

Introduction to Programming and Computing for Scientists

Oxana Smirnova

Lund University

Tutorial 2a: writing a document using LaTeX

You need a text editor and a LaTeX distribution

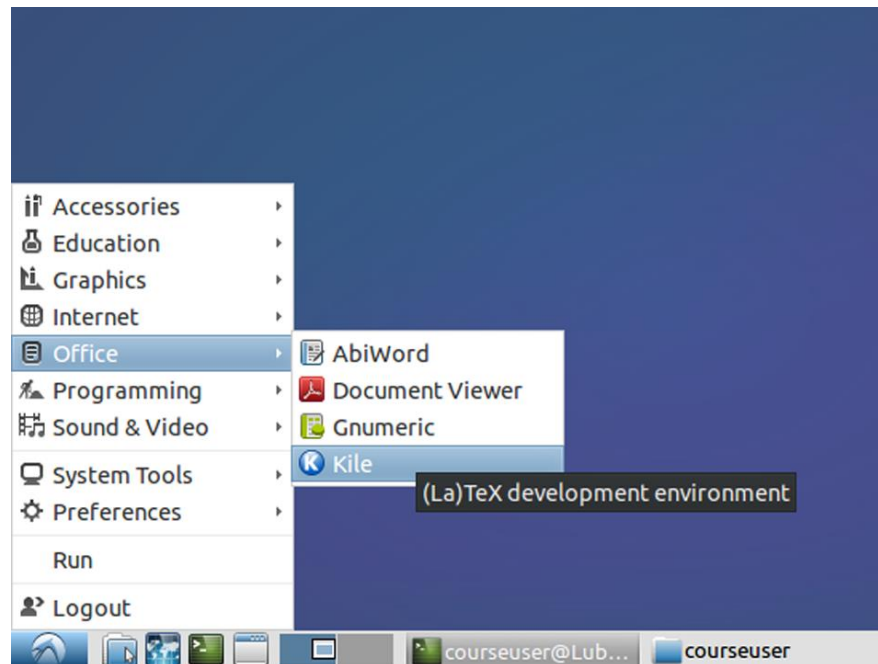
- LaTeX files are simple ASCII files, like any program code
- They can be edited on any platform (Linux, Windows, anything) using any text editor
- These days everybody prefers to have the result in PDF
 - This was not the case 20 years ago, so by default LaTeX produces DVI files
 - All modern LaTeX systems can build PDF as well (**pdf~~l~~atex** command in Linux)
- There are different LaTeX distributions, all based on the same LaTeX2e version

Platform	LaTeX distribution
Ubuntu, Debian	texlive , texlive-base , texlive-full
RedHat, CentOS, Fedora, SuSE	texlive , texlive-base , texlive-latex
Linux	tetex – <i>not supported since 2006</i>
Windows	MiKTeX
Mac OS	MacTeX

- There are many packages not included in the typical distributions, but they always can be added later

Highly recommended way: use a LaTeX IDE

- LaTeX IDEs can:
 - Edit the text, highlighting elements and environments
 - Assist in typing the environments and tags
 - Offer menus for most common environments, tags, symbols etc
 - Offer single-click interface to build and view LaTeX files
- Many such IDEs exist, today we will use **Kile**
 - Find it in the menu, or type **kile** in “Run”

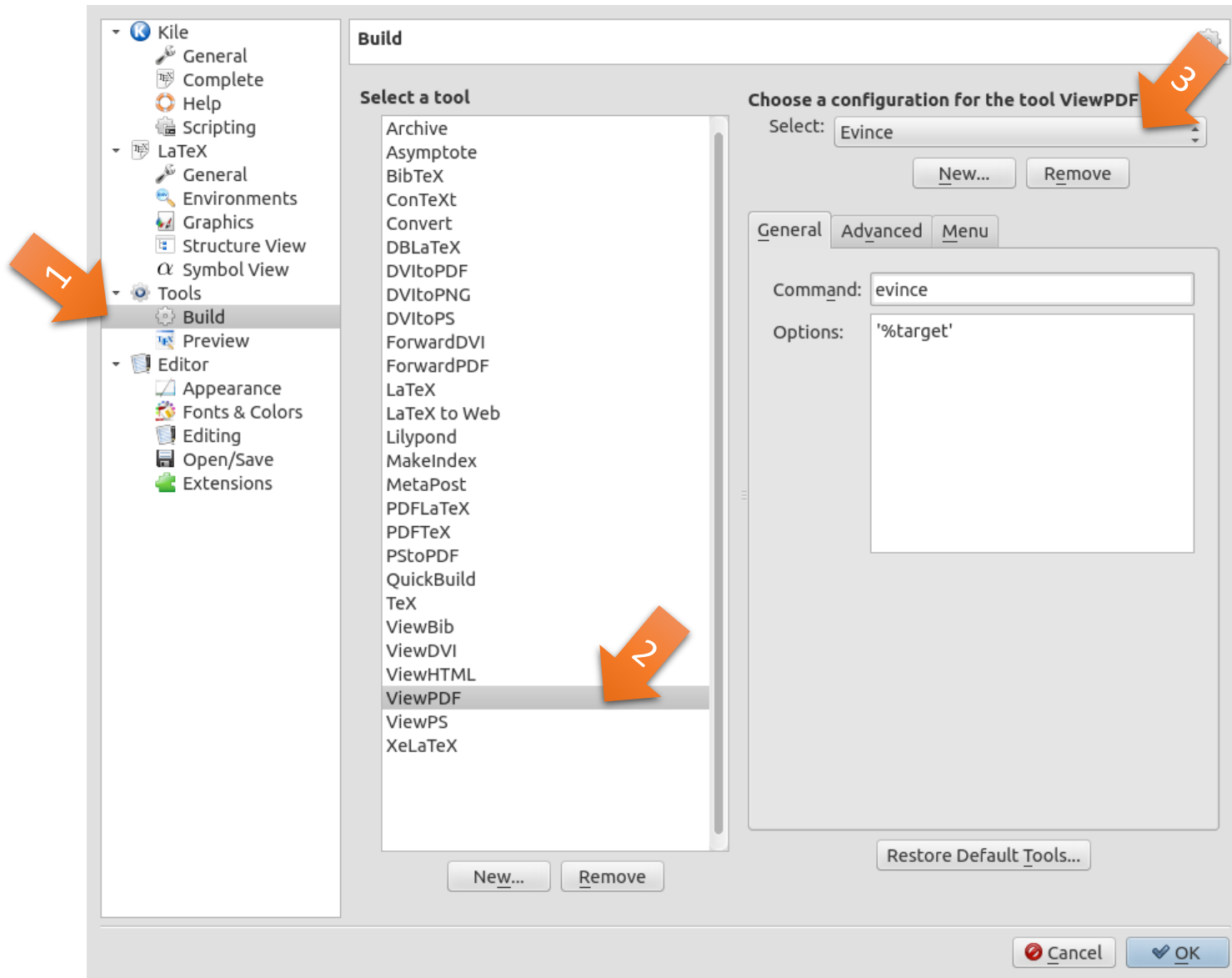


Configure your Kile

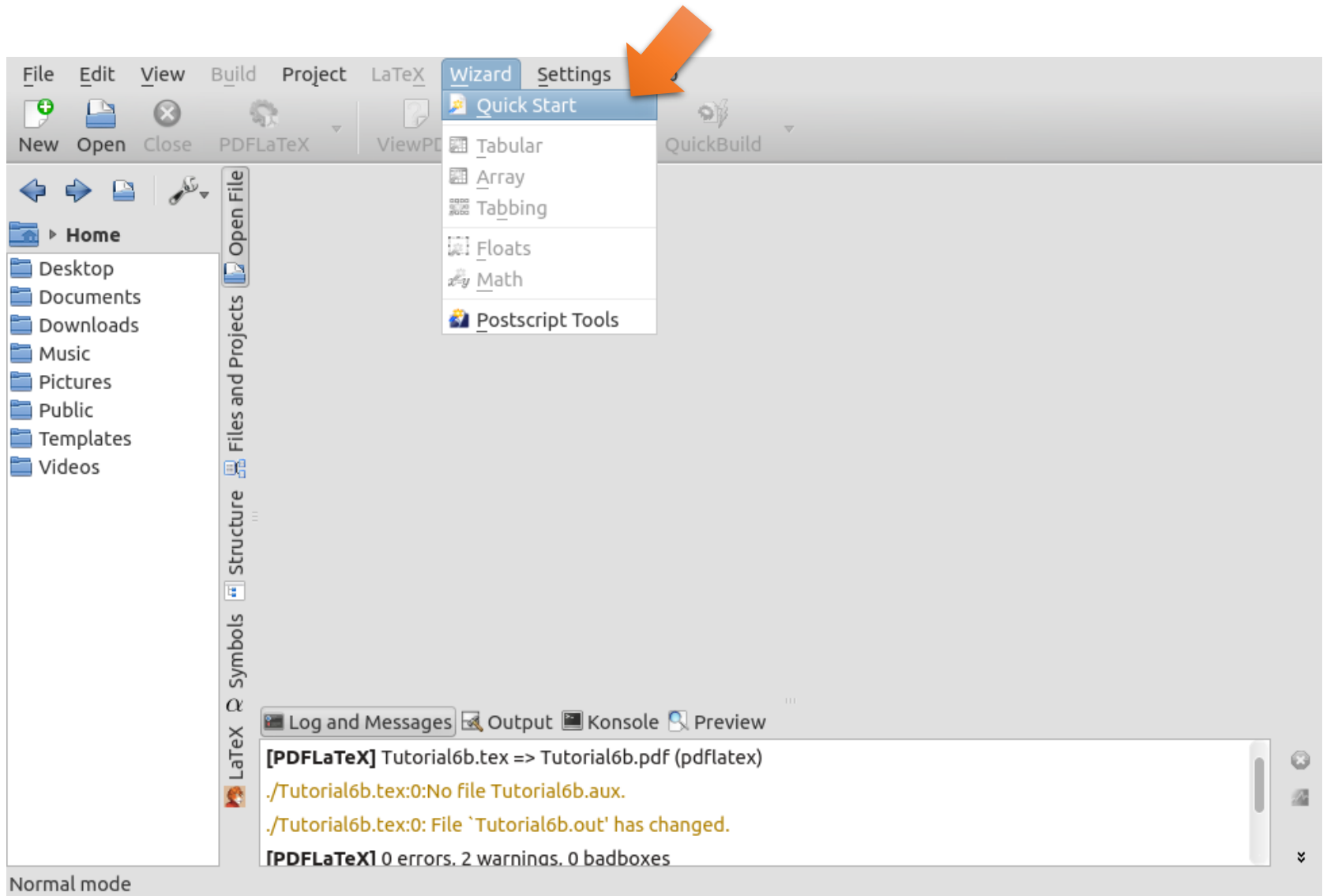


The screenshot shows the Kile application interface. The menu bar includes File, Edit, View, Build, Project, LaTeX, Wizard, Settings, and Help. The Settings menu is open, showing options such as 'Define Current Document as 'Master Document'', 'System Check...', 'Toolbars Shown', 'Show Statusbar', 'Show Side Bar', 'Show Messages Bar', 'Full Screen Mode' (with keyboard shortcut Ctrl+Shift+F), 'Configure Shortcuts...', 'Configure Toolbars...', and 'Configure Kile...'. The 'Configure Kile...' option is highlighted. The left sidebar shows a file explorer with 'Home' and various folders like Desktop, Documents, Downloads, Music, Pictures, Public, Templates, and Videos. The bottom status bar indicates 'Normal mode'. The bottom panel shows the LaTeX log output: [PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf (pdflatex), ./Tutorial6b.tex:0:No file Tutorial6b.aux., ./Tutorial6b.tex:0: File `Tutorial6b.out' has changed., [PDFLaTeX] 0 errors. 2 warnings. 0 badboxes.

Configure your Kile: select Evince as PDF viewer

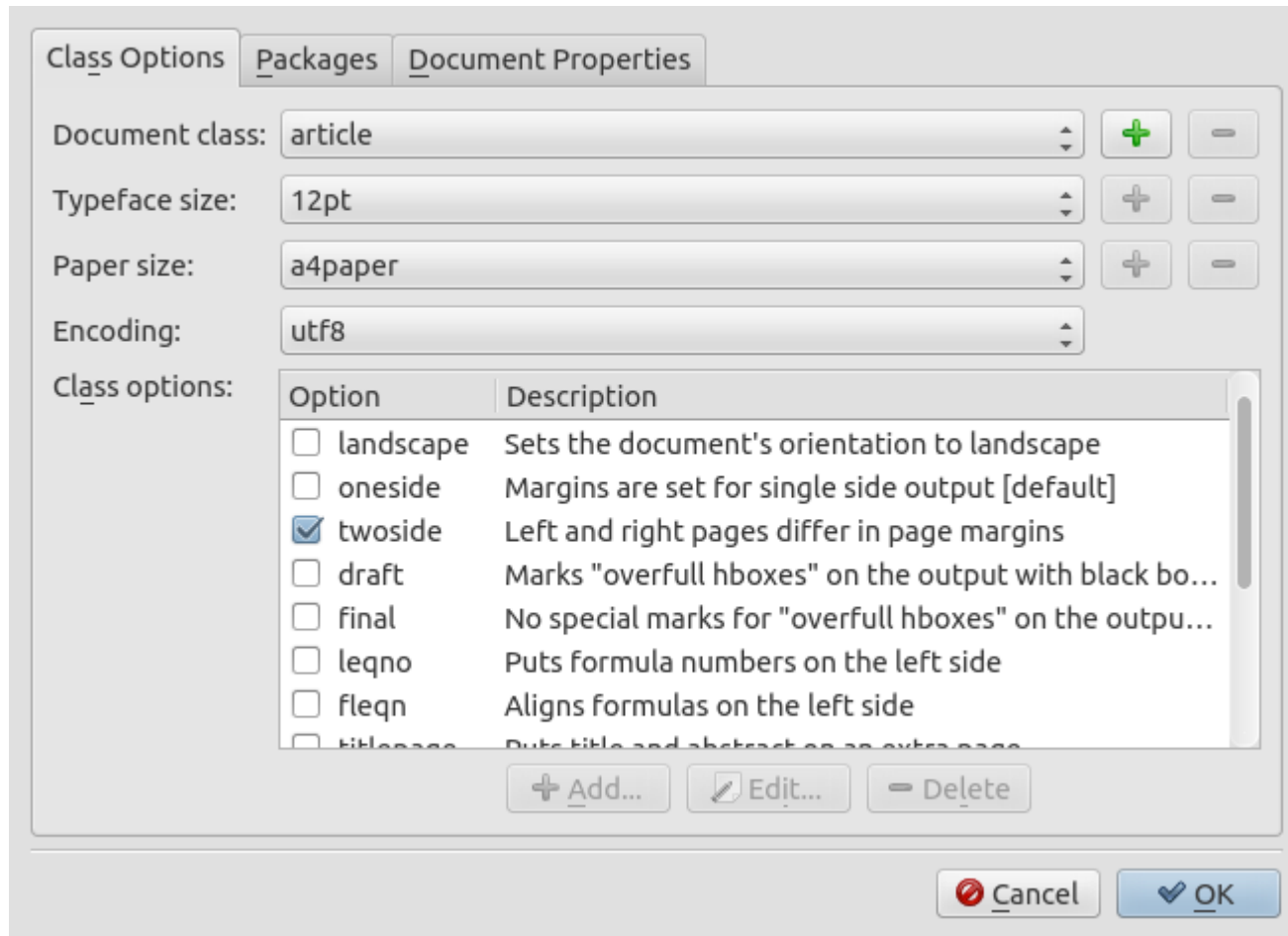


Quick-start the new document using Kile Wizard



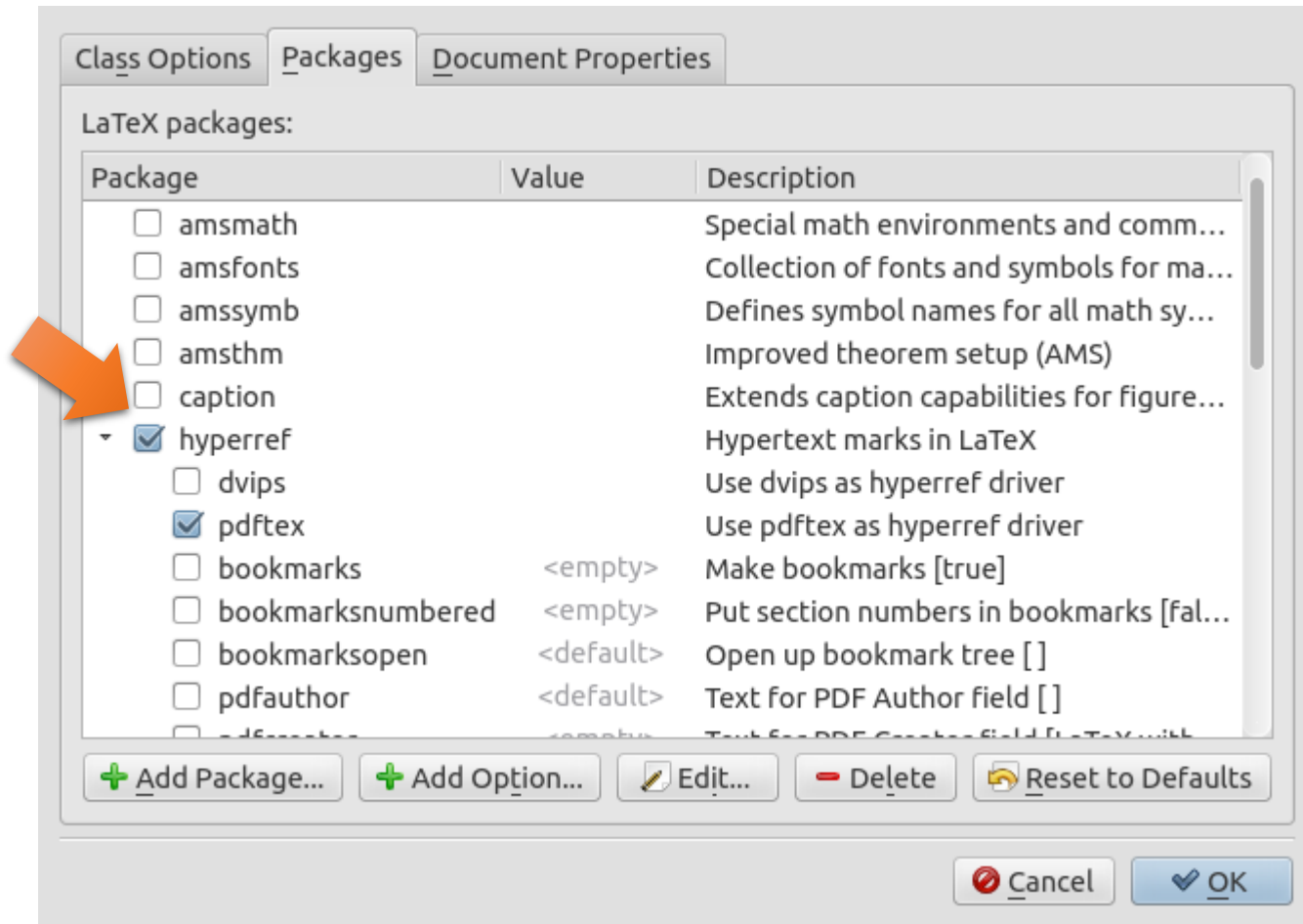
We will make an article for a two-sided A4 printing

Don't click OK yet, let's go to the Packages tab



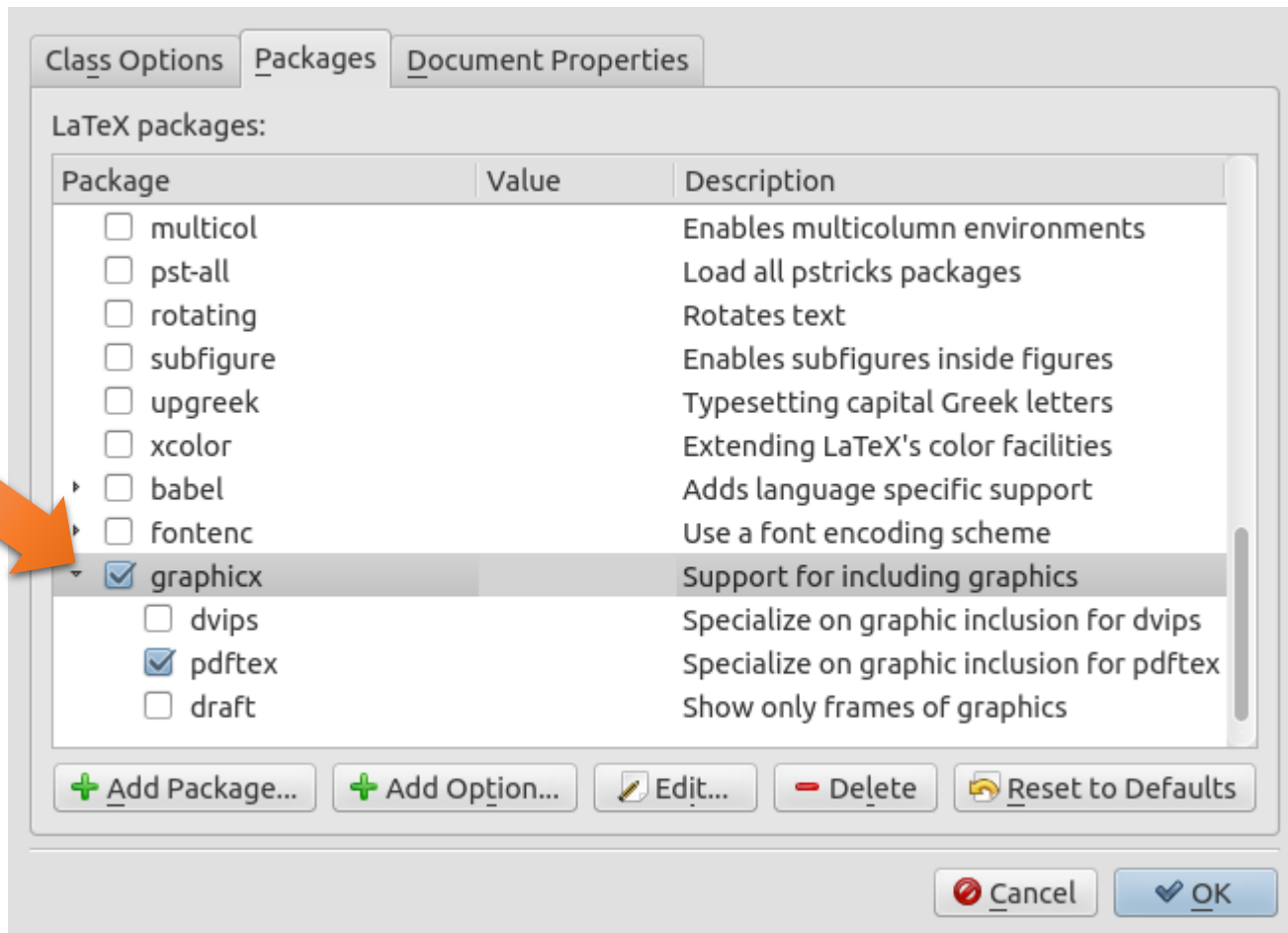
Let's pick some useful LaTeX packages

hyperref with **pdftex** will make PDF files with clickable cross-references

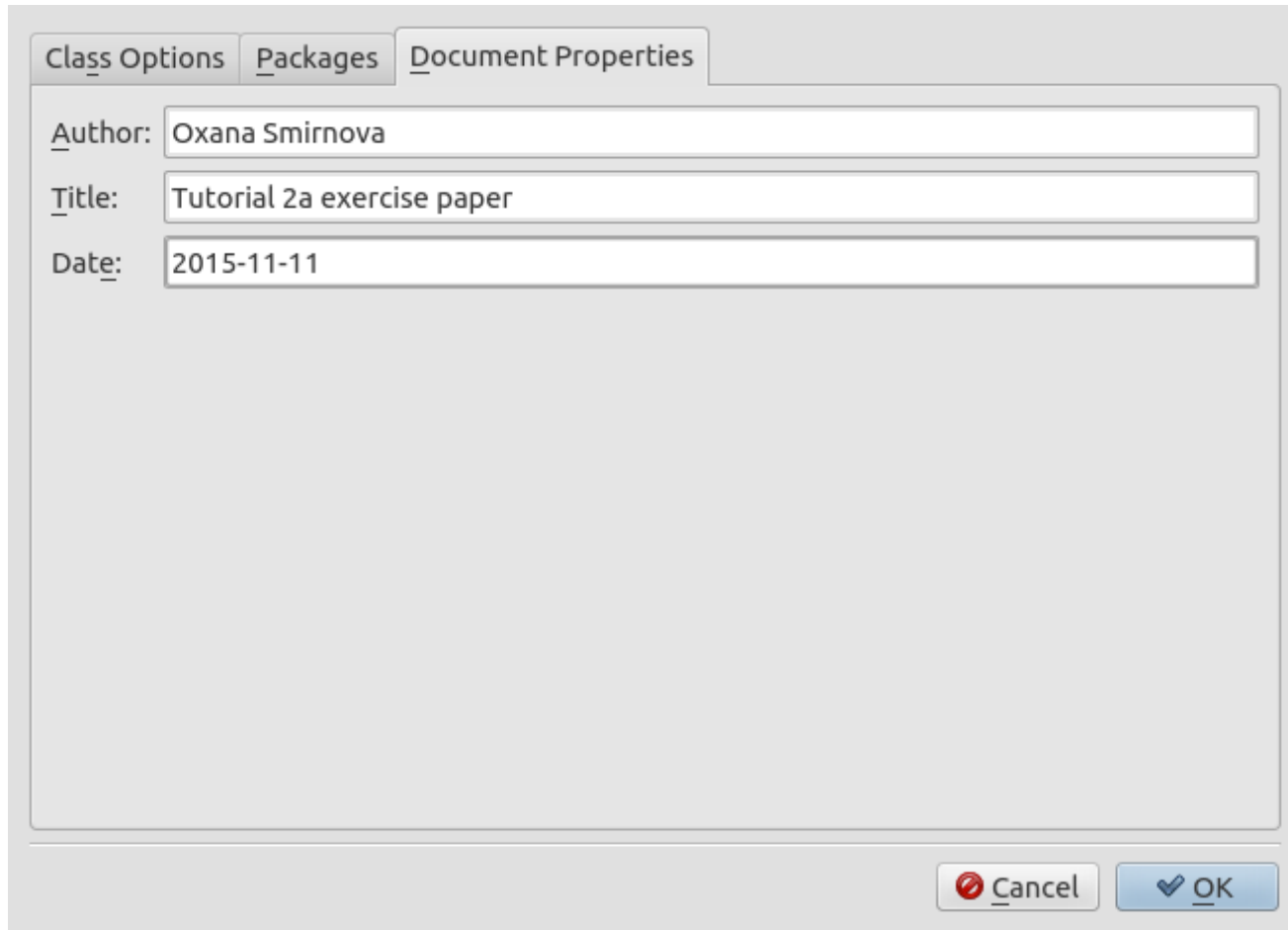


More useful packages

graphicx with **pdftex** will allow to insert raster graphics (JPG, PNG etc)



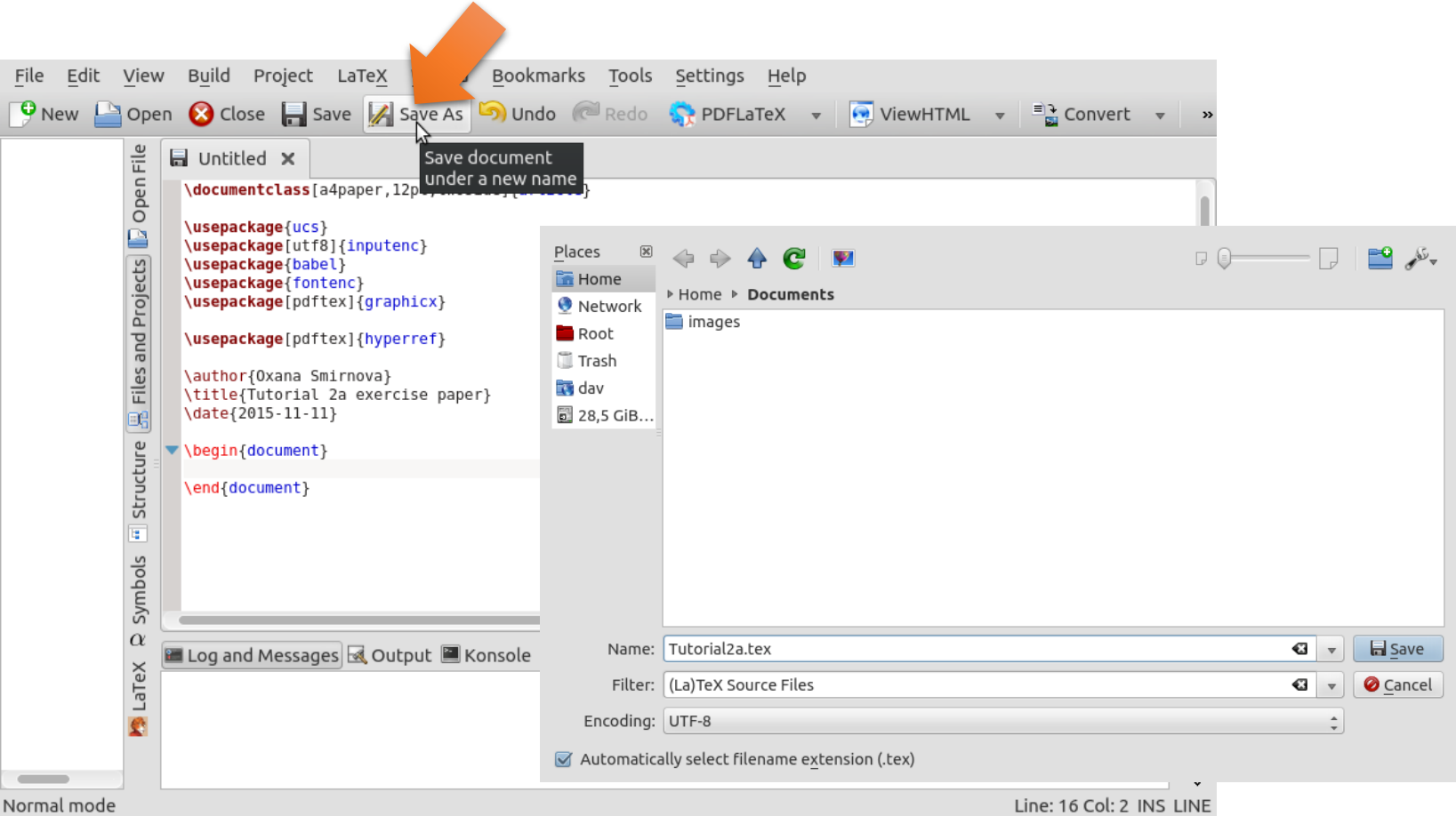
And now some metadata



The image shows a dialog box titled 'Document Properties' with three tabs: 'Class Options', 'Packages', and 'Document Properties'. The 'Document Properties' tab is active. It contains three text input fields: 'Author:' with the value 'Oxana Smirnova', 'Title:' with the value 'Tutorial 2a exercise paper', and 'Date:' with the value '2015-11-11'. At the bottom right, there are two buttons: 'Cancel' (with a red circle and slash icon) and 'OK' (with a blue checkmark icon).

Now it is OK to click OK

Time to save the file



And now let's build it

The screenshot shows a LaTeX editor window with the following content:

```
\documentclass[a4paper,12pt,twoside]{article}

\usepackage{ucs}
\usepackage[utf8]{inputenc}
\usepackage{babel}
\usepackage{fontenc}
\usepackage[pdftex]{graphicx}

\usepackage[pdftex]{hyperref}

\author{Oxana Smirnova}
\title{Tutorial 2a exercise paper}
\date{2015-11-11}

\begin{document}
|
\end{document}
```

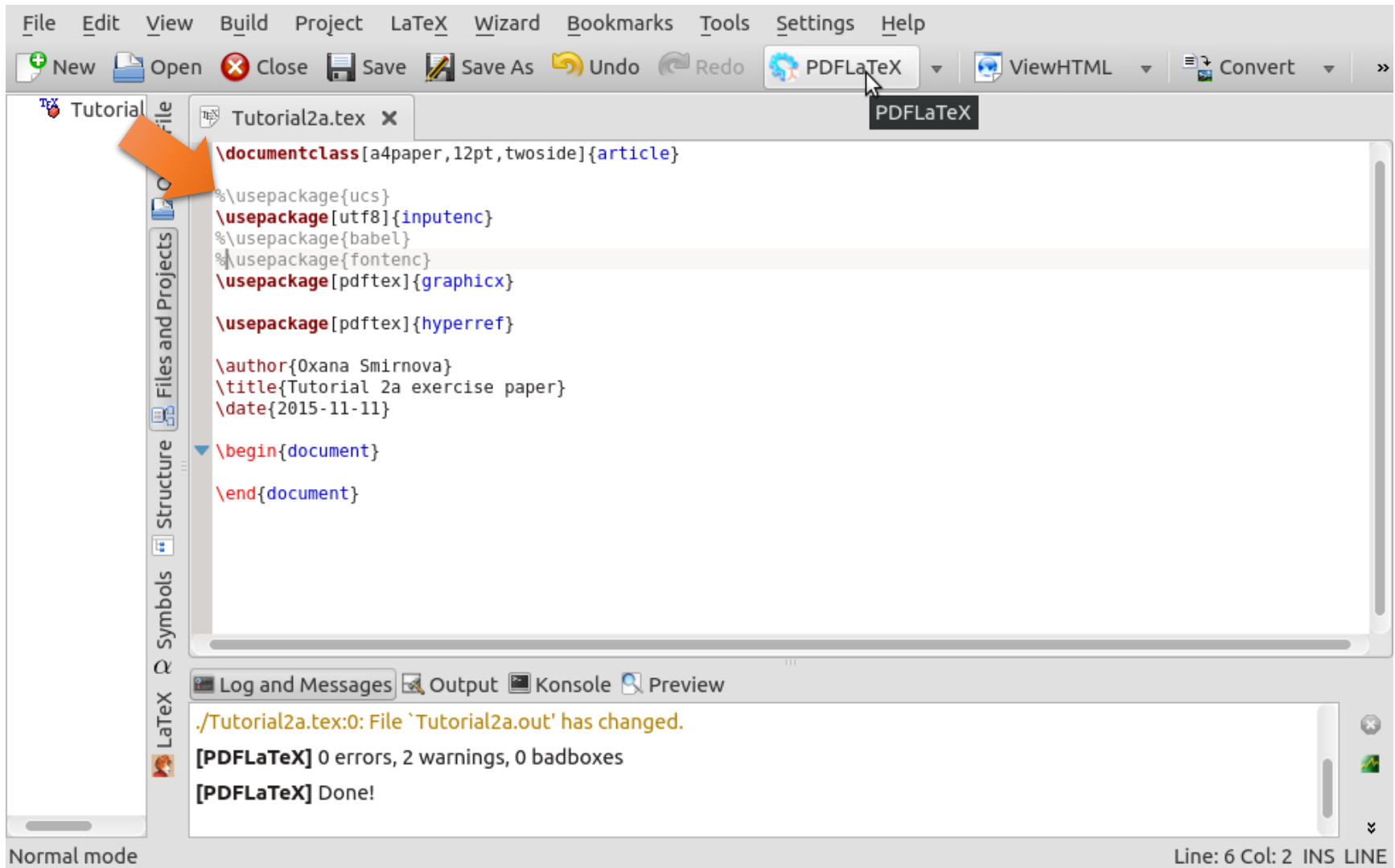
The error log at the bottom of the window displays:

```
[PDFLaTeX] finished with exit code 1
./Tutorial2a.tex:4:File `ucs.sty' not found. \usepackage
[PDFLaTeX] 1 error, 0 warnings, 0 badboxes
```

The status bar at the bottom right indicates "Line: 16 Col: 2 INS LINE".

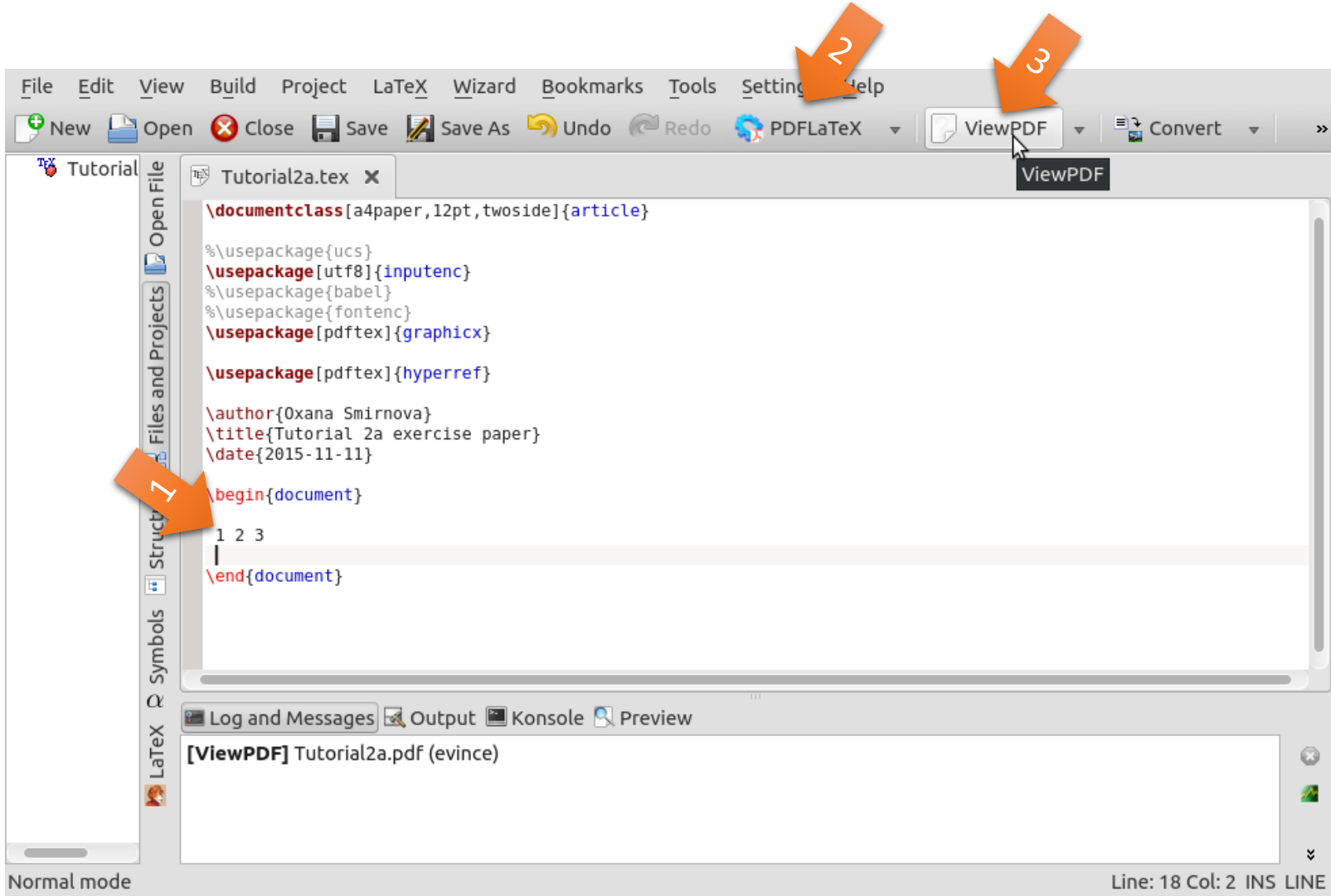
Whatever, we don't need this package, *comment* it out

Use `%` to *comment* (inactivate) any line in LaTeX; you can turn off many packages

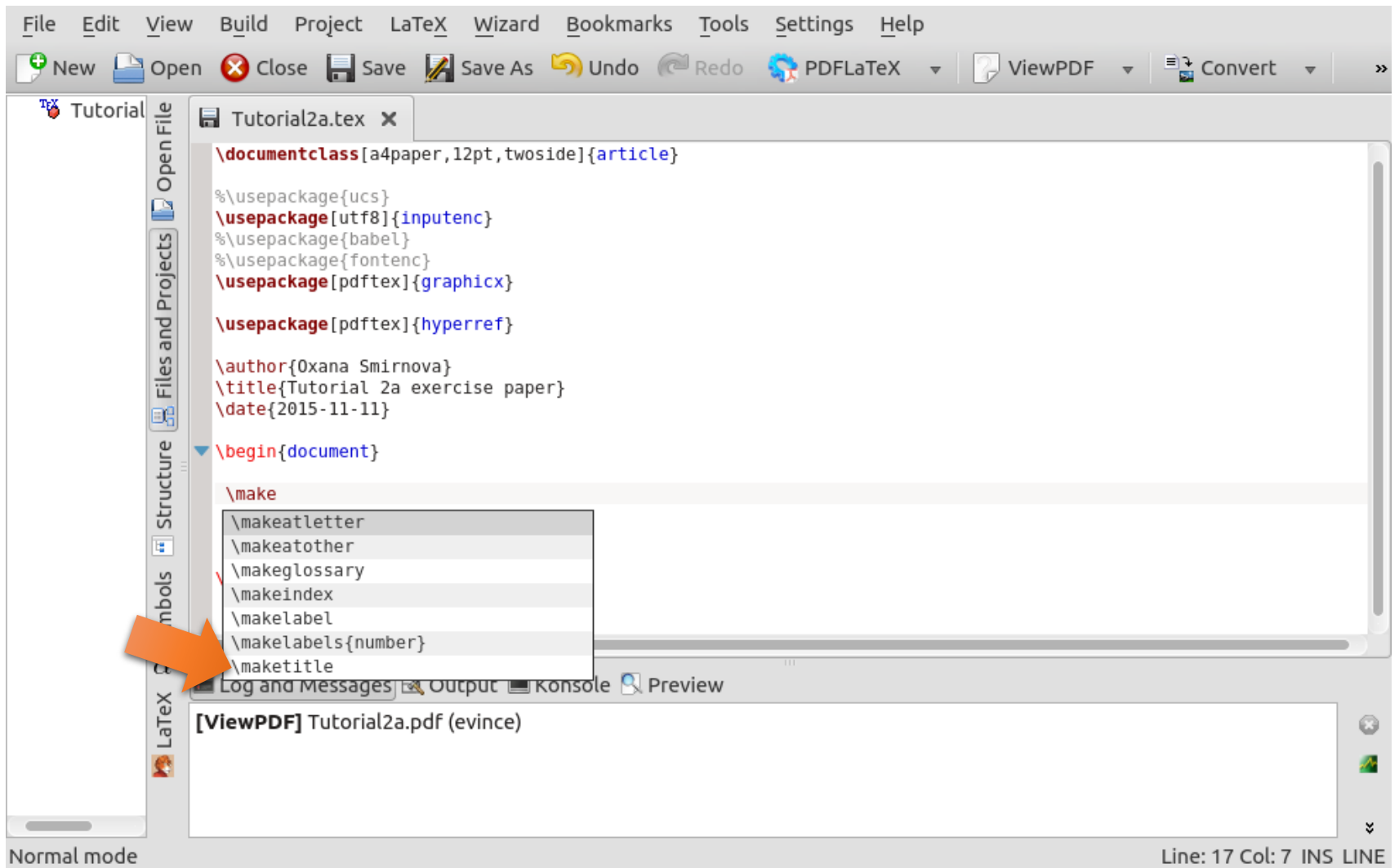


```
File Edit View Build Project LaTeX Wizard Bookmarks Tools Settings Help
New Open Close Save Save As Undo Redo PDFLaTeX ViewHTML Convert >>
Tutorial2a.tex x
\documentclass[a4paper,12pt,twoside]{article}
%\usepackage{ucs}
\usepackage[utf8]{inputenc}
%\usepackage{babel}
%\usepackage{fontenc}
\usepackage[pdftex]{graphicx}
\usepackage[pdftex]{hyperref}
\author{Oxana Smirnova}
\title{Tutorial 2a exercise paper}
\date{2015-11-11}
\begin{document}
\end{document}
Log and Messages Output Konsole Preview
./Tutorial2a.tex:0: File `Tutorial2a.out' has changed.
[PDFLaTeX] 0 errors, 2 warnings, 0 badboxes
[PDFLaTeX] Done!
Normal mode Line: 6 Col: 2 INS LINE
```

Add some text, build and view the result



Where's the title? Let's make it: `\maketitle`



The screenshot shows a LaTeX editor window with the following content:

```
\documentclass[a4paper,12pt,twoside]{article}

%\usepackage{ucs}
\usepackage[utf8]{inputenc}
%\usepackage{babel}
%\usepackage{fontenc}
\usepackage[pdftex]{graphicx}

\usepackage[pdftex]{hyperref}

\author{Oxana Smirnova}
\title{Tutorial 2a exercise paper}
\date{2015-11-11}

\begin{document}

\make
  \makeatletter
  \makeatother
  \makeglossary
  \makeindex
  \makelabel
  \makeLabels{number}
  \maketitle
```

The dropdown menu for `\make` is open, showing the following options:

- `\makeatletter`
- `\makeatother`
- `\makeglossary`
- `\makeindex`
- `\makelabel`
- `\makeLabels{number}`
- `\maketitle`

The status bar at the bottom right indicates "Line: 17 Col: 7 INS LINE".

Would be nice to add e-mail, centered

The screenshot shows a LaTeX editor window with the following code in the main editor:

```
\documentclass[a4paper,12pt,twoside]{article}

%\usepackage{ucs}
\usepackage[utf8]{inputenc}
%\usepackage{babel}
%\usepackage{fontenc}
\usepackage[pdftex]{graphicx}

\usepackage[pdftex]{hyperref}

\author{Oxana Smirnova}
\title{Tutorial 2a exercise paper}
\date{2015-11-11}

\begin{document}

\maketitle

\begin{center}
\texttt{oxana.smirnova@hep.lu.se}
\end{center}

1 2 3
```

The callout box contains the following text:

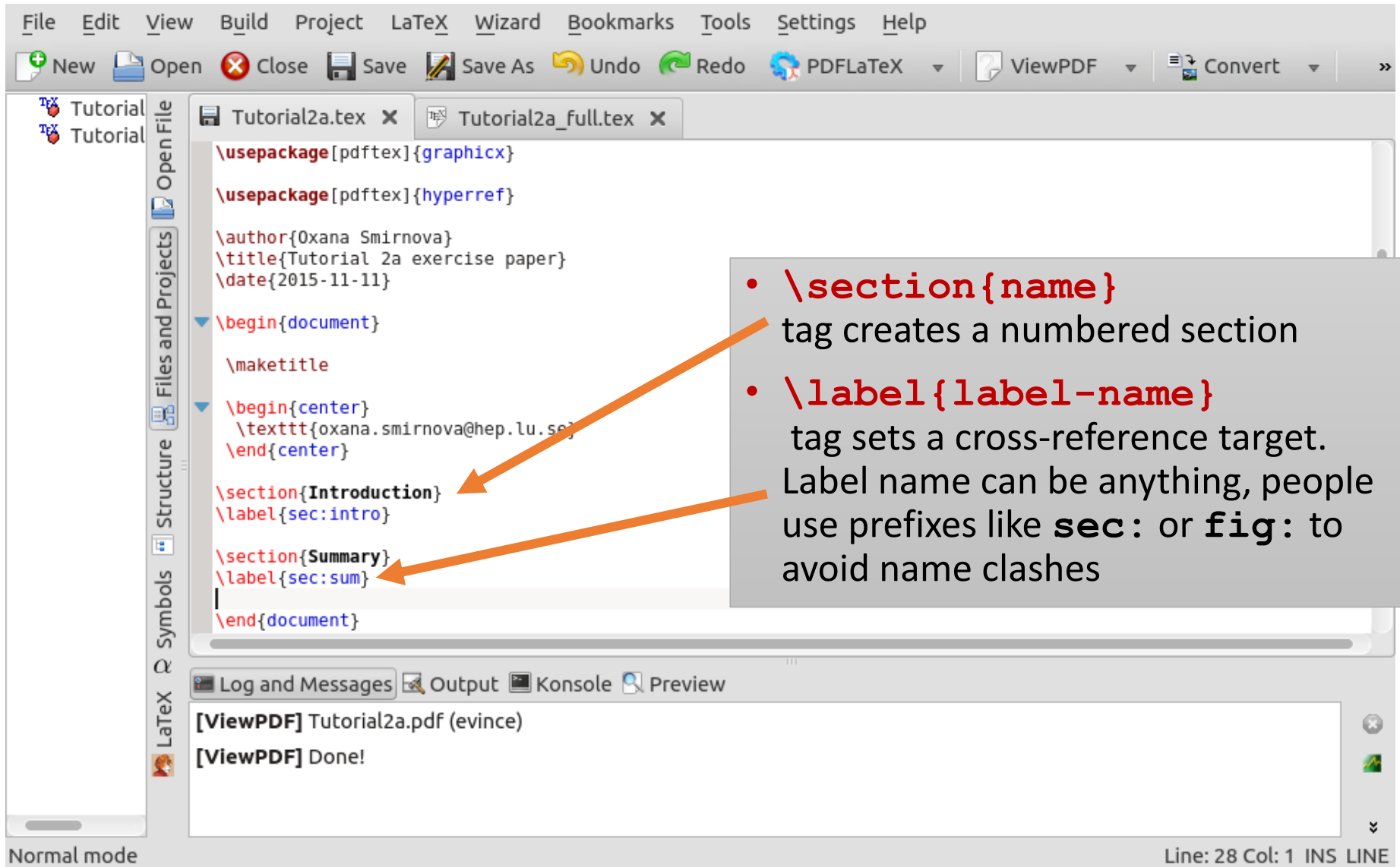
- `\begin{center}`
`\end{center}`
this environment center-aligns everything inside it
- `\texttt{...}` tag applies equidistant “typewriter”-like font

The bottom of the editor shows the Log and Messages window with the following output:

```
[ViewPDF] Tutorial2a.pdf (evince)
[ViewPDF] Done!
```

Normal mode Line: 21 Col: 14 INS LINE

Time to add some sections and labels for cross-reference



The screenshot shows a LaTeX editor window with the following code in the main editor:

```
\usepackage[pdftex]{graphicx}
\usepackage[pdftex]{hyperref}

\author{Oxana Smirnova}
\title{Tutorial 2a exercise paper}
\date{2015-11-11}

\begin{document}

\maketitle

\begin{center}
\texttt{oxana.smirnova@hep.lu.se}
\end{center}

\section{Introduction}
\label{sec:intro}

\section{Summary}
\label{sec:sum}

\end{document}
```

Two orange arrows point from the callout box to the `\section{Introduction}` and `\section{Summary}` lines in the code.

• `\section{name}`
tag creates a numbered section

• `\label{label-name}`
tag sets a cross-reference target. Label name can be anything, people use prefixes like **sec:** or **fig:** to avoid name clashes

Log and Messages: [ViewPDF] Tutorial2a.pdf (evince)
[ViewPDF] Done!

Normal mode Line: 28 Col: 1 INS LINE

So how do we do cross-referencing?

The screenshot shows a LaTeX editor window with the following content:

```
\author{Oxana Smirnova}
\title{Tutorial 2a exercise paper}
\date{2015-11-11}

\begin{document}

\maketitle

\begin{center}
\texttt{oxana.smirnova@hep.lu.se}
\end{center}

\section{Introduction}
\label{sec:intro}

This is introduction. Summary will be given in Section \ref{sec:sum}.

\section{Summary}
\label{sec:sum}

\end{document}
```

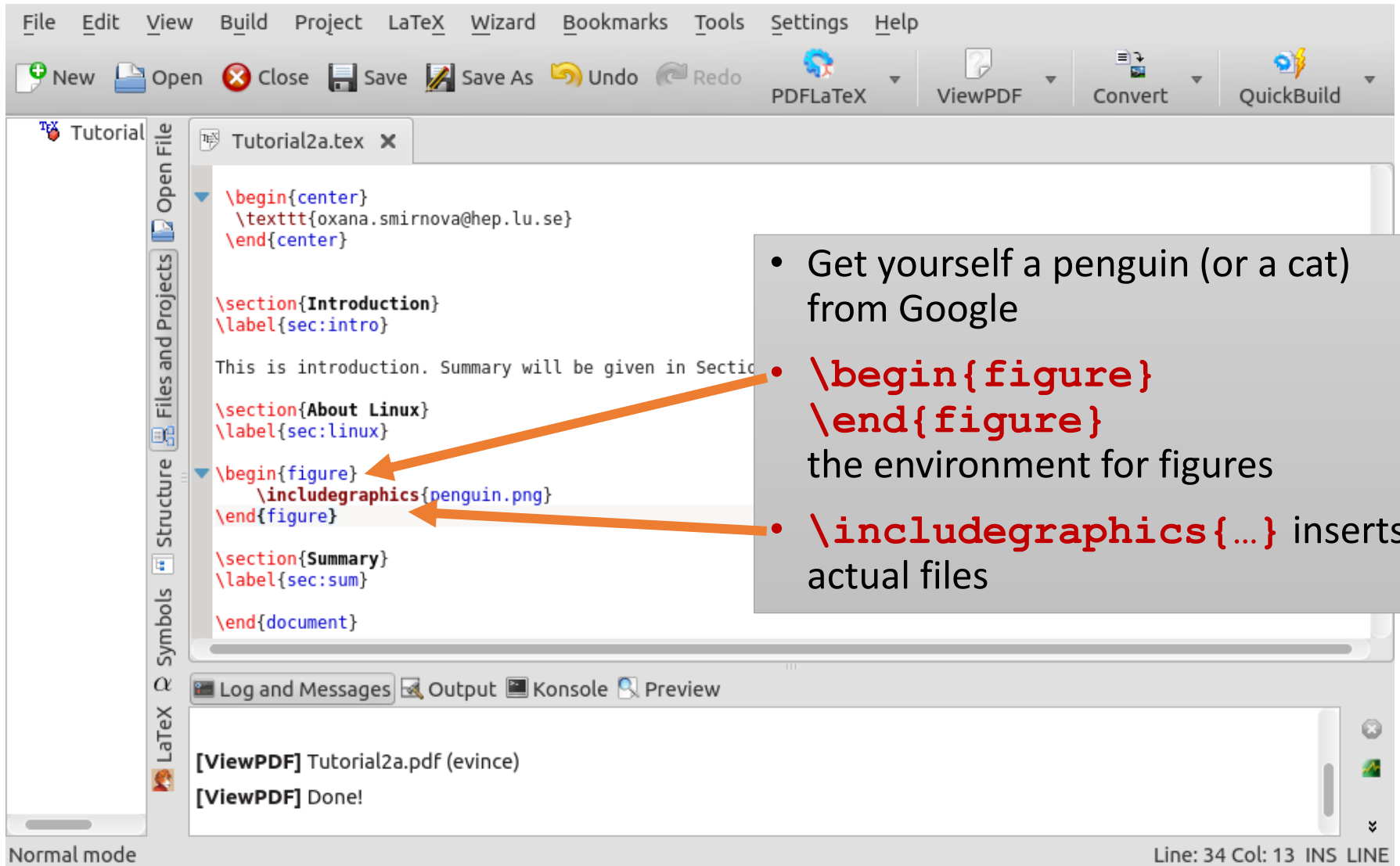
The text "This is introduction. Summary will be given in Section \ref{sec:sum}." is highlighted in grey. An orange arrow points from a callout box to the `\ref{sec:sum}` command.

• `\ref{label-name}`
a very smart tag that inserts numbering of the labelled environments and even creates clickable cross-references in PDF

Log and Messages: [ViewPDF] Tutorial2a.pdf (evince)
[ViewPDF] Done!

Normal mode Line: 26 Col: 70 INS LINE

Let's add a picture



The screenshot shows a LaTeX editor window with the following content:

```
\begin{center}
\texttt{oxana.smirnova@hep.lu.se}
\end{center}

\section{Introduction}
\label{sec:intro}

This is introduction. Summary will be given in Section 2.

\section{About Linux}
\label{sec:linux}

\begin{figure}
\includegraphics{penguin.png}
\end{figure}

\section{Summary}
\label{sec:sum}

\end{document}
```

The callout box contains the following list:

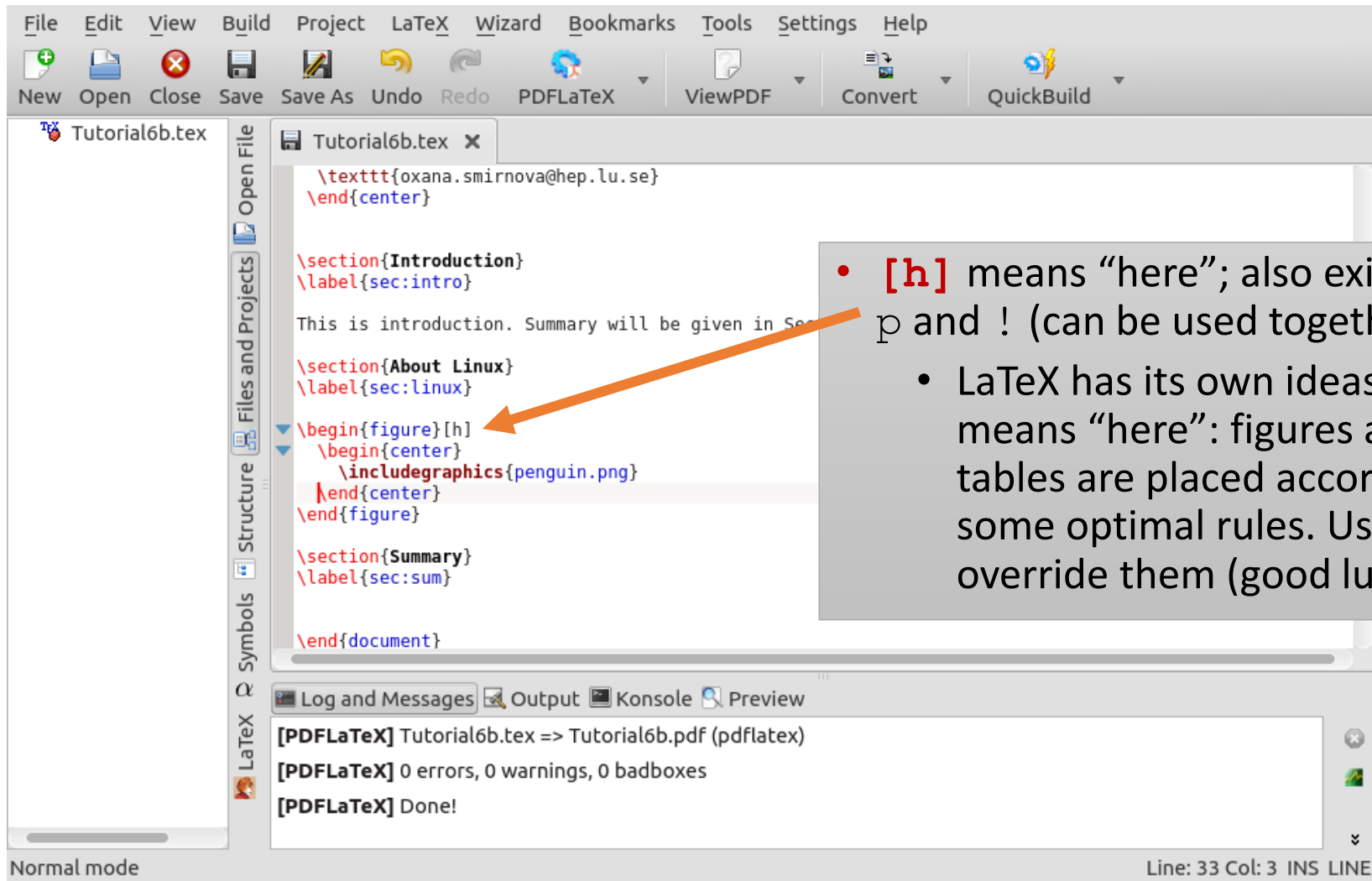
- Get yourself a penguin (or a cat) from Google
- **`\begin{figure}`**
`\end{figure}`
the environment for figures
- **`\includegraphics{...}`** inserts actual files

At the bottom of the editor, the Log and Messages window shows:

```
[ViewPDF] Tutorial2a.pdf (evince)
[ViewPDF] Done!
```

Line: 34 Col: 13 INS LINE

This looked ugly, let's pin it and center it



The screenshot shows a LaTeX editor interface with a menu bar (File, Edit, View, Build, Project, LaTeX, Wizard, Bookmarks, Tools, Settings, Help) and a toolbar (New, Open, Close, Save, Save As, Undo, Redo, PDFLaTeX, ViewPDF, Convert, QuickBuild). The main editor window displays the following LaTeX code:

```
\texttt{oxana.smirnova@hep.lu.se}
\end{center}

\section{Introduction}
\label{sec:intro}

This is introduction. Summary will be given in Section 2.

\section{About Linux}
\label{sec:linux}

\begin{figure}[h]
\begin{center}
\includegraphics{penguin.png}
\end{center}
\end{figure}

\section{Summary}
\label{sec:sum}

\end{document}
```

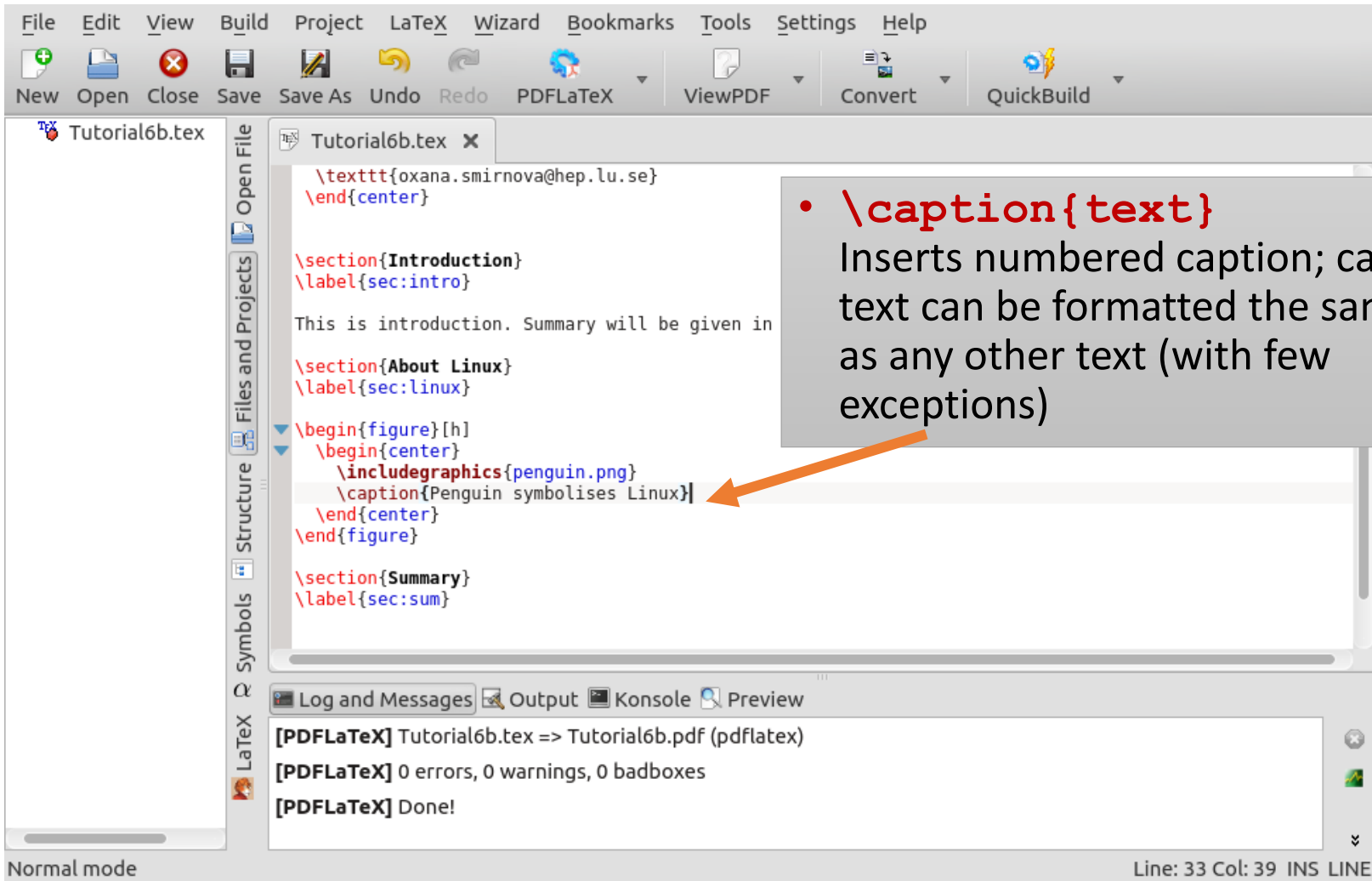
An orange arrow points from the callout box to the `[h]` option in the `\begin{figure}` command.

Log and Messages: [PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf (pdflatex)
[PDFLaTeX] 0 errors, 0 warnings, 0 badboxes
[PDFLaTeX] Done!

Normal mode Line: 33 Col: 3 INS LINE

- **[h]** means “here”; also exist H, t, b, p and ! (can be used together)
- LaTeX has its own ideas what means “here”: figures and tables are placed according to some optimal rules. Use “!” to override them (good luck...)

Every figure needs a caption



The screenshot shows a LaTeX editor window with the following content:

```
\texttt{oxana.smirnova@hep.lu.se}
\end{center}

\section{Introduction}
\label{sec:intro}

This is introduction. Summary will be given in

\section{About Linux}
\label{sec:linux}

\begin{figure}[h]
\begin{center}
\includegraphics{penguin.png}
\caption{Penguin symbolises Linux}
\end{center}
\end{figure}

\section{Summary}
\label{sec:sum}
```

The `\caption{Penguin symbolises Linux}` line is highlighted in blue, and an orange arrow points from a callout box to it.

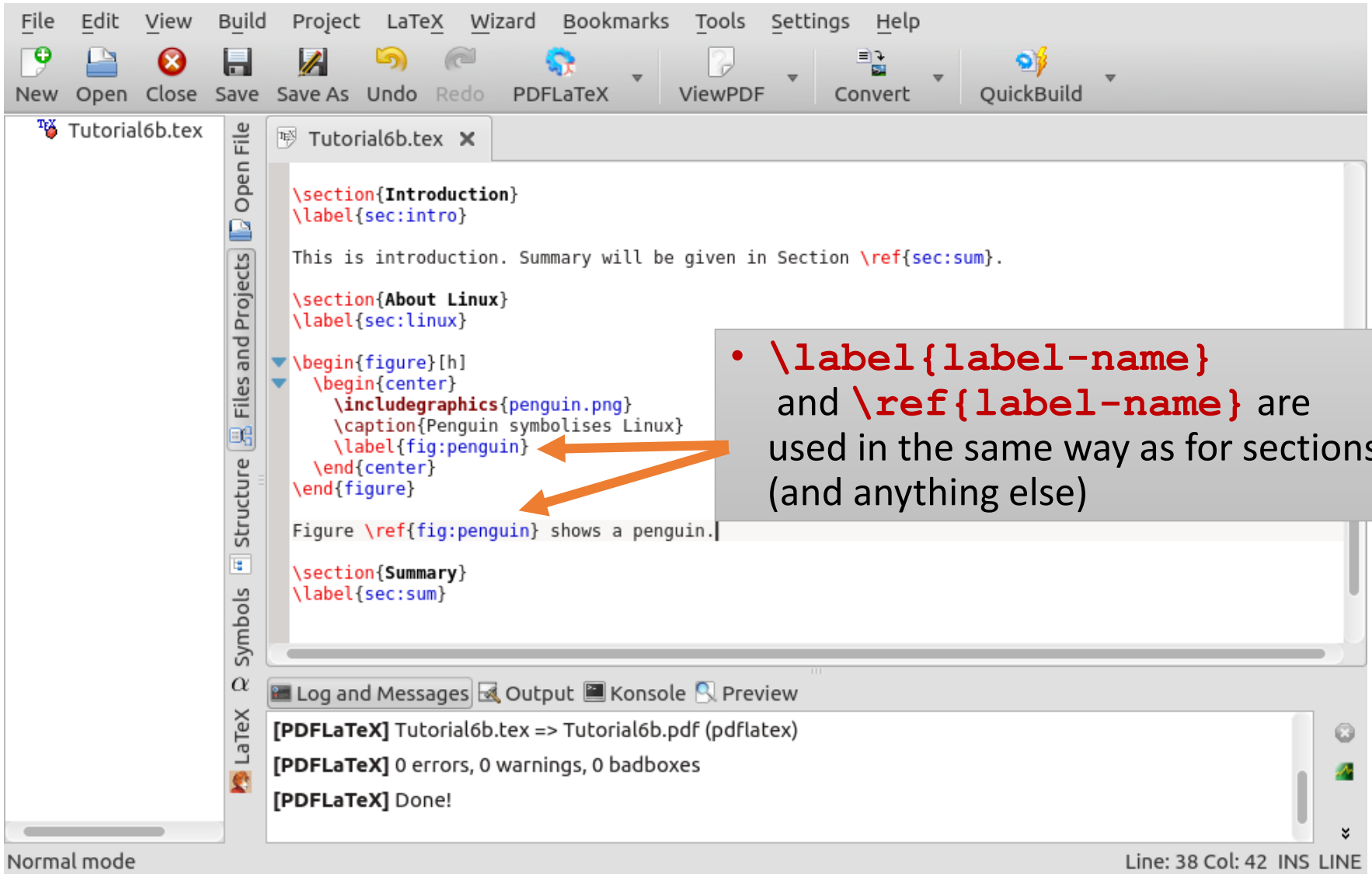
Log and Messages:

```
[PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf (pdflatex)
[PDFLaTeX] 0 errors, 0 warnings, 0 badboxes
[PDFLaTeX] Done!
```

Normal mode Line: 33 Col: 39 INS LINE

- `\caption{text}`
Inserts numbered caption; caption text can be formatted the same way as any other text (with few exceptions)

We also want to cross-reference figures



The screenshot shows a LaTeX editor window with the following content:

```
\section{Introduction}
\label{sec:intro}

This is introduction. Summary will be given in Section \ref{sec:sum}.

\section{About Linux}
\label{sec:linux}

\begin{figure}[h]
\begin{center}
\includegraphics{penguin.png}
\caption{Penguin symbolises Linux}
\label{fig:penguin}
\end{center}
\end{figure}

Figure \ref{fig:penguin} shows a penguin.

\section{Summary}
\label{sec:sum}
```

A callout box on the right contains the following text:

- `\label{label-name}` and `\ref{label-name}` are used in the same way as for sections (and anything else)

The callout box has two orange arrows pointing to the `\label{fig:penguin}` line in the figure block and the `\ref{fig:penguin}` line in the text block.

Log and Messages:

```
[PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf (pdflatex)
[PDFLaTeX] 0 errors, 0 warnings, 0 badboxes
[PDFLaTeX] Done!
```

Normal mode Line: 38 Col: 42 INS LINE

Final adjustments

The screenshot shows a LaTeX editor window with the following code in the main editor:

```
\section{Introduction}
\label{sec:intro}

This is introduction. Summary will be given

\section{About Linux}
\label{sec:linux}

\begin{figure}[h]
\begin{center}
\includegraphics[width=2cm]{penguin.png}
\caption{Penguin symbolises Linux}
\label{fig:penguin}
\end{center}
\end{figure}

Figure \ref{fig:penguin} shows a \textit{penguin}.

\section{Summary}
\label{sec:sum}
```

The callout box contains the following text:

- `\includegraphics [] {...}` can take various options specified in []
- `\textit{...}` applies *italic* (slanted) font to the text

The Log and Messages window at the bottom shows the following output:

```
[PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf (pdflatex)
[PDFLaTeX] 0 errors, 0 warnings, 0 badboxes
[PDFLaTeX] Done!
```

Normal mode Line: 38 Col: 50 INS LINE

We have to cite bibliography reference now

The screenshot shows a LaTeX editor window with the following content:

```
This is introduction. Summary will be given in
```

```
\section{About Linux}
\label{sec:linux}

\begin{figure}[h]
\begin{center}
\includegraphics[width=2cm]{penguin.png}
\caption{Penguin symbolises Linux}
\label{fig:penguin}
\end{center}
\end{figure}

Figure \ref{fig:penguin} shows a \textit{penguin}. For more details, check
the Linux Web page \cite{linux}.

\section{Summary}
\label{sec:sum}

\begin{thebibliography}{99}
\bibitem{linux} Linux web site: \url{www.linux.com}
\end{thebibliography}
```

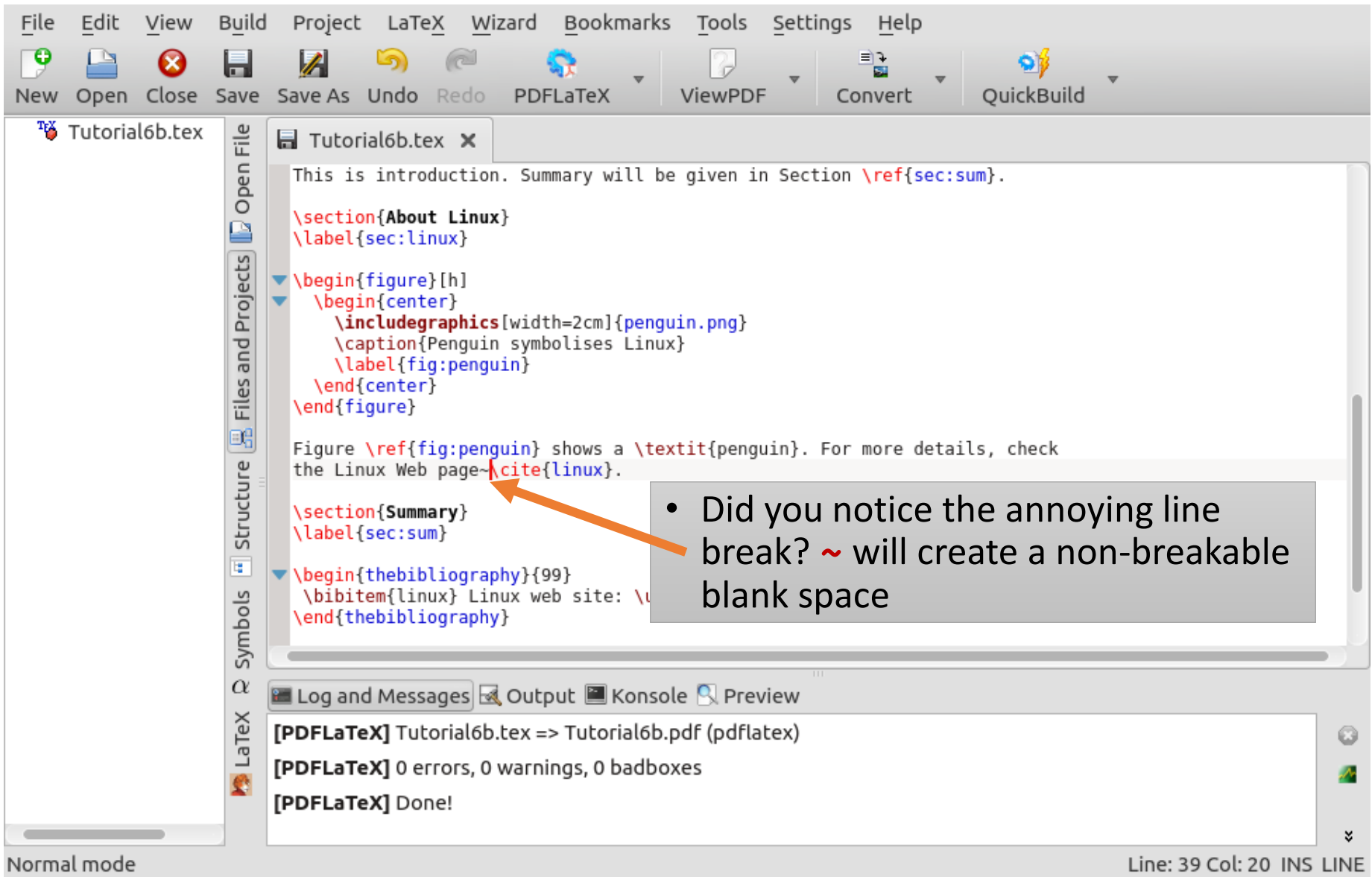
The Log and Messages window at the bottom shows the compilation output:

```
[PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf (pdflatex)
[PDFLaTeX] 0 errors, 0 warnings, 0 badboxes
[PDFLaTeX] Done!
```

Normal mode Line: 38 Col: 68 INS LINE

- `\cite{item-name}` inserts cross-reference to the named bibliography item
- `\begin{thebibliography}` environment lists bibliography items
 - Each item is defined via `\bibitem{item-name}`
- `\url{...}` creates clickable Web links in the PDF file

One small detail: non-breaking space



The screenshot shows a LaTeX editor window with the following content:

```
This is introduction. Summary will be given in Section \ref{sec:sum}.  
  
\section{About Linux}  
\label{sec:linux}  
  
\begin{figure}[h]  
  \begin{center}  
    \includegraphics[width=2cm]{penguin.png}  
    \caption{Penguin symbolises Linux}  
    \label{fig:penguin}  
  \end{center}  
\end{figure}  
  
Figure \ref{fig:penguin} shows a \textit{penguin}. For more details, check  
the Linux Web page- \cite{linux}.  
  
\section{Summary}  
\label{sec:sum}  
  
\begin{thebibliography}{99}  
  \bibitem{linux} Linux web site: \u  
\end{thebibliography}
```

An orange arrow points to the line break in the `\cite{linux}` command. A grey callout box contains the text:

- Did you notice the annoying line break? ~ will create a non-breakable blank space

The bottom status bar shows: Normal mode, Line: 39 Col: 20 INS LINE. The Log and Messages window at the bottom displays:

```
[PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf (pdflatex)  
[PDFLaTeX] 0 errors, 0 warnings, 0 badboxes  
[PDFLaTeX] Done!
```

Make a new `\subsection` and a table

The screenshot shows a LaTeX editor window with the following code in the main editor:

```
\end{center}
\end{figure}

Figure \ref{fig:penguin} shows a \textit
the Linux Web page~\cite{linux}.

\subsection{Linux flavours}
\label{sec:flavours}

\begin{table}[h]
\begin{center}
\caption{Different flavours of Linux}
\label{tab:flavours}
\begin{tabular}{c|c|c|c} % | is for border, c is for centering
\textbf{Distribution}&RedHat&Debian&SuSE\\
Fedora 20 & X & & \\
\end{tabular}
\end{center}
\end{table}

\section{Summary}
```

Callout boxes explain the following syntax elements:

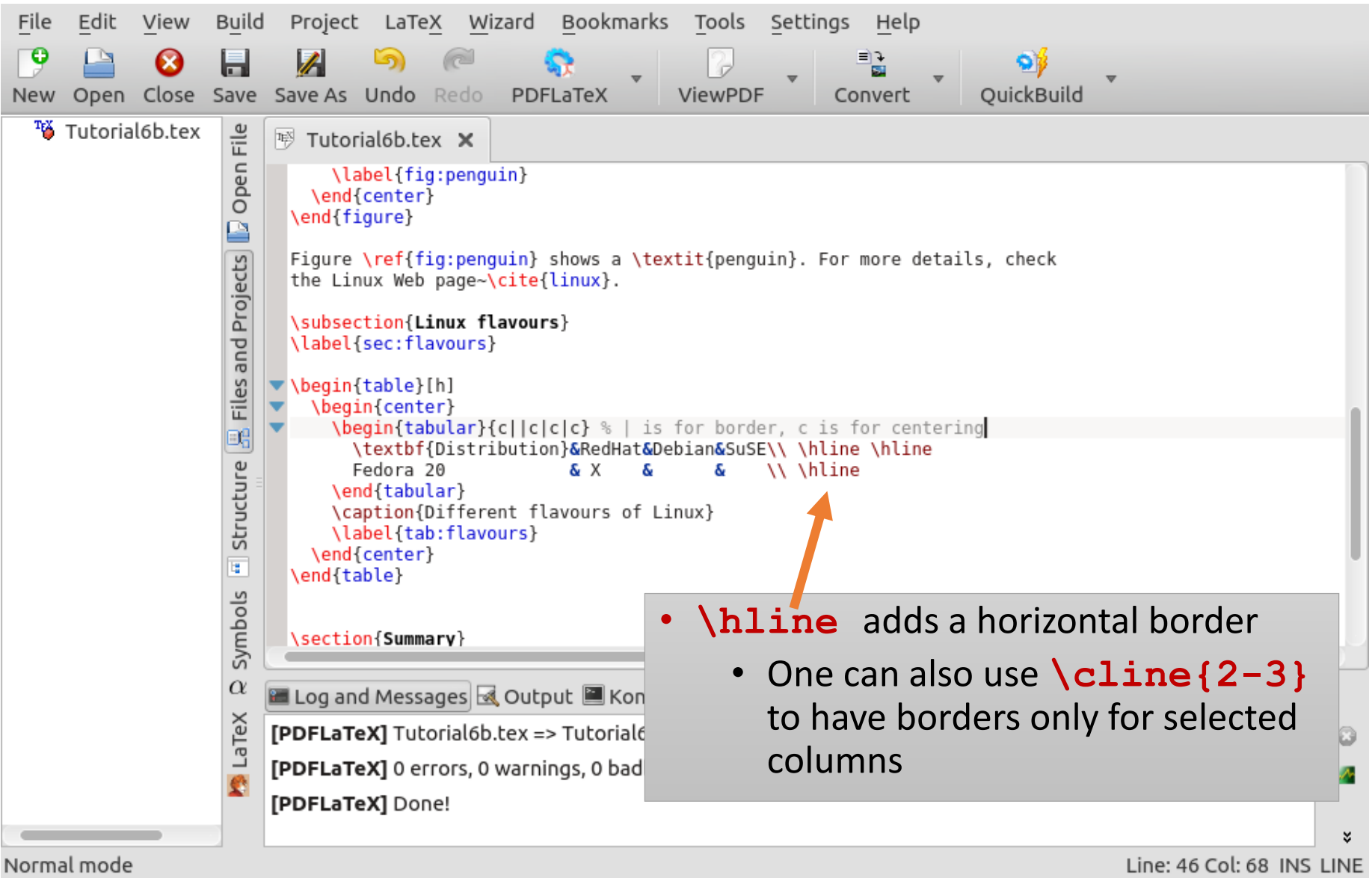
- `\begin{table}` is very similar to `\begin{figure}`
- Tables themselves are defined by `\begin{tabular}`
- Each letter in `{c|c}` indicates a column; “c” means centered, can be also “l” or “r”
- `&` separates cells
- `\\` ends rows

The Log and Messages window at the bottom shows the following output:

```
[PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf (pdflatex)
[PDFLaTeX] 0 errors, 0 warnings, 0 badboxes
[PDFLaTeX] Done!
```

Normal mode Line: 48 Col: 64 INS LINE

It was an ugly table, let's make it slightly better



The screenshot shows a LaTeX editor window with the following content:

```
\label{fig:penguin}
\end{center}
\end{figure}

Figure \ref{fig:penguin} shows a \textit{penguin}. For more details, check
the Linux Web page~\cite{linux}.

\subsection{Linux flavours}
\label{sec:flavours}

\begin{table}[h]
\begin{center}
\begin{tabular}{c|c|c|c} % | is for border, c is for centering
\textbf{Distribution}&RedHat&Debian&SuSE\\ \hline \hline
Fedora 20 & X & & \\ \hline
\end{tabular}
\caption{Different flavours of Linux}
\label{tab:flavours}
\end{center}
\end{table}

\section{Summary}
```

The callout box contains the following text:

- `\hline` adds a horizontal border
- One can also use `\cline{2-3}` to have borders only for selected columns

Log and Messages: [PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf [PDFLaTeX] 0 errors, 0 warnings, 0 bad boxes [PDFLaTeX] Done!

Normal mode Line: 46 Col: 68 INS LINE

A footnote

The screenshot shows a LaTeX editor window with the following content:

```
Figure \ref{fig:penguin} shows a \textit{penguin}. For more details, check
the Linux Web page~\cite{linux}.

\subsection{Linux flavours}
\label{sec:flavours}

Table~\ref{tab:flavours} lists some Linux flavours~\footnote{Only one is shown
for simplicity}.

\begin{table}[h]
\begin{center}
\begin{tabular}{c|c|c|c} % | is for border, c is for centering
\textbf{Distribution}&RedHat&Debian&SuSE\\ \hline \hline
Fedora 20 & X & & \\ \hline
\end{tabular}
\caption{Different flavours of Linux}
\label{tab:flavours}
\end{center}
\end{table}

\section{Summary}
```

An orange arrow points from the `\footnote` command in the code to a callout box:

- `\footnote{text}` puts text in the automatically numbered footnote

The bottom of the editor shows the Log and Messages window with the following output:

```
[PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf (pdflatex)
[PDFLaTeX] 0 errors, 0 warnings, 0 badboxes
[PDFLaTeX] Done!
```

Normal mode Line: 45 Col: 16 INS LINE

Now let's try mathematics in a new section

The screenshot shows a LaTeX editor interface with the following components:

- Menu Bar:** File, Edit, View, Build, Project, LaTeX, Wizard, Bookmarks, Tools, Settings, Help.
- Toolbar:** New, Open, Close, Save, Save As, Undo, Redo, PDFLaTeX, ViewPDF, Convert, QuickBuild.
- File List:** Tutorial6b.tex, intro.tex.
- Main Editor:** Contains LaTeX source code for a table caption and a new section.

```
\caption{Different flavours of Linux}
\label{tab:flavours}
\end{center}
\end{table}

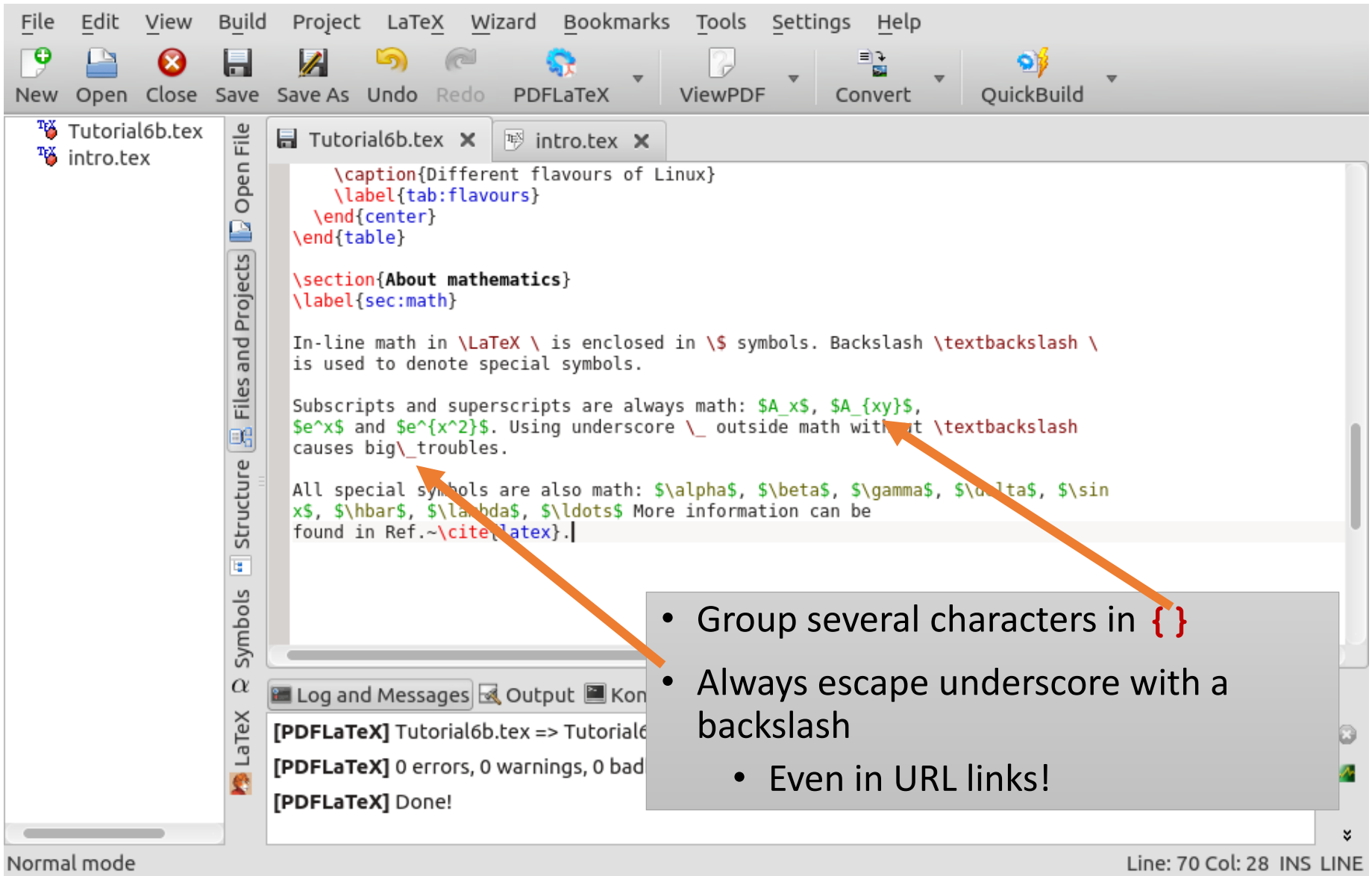
\section{About mathematics}
\label{sec:math}

In-line math in \LaTeX is enclosed in \$ symbols. Backslash \textbackslash is used to denote special symbols.

Subscripts and superscripts are always math: $A_x$, $A_{xy}$, $e^x$ and $e^{x^2}$. Using underscore _ outside math without \textbackslash causes big troubles.

All special symbols are also math: $_alpha$, $_beta$, $_gamma$, $_delta$, $_sin x$, $_hbar$, $_lambda$, $_dots$ More information can be found in Ref. \cite{latex}.
```
- Log and Messages:** Shows successful compilation: [PDFLaTeX] Tutorial6b.tex => Tutorial6b.pdf (pdflatex), [PDFLaTeX] 0 errors, 0 warnings, 0 badboxes, [PDFLaTeX] Done!
- Callout:** A yellow starburst contains the text "Noticed something wrong?".
- Status Bar:** Normal mode, Line: 70 Col: 28 INS LINE.

Corrected mathematics text



The screenshot shows a LaTeX editor window with the following content:

```
\caption{Different flavours of Linux}
\label{tab:flavours}
\end{center}
\end{table}

\section{About mathematics}
\label{sec:math}

In-line math in \LaTeX is enclosed in \$ symbols. Backslash \textbackslash
is used to denote special symbols.

Subscripts and superscripts are always math: $A x$, $A_{xy}$,
$e^x$ and $e^{x^2}$. Using underscore \_ outside math without \textbackslash
causes big \_troubles.

All special symbols are also math: $_alpha$, $_beta$, $_gamma$, $_delta$, $_sin
x$, $_hbar$, $_lambda$, $_ldots$ More information can be
found in Ref. \cite{latex}.
```

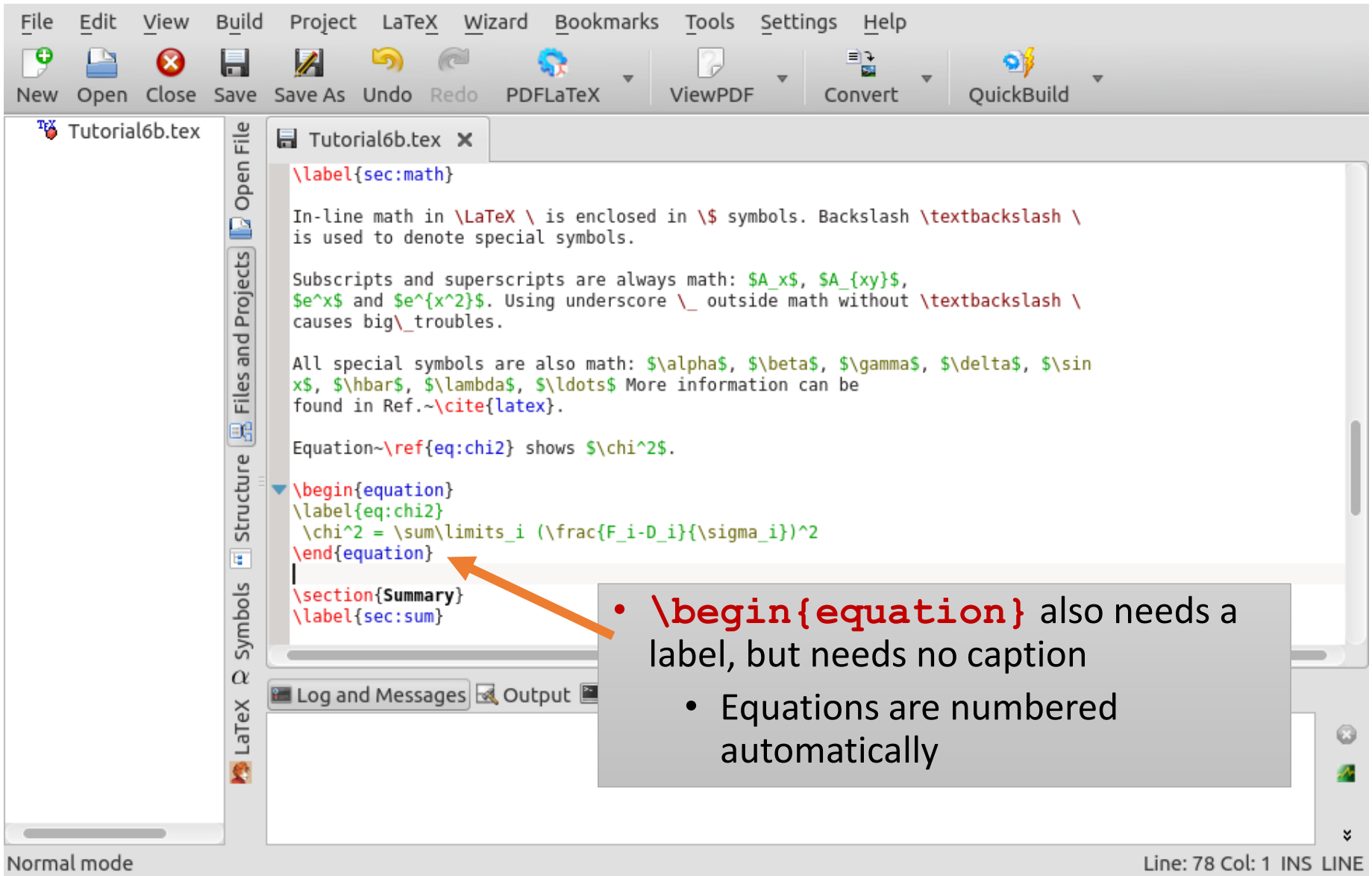
Log and Messages: [PDFLaTeX] Tutorial6b.tex => Tutorial6
[PDFLaTeX] 0 errors, 0 warnings, 0 bad
[PDFLaTeX] Done!

Normal mode Line: 70 Col: 28 INS LINE

Callout box content:

- Group several characters in `{ }`
- Always escape underscore with a backslash
 - Even in URL links!

And now let's try an equation



The screenshot shows a LaTeX editor window titled 'Tutorial6b.tex'. The main text area contains the following LaTeX code:

```
\label{sec:math}

In-line math in \LaTeX \ is enclosed in \$ symbols. Backslash \textbackslash \
is used to denote special symbols.

Subscripts and superscripts are always math: $A_x$, $A_{xy}$,
$e^x$ and $e^{x^2}$. Using underscore \_ outside math without \textbackslash \
causes big\_troubles.

All special symbols are also math: $\alpha$, $\beta$, $\gamma$, $\delta$, $\sin
x$, $\hbar$, $\lambda$, $\dots$ More information can be
found in Ref.~\cite{latex}.

Equation~\ref{eq:chi2} shows $\chi^2$.

\begin{equation}
\label{eq:chi2}
\chi^2 = \sum\limits_i (\frac{F_i-D_i}{\sigma_i})^2
\end{equation}

\section{Summary}
\label{sec:sum}
```

The code is color-coded: labels are blue, math mode is green, and section names are red. An orange arrow points from a callout box to the `\begin{equation}` command. The callout box contains the following text:

- `\begin{equation}` also needs a label, but needs no caption
- Equations are numbered automatically

At the bottom of the editor, it says 'Normal mode' and 'Line: 78 Col: 1 INS LINE'.

Oh, that was also ugly. Fixing...

The screenshot shows a LaTeX editor interface with a menu bar (File, Edit, View, Build, Project, LaTeX, Wizard, Bookmarks, Tools, Settings, Help) and a toolbar (New, Open, Close, Save, Save As, Undo, Redo, PDFLaTeX, ViewPDF, Convert, QuickBuild). The main window displays the file 'Tutorial6b.tex' with the following LaTeX code:

```
\label{sec:math}

In-line math in \LaTeX \ is enclosed in \$ symbols. Backslash \textbackslash \
is used to denote special symbols.

Subscripts and superscripts are always math: $A_x$, $A_{xy}$,
$e^x$ and $e^{x^2}$. Using underscore \_ outside math without \textbackslash \
causes big\_troubles.

All special symbols are also math: $\alpha$, $\beta$, $\gamma$, $\delta$, $\sin
x$, $\hbar$, $\lambda$, $\dots$ More information can be
found in Ref.~\cite{latex}.

Equation~\ref{eq:chi2} shows $\chi^2$.

\begin{equation}
\label{eq:chi2}
\chi^2 = \sum\limits_i \left(\frac{F_i-D_i}{\sigma_i}\right)^2
\end{equation}

\section{Summary}
\label{sec:sum}
```

An orange arrow points from a callout box to the `\left` and `\right` symbols in the equation block. The callout box contains the following text:

- `\left` (and `\right`) are some of the very many mathematical symbols in LaTeX

At the bottom of the editor, it says 'Normal mode' on the left and 'Line: 78 Col: 1 INS LINE' on the right.

And finally, some bulleted lists

The screenshot shows a LaTeX editor window with the following content:

```
File Edit View Build Project LaTeX Wizard Bookmarks Tools Settings Help
New Open Close Save Save As Undo Redo PDFLaTeX ViewPDF Convert QuickBuild

Tutorial6b.tex
Tutorial6b.tex x
All special symbols are also math:  $\alpha$ ,  $\beta$ ,  $\gamma$ ,  $\delta$ ,  $\sin$ 
 $x$ ,  $\hbar$ ,  $\lambda$ ,  $\dots$  More information can be
found in Ref.~\cite{latex}.

Equation~\ref{eq:chi2} shows  $\chi^2$ .

\begin{equation}
\label{eq:chi2}
\chi^2 = \sum\limits_i \left(\frac{F_i - D_i}{\sigma_i}\right)^2
\end{equation}

\section{Summary}
\label{sec:sum}

We learned the following:
\begin{itemize}
\item Linux is good
\item \LaTeX \ is good
\end{itemize}

\begin{thebibliography}{99}
```

A callout box with an orange arrow pointing to the `\begin{itemize}` command contains the text: **• `\begin{itemize}` creates a list of un-numbered items**

Log and Messages Output Konsole Preview

[ViewPDF] Tutorial6b.pdf (evince)
[ViewPDF] Done!

Normal mode Line: 85 Col: 24 INS LINE

There are also numbered lists

The screenshot shows a LaTeX editor interface with a menu bar (File, Edit, View, Build, Project, LaTeX, Wizard, Bookmarks, Tools, Settings, Help) and a toolbar (New, Open, Close, Save, Save As, Undo, Redo, PDFLaTeX, ViewPDF, Convert, QuickBuild). The main editor window displays the source code for 'Tutorial6b.tex'. The code includes a citation, an equation, a section header, and a list. A callout box with an orange arrow points to the `\begin{enumerate}` command, explaining that it is similar to `\begin{itemize}` but the items are numbered.

```
found in Ref.~\cite{latex}.
```

```
Equation~\ref{eq:chi2} shows  $\chi^2$ .
```

```
\begin{equation}
```

```
\label{eq:chi2}
```

```
\chi^2 = \sum\limits_i \left(\frac{F_i-D_i}{\sigma_i}\right)^2
```

```
\end{equation}
```

```
\section{Summary}
```

```
\label{sec:sum}
```

We learned the following:

```
\begin{itemize}
```

```
\item Linux is good
```

```
\item \LaTeX \ is good for:
```

```
\begin{enumerate}
```

```
\item Structuring documents
```

```
\item Writing mathematical equations
```

```
\end{enumerate}
```

```
\end{itemize}
```

`\begin{enumerate}` is similar to **`\begin{itemize}`**, only the items get numbered

Log and Messages | Output | Konsole | Preview

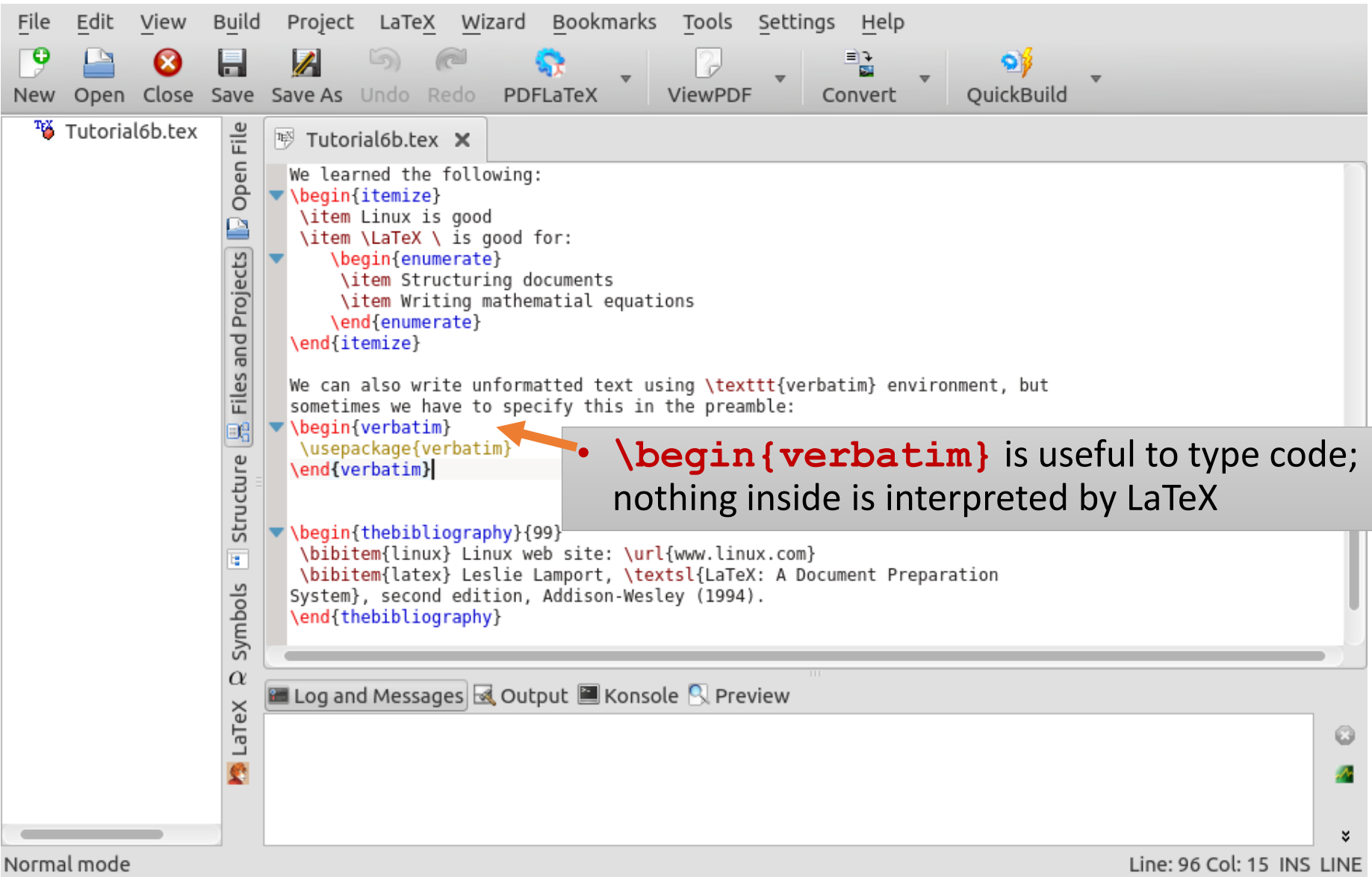
[ViewPDF] Tutorial6b.pdf (evince)

[ViewPDF] Done!

Normal mode

Line: 89 Col: 20 INS LINE

Last, but not least: you can have unformatted text, too



The screenshot shows a LaTeX editor interface with a menu bar (File, Edit, View, Build, Project, LaTeX, Wizard, Bookmarks, Tools, Settings, Help) and a toolbar (New, Open, Close, Save, Save As, Undo, Redo, PDFLaTeX, ViewPDF, Convert, QuickBuild). The main editor window displays the file 'Tutorial6b.tex' with the following content:

```
We learned the following:  
\begin{itemize}  
  \item Linux is good  
  \item \LaTeX \ is good for:  
    \begin{enumerate}  
      \item Structuring documents  
      \item Writing mathematical equations  
    \end{enumerate}  
  \end{itemize}  
  
We can also write unformatted text using \texttt{verbatim} environment, but  
sometimes we have to specify this in the preamble:  
\begin{verbatim}  
  \usepackage{verbatim}  
\end{verbatim}  
  
\begin{thebibliography}{99}  
  \bibitem{linux} Linux web site: \url{www.linux.com}  
  \bibitem{latex} Leslie Lamport, \textsl{LaTeX: A Document Preparation  
System}, second edition, Addison-Wesley (1994).  
\end{thebibliography}
```

An orange arrow points from a callout box to the `\begin{verbatim}` line in the code. The callout box contains the text: **`\begin{verbatim}` is useful to type code; nothing inside is interpreted by LaTeX**

The bottom of the editor shows a status bar with 'Normal mode' on the left and 'Line: 96 Col: 15 INS LINE' on the right. The bottom panel contains tabs for 'Log and Messages', 'Output', 'Konsole', and 'Preview'.

And the result should look like this:

Tutorial 2a exercise paper

Oxana Smirnova

2015-11-11

oxana.smirnova@hep.lu.se

1 Introduction

This is introduction. Summary will be given in Section 4.

2 About Linux



Figure 1: Penguin symbolises Linux

Figure 1 shows a *penguin*. For more details, check the Linux Web page [1].

2.1 Linux flavours

Table 1 lists some Linux flavours [1].

Distribution	RedHat	Debian	SuSE
Fedora 23	X		

Table 1: Different flavours of Linux

¹Only one is shown for simplicity

3 About mathematics

In-line math in \LaTeX is enclosed in $\$$ symbols. Backslash \backslash is used to denote special symbols.

Subscripts and superscripts are always math: A_x , A_{xy} , e^x and e^{x^2} . Using underscore $_$ outside math without \backslash causes `big_troubles`.

All special symbols are also math: α , β , γ , δ , $\sin x$, h , λ , \dots . More information can be found in Ref. [2].

Equation 1 shows χ^2 .

$$\chi^2 = \sum_i \left(\frac{F_i - D_i}{\sigma_i} \right)^2 \quad (1)$$

4 Summary

We learned the following:

- Linux is good
- \LaTeX is good for:
 1. Structuring documents
 2. Writing mathematical equations

We can also write unformatted text using `verbatim` environment, but sometimes we have to specify this in the preamble:

```
\usepackage{verbatim}
```

References

- [1] Linux web site: www.linux.com
- [2] Leslie Lamport, *LaTeX: A Document Preparation System*, second edition, Addison-Wesley (1994).

Concluding notes

- There are many more LaTeX tags and environments
- Those tags and environments we tried have many different options
- Every tag and environment can be modified and tailored to your needs
- There is no way you can remember all the tags; get yourself a book (many good books exist), or use any of the multiple online references
 - Wikibooks: <http://en.wikibooks.org/wiki/LaTeX>
 - LaTeX Reference Manual: <http://home.gna.org/latexrefman/>
- All serious scientific journals have official LaTeX templates and styles, usually complete with instructions
- **Homework**: upload the LaTeX document (and the picture) you have just created to L@L, assignment HW2A
 - If you did not finish it now, please complete it at home
 - Consider using **tar** or **zip** if you have many files (LaTeX, image and PDF)
 - Deadline: the best is to have it ready by TOMORROW's tutorial!