column width is given. A given width will allow the cell to have linebreaks and multiple paragraphs of text, see section 4.5.3.

³In the case of PDF, the original image is additionally compressed.

You can mark multiple cells of one row as a multicolumn cell using the check box **Multicolumn**. This will merge the cells to *one* cell, spread over more than one column. Multicolumn cells are treated as own rows, so that the alignment, width, and border settings affect only the multicolumn cell. Here's an example table with a multicolumn cell in the first row and one in the last row without the upper border:

abc	def ghi		jkl
A	B	C	D
1	2	3	4

At the moment LyX doesn't support multirow cells. Adept users can declare special L^AT_EX-arguments for the table. They are necessary for special table formatting, like for multirow cells, explained in the tables section of the *Extended Features* manual. You can also rotate the current cell or the whole table 90 degrees counterclockwise. These rotations are not visible in LyX but in the output.

Note: Most DVI-viewers are *not* able to display rotations.

The **Borders** tab allows you to add and delete border lines for the current row/column. The button **Default** adds lines for all cell borders.

4.5.2 Longtables

If the table is too long to fit on one page, you can use the option **Use long table** in the tab **Longtable** of the table dialog to split the table automatically over more pages. Doing this enables some check boxes and you can now define:

Header: The current row and all rows above, that don't have any special options defined, are defined to be the header rows of all pages of the longtable; except for the first page, if **First header** is defined.

First header: The current row and all rows above, that don't have any special options defined, are defined to be the header rows of the first page of the longtable.

Footer: The current row and all rows below, that don't have any special options defined, are defined to be the footer rows of all pages of the longtable; except for the last page, if **Last footer** is defined.

Last footer: The current row and all rows below, that don't have any special options defined, are defined to be the footer rows of the last page of the longtable.

You can also specify a row where the table is splitted. If you set more than one option in the same table row, you should be aware of the fact that only the first one is used in the given table row. The others will then be defined as *empty*. In this context, first means first in this order: Footer, Last footer, Header, First header. See the following longtable to see how it works:

Example Phone List (ignore the names)		
NAME		TEL.
Annovi	Silvia	111
Bertoli	Stefano	111
Bozzi	Walter	111
Cachia	Maria	111
Cachia	Maurizio	111
Cinquemani	Giusi	111
Colin	Bernard	111
Concli	Gianfranco	111
Dal Bosco	Carolina	111
Dalpiaz	Annamaria	111
Feliciello	Domenico	111
Focarelli	Paola	111
Galletti	Oreste	111
Gasparini	Franca	111
Rizzardi	Paola	111
Lassini	Giancarlo	111
Malfatti	Luciano	111
Malfatti	Valeriano	111
Meneguzzo	Roberto	111
Mezzadra	Roberto	111
Pirpamer	Erich	111
Pochiesa	Paolo	111, 222
Radina	Claudio	111
Stuffer	Oskar	111
Tacchelli	Ugo	111
Tezzele	Margit	111
Unterkalmsteiner	Frieda	111
Vieider	Hilde	111
Vigna	Jürgen	111
Weber	Maurizio	111
Winkler	Franz	111
Annovi	Silvia	555
Bertoli	Stefano	555
Bozzi	Walter	555
Cachia	Maria	555
Cachia	Maurizio	555
Cinquemani	Giusi	555
Colin	Bernard	555
continue ...		

Example Phone List		
NAME		TEL.
Concli	Gianfranco	555
Dal Bosco	Carolina	555
Dalpiazz	Annamaria	555
Feliciello	Domenico	555
Focarelli	Paola	555
Galletti	Oreste	555
Gasparini	Franca	555
Rizzardi	Paola	555
Lassini	Giancarlo	555
Malfatti	Luciano	555
Malfatti	Valeriano	555
Meneguzzo	Roberto	555
Mezzadra	Roberto	555
Pirpamer	Erich	555
Pochiesa	Paolo	555, 222
Radina	Claudio	555
Stuffer	Oskar	555
Tacchelli	Ugo	555
Tezzele	Margit	555
Unterkalmsteiner	Frieda	555
Vieider	Hilde	555
Vigna	Jürgen	999
Weber	Maurizio	555
Winkler	Franz	555
End		

4.5.3 Table Cells

A table cell can contain text, inline equations, a figure, or another table. All these kinds of objects can be placed in the same cell. Font sizes and shapes can also be altered. But you can't put a special environment in a cell (like **Section***, etc.), nor set spacing options etc. for the cell's paragraph.

To have multi-line entries in table cells, you have to declare a fixed width for the column in the table dialog. Your text is then automatically split into multiple lines and the cell is enlarged vertically when the length of the text exceeds the given width. An example:


1	2	3
4	This is a multi-line entry in a table.	5
6	This is longer now.	7
8	This is a multi-line entry in a table. This is longer now.	9

Cutting and pasting between tables and table cells works reasonably well. You can cut and paste even more than one row. Selection with the mouse or with **Shift** plus the arrow keys works as usual. You can also copy and paste the entire table as a single unit by starting the selection from outside the table.

4.6 Floats

A float is a block of text associated with some sort of label, which doesn't have a fixed location. It can "float" forward or backward a page or two, to wherever it fits best. Footnotes and Margin Notes are also floats, because they can float to the next page when there are too much notes at the page.

Floats makes it possible to get a high quality layout. Images and tables can evenly be spread to the pages to avoid whitespace and pages without text. As the floating often destroys the context between the text and the image/table, every float can be referenced in the text. Floats are therefore numbered. Referencing is described in section 6.1.

To insert a float, use the menu **Insert**▷**Floats**. A box with a caption that has e. g. the label "Figure #:" (# is the actual number) will be inserted into your document. The label will automatically be translated to the document language in the output. Behind the label you can insert the caption text. The image or table is inserted above or below the caption in a separate paragraph within the float. To keep your LyX-document readable, you can open and close the float box by left-clicking on the box label. A closed float box looks like this:  – a gray button with a red label.

It is recommended to insert floats as a separate paragraph to avoid possible L^AT_EX-errors that can occur when the surrounding text is specially formatted.

4.6.1 Float Types

4.6.1.1 Figure Floats

The menu **Insert**▷**Float**▷**Figure** inserts a float with the label "**Figure #:**". Set the cursor above this label (or before it and press enter) and insert the image as described

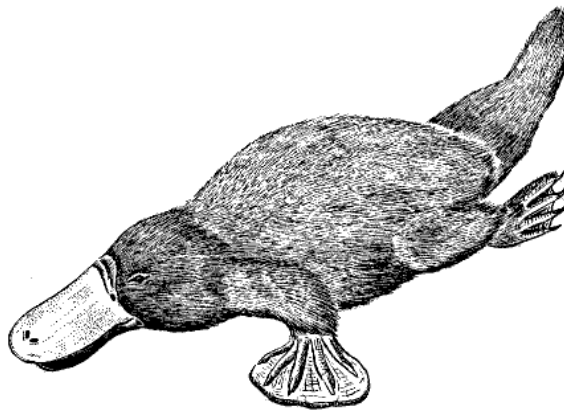


Figure 4.1: A severely distorted platypus in a float.

Figure 4.2: M.C. Escher on acid.



above to get the caption printed below the image. This is what we did for Figure 4.1. If you want the caption to be above the image, set the cursor at the end of the caption, press enter and insert the image. This was done in Figure 4.2.

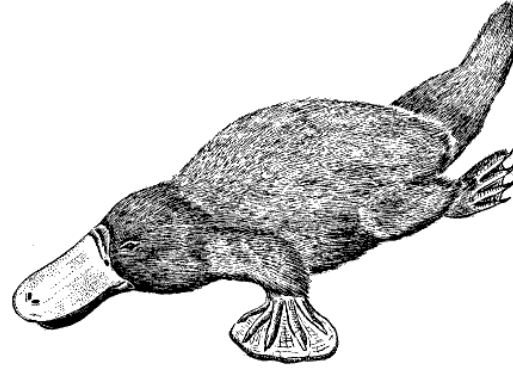
This figure float show also how to set a label and create a cross-reference to it. As described in section 6.1, you can simply insert a label in the caption using the menu `Insert▷Label` and refer to it using the menu `Insert▷Cross-Reference`. It is important to use references to figure floats, rather than using vague references like “the figure above”, because as \LaTeX will reposition the floats in the final document; it might not be “above” at all.

Normally one inserts only one image to a figure float, but sometimes you might want to use two images with separate subcaptions. This can be done in the graphics dialog: Right-click on an image and go to the tab `Extra options` in the appearing dialog, use the option `Subfigure`, and enter the subcaption for the image in the now enabled caption field. Figure 4.3 is an example of a figure float with two images set side by side. You can also set the images one below the other.

Note that the caption is added to the List of Figures as described in section 6.2.2.



(a) Undefinable structure



(b) Platypus

Figure 4.3: Two distorted images.

Table 4.2: A table float.

1	2	3
Joe	Mary	Ted
$\int x^2 dx$	$\begin{matrix} a & b \\ c & d \end{matrix}$	$1 + 1 = 2$

4.6.1.2 Table Floats

Table floats can be inserted using the menu **Insert**▷**Float**▷**Table**. They have the same properties as figure floats except of the different label. Table 4.2 is an example of a table float.

4.6.1.3 Algorithm Floats

This float type is inserted with the menu **Insert**▷**Float**▷**Algorithm**. It is used for program codes and descriptions of algorithms. A possible environment for algorithms is the **LyX-Code**, described in section 3.3.9.

Note: that the float label is not automatically translated into the document language. You have to do this manually by adding the following line

`\floatname{algorithm}{your name}`

to the document preamble (menu **Document**▷**Settings**). **your name** is the word “*algorithm*” in your language.

4.6.1.4 Text Wrap Floats

This float type is used if you want to “wrap” text around a figure so that it only occupies some fraction of the column width. It can be inserted using the menu

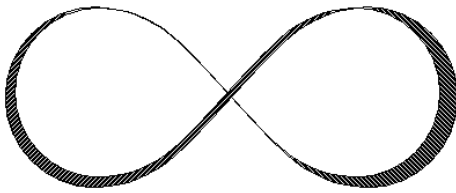


Figure 4.4: This is a wrapped figure, and this is the brilliant caption that describes it

Insert▷Float▷Text Wrap Float if the L^AT_EX-package **floatflt** is installed.⁴ The width and placement of the float is adjusted by right-clicking on the float box. Figure 4.4 is an example Text wrap float with a width of 40 col%.⁵ Some space was added under the caption to separate it better from the surrounding text.

The L^AT_EX-package **floatflt** also supports table wrap floats, but they are not yet supported by LyX. If you need this, read the documentation of **floatflt** [10].

Note: Text wrap float floats might be fragile! E.g. having a figure too close to the bottom of the page can mess things up in the way that the float doesn’t appear in the output or that it is placed over some other text.⁶ In general:

- Wrap floats should not be placed in paragraphs that run over a page break. That means that wrap floats should better be inserted to the exact place when the document is nearly ready and you are able to estimate where page breaks will appear.
- Wrap floats should either be placed in an own paragraph before the paragraph where they should wrap into or within a paragraph.
- Wrap floats in consecutive paragraphs may cause troubles, so assure that there is a text paragraph between them as separator.
- Wrap floats are not allowed in section headings or tables.

4.6.2 Rotated Floats

Especially for wide tables you might have floats rotated. To rotate a whole float including the caption, right-click on the float-box and use the option **Rotate sideways**.

Rotated floats are always placed on its own page (or column, when you have a two-column document). They are rotated so that you can read them from the outside margin. Forcing the rotation direction is explained in the *Embedded Objects* manual.

Referencing rotated floats is the same like for normal floats, the caption format is also the same: Table 4.3 is an example of a rotated table float.

Note: Not all DVI-viewers are able to display rotated floats.

⁴Installing a L^AT_EX-package is explained it in the *L^AT_EX Configuration* manual.

⁵Available units are explained in Appendix C.

⁶The better solution is to use the L^AT_EX-package **wrapfig** instead of **floatflt** but it is currently not supported by LyX.

Table 4.3: Rotated table

test	b	c	d	e
------	---	---	---	---

4.6.3 Float Placement

Right-clicking on a float-box opens a dialog where you can alter the placement options that L^AT_EX uses for positioning the float.

The option **Span columns** is only useful for two-column documents: If you select it, the float will span across both columns on the page instead of being confined to just one.

The option **Rotate sideways** is used to rotate floats, see section 4.6.2.

You can use one or more of the following options in the float dialog to set the placement for a particular float when you uncheck the option **Use default placement**:

Here if possible: try to place the float on the position where it is inserted

Top of page: try to place the float on the top of the current page

Bottom of page: try to place the float on the bottom of the current page

Page of floats: try to place the float on an own page

The order of the above options is *always* used by L^AT_EX. That means, if you use the default placement, L^AT_EX will first try out **Here if possible**, then **Top of page**, and then the others. If you don't use the default, L^AT_EX will try only the checked options but in the same order. If none of the 4 placements are possible the procedure is internally repeated but it is tried to put the float on the following page.

By default, each option has its own rules:

Top of page only floats occupying less than 70 % of the page can be placed at the top of a page

Bottom of page: only floats occupying less than 30 % of the page can be placed at the bottom of a page.

Page of floats: only if more than 50 % of the page are occupied by floats, several floats can be set together on a page.

If you don't like these rules, you can ignore them by using the additional option `ignore LATEX rules`.

Sometimes you might need, under all circumstances, a float to be placed exactly at the position where it is inserted. For this case you can use the option **Here definitely**. Use this option very rarely and only if the document is nearly ready to be printed. Because the float is then no longer able to “float” when you change your document and this will often destroy the page layout.

There are no placement options for text wrap floats, because they are always surrounded by the text of a certain paragraph.

For more details about float placements, have a look at L^AT_EX books like [1, 2, 3].

4.7 Minipages

L^AT_EX provides a mechanism to produce essentially a page within a page, called minipage. Within a minipage, all the usual rules of indentation, line wrapping, etc. apply.

Minipages in LyX have their own collapsible box inserted via the menu **Insert**▷**Box**. Right-clicking on the box allows you to alter the width of the minipage and its alignment within the page.

*This is a minipage. The
text is set in an italic
style.*

*Minipages are often used
for text in another lan-
guage or text that needs
another formatting.*

If you place two minipages side-by-side, you can use Horizontal Fills as described in section 3.5.1:


This is a minipage
with some stupid
dummy text. This
dummy text is used
to increase the size
of the minipage.

This is a minipage
with some stupid
dummy text. This
dummy text is used
to increase the size
of the minipage.

When you right-click on a minipage box, you can change the box from a minipage to other box types. All box types and their settings are explained in detail in chapter *Boxes* of the *Embedded Objects* manual.

5 Mathematical Formulas

5.1 Basic Math Editing

To create a math formula, you can just click on the toolbar icon . That will create a little blue rectangle, with purple markers around its corners. That blue rectangle is the formula itself; the purple markers indicate what level of nesting within the formula you are at. You can also choose a particular formula type to insert via the **Insert** ▸ **Math** menu.

Editing the parameters of a formula and adding math constructs can be done with the **math toolbar**, that appears when the cursor is in a formula.

There are two main types of formulas: Inline formulas appear within a text line, like this one:

This is a line with an inline formula $A = B$ in it.

Displayed formulas appear outside the text like as they were in an own paragraph, like this one:

$$A = B$$

You can only number and reference displayed formulas.

LYX supports also many L^AT_EX math commands. E.g. typing “`\alpha`”, followed by a space, in a formula will create the Greek letter α . So typing commands might sometimes be faster than using the **Math Panel**.

5.1.1 Navigating in Formulas

The best control over the cursor position within an existing formula is achieved with the arrow keys. LYX uses small rectangles to indicate places where something can be inserted. The arrow keys can be used to navigate between parts of a formula. Pressing **Space** will leave a formula construct (a square root $\sqrt{2}$, or parentheses (f) , or a matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$). Pressing **Escape** will leave the formula, placing the cursor after the formula. **Tab** can be used to move horizontally in a formula; for example, through the cells of a matrix or the positions in a multi-line equation.

Space, printed in this document as “`_`”, seems to do nothing in a formula, since it does not add a space between characters, but it does exit a nested structure. For this reason, you have to be careful about using **Space**. For example, if you want $\sqrt{2x+1}$, type `\sqrt_2x+1` and not `\sqrt_2x_+1`, since in the latter case only the $2x$ will be under the square root sign: $\sqrt{2x} + 1$.

You can leave many parts of a formula, like this matrix, partially filled in, such as:

$$\begin{pmatrix} \lambda_1 & & \\ & \ddots & \\ & & \lambda_n \end{pmatrix}$$

If you leave a fraction only partially filled in, or a subscript with nothing in it, the results will be unpredictable, but most constructs don't mind.


5.1.2 Selecting Text

You can select text within a formula in two different ways. Place the cursor at one end of the string of text you want, and press **Shift** and a cursor movement key to select text. It will be highlighted as with regular text selection. Alternatively, you can select text with the mouse in the usual way. That text can then be cut or copied, and then pasted within any formula, but not in a normal text region in LyX.

5.1.3 Exponents and Subscripts


You can use the math panel to add super- or subscripts, but the much easier way is to use a command. To get x^2 , type in a formula `x^2_`. The final **Space** puts the cursor back down on the base line of the expression. If you type `x^2y`, you will get x^{2y} , to get x^2y , type `x^2_y`. If you use characters in the superscript, that could be accented with the hat “^”, you have to use an extra **Space** to separate the hat and the character. E.g. if you want x^a , type `x^_a`. Subscripts are similar: To get a_1 , type `a_1_`.

5.1.4 Fractions

Create a fraction with either the command `\frac` or using the icon  in the **Math Panel**. You will be presented with an empty fraction. The cursor is above the fraction line. To move it to the bottom, simply press **Down**. To move back up, press **Up**. Any math structure can be placed in a fraction, as this example shows:

$$\left[\frac{1}{\begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}} \right]$$

5.1.5 Roots

Roots can be created using the **Math Panel** button  or the commands `\sqrt` or `\root`. With the command `\root` you can produce roots of higher orders, like cube roots, while `\sqrt` produces always a square root.

5.1.6 Operators with Limits

Sum (\sum) and integral (\int) operators are very often decorated with limits. These limits can be entered in L^AT_EX by entering them as you would enter a super- or subscript, directly after the symbol. The sum operator will automatically place its “limits” over and under the symbol in displayed formulas, and on the side in inline formulas. Such as $\sum_{n=0}^{\infty} \frac{1}{n!} = e$, versus

$$\sum_{n=0}^{\infty} \frac{1}{n!} = e$$

Integral signs, however, will place the limits on the side in both formula types.

All operators with limits will be automatically re-sized when placed in display mode. The placement of the limits can be changed by placing the cursor directly behind the operator and hitting M-m | or using the menu Edit▷Math▷Change Limits Type.

Certain other mathematical expressions have this “moving limits” feature as addition, such as

$$\lim_{x \rightarrow \infty} f(x),$$

which will place the $x \rightarrow \infty$ underneath the “lim” in display mode. In inline formulas it looks like this: $\lim_{x \rightarrow \infty} f(x)$.


Note that the lim-function was entered as the function macro `\lim`. Have a look at section 5.1.9 for an explanation of function macros.


5.1.7 Math Symbols

Most math symbols can be found in the Math Panel under one of several categories; including Greek, Operators, Relations, Arrows. There are also the additional symbols provided by the American Mathematical Society (AMS).

If you know the L^AT_EX-command for a construct or symbol you wish to use, you don’t have to use the Math Panel, but can type the command directly into the formula. L^AT_EX will convert it to the corresponding symbol or construct.

5.1.8 Altering Spacing

You may want to create spaces that differs from the standard spacing that L^AT_EX provides. To do this, type C-Space or to use the Math Panel button . This generates a small space, and shows a small marker on the screen. Here a example for

the sequence **a C-Space b**: $a\,b$ (appears in L^AT_EX as ). You can change the space to different sizes when you set the cursor behind the space marker and hit space again several times. With every space hit the size will be changed. Some markers for the space size appear red in L^AT_EX, because they are a negative spaces. Here two examples:


a C-Space b and 3×Space: $a\,b$

a C-Space b and 5×Space: $a\,b$

Table 5.1: Accent names and the corresponding commands.

Name	Command	Example
circumflex	<code>\hat</code>	\hat{a}
grave	<code>\grave</code>	\grave{a}
acute	<code>\acute</code>	\acute{a}
umlaut	<code>\ddot</code>	\ddot{a}
tilde	<code>\tilde</code>	\tilde{a}
dot	<code>\dot</code>	\dot{a}
breve	<code>\breve</code>	\breve{a}
caron	<code>\check</code>	\check{a}
macron	<code>\bar</code>	\bar{a}
vector	<code>\vec</code>	\vec{a}

5.1.9 Functions


The Math Panel contains under the button  a number of functions, such as \sin , \lim , *etc.* (you can also insert them in a formula by typing `\sin` etc.). Standard mathematical practice is, that functions are printed upright to avoid confusions, because *sin* does normally mean *sin*.

Using the function macros will also produce correct spacing around the function: $a \sin x$ is different from $asinx$

For some mathematical objects, like the limes, the macro changes the way that subscripts are placed, like described in section 5.1.6.


5.1.10 Accents

In a formula you can insert accented characters in the same way as in text mode. This may depend on your keyboard, or the bindings file you use. You can also use L^AT_EX commands to e.g. enter \hat{a} even if your keyboard doesn't have hat-accent enabled. Our example is entered by typing `\hat{a}` in a formula. Table 5.1 shows the equivalences between the accent names and the commands.

You can choose one of the accents by selecting an item from the Frame decorations symbol set button  in the math panel ; this will apply to any selection you have made within a formula too.

5.2 Brackets and Delimiters

There are several brackets available through L^AT_EX. For most purposes, using just the keys `[]{}()|<>` should suffice. But if you want to surround a large structure, like a matrix or a fraction, or if you have several layers of brackets, is better using

Math Panel's delimiter icon . For example, that's how you would construct the brackets around a standard matrix such as:

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

and to make it easier to see the layers of parentheses as in:

$$\frac{1}{\left(1 + \left(\frac{1}{1 + \left(\frac{1}{1+x}\right)}\right)\right)}$$

The parentheses, and other brackets from that menu will automatically re-size to accommodate the size of what is inside.

To construct brackets click on the button for the bracket you want on the left side and right side. If you use the option **Keep matched**, the selected bracket type will be used for the left and the right side. The selection will be shown below the button field. If you want one side to not have a bracket, use the blank button. It will appear in L^AT_EX with a dotted line, but nothing will be printed.

If you want to place brackets around math structures, like a square root, you can do that by highlighting (selecting) the structure that is to go inside the brackets. Then choose the appropriate brackets for left and right and click on **Insert**. The parentheses will be drawn around the selected structure.

The next section explains how to insert a L^AT_EX “{” for grouping.


5.3 Grouping

You may need to group a set of symbols. In L^AT_EX, for example, the typesetting of $\{x^y\}^z$ is different from $x^{\{y^z\}}$:

$$x^{yz} \quad \text{differs from} \quad x^{y^z}$$

To create this grouping, you need to use the key sequence “\{” then type space. Inside L^AT_EX, you will see red braces indicating the grouping. Within this braces you insert the grouped structure. The grouping braces won't appear in the output in contrary to normal braces.

5.4 Arrays and Multi-line Equations

Matrices are entered in L^AT_EX using the Math Panel matrix button . It will open a dialog for you to choose the number of rows/columns. Here is an example:

$$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$$

The parentheses aren't automatic, but you can add them as described in section 5.2. When you construct the matrix, you can decide whether the column entries will be left-, right-, or center-justified. This alignment is set in the box **Horizontal** with the letters “l”, “r”, and “c”. LyX proposes a “c” for every column as default. For example, the sequence “lrc” means that the first column will be left-justified, the second will be centered, and the third column will be right-justified, because each letter corresponds to the relevant column. The result will look like this:

<i>this</i>	<i>this column</i>	<i>this column</i>
<i>column</i>	<i>has</i>	<i>has right .</i>
<i>has left alignment</i>	<i>center alignment</i>	<i>alignment</i>

You can add more rows to an existing matrix by hitting **C-Enter** while the cursor is in the matrix. Adding or deleting columns can be done via the menu **Edit▷Math**.

There are other arrays used in formulas, such as distinctions of cases. It can be created with the menu **Insert▷Math▷Cases Environment** or the command `\cases`. Here an example:

$$f(x) = \begin{cases} -1 & x < 0 \\ 0 & x = 0 \\ 1 & x > 0 \end{cases}$$

Multi-line formulas are created when you press **C-Enter** within a formula. In an empty formula you can see that three blue boxes appear, one for each column. When you press **C-Enter** in a non-empty formula, the part before the relation sign (equal sign “=” etc.) will be inserted automatically to the first column, the relation sign is in the second column, and the rest in the third column. A new row is created by every further hit of **C-Enter**. Multi-line formulas are always displayed formulas. Here is an example:

$$\begin{array}{lcl} a^2 & = & (b^2 + c^2)(b^2 - c^2) \\ a & = & \sqrt{b^4 - c^4} \end{array} \quad (5.1)$$

To change the column assignment of the formula parts, place the cursor where you want to start the shift and hit **C-Tab**. It shifts everything in the column which is right beside the current cursor position to the next column. Note that the middle column is designed for relation signs, structures within this column will be printed in a smaller size:

$$\frac{A}{B} \quad \frac{A}{B} \quad \frac{A}{B}$$

The multi-line formula type described here is called **eqnarray**. There are other multi-line types being more suitable for certain situations, for example if you want a better inter-line spacing than in formula (5.1). The other types are described in section 5.8.2.

5.5 Formula Numbering and Referencing

To number a formula, set the cursor in the formula and use the menu **Edit▷Math▷Toggle Numbering** or the shortcut **M-m n**. The formula number appears in L^AT_EX as “#” within parentheses. The “#” denotes, that the number will be calculated automatically when the output is generated. The placement and format of the formula number in the output depends on the document class. In this document the number is printed together with the chapter number, separated by a dot:

$$1 + 1 = 2 \tag{5.2}$$

Using **M-m n** in a numbered formula will switch off the numbering. You can only number displayed formulas.

Multi-line formulas can be numbered line by line: Using the menu **Edit▷Math▷Toggle Numbering of Line** or the shortcut **M-m N** will only toggle the numbering of the line where the cursor is in:

$$1 = 3 - 2 \tag{5.3}$$

$$2 = 4 - 2$$

$$4 \leq 7 \tag{5.4}$$

To number all lines use the shortcut **M-m n**.

Every displayed formula can be referenced by its number using a label. A label is inserted with the menu **Insert▷Label** when the cursor is in the formula. This opens a dialog to enter the label. It is recommended to use the proposed “eq:” as first part of the label, because this helps later to identify the label type when you have many labels in your document. We inserted in the following example the label “eq:tanhExp” in the second line:

$$\begin{aligned} \tanh(x) &= \frac{\sinh(x)}{\cosh(x)} \\ &= \frac{e^{2x} - 1}{e^{2x} + 1} \end{aligned} \tag{5.5}$$

Every labeled line is automatically numbered. Therefore the label is shown in L^AT_EX at the place of the formula number placeholder “#”. You can reference a labeled formula using the menu **Insert▷Cross Reference**. A dialog appears to choose a label you want refer to. The reference appears in L^AT_EX as grey cross reference box and in the output as the formula number:

This is a cross-reference to equation (5.5).

The properties of L^AT_EX’s cross-reference box are described in section 6.1. To delete a label, set the cursor in the labeled formula, use the menu **Insert▷Label** and delete the label in the appearing dialog.¹

¹This is a unintuitive and will be fixed in the next version of L^AT_EX.

5.6 User defined math macros

LyX allows you to define macros for formulas. For example we assume that solutions of the quadratic equation often occur in our document in various forms and we want to create a macro to print them.

The general form of a quadratic equation is:

$$0 = \lambda^2 + p\lambda + q$$

The general form of its solution is:

$$\lambda_{1,2} = -\frac{p}{2} \pm \sqrt{\frac{p^2}{4} - q}$$

The macro should print the parameters λ , p and q like in the equation above.

A macro is created by executing the command

math-macro_Name_Number of Arguments

in the minibuffer at the bottom of the LyX screen. Name is the name of the new macro which mustn't contain numbers. The number of arguments can be a number in the range 1-9. If you want to define a macro without arguments, don't declare the number of arguments.

We have three arguments and name the macro "qE", so that the command is:

math-macro_qE_3

This results in the following macro definition box:

Macro: qE:

The first blue box is for the definition, where you insert the formula via the math panel or commands. The placeholder for the arguments are inserted as a backslash and sharp followed by the argument number, e.g. " $\backslash\#1$ " for the first argument. Placeholders will be displayed in red. The second blue box is for the appearance in LyX. This is useful when you have a large structure that shouldn't be displayed in LyX with its full size. If you want to see the macro as it is defined, leave the box blank. In our example we insert the sequence

qE: $\backslash\#1$, $\backslash\#2$, $\backslash\#3$

The macro will then be shown as the macro name followed by the three arguments.

To use the macro in a formula, type its name as command, in our case " $\backslash\text{qE}$ ". The macro is inserted with boxes for the arguments looking similar to this:

qE qE: $\#1$, $\#2$, $\#3$
 $\#1$:
 $\#2$:
 $\#3$:

The arguments are inserted in the blue boxes. If the cursor is outside the macro, the arguments are put in the macro. To change the arguments, put the cursor in the

Table 5.2: Typefaces and the corresponding commands.

Font	Command
Roman	<code>\mathrm</code>
Bold	<code>\mathbf</code>
<i>Italic</i>	<code>\mathit</code>
Typewriter	<code>\mathtt</code>
BLACKBOARD	<code>\mathbb</code>
Fraktur	<code>\mathfrak</code>
<i>CALLIGRAPHIC</i>	<code>\mathcal</code>
SansSerif	<code>\mathsf</code>

formula before or after the macro and press the right or left arrow key respectively. The arguments appear now again below the macro definition.

If you change the macro definition all macros are changed automatically to the new definition. Here an example of our macro with the arguments x , $\ln(x)$, and B :

$$x_{1,2} = -\frac{\ln(y)}{2} \pm \sqrt{\frac{\ln(y)^2}{4} - B}$$


When the document is exported to L^AT_EX, the macro definition will be inserted as the command:

```
\newcommand{\qE}[3]{\#1_{\#2}=\frac{\#3}{\#4}\pm\sqrt{\frac{\#3^2}{\#4}-\#5}}
```

The command is not inserted in the document preamble. That means you can only use macros in formulas that are below the macro definition box in your document. There are also some other restrictions: The command `\newcommand` supports optional arguments, which are not available in L^yX's macros. You can also not change subsequently the name of the macro and the number of arguments.

5.7 Fine-Tuning

5.7.1 Typefaces

The standard font for text is italic, for numbers the standard is roman. To set a font in a formula, use the Math Panel button , or enter its command, listed in table 5.2, directly.

Note: that you can only print capital letters in the typefaces **Blackbold** and **Calligraphic**.

When you use a typeface, a blue box is inserted in the formula. Every character in this box will be printed in this typeface. Pressing **Space** within the box, will set the cursor outside, so that you have to use a protected space when you need a space in

the box. Here an example where a “N” in **Blackbold** denotes the set of numbers:

$$f(x) = \sqrt{x}; x \in \mathbb{N}$$

The typefaces are nestable, which can cause confusion. You can e.g. put a character in Fraktur in a box for Typewriter: **abcðe**
So better don't use this feature.


The typefaces have no effect on Greek letters: **αβγδϵ**
You can only print them emboldened using the command `\boldsymbol`, which works like the other typeface commands: $\alpha\beta\gamma\boldsymbol{\alpha\beta\gamma}$

`\boldsymbol` works for all symbols, letters, and numbers.

A number of other font options are available as well, in the menu **Insert**▷**Math**▷**Font Change**.

5.7.2 Math Text


Typefaces are useful for entering some characters in some given font, but not for text. For typing longer pieces of text use the math text, which is obtained using the entry

Normal text mode of the Math Panel button  (alternatively the shortcut **M-m m**). Math text appears in L^AT_EX in black instead of blue. You can use spaces and accents in math text like in normal text. Here is an example:

$$f(x) = \begin{cases} x & \text{if I say so} \\ -x & \text{unter Umständen} \end{cases}$$

5.7.3 Font Sizes

There are four font styles (relative sizes) used in math-mode, which are automatically chosen in most situations. These are called `textstyle`, `displaystyle`, `scriptstyle`, and `scriptscriptstyle`. For most characters, `textstyle` and `displaystyle` are actually the same size, but fractions, superscripts and subscripts, and certain other structures, are set larger in `displaystyle`. Except for some operators, which resize themselves to accommodate various situations, all text will be set in the styles as L^AT_EX thinks is

appropriate. These choices can be overridden by using the math panel button . A box for the size will be created in which you can insert the math structure. For example, you can set $\frac{1}{2}$, which is normally in `textstyle`, larger in `displaystyle`: $\frac{1}{2}$. The four styles are used in the following example:

displaystyle, textstyle, scriptstyle, scriptscriptstyle.

All these math-mode font sizes are relative, that means, if the whole math inset is set in a particular size with the menu **Edit**▷**Text Style**, all sizes in the formula will be adjusted relative to this size. Similarly, if the base font size of the document is changed, all fonts will be adjusted to correspond. As example a formula in the font size “largest”:

$$e = \sum_{n=0}^{\infty} \frac{1}{n!}$$

5.8 AMS- \LaTeX

LyX supports the packages provided by the American Mathematical Society (AMS) that are in common use.

5.8.1 Enabling AMS-Support

Selecting the checkbox **Use AMS math package** in the **Document** \triangleright **Settings** dialog under **Math Options** will include the AMS-packages in the document, and make the facilities available. AMS is needed for many math-constructs, so when you get \LaTeX -errors in formulas, assure that you have enabled AMS.

5.8.2 AMS-Formula Types


AMS- \LaTeX provides a selection of different formula types. LyX allows you to choose between `align`, `alignat`, `flalign`, `gather`, and `multline`. We refer to the AMS-documentation for an explanation of these formula types.


6 More Tools

6.1 Cross-References

One of LyX's strengths are cross-references. You can reference every section, float, footnote, formula, and list in the document. To reference a document part, you have to insert a label into it. The label is used as anchor and name for the reference. We want for example refer to the the second item of the following list:

1. First item
2. Second item
3. Third item

First we insert a label into the second item with the menu `Insert > Label` or the by pressing the toolbar button . A grey label box like this: `fig:This-is-a` is inserted and the label window pops up asking for the label text. LyX offers as text the first words of the item with a prefix, in our case the text “enu: Second-item”. The prefix “enu:” stands for “enumerate”. The prefix depends on the document part where the label is inserted, e.g. if you insert a label to a section heading, the prefix will be “sec:”.

To reference the item, we refer to its label using the menu `Insert > Cross-Reference` or the toolbar button . A grey cross-reference box like this: `Ref: sec:Contrib` is inserted and the cross-reference window appear showing all labels of the document. We can now sort the labels alphabetically and then choose the entry “enu:Second-item”. At the position of the cross-reference box the item number will appear in the output. Here is our cross-reference:

Item 2

It is recommended to use a protected space¹ between the cross-reference name and its number to avoid ugly linebreaks between them.

There are six varieties of cross-references:

`<reference>`: prints the float number, this is the default: 4.3

`(<reference>)`: prints the float number within two parentheses, this is the style normally used to reference formulas, especially when the reference name “Equation” is omitted: (5.5)

¹described in section 3.5.6.2

<page>: prints the page number: Page 62

on page <page>: prints the text "on page" and the page number: on page 62

<reference> on page <page>: prints the float number, the text "on page", and the page number: 4.3 on page 62

Formatted reference: prints a self defined cross-reference format.

Note: This feature is only available when you have the L^AT_EX-package **prettyref** installed.

Note that the style **<page>** won't print the page number if the label is on the previous, the same, or the next page. You will e.g. see the text "on this page" instead.

The number and current page of the referred document part in the output, is automatically calculated by L^AT_EX. The varieties are adjusted in the field **Format** of the cross-reference window, that appear when you click on the cross-reference box.

You can only use the style **<reference>** to reference numbered document parts, while the reference style **<page>** is always possible.

If you want to reference a section, put the label in the section heading, to reference a float, put the label in the caption. For footnotes you can put the label somewhere in it. Referencing formulas is explained in section 5.5.

The button **Go to Label** in the cross-reference window sets the the cursor before the referred label. The button text changes then to **Go Back** and you can use it to set the cursor back to the cross-reference. Right-clicking on a cross-reference box also sets the cursor before the referred label but without a possibility to go back.

You can change labels at any time by clicking on the label box. References to the changed label will automatically change its link to the new label text, so that you don't need to take care about this.

If a cross-reference refers to a non-existing label, you'll see two question marks in the output instead of the reference.

References are described in detail in the *Embedded Objects* manual.

6.2 Table of Contents and other Listings

6.2.1 Table of Contents and Outline

The Table of Contents (TOC) is inserted with the menu **Insert**▷**List/TOC**▷**Table of Contents**. Is is displayed in LyX as a gray box. If you click on it, the TOC window appears, showing you the TOC entries. You can jump to a document part by clicking on an entry. Thus you can use this window as graphical alternative for the **Navigate** menu.

The TOC lists every numbered section automatically. If you have declared a short title for a section heading, as described in section 3.3.4.4, it will be used in the TOC instead of the section heading. Section 3.3.4.3 describes how the level is adjusted that defines which section types are listed in the TOC. You can also adjust the level for

the displayed sections in the TOC window using the grey fader at the bottom of the window. Unnumbered sections are not listed in the TOC.

You can use the TOC window also as outline to move and rearrange sections in your documents. The TOC window therefore also appears when you use the menu **Document▷Outline**.

6.2.2 List of Figures, Tables and Algorithms

Table, figure, and algorithm lists are very much like the table of contents. You can insert them via the **Insert▷List / TOC** submenus. The list entries are the float captions and the float number.

6.3 URLs (Uniform Resource Locators)

It is often desirable to include long “verbatim” items in a document such as Web site URLs, e-mail addresses, etc. These things typically do not contain any spaces and are thus difficult to typeset properly. Such items will often fall on a line boundary if they cannot be split, resulting in an overfull line. To avoid this, use the menu **Insert▷URL** to enter a long URL and have it split gracefully, if necessary.

The URL dialog has two fields; the URL field and the **Name** field for the URL description, which will be typeset as plain text immediately before the URL. Here an example:

LyX-Homepage `http://www.lyx.org`.

Important notes:

- When you use the following characters: "%", "#", "^", you have to write them with a backslash before, e.g. “\#”.
- URLs must not end with a backslash!

6.4 Appendices

Appendices are created with the menu **Document▷Start Appendix Here**. This menu sets the document from the current cursor position to the end as appendix region. The region is marked with a red borderline.


Every chapter (or section) within the appendix region is treated as an appendix, numbered with a capital Latin letter. The appendix subsections are numbered with this letter followed by a dot and the subsection number. All appendix sections can be referenced as if they were normal sections, here two examples:

Appendix D; Appendix A.1.11

6.5 Bibliography

There are two ways of generating the bibliography in a LyX-document. You can include a bibliography database², which is explained in the next subsection or you can insert the bibliography manually. For the second method we use the paragraph environment `Bibliography`, described in section 3.3.8.2.

Within the `Bibliography` environment, every paragraph begins with a gray bibliography box labeled with a number. If you click on it, you will get a dialog in which you can set a `Key` and a `Label`. The key is the symbolic name by which you will refer to this bibliography entry. For example, our second entry in the bibliography is a book about \LaTeX and we used “`latexcompanion`”, a short form of its title, as key.

You can refer to the key of a bibliography entry using the menu `Insert`▷`Citation` or the toolbar button . A citation reference box is inserted and a citation window will appear in which you can select one or more keys in the available key list. The citation reference box will be labeled with the referenced key. When you click on the box, the citation window appears and you can change the reference.

Citation references appear in the output as number of the bibliography entry with surrounding brackets. If you set a `Label` for the entry, the label will appear instead of the number. Here two examples; the first without a label, the second with the label “Credits”:

Have a look at the \LaTeX Companion Second Edition: [1]

The LyX-Team members are listed in the Credits: [Credits]

6.5.1 Bibliography databases (`BibTeX`)

Bibliography databases are useful if you use the same bibliography in different documents. It makes it also very easy to have a uniform layout for all bibliography entries. You can collect the bibliography of all relevant books and articles of your working field in a database. This database can be used for different documents, because only the referenced entries of the database will appear in the bibliography list.

The database is a text file with the file extension “`.bib`” containing the bibliography in a special format. The format is explained in \LaTeX books ([MG04, KD03, Lam94]). Normally one uses a special program to create and edit entries of the database. Under <http://wiki.lyx.org/BibTeX/Programs> you find a list of programs for bibliography databases.

To use a database, use the menu `Insert`▷`List/TOC`▷`BibTeX Bibliography`. A grey box will be inserted and a window appears. In this window you can load one or more databases and a style file.

The style file is a text file with the file extension “`.bst`” that declares the layout of all bibliography entries. Many publishers provide special style files, so that you don’t have to take care of the layout.

Inserting a citation reference works like described above.

²Known under the name “`BibTeX`-database”.

To generate the bibliography from a database, the program BibTeX is used by LyX. This program can be controlled with options that you can add in LyX's preferences dialog under **Outputs, LaTeX** in the field **BibTeX command**. Before adding options, it is strongly recommended to read the manual of BibTeX.

We use two bibliographies in this document to show the difference between the two methods of creating them. As you can see, the bibliography that is created from a database lists only the database entries that are referenced in the document. We used the style file `alphadin.bst` to get the complicated German reference key scheme in the bibliography.


6.5.2 Bibliography layout

In the citation reference dialog you can set a special citation format. For this feature you need to use the option **Natbib** enabled in the **Document > Settings** dialog under **Bibliography**. Setting a citation style for a reference will overwrite the default. For the global citation format use the BibTeX style files as explained in the previous section.

You can also set text, that should appear before or after a citation reference, in the citation reference window. Here an example where we set the text "Chapter 3" to appear after the reference:

Have a look at [1, Chapter 3].

6.6 Index

An index entry is created if you use the menu **Insert > Index Entry** or the toolbar button . A gray box labeled "idx" is inserted containing the text that appears in the index. The word where the cursor is in or the currently highlighted text is proposed by LyX as index entry.

Note: The index entry text field differs from all other text fields, because you have to insert valid LaTeX-code. Therefore you cannot insert

Find & Replace

to an index entry field, because the "&" character is used in LaTeX to separate table columns, so that you will get LaTeX-errors. The correct entry is

Find \& Replace

This behavior is necessary because index entries can be formatted in many ways using special LaTeX commands. We give a short overview of the index command in the next subsections. For a detailed description of LaTeX's index mechanism, have a look at one of the LaTeX books [1, 2, 3].

You can change index entries by clicking on the index box.

The index list is inserted to the document with the menu **Insert > List / TOC > Index List**. A light blue box labeled "Index" will show the place where the index is printed in the output. The index list box is not clickable like other LyX-boxes.

6.6.1 Grouping Index Entries

Index entries are often grouped to offer the reader a fast search in the index. We want to group for example the index entries for itemized and enumerated lists under the entry “Lists”. First we create the entry “Lists” in section 3.3.6. In the text field for the itemized list index entry in section 3.3.6.2, we insert the command

Lists ! Itemize

and the command

Lists ! Enumerate

for the enumerated list in section 3.3.6.3.

The exclamation mark “!” marks the grouping levels. You can have three levels; every index level is indented a bit more. An index entry for the higher levels is not required. If we don’t have an index entry for “Lists”, it will be printed anyway, but without a page number.

6.6.2 Page Ranges

Normally an index entry will appear with the page number of the indexed section. But sometimes you want to index more pages under the same entry. E.g if we want to index the paragraph environments, we create an index entry in section 3.3 with the command

Paragraph environments|(

and another entry at the end of section 3.3.9 with the command

Paragraph environments|)

The commands “|” and “|)” respectively starts and ends the index range. You can also add the same index entry at different places in the document. They appear in the output under one entry with a comma separated list of the pages of the indexed document parts. An example is the index entry “Document ! Settings”.

6.6.3 Cross referencing

It is also possible to refer to another index entry. We referred for example in the index entry “GIF” (in section 4.4.1) to the index entry “Image formats” in the same section using the command

GIF|see{Image formats}

The text within the braces is the referenced entry. The reference will appear in the output without a page number.

6.6.4 Index Entry Order

You can use accented characters in the index entry, but the entries might then not follow the rules for the index order. The index entries are sorted alphabetically, but L^AT_EX³ doesn’t know how to sort accents in different languages. We created as

³The index generating is done in the background by an extra program, see section 6.6.6.

example the three dummy index entries “maison”, “maïs”, and “maître”. They will be sorted in the order maïs, maître, maison, but we want the order maïs, maison, maître. To achieve this, we use the command

previous entry@current entry

In our case we want to have “maison” after “maïs” and write therefore for the index entry of maison:

maïs@maison

The previous entry needn’t to be a real existing entry, you can also use another word to tell L^AT_EX the entry order, see the next subsection for an example.

6.6.5 Index Entry Layout

You can insert entries together with L^AT_EX-commands for the layout. If you need for example an italic entry, you can write

\textit{This is an italic entry}

where the command **\textit** produces the italic layout. We refer to L^AT_EX books ([1, 2, 3]) for an overview of layout commands. There is only the problem, that layout commands destroy the sorting order. To avoid that our index entry appears as the first one, we use the following command instead:

This@\textit{This is an italic entry}

You can also format the page number using the character “|” followed by a L^AT_EX-command without a backslash. We can write for example

old-style page number:|oldstylenums

to get the page number in an old-style layout. Normally all L^AT_EX-commands begin with a backslash, but in this special case “|**command**” means **\command{page number}**. Have a look at section 6.9.2 to learn more about the L^AT_EX-syntax.

You can also change the layout for the whole index. E.g. we marked the index list box of this document as bold to get a bold font for all index entries.

6.6.6 Index Program


LyX uses for the index generation by default the program **makeindex**. It can be controlled by options that can be set in LyX’s preferences dialog, see section B.5.4. The available options are listed and explained in [7].

You can also specify there another program to generate the index, for example **xindy**.

6.7 Nomenclature / Glossary

Sometimes you need to compile a list of symbols that are mentioned in your document with a brief explanation of them – a so called nomenclature or glossary.

To be able to create nomenclatures, you need the L^AT_EX package **nomenc** installed. You find it in the T_EX Catalogue, [5] or in the package manager of your L^AT_EX-system.

A nomenclature entry is created if you place the cursor after a symbol entry and then use the menu **Insert**▷**Nomenclature Entry** or the toolbar button . A gray box labeled “Nom” is inserted and a window pops up asking for the nomenclature entry.

A nomenclature entry consists of two main entries. The first is the symbol that you want to refer to. The second is the description of the symbol.

Note: Like for the index entry dialog, you have to enter valid L^AT_EX-code for all fields of the nomenclature dialog.

6.7.1 Nomenclature Definition and Layout

When you have symbols in formulas, you have to define them in the **Symbol** field as L^AT_EX-formula. For example to get “ σ ”, insert this:

`\sigma`

The “**`\`**” character hereby starts/ends the formula. The L^AT_EX-command for the Greek letter is the name of the letter beginning with a backslash “**`\`**”. For capital Greek letters, start the command also with a capital letter, like **`\Sigma`**.

(A short introduction to the L^AT_EX-syntax is given in section 6.9.2.)

You cannot use the **Text Style** dialog to format the description text but have to use L^AT_EX-commands. For example the description of the nomenclature entry for the “ σ ” in this document is:

dummy entry for the character `\textsf{sigma}`

The command **`\textsf`** sets the fonts to **sans serif**. To get **bold** font use the command **`\textbf`**, for **typewriter** use **`\texttt`**, for *emphasized* use **`\emph`**.

6.7.2 Sort Order of Nomenclature Entries

The nomenclature entries are sorted alphabetically by the L^AT_EX-code of the symbol definition. This leads to undesired results when you for example have symbols in formulas. Suppose you have nomenclature entries for the symbols a and σ . They will be sorted by “**`a`**” and “**`\sigma`**” – the σ will be sorted before the a since the character “**`\`**” is considered in sorting.

To control the sort order, you can edit the **Sort as** field of the nomenclature dialog. Then the nomenclature entry will be sorted by this entry and not the symbol definition. For the given example, you can insert **`sigma`** to this field for the σ , then a will be located before σ .

For subgrouping and tips for using sort entries see the **nomenc1** documentation, [11].

6.7.3 Nomenclature Options

The **nomenc1** package offers some options to adjust the appearance of the nomenclature. Here are some of its options, for more have a look at its documentation:

refeq Appends the phrase “, see equation (*eq*)” to every nomenclature entry, where *eq* is the number of the last equation in front of the nomenclature entry

refpage Appends the phrase “, page (*page*)” to every nomenclature entry, where *page* is the number of the page on which the nomenclature entry appeared

intoc Inserts the nomenclature in the Table of Contents

There are furthermore the options **croatian**, **danish**, **english**, **french**, **german**, **italian**, **polish**, **portuguese**, **russian**, **spanish**, and **ukrainian** to print the reference texts and the nomenclature title in the corresponding language.

To use one or more of the options, add them to the comma-separated document class options list in the Document▷Settings dialog. In this document the options **intoc** and **refpage** are used.

You can also use the first two options above only for certain nomenclature entries when you add one of the following commands as last entry to the Description field in the nomenclature dialog:

\nomrefeq Like the **refeq** option

\nomrefpage Like the **refpage** option

\nomrefeqpage Short notation of **\nomrefeq\omrefpage**

\nomnorefeq, **\nomnorefpage**, **\nomnorefeqpage** Turns off the corresponding options

6.7.4 Printing the Nomenclature

To print the nomenclature, use the menu Insert▷Lists / TOC▷Nomenclature. A light blue box labeled “Nomenclature” will show the place where the nomenclature is printed in the output. Like the index list box, the nomenclature list box is not clickable.

In the printed output the title of the nomenclature appears as “Nomenclature”. If you are not happy with the name, you can change it by redefining the command **\nomname** in the preamble. For example, in order to change the name to *List of Symbols*, add the following line to the preamble:

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

If you are unhappy with the amount of space for symbols, you can alter it by adding the following line to the preamble:

```
\renewcommand{\nomlabelwidth}{width}
```

Where the width is a value with one of the units listed in Appendix C. The default value is 1 cm.

6.8 Branches

Sometimes it is useful to hide some document parts in the output. For example a teacher who is setting an exam obviously doesn't want the pupils to see the answers, but having questions and answers in the same document will make the life of the markers of that exam much easier.

For these cases LyX offers to put text into branches. The text will then only appear in the output when its branch is activated. To create a branch, go in the **Document > Settings** dialog to **Branches**. The name of the branch, its activation state and the background color of the branches inside LyX can be specified in this dialog.

Text that should be in a branch is set into branch inset boxes. These boxes are inserted via the menu **Insert > Branch** where you can choose a branch. You can later change the branch of the boxes by right-clicking on them.

Here is an example, where only the question text appears, the answer branch is deactivated and does therefore not appear in the output:

Question: Who was the first physics Nobel prize winner?

To use conditional output inside places where you cannot insert branch insets, like inside equations, you can code special L^AT_EX definitions for each branch. For example you can define for the question branch⁴

```
\newcommand{\question}[1]{\#1}
```

```
\newcommand{\answer}[1]{}
```

and for the answer branch

```
\newcommand{\question}[1]{}
```

```
\newcommand{\answer}[1]{\#1}
```

Now it is possible to use the commands `\question{...}` and `\answer{...}` to obtain conditional output. Here is an example formula where only the `\question` part appears:

$$x^2 - 2x - 2 \Rightarrow x_1 = 1 + \sqrt{3}.$$


Inside math, the same effect can be achieved using math macros, see section 5.6.

6.9 ERT and the L^AT_EX Syntax

6.9.1 ERT Boxes

As LyX uses L^AT_EX in the background, it supports many L^AT_EX commands and constructs, but not all. L^AT_EX contains of hundreds of packages which provide different commands. Every month many packages are updated and new ones added. This has the advantage that you can typeset nearly everything, for every problem exists a L^AT_EX-package. But LyX can of course not be up to date and support all these packages and their commands.

⁴For an introduction to the L^AT_EX-syntax, see section 6.9.2.

But don't worry, you can use any \LaTeX -command directly in \LyX inside the ERT box. ERT stands for "evil red text", evil because \LyX is designed to avoid that you have to use \LaTeX -commands. An ERT box is created by the menu **Insert**▷**TeX** or by the toolbar button . The box itself can be displayed in three different styles: **Inline**, **Collapsed**, and **Open**. To change the style, right-click on the box and use the appearing dialog. Left-clicking on the box will switch between **Collapsed** and **Open**.

You can insert complete or incomplete commands into ERT. Incomplete means that the command argument can be Standard \LyX text. For example you want to draw a frame around a word and uses therefore the \LaTeX -command \fbox , you can write the command part \fbox { in an ERT box before the word and the closing brace } in a second ERT box behind the word. The word between the two ERT boxes is then the argument as it is in the following example:

This is a line with a \fbox { framed } word.

gives

This is a line with a framed word.

Note: At the end of \LaTeX -commands without parameters, you have to insert a space to let \LaTeX know that the command is finished.

6.9.2 Short Introduction to the \LaTeX Syntax

When you write larger documents or books, you will need to know something about the \LaTeX -commands that \LyX uses in the background. Because \LaTeX is based on commands, you can "program" your text. This has the advantage that the layout of the document can be changed at every time if you know the right commands. E.g. imagine you have to write a manual for a product and the deadline is at the end of the day. Your boss just has complimented you for your good work but wants to have all caption labels bold. But you have over hundred figure and table captions with non-bold labels in your manual. Of course it's impossible to change all caption labels by hand in one day.

Now \LaTeX comes into play. As written above, for every problem exists a \LaTeX -package. First you have to find out which and therefore look in the \LaTeX package database, [FW].

As result you know that the package **caption** is what you need. To use a package, you have to load it in the document preamble (menu **Document**▷**Settings**) with the command

\usepackage [options]{package name}

All \LaTeX commands begin with a backslash, the command argument is set within two braces, and the options are set within two brackets. Note that not all commands have an argument and options.

In your case the package name is **caption**. After a look in the documentation of the package, you know that the option **labelfont=bf** will change the font of all caption labels to bold. So you add the command

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

to the preamble and the problem is solved.⁵

Note that some document classes have built-in solutions for well known problems like your case. For example if you use a koma-script class, you don't need the package **caption**, you can instead write

`\setkomafont{captionlabel}{\bfseries}`

in the preamble and the problem is solved. So if you plan to write a large document, you should have a look at the documentation of the document class you want to use. (`\setkomafont` is an example for a command with more than one argument.)

Commands in the preamble affects the whole document, while commands in the text affects only the text after the command or only the text used as command argument. To insert a L^AT_EX-command in text, use the ERT box as described in the previous section.

If you want to learn more about L^AT_EX and its syntax, have a look at the L^AT_EX-books [1, 2].

6.10 Previewing Snippets of your Document

LyX allows you to generate previews of sections of your document on the fly so you can see how they'll look in the final document without having to break your train of thought with View▷DVI.

If you would for example like to see in LyX your math formulas typeset by L^AT_EX, install the L^AT_EX-package **preview-latex** as explained below, and turn on **Instant preview** in the Tools▷Preferences dialog under Look and feel▷Graphics.

Previews are generated when you load a document into LyX and when you finish editing an inset. Previews of an already loaded document are *not* generated just by selecting the **Instant preview** check box, you have to reopen the documents to activate the previews.

LyX will generate previews of math insets. It will also generate previews of included insets if you select the **Show preview** check box in the insert dialog. This is useful if you wish to generate a preview of a L^AT_EX figure, for example.

To get previews working, you need the L^AT_EX package **preview-latex** (on some systems named simply **preview**) installed. In case it is not already installed, you find it in the T_EX Catalogue, [5] or in the package manager of your L^AT_EX-system. You obtain prettier results if you install the program **pnmcrop** from the **netpbm** package; for LyX on Windows this program is automatically installed together with LyX.

You can furthermore preview the L^AT_EX source of the whole document or parts of it. Use the menu View▷View Source and a window will be shown where you can see the L^AT_EX-source code. The window shows the source of the whole paragraph where the cursor is currently in. You can also select document parts in LyX's main window, then only this selection (when it is more than one paragraph) is shown as source code.

⁵For more commands provided by the **caption** package, have a look at its documentation, [8].

To view the whole document as source, enable the corresponding option in the source view window.

6.11 Spell Checking

LyX itself has no built-in spell checker. Rather it uses one of the external programs `aspell`, `ispell`, `hspell`, or `pspell` as backend. This section assumes you have already installed and set up one of these programs. `aspell` can be seen as successor of `ispell`, so that it is recommended to use `aspell`. `hspell` is a Hebrew spell-checker. The used spell checker and its settings are specified in LyX's preferences under **Language Settings**.

For LyX on Windows, the selection box for the spell checking program is greyed out in the preferences dialog because only `aspell` can be used.

The menu **Tools**▷**Spellchecker** starts the spell checking beginning from the current cursor position. A dialog window will appear showing any incorrect (or unknown) word found, allowing you to edit and replace it in a second line. Whenever an unknown word is found, the word is highlighted and the text scrolled so that it is visible. In the spell checker dialog, there is also a box showing suggestions for a correction, if any could be found. Clicking on one of the corrections will copy to the **Replace** field, double-click invokes directly the replacement. Unknown but correctly typed words can be added to the personal dictionary.

By default, the used dictionary file is determined by the document language that is set in the **Document**▷**Settings** dialog. If you do not have a dictionary for the document language, spell checking will bring an error message. In this case, you can specify another dictionary file in the dialog by specifying a different **Alternative language** in preferences dialog.

After a spell check you'll informed about the number of checked words.

Limitations

It is not possible to change the spelling of a particular word globally, rather than having to change the spelling separately for each occurrence of the word. But you can use the **Find & Replace** dialog for that.

LyX cannot correctly spell check documents containing multiple languages. This does work with `pspell`, assuming you have marked the different languages appropriately.

Further Settings

The **Spellchecker** section in the preferences dialog has some additional options:

Escape characters Allows you to add non-standard characters that the spell checker should consider, e.g. German umlauts although you spell check English document. This should not normally be needed.


Personal dictionary to use a different file than the spell checker’s default choice as your personal dictionary

Accept compound words Prevent the spell checker from complaining about compounded words like “passthrough”.

Use input encoding Uses the document encoding that is set in the Document>Settings dialog under Language also for the spellchecker.⁶ Only enable this if you use `ispell` and can’t spell check words with international letters in them. There have been reports that this does not work with all dictionaries, so this is disabled by default.

6.12 Thesaurus

Thesaurus currently only works when you use the document language English.

To start the thesaurus, highlight one word or set the cursor behind it, and use the menu Tools>Thesaurus or the toolbar button . A dialog pops up showing you probably related words that you can use as replacement.

The shown related words are in many cases not really related to the word you are currently checking, scrolling in the shown list might help in some cases to find related words.

The thesaurus only works for single words, and also only when it is in the singular form. For example starting the thesaurus with the word “reports” leads to no results, while results are shown for the word “report”. To avoid this, you can highlight only the part “report” of the word “reports” to get results.

6.13 Change Tracking

When you work on a document together with many people it is extremely useful to see changes others made highlighted in the document. You can then decide if you accept a change or not. This can be achieved by turning on change tracking in the menu Document>Change Tracking>Track Changes.

Changes made in the document will then be highlighted by colors: **Blue text** is an addition, **red canceled text** is a deletion. You can change the color in LyX’s preferences dialog under Look and feel, Colors.

When change tracking is activated, you will see the review toolbar in LyX:



The review toolbar as shown above contains from left to right the following buttons:

⁶The encodings are explained in section A.6.6.



Document▷Change Tracking▷Track Changes



Document▷Change Tracking▷Show Changes in Output



Jumps to the next change



Document▷Change Tracking▷Accept Change



Document▷Change Tracking▷Reject Change



Document▷Change Tracking▷Merge Changes



Document▷Change Tracking▷Accept All Changes



Document▷Change Tracking▷Reject All Changes



Insert▷Note▷LyX Note



Navigate▷Next Note

The review toolbar helps you to accept, reject, or merge changes – highlight the change and press one of the desired toolbar buttons. When you merge changes, a window pops up showing you informations about the next change behind the current cursor position. So you don't need to highlight a certain change. Within the merge window you can decide to accept or reject changes and step to the next change. This way you can jump through all changes of the document.

The toolbar has two buttons to handle notes because notes are often important to describe a change.

To show made changes in the output you need the L^AT_EX package **dvipost** installed. You find it in the T_EX Catalogue, [5] or in the package manager of your L^AT_EX-system.

6.14 International Support

This section describes how to use LyX with any language you want. For some non-western languages there are special Wiki-pages that explain how to set up LyX to use them: [14, 15, 16, 17]

Besides languages, LyX also supports phonetic symbols, see section A.4.2.

6.14.1 Language Options

The Document▷Settings dialog lets you set the language and character encoding for your language.

Choose your language in the Language section of this dialog. The default is English.

The Encoding box lets you choose the character encoding map you want to use for L^AT_EX export. The option use language's default encoding is the preferred choice and works well in most cases. For details about the different encoding options see section A.6.6.

6.14.2 Keyboard mapping configuration

If you have for example a U.S.-style keyboard and want to write in a different language than English, you can use an alternate keymap. For example, if you have a U.S.-style keyboard but want to write in Italian, you can configure L^AT_EX to use an Italian keymap. The preferences dialog allows you to choose up to two keyboard mappings, see section B.1.5. You can choose primary and secondary keyboard languages and then select which one you want to use.

Finally, you may just want to change a few key mappings or create an entirely different keymap (for Vulcan, for instance). You may, for example, normally write in Italian on a U.S. keyboard but want to include an occasional quotation in German. In such a case, you can write your own keyboard mapping or modify an existing one to support the characters you want. This and much more customizations are explained in the *Customization* manual.

6.14.3 Character Tables

Table 6.2 shows the Latin1 character set. You should be able to enter the characters in the first eight columns directly from the keyboard.

There are a few things you need to know about this table. Here are some of the details you'll need to bear in mind when using characters from the Latin1 character set:

- Even if you have selected latin1 in the Document▷Settings dialog, users who have only the T1-fonts for L^AT_EX [or who have the T1-fonts but aren't using them] will still miss a few characters: D0, F0, DE, FE, AB, and BB – the uppercase and lowercase eth and thorn, and the french quotes won't show up.

The following is a full list of all of the accented characters L^AT_EX can display directly. It includes not only the accented characters from the previous table, but also the characters from ISO8859--2 through 4.

- From ISO8859--1:

¨ Ä Ë Ì Ö Ü ä ë ï ö ü ÿ

diaeresis

1

1

circumflex

grave

acute

tilde

cedilla

macron

- circumflex

circumflex

acute

tilde

cedilla

macron

Hungarian umlaut

95

A The User Interface

This appendix lists all available menus and describes its functionality. It is designed as quick reference if you are searching for a special topic inside the user's guide.

A.1 The File Menu

Under the File menu are the basic operations in addition to some more advanced operations. At the end of the menu the four last opened documents are listed.

A.1.1 New

Creates a new document.

A.1.2 New from Template

This menu prompts you for a template to use. Selecting a template will automatically set certain layout features for the document, features you would otherwise need to change manually.

A.1.3 Open

Opens a document.

A.1.4 Open Recent

The submenu shows a list of the recently opened files. Click there on a file to open it.

A.1.5 Close

Closes the current document.

A.1.6 Save

Saves the actual document.

A.1.7 Save As

Saves the actual document under a new name to create a copy.

A.1.8 Revert to saved

Reloads the actual document from disk.

A.1.9 Version Control

This is used when more people are working on the same document. It is described in the section *Version Control in LyX* of the *Extended Features* manual.

A.1.10 Import

You can import there files from older LyX-versions, L^AT_EX-files and plain text files (ASCII-files). The files will be imported as new LyX-document.

When using the menu **Plain Text**, **Join Lines**, all lines will be imported consecutively to one big paragraph. A new paragraph is started when there is a blank line in the file. **,** the text is inserted as Paragraphs, where the line breaks of the text will start a new paragraph.

A.1.11 Export

You can export your document to various file formats. The resulting files are placed in the directory of your LyX-file. The menu entries are not the same on all installations. They depend on the programs found by LyX while its configuration.

Here is a list of all available entries; they are explained in detail in section 3.7.2:

CJK LyX format of the special LyX 1.4.x versions for Chinese, Japanese, and Korean (CJK); (Since LyX 1.5.0 CJK support is fully integrated to LyX.)

DVI DVI-format

HTML HTML-format (the HTML-converter is a third-party product and doesn't work in all cases)

HTML (MS Word) HTML-format specialized so that the result can be imported to MS Word, as consequence of this formulas will be embedded as bitmap fonts and not in the format MathML.

LaTeX (pdflatex) text file with the L^AT_EX source, additionally all images used in the document will be converted to a format that is readable for the **pdflatex** program (GIF, JPG, PDF, PNG)

LaTeX (plain) text file with the \LaTeX source code, additionally all images used in the document will be converted to the EPS-format, only this format is readable for the `latex` program

LyX 1.y.x LyX-document in a format readable for the LyX versions 1.y.x (“y” is replaced by the version number)

OpenDocument OpenDocument-formatted text file, to be opened with OpenOffice, KOffice, Abiword, etc. (the OpenDocument-converter is a third-party product and doesn’t work in all cases)

PDF PDF-format using the program `ps2pdf`

PDF (dvipdfm) PDF-format using the program `dvipdfm`

PDF (pdflatex) PDF-format using the program `pdflatex`

Plain text text format

Plain text (ps2ascii) text format, the document will first be converted to Postscript format and then exported as text using the program `ps2ascii`

Postscript PostScript format using the program `dvips`

Custom custom format

The program `dvipdfm` produces internally a dvi-file which is then converted to a pdf-file. It is a bit out of date and therefore the output could look different from what you want. `pdflatex` produces directly pdf-files and supports the latest pdf-file formats.

If one of the menu entries DVI, PDF (`pdflatex`) or Postscript is missing, you need to update your \LaTeX installation. After updating you have to reconfigure LyX, see section 1.4.

The menu **Custom** allows you to export your file by using special command line options for the export program.

A.1.12 Print

With this menu you can print your document to a file in PostScript format or send it to a printer. The printer will also use the document in PostScript format. The conversion to PostScript is done in the background by LyX using the program `dvips`. For more informations have a look at section 3.7.4.

A.1.13 New and Close Window

Opens a new instance of LyX with all currently opened documents. You can close it later with the corresponding menu.

A.2 The Edit Menu

A.2.1 Undo and Redo

Described in section 2.3.

A.2.2 Cut, Copy, Paste, Paste Recent, Paste Special

Described in section 2.2.

A.2.3 Select All

Selects the whole document.

A.2.4 Find & Replace

Described in section 2.2.

A.2.5 Move paragraph Up/Down

This shifts the paragraph where the cursor is currently in one paragraph up or down.

A.2.6 Text Style

Described in section 3.6.4.

A.2.7 Paragraph Settings

The settings in the paragraph dialog only affects the paragraph where the cursor is in. Here you can set here the paragraph alignment and line spacing.

You can also prevent that the first line of the paragraph is indented. This option works only when you have chosen to separate paragraphs with indents in the Document▷Settings dialog under Text Layout.

A.2.8 Tabular and Math

These two menus are only active when the cursor is inside a table or a formula. The properties of this table/formula can now be changed. The properties of tables are described in section 4.5, the properties of formulas in chapter 5.

A.2.9 Increase / Decrease List Depth

These menus are only active when the cursor is in an environment that can be nested. They in/decrease the environment nesting level as explained in section 3.4 and 3.3.4.3.

A.3 The View Menu

The **View** menu contains a list of available formats in which you can view the actual document with an external program. The menu entries for the viewing formats are not the same on all installations - it depends on the \LaTeX programs that are found while \LyX was configured. All possible formats are formats listed in section A.1.11. You should at least see the menu entries **DVI** and **PDF (pdf \LaTeX)**. If one of the two is missing, you need to update your \LaTeX installation. After updating you have to reconfigure \LyX , see section 1.4.

Invoking a menu will start a viewer program. The viewer can be set or changed in the preferences, see section B.7. The default viewers are set by \LyX while it is first configured.

At the bottom of the **View** menu the opened documents are listed.

A.3.1 View Source

Opens a window showing the source code of the actual document, as described in section 6.10.

A.3.2 Update

This menu allows you to update the view with your latest changes without opening a new view window.

A.3.3 Toolbars

In this menu you can set the appearance of the different toolbars. All toolbars and the **Command Buffer** can be turned on and off. The *on* state is denoted in the menu with a checkmark. The **Review**, **Table**, **Math Panels**, and **Math** toolbars can be additionally set to the state *automatic* that is denoted in the menu with the suffix **(auto)**.

In the *on* state the toolbar is permanently shown, in the *automatic* state the toolbar is only shown when the cursor is in a certain environment or when a certain feature is enabled. That means that the review toolbar will only be shown when change tracking is activated, the math and table toolbars are only shown when the cursor is inside a formula or table, respectively.

\LyX 's toolbars and its buttons are explained in section A.9.

A.4 The Insert Menu

A.4.1 Math

Inserts math constructs that are explained in chapter 5.

A.4.2 Special Character

Here you can insert the following characters:

Ellipsis Inserts an ellipsis: ...

End of Sentence Inserts an end of sentence dot as described in section 3.8.3.1.

Ordinary Quote Inserts this quote: ”, no matter what quote type you selected in the Document▷Settings dialog under Language.

Single Quote Inserts this quote: ‘

Menu Separator Inserts the menu separator sign: ▷

Phonetic Symbols Creates a formula with a so called tipa inset. Here you can insert commands to create IPA phonetic symbols. For this feature you must have the L^AT_EX-package **tipa** installed.

For more informations about this feature we refer to the documentation of **tipa**, [12] and this Wiki-page:

<http://wiki.lyx.org/LyX/LinguistLyX>.

A.4.3 Formatting

Here you can insert the following format constructs:

Superscript Inserts an superscript: test^{a,b}

Subscript Inserts an subscript: test_{3x}

Protected Space Inserts a protected space that is described in section 3.5.6.2.

Inter-word Space Inserts an inter-word space that is described in section 3.5.6.1.

Thin Space Inserts a thin space that is described in section 3.5.6.3.

Horizontal Fill Inserts an horizontal fill, see section 3.5.1 for a description.

Horizontal Line Inserts an horizontal line, see section 3.5.7 for a description.

Vertical Space Inserts vertical space, see section 3.5.2 for a description.

Hyphenation Point Inserts an hyphenation point, see section 3.8.2

Ligature Break Inserts a ligature break, see section 3.8.4

Line Break Inserts a forced linebreak, see section 3.5.5

Page Break Inserts a forced pagebreak, described in section 3.5.4

Clear Page Inserts a clear pagebreak, described in section 3.5.4.1

Clear Double Page Inserts a clear doublepage break, described in section 3.5.4.1

A.4.4 List / TOC

Various lists can be inserted with this menu. The table of contents, the algorithm, figures, and tables list are described in section 6.2. The index list is described in section 6.6, the nomenclature in section 6.7, and the BibT_EX bibliography in section 6.5.1.

A.4.5 Float

To insert floats, described in section 4.6.

A.4.6 Note

To insert notes, described in section 4.1.

A.4.7 Branch

Inserts branch insets as described in section 6.8.

A.4.8 File

Here you can insert files to include them or its content to your document. How this can be done is in detail explained in chapter *External Stuff* of the *Embedded Objects* manual.

A.4.9 Box

Inserts a minipage box that is described section 4.7. All box types supported by L_AT_EX are explained in detail in chapter *Boxes* of the *Embedded Objects* manual.

A.4.10 Citation

Inserts a citation as described in section 6.5.

A.4.11 Cross-Reference

Inserts a cross-reference as described in section 6.1.

A.4.12 Label

Inserts a label as described in section 6.1.

A.4.13 Caption

Inserts a caption to floats or longtables. Floats are described in section 4.6, cations in longtables are described in section *Longtable Captions* of the *Embedded Objects* manual.

A.4.14 Index Entry

Inserts an index entry as described in section 6.6.

A.4.15 Nomenclature Entry

Inserts a nomenclature entry as described in section 6.7.

A.4.16 Table

Inserts a table. Tables are described in section 4.5.

A.4.17 Graphics

Inserts a graphic. Graphics are described in section 4.4.

A.4.18 URL

Inserts an URL box as described in section 6.3.

A.4.19 Footnote

Inserts a footnote, see section 4.2.

A.4.20 Marginal Note

Inserts a marginal note, see section 4.3.

A.4.21 Short Title

Inserts a short title, see section 3.3.4.4.

A.4.22 T_EX Code

Inserts an ERT box, see section 6.9.1 for a description.

A.4.23 Program Listing

Inserts a program listings box. Program listings are explained in chapter *Program Code Listings* of the *Embedded Objects* manual.

A.4.24 Date

Inserts the actual date. The format depends on the date format of the language that is used for LyX's menus. LyX offers another ways to insert a date which is explained in section *External Material* of the *Embedded Objects* manual. There the different methods are also compared.

A.5 The Navigate Menu

This menu lists the existing, chapter, sections, figures, and tables of the current document. This allows you to navigate easily through you document.

The Navigate menu also offers to

A.5.1 Bookmarks

With this menu you are able to define your own bookmarks. This is useful when you are working on a large documents and often have to jump e.g. between section 2.5 and 6.3. To create bookmarks for this example, go to section 2.5 and use the menu **Save Bookmark 1**. Then go to section 6.3 and use **Save Bookmark 2**. Now you can easily jump between these sections by using the menu or by the key bindings C-1 and C-2.

You can also use bookmarks to jump between several opened documents. The saved bookmarks are valid till the document is closed.

A.5.2 Next Note, Change, Cross-reference

Jump to the next note, change, or cross-reference following the current cursor position.

A.5.3 Go to Label

Only active when the cursor is in front of a cross-reference. Sets the cursor before the referenced label, the same as if you right-click on a cross-reference box.

A.6 The Document Menu

A.6.1 Change Tracking

Change Tracking is described in section 6.13.

A.6.2 LaTeX Log

After running L^AT_EX by viewing or exporting a document, this menu will be enabled. It shows the logfile of the used L^AT_EX-program.

Here you can see how L^AT_EX works in the background. *Experts* will find in it reasons for L^AT_EX-errors.

A.6.3 Outline

Opens the TOC/Outline window as described in section 6.2.1.

A.6.4 Start Appendix Here

This menu will start the appendix of the document at the current cursor position as described in section 6.4.

A.6.5 Compressed

Un/compresses the actual document.

A.6.6 Settings

This menu dialog contains some submenus to set properties for the whole document. You can save your document settings as default with the **Save as Document Defaults** button in the dialog. This will create a template named `default.lyx` which is automatically loaded by L^AT_EX when you create a new document without using a template.

The different submenus of the dialog are explained in the following:

Document Class

Here you set the document class, class options, and a Postscript driver. Document classes are described in section 3.1.2. The Postscript driver is used for L^AT_EX's color and graphics packages. When using **Default**, the default driver for the L^AT_EX-packages are used. It is recommended to use the default unless you know what you are doing.

Fonts

The document font settings are described in section 3.6.

Text Layout

You can specify if paragraphs should be separated by indentations or vertical skips. The line spacing and the number of text columns can here also be specified.

Note that LyX won't show two columns or the set up line spacing on screen. That's impractical, often unreadable, and not part of the WYSIWYM concept. However, it will be as you specified it in the output.

The listings settings are explained in the corresponding section in the *Embedded Objects* manual.

Page Layout

A description of this menu is given in section 3.1.4 and 3.1.3.

Page Margins

Here you can adjust the paper margins, see section 3.1.5.

Language

The document language and quote styles are set here. The encoding specifies how the document content is exported to L^AT_EX (the LyX file is always encoded in utf8). All characters that cannot be encoded using the specified encoding will be exported as L^AT_EX-commands (this can fail if a L^AT_EX-command is not known for a particular character).¹

If you use the option *use language's default encoding*, LyX determines the encoding of a portion of text from the language of this text. If the document contains text in more than one language you may get more than one encoding in the L^AT_EX file. If you do not use this option then the complete document will always use exactly one encoding. Checking this option is the preferred setting unless you use XeT_EX² (see below).

LyX also supports Unicode output, which is particularly useful if you need lots of special symbols or non-alphabetic scripts, respectively. If you want to use this (and your L^AT_EX installation supports Unicode, for that matter), choose one of the four utf8 variants from the list below. Unfortunately the unicode support of standard L^AT_EX is quite incomplete, so it is not uncommon that a file with lots of unicode symbols works fine with *use language's default encoding* (when LyX uses it's list of known L^AT_EX-commands), but does not work with a fixed utf8 encoding (when the list of known L^AT_EX-commands is not used, because all unicode symbols can be encoded in utf8).

Here is a list with the important encodings:

L^AT_EX default Same as *use language's default encoding*, but the L^AT_EX-package **inputenc** is not used. You probably need to load some other packages manually in the preamble.

¹The known commands are defined in a text file. You can add commands for unknown symbols to that file yourself, see the *Customization* manual for details.

²XeT_EX is a T_EX typesetting engine, an alternative for L^AT_EX. It natively supports Unicode while its input file is assumed to be in UTF-8 encoding. More about using LyX with XeT_EX can be found in [13].

armSCII8 encoding for Armenian

ascii the ASCII encoding, covers only plain English, may result in a big file because lots of L^AT_EX-commands may be needed

cp1250 MS Windows code page for latin2

cp1251 MS Windows code page for Cyrillic

cp1252 MS Windows code page for latin1

cp1255 MS Windows code page for Hebrew, superset of the ISO-8859-8 encoding

cp1256 MS Windows code page for Arabic and Farsi

cp1257 MS Windows code page for Estonian, Latvian, and Lithuanian, the ISO-8859-13 encoding that is a superset of the ISO-8859-4 encoding

iso88595 the ISO-8859-5 encoding, covers Belorussian, Bulgarian, Macedonian, Serbian, and Ukrainian

iso-8859-7 the ISO-8859-7 encoding, covers Greek

8859-8 the ISO-8859-8 encoding, covers Hebrew

koi8-r standard Cyrillic especially for Russian

koi8-u Cyrillic for Ukrainian

latin1 the ISO-8859-1 encoding, covers the languages Albanian, Catalan, Danish, Dutch, English, Faroese, Finnish, French, Galician, German, Icelandic, Irish, Italian, Norwegian, Portuguese, Spanish, and Swedish; should be replaced by latin9

latin2 the ISO-8859-2 encoding, covers Albanian, Croatian, Czech, German, Hungarian, Polish, Romanian, Slovak, and Slovenian

latin3 the ISO-8859-3 encoding, covers Esperanto, Galician, Maltese, and Turkish

latin4 the ISO-8859-4 encoding, covers Estonian, Latvian, and Lithuanian

latin5 the ISO-8859-9 encoding, covers Turkish, like the ISO-8859-1 encoding where the Icelandic letters are replaced by Turkish ones

latin9 the ISO-8859-15 encoding, like the ISO-8859-1 encoding, but with the euro currency sign, the œ-ligature and some characters used for French and Finnish; latin9 should be the replacement for latin1

pt154 Cyrillic for Kazakh

utf8 Unicode utf8 with the L^AT_EX-package **inputenc** (first variant, for latin symbols and some others).

utf8x Unicode utf8 with the L^AT_EX-package **inputenc** (second variant, for greek and CJK symbols and some others).

UTF8 Unicode utf8 with the L^AT_EX-package **CJK** (for the languages Chinese, Japanese and Korean)

utf8-plain Unicode utf8 to be used with XeT_EX, which uses Unicode directly, without the help of the L^AT_EX-package **inputenc** ³

Numbering & TOC

You can adjust here the numbering depth of sections headings as described in section 3.3.4.3.

Bibliography

You can specify here a citation style using the L^AT_EX-packages **natbib** or **jurabib**. For a further description see section 6.5.

Math Options

These options will force L_YX to use the L^AT_EX-packages **amsmath** and **esint** or to use them automatically when they are needed.

amsmath is needed for many constructs, so when you get L^AT_EX-errors in formulas, assure that you have enabled AMS.

esint is used for special integral characters.

Float Placement

The float placement options are described in section 4.6.3.

Bullets

Here you can adjust the characters for the itemize levels. The itemize environment is described in section 3.3.6.2.

Branches

Branches are described in section 6.8.

³More about using L_YX with XeT_EX can be found in [13].

LaTeX Preamble

In this text field are entered commands to load special \LaTeX -packages or to define \LaTeX -commands. The preamble is a thing for \LaTeX -experts. You shouldn't enter commands here until you don't exactly know what you do.

An introduction in the \LaTeX -syntax is given in section 6.9.2.

A.7 The Tools Menu

A.7.1 Spellchecker

Spell checking is explained in section 6.11.

A.7.2 Thesaurus

The thesaurus is described in section 6.12.

A.7.3 Count Words

Counts the number of words in the actual document or the highlighted document part.

A.7.4 TeX Information

Shows you a list of the classes and styles installed in your \LaTeX -system.

A.7.5 Reconfigure

This menu reconfigures \LaTeX . That means \LaTeX looks for \LaTeX -packages and needed programs, see also section 1.4.

A.7.6 Preferences

The preferences dialog is described in detail in chapter B.

A.8 The Help Menu

This menu opens the documentation files of \LaTeX in the language of \LaTeX 's menus.

The menu \LaTeX Configuration shows a \LaTeX -document with informations about the \LaTeX -packages and classes found by \LaTeX (see also section 1.5).

A.9 Toolbars

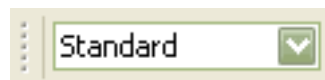
How to show or hide toolbars is explained in section A.3.3.

It is also possible to define custom toolbars. This is described in the *Extended Features* manual.

A.9.1 Standard Toolbar



The standard toolbar as shown above contains from left to right the following buttons:



pull-down menu for the paragraph environments



File > New



File > Open



File > Save



File > Print



Tools > Spellchecker



Edit > Undo



Edit > Redo



Edit > Cut



Edit > Copy



Edit > Paste



Edit > Find & Replace

Emphasize text, function of the Edit > Text Style dialog

Set text to noun style, function of the Edit > Text Style dialog

Formats text using the current settings in the Edit > Text Style dialog



Insert > Math > Inline Formula



Insert > Graphics



Insert▷ Table



Toggle outline window on/off, Document▷ Outline



Toggle math toolbar on/off



Toggle table toolbar on/off

A.9.2 Extra Toolbar



The extra toolbar as shown above contains from left to right the following buttons:

Default

Numbered list



Itemized list

List

Description list



Edit▷ Increase List Depth



Edit▷ Decrease List Depth



Insert▷ Float▷ Figure



Insert▷ Float▷ Table



Insert▷ Label




Insert▷ Cross-Reference



Insert▷ Citation




Insert▷ Index Entry

 Insert▷ Nomenclature Entry


 Insert▷ Footnote

 Insert▷ Marginal Note

 Insert▷ Note▷ LyX Note

 Insert▷ Box

 Insert▷ URL

 Insert▷ TeX

 Insert▷ File▷ Child Document

Edit▷ Text Style

Edit▷ Paragraph Settings

 Tools▷ Thesaurus

A.9.3 View / Update Toolbar



The view / update toolbar as shown above contains from left to right the following buttons:

View▷ DVI

 View▷ Update▷ DVI

 View▷ PDF

 View▷ Update▷ PDF⁴

View▷ Postscript

⁴This button is on some LyX for Windows installations not here because its functionality is merged with View▷ PDF.



A.9.4 Other Toolbars

The change tracking toolbar is explained in section 6.13, the table toolbar is explained in the *Embedded Objects* manual.

B The Preferences Dialog

The preferences dialog is called with the menu Tools▷Preferences. It consists of submenus explained in the following.

B.1 Look and Feel

B.1.1 User Interface

Note: You have to restart LyX before changes in ui- and bind-files take effect.

B.1.1.1 User Interface File

The appearance of the menus and toolbars can be changed by choosing an user interface (ui) file. An ui-file is a textfile where the toolbars and menus are listed. The toolbar buttons and menu entries are specified in the files *stdtoolbars.inc* and *stdmenus.inc*, respectively. To create your own menu and toolbar layout, start with a copy of these files and edit the entries.

The syntax of the .inc-files is straightforward: The Menubar, Menu and Toolbar entries must be ended with an explicit End. They may contain Submenus, Items, OptItems, Separators, Icons, and in the case of the “file” menus a Lastfiles entry. The syntax for the entries is:

Item “menu or button name” “LyX-function”

All LyX-functions are listed in [18].

An example: Assuming you use the menu Navigate▷Bookmarks quite often and therefore want six available bookmarks, you can add the line

Item "Save Bookmark 6" "bookmark-save 6"

to the navigate menu section in the .inc-file to have the sixth bookmark.

B.1.1.2 Bind-File

Bindings are used to bind a function to a key. Several binding files are available:

cua.bind typical set of PC keyboard shortcuts

(x)emacs.bind set of bindings like they are used in the editor programs Emacs (XEmacs)

mac.bind set of bindings for Mac OS systems.

There are also bind-files designed for special document classes, like *broadway.bind*, and bind files for special languages. The name of language bind-files begin with a language code, e.g. “pt” for Portuguese. If you use LyX in a certain language, LyX will try to use the appropriate bind-file.

Some bind-files, like *math.bind*, have only a small scope. When looking at the the end of the file *cua.bind*, you can see that they are included to keep the overview in the bind-file.

If you like to customize the keybindings to your own taste, modify the bind-files with a text editor. The syntax of the entries is:

```
\bind "key combination" "LyX-function"
```

All LyX-functions are listed in [18].

B.1.1.3 Session

When the option **Save / restore window size**, or **use fixed size** is not checked, you can specify the size of LyX’s main window when LyX is started.

With the option **Save / restore window position** LyX will be opened with its main window at the last used position.

The option **Restore cursor positions** sets the cursor to the position in the file where it has been the last time.

The option **Load opened files from last session** opens all files that were opened in the last LyX session.

B.1.1.4 Documents

When the option **Backup documents** is set, you can specify the time between backup saves.

Maximum last files is the number of last opened files that LyX should display in the menu **File**▷**Open Recent**.

B.1.1.5 Scrolling

The option **Cursor follows scrollbar** sets the cursor to the top of the currently displayed document part when scrolling.

B.1.1.6 Pixmap Cache

With the option **Enable Pixmap Cache** enabled, LyX needs to redraw the screen less often. This results in better performance, especially on slow systems. On the other hand, the characters might look more fuzzy on screen. So whether you enable this or not depends on whether you prefer speed over aesthetics. Note that the Pixmap Cache is only available and useful under Mac OS and Windows.

B.1.2 Screen Fonts

These fonts are used to display your documents on the screen.

Note: This section only deals with the fonts *inside* the LyX window. The fonts that appear on the output are independent from these fonts, and set in the menu [Layout▷Document](#).

By default, LyX uses Times as roman (serif) font, Arial or Helvetica (depends on the system) as sans serif font, and Courier as typewriter font.

You can change the font size with the Zoom setting.

Screen DPI is the screen resolution in dpi (dots per inch). The Font Sizes are calculated as letter height in units of points. 72points have the size of 1inch, see Appendix C.

The default Font Sizes are the same as if a document font size of 10 pt would be used. The sizes are explained in detail in section 3.6.2.

B.1.3 Colors

You can here change all colors used by LyX. Choose an item in the list and use the Alter button.

B.1.4 Graphics

Here you can specify how graphics inside LyX are displayed.

Instant Preview enables previewing snippets of your document. This feature is described in section 6.10.

B.1.5 Keyboard Map

Normally keyboard settings have to be done in a menu of your operating system. For the case that this is not possible, LyX provides keyboard maps. If you have e.g. a Czech keyboard but want to write with it like with a Romanian one, you can use the keyboard map file named *romanian.kmap*.

Note: Keyboard maps are only provided as makeshift and don't work on all systems.

B.2 Paths

Working directory This is LyX's working directory. It is the default when you Open, Save or Save as files.

Document templates This directory will be opened when you use the menu [File▷New from Template](#).

Backup directory Backup copies will be saved to this directory. When no directory is given but backups are enabled as described in section B.1.1.4, the **Working directory** will be used to save the backups.

The backup files have the ending “.lyx~”.

LyXServer-Pipe Here you can enter the name of a Unix-pipe. This pipe is used to send data from external programs to LyX.

Note: This feature doesn't work on Windows systems.

Temporary directory Temporary files will be saved in this directory.

PATH prefix This field contains a list of paths to external programs. When LyX needs to use an external program, it looks in this list where to find it on the system. The path list is automatically set up on Windows and Mac systems while LyX is configured, so that you normally don't have to modify it. On Unix / Linux systems, the path list will need to be set only if there are external programs you wish to use that are not in your normal system path (\$PATH).

B.3 Identity

Here you can insert your name and email address. The identity will be used when you have enabled change tracking as described in section 6.13, to mark changes you make as yours.

B.4 Language Settings

B.4.1 Language

Default language is the language used in new documents

Language package is a L^AT_EX-command to load a L^AT_EX-package that handles language issues. The default is the L^AT_EX-command `\usepackage{babel}` that loads the package **babel**.¹

The **babel** translates in the background automatically text labels of documents to the document language. A text label is for instance the word “Table” at the beginning of every table-caption.

Command start When a special L^AT_EX-package is needed to write in a certain document language, you can here specify the command to start the package. An example is the start command `\begin{arabtext}` that is needed to write Arabic using the package **ArabT_EX**, see [14]. The default is the **babel** command `\selectlanguage{ $\$$ lang}`.

¹For an introduction to the L^AT_EX-Syntax, have a look at section 6.9.

Command end Counterpart to **Command start**. Some packages, like the default, don't have an end command since the start command toggles the package on and off.

Use babel Whether **babel** is used or not.

Global When this option is set, the languages used in the document will be added as options to the document class options, so that they can be used by all L^AT_EX-packages. Otherwise they will only be used as options for the **babel** package.

Auto begin When this option is set, the documents starts with the chosen document language. When this option is not set, the **Command start** is explicitly set to the beginning of the document in the L^AT_EX-output. This assures that the correct language is used when you use another **Command start** than the default.

Auto end Counterpart to **Auto begin**. When it is not set, the **Command end** is set to the end of the document.

Mark foreign languages Text marked formatted in a language different from the document language will be underlined blue.

Right to left language support Enables the use of languages, written from right to left, like Arabic, Hebrew, Farsi.

B.4.2 Spellchecker

The spellchecker settings are explained in section 6.11

B.5 Outputs

B.5.1 Printer

Default printer Here you can specify the name of your default printer. The name will be used when the **Printer command** is executed.

Note: You can leave this field empty on Windows systems because it has there no effect.

Adapt output to printer This option works only for the **Printer command** “dvips”. It activates a configuration file for dvips. This is an option only for dvips experts.

Printer command is the command L^AT_EX / L^AT_EX uses for printing. The default is on most systems dvips.

Printer Command Options Here you can specify printer options. A list of printer options with explanations can be found in the documentation of the program that provides the **Printer command** you are using.

B.5.2 Date Format

The date format can be one or a mixture of the formats listed here:

`http://unixhelp.ed.ac.uk/CGI/man-cgi?date`

For example the format

`%d/%m/%y`

prints the date as day/month/year.

B.5.3 Plain Text

Output line length sets the maximum number of characters printed in one line when using the menu `File▷Export▷Plain text`. Setting the line length to 0 means all text is printed in one endless line.

roff command defines an additional command used to produce better ASCII tables with the `groff/troff/nroff` UNIX-commands (refer to their manuals for more information about them). Setting this as empty tells LyX to use the internal formatter.

B.5.4 LaTeX

TeX encoding This is the default encoding of the document font. T1 is the default and covers western languages and symbols. T2A, T2B, T2C, LCY, and X2 are for Cyrillic. Combinations of the encodings are possible, like "T1, T2B". The font encoding is normally automatically loaded by the language packages LyX sets up in the background. So there is no need to change the default encoding.

Default paper size This is the paper size that is used for new documents. The Default value depends on your L^AT_EX-system setup.

Reset class options when document classes changes Removes all manually set document class options in the `Document▷Settings` dialog when changing the document class.

In the `External Applications` field you can specify commands with parameters for the listed applications. Before you change something here, it is strongly recommended to read the manuals of the applications. Currently the following commands can be set:

CheckTeX command Command for the program CheckT_EX that is described in section *Checking T_EX* of the *Extended Features* manual.

BibTeX command Command for the program BibT_EX that generates the bibliography, see section 6.5.1.

Index command Command for the program that generates the index, see section 6.6.6.

DVI viewer paper size options They only have an effect when the program `xdvi` is used as DVI-viewer.

B.5.5 Paths

The submenu **Paths** is only available in the Windows version of LyX. The option **Use Windows-style paths** in \LaTeX files uses the Windows path style:

C:\test\hello

instead of the Unix path style:

C:/test/hello

B.6 Converters

Here you find the list of defined converter commands to convert material from one format to another. You can modify them or create new ones. To modify a converter, select it, change the entry of the field **Converter** and/or **Extra flag**, and press the **Modify** button. To create a new converter, select an existing one, select a different format in the **From format** drop-down list, modify the **Converter** field, and press the **Add** button.

When the **Converter File Cache** is enabled, conversions will be cached as long as specified in the field **Maximum Age (in days)**. This means that images don't need to be converted again when you reopen a document; the converted images from the cache will be used instead.

More about converters, like the variables and flags that can be used in the converter definition, is described in section *Converters* of the *Customization* manual.

B.7 File Formats

Here you find the list of defined file formats that LyX can handle. You can modify the viewer and editor program that should be used for certain formats. To create a new format, select an existing one, change the entry of the fields **Format** and **GUI name**, and press the **Add** button.

More about formats, like the options that can be used in the format definition, is described in section *Formats* of the *Customization* manual.

B.8 Copiers

Here you find the list of defined copiers. Since all conversions from one format to another take place in LyX's temporary directory, it is sometimes necessary to modify a file before copying it to the temporary directory in order that the conversion may be performed. This is done by a Copier.

More about converters is described in section *Copiers* of the *Customization* manual.

C Units available in \LaTeX

To understand the units described in this documentation, C.1 explains all units available in \LaTeX .

Table C.1: Units

unit	name/description
mm	millimeter
cm	centimeter
in	inch
pt	point (72.27 pt = 1 in)
pc	pica (1 pc = 12 pt)
sp	scaled point (65536 sp = 1 pt)
bp	big point (72 bp = 1 in)
dd	didot (72 dd \approx 37.6 mm)
cc	cicero (1 cc = 12 dd)
Scale%	% of original image width
text%	% of text width
col%	% of column width
page%	% of paper width
line%	% of line width
theight%	% of text height
pheight%	% of paper height
ex	height of letter x in current font
em	width of letter M in current font
mu	math unit (1 mu = 1/18 em)

D Credits

The documentation is a collaborative effort between many different people (and we would encourage people to contribute!).

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- ROBIN SOCHA
- UWE STÖHR
- The L^AT_EX Team: [Credits]

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Nomenclature

a dummy entry for the character a, page 86

C Control key, page 6

Esc Escape key, page 6

M Meta or Alt key, page 6

S Shift key, page 6

Tab Tabulator key, page 6

σ dummy entry for the character sigma, page 86

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