

# Introducing T<sub>E</sub>X/L<sup>A</sup>T<sub>E</sub>X

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# Installing a T<sub>E</sub>X/L<sub>A</sub>T<sub>E</sub>X System on Your Home or Office Machine

There are **six** easy steps:

1. Install GSView, a postscript previewer.
2. Install MiK<sub>T</sub>E<sub>X</sub>, a complete T<sub>E</sub>X/L<sub>A</sub>T<sub>E</sub>X system.
3. Install WinEdt, a T<sub>E</sub>X/L<sub>A</sub>T<sub>E</sub>X shell for Windows.
4. Configure dvips for your printer.
5. Configure MiK<sub>T</sub>E<sub>X</sub> to interact properly with WinEdt.
6. Test your installation.

# Getting and Installing GSView

There are several ways to obtain GSView:

1. Download the file `gsv27550.exe` at <http://www.cs.wisc.edu/~ghost/aladdin/get550.html>.
2. Transfer the file from the sci-math server to your office machine. The file is located in the directory `g:\ghost_ps`.
3. Bring a zip disk to my office and I'll place all of the files you need on your zip disk.

Installing GSView is easy. Simply double-click the file `gsv27550.exe` in the Explorer and click the Setup button in the resulting dialog. After that, accept all of the defaults (keep hitting the Next button). Click the Exit button to conclude the installation.

*Note: It's best to install everything on your `c:\` drive (the default), especially if this is your first time installing a  $\text{T}_{\text{E}}\text{X}$  system.*

# Getting and Installing MiKTeX

There are several ways to obtain MiKTeX:

1. Download the file `complete.exe` at  
<http://www.inx.de/~cschenk/miktex/getting.html>.
2. Transfer the file from the sci-math server to your office machine. The file is located in the directory `g:\miktex`.
3. Bring a zip disk to my office and I'll place all of the files you need on your zip disk.

Installing MiKTeX is easy. Simply double-click the file `complete.exe` in the Explorer and accept all of the defaults (keep hitting the Next button).

*Note: It's best to install everything on your `c:\` drive (the default), especially if this is your first time installing a TeX system.*

# Getting WinEdt

There are several ways to obtain WinEdt<sup>1</sup>:

1. Download the file `winedt32.exe` at

<http://home.iSTAR.ca/~winedt/download.html>

2. Transfer the file from the sci-math server to your office machine. The file is located in the directory `g:\winedt`.
3. Bring a zip disk to my office and I'll place all of the files you need on your zip disk.

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<sup>1</sup>WinEdt is *shareware*. You can use it for a 30-day trial period. After that, there is a \$40 registration fee (worth every penny, in my opinion—a terrific program!).

# Installing WinEdt

Installing WinEdt is a little trickier than the previous installations.

1. Double-click the file `winedt32.exe` in the Explorer. The file `winedt32.exe` is a self-extracting zip file. Choose a folder, perhaps `c:\temp`, where you want the files unzipped and click the Unzip button. This will create a folder called `144mb` in `c:\temp`.
2. In the folder `144mb` you will find another folder called `Disk1`. In the folder `Disk1` resides a file called `Setup.exe`. Double-click the file `Setup.exe` and accept all of the defaults (keep hitting the Next button).

*Note: It's best to install everything on your `c:\` drive (the default). The default installation of WinEdt assumes that MiKTeX is installed on the `c:` drive. If you decide to install either program elsewhere, some further customization (tricky for new users) is required.*

# Configuring dvips

You need to configure dvips with settings matching your personal printer.

1. Use WinEdt to open the file `config.ps` in `c:\texmf\dvips\config\local\`.
2. Locate the lines in `config.ps` that read like this:

```
;;; METAFONT mode to be used when generating fonts.  
M ljfour
```

3. These lines indicate that dvips is configured for the HP4 printer. You need to change the driver to one that recognizes your printer. Open the file `mfmodes` in `c:\texmf\miktex\config` and locate your printer. Take note of the printer driver and the resolution. For example, if you see

```
canonbjc
Canon BJC-600 (360dpi)
360
360
```

then your resolution is 360dpi (dots per inch) and your printer driver's name is canonbjc.

4. Change the line in (2) to

```
;;; METAFONT mode to be used when generating fonts.
M canonbjc
```

5. Next, you need to change the resolution. Note the line in config.ps that reads

```
;;; Vertical and horizontal resolution.
D 600
```

Note the resolution found in (3) and make the appropriate change.

```
;;; Vertical and horizontal resolution.
D 360
```

## 6. Locate the line

```
;;; Uncomment these lines if you have PostScript  
versions of the fonts.
```

and uncomment each of the four lines following this one. Also, add the `amsfonts.map`. The final result should look like this:

```
p +cmfonts.map  
p +amsfonts.map  
p +lafonts.map  
p +cyrfonts.map  
p +eufonts.map
```

## 7. Comment the a4 paper size and uncomment the lettersize, if needed, like this:

```
;% A4size 210mm 297mm  
;%+ %%PaperSize: A4
```

```
@ letterSize 8.5in 11in
```

## 8. Save and close the file `config.ps`.

# Configure MiKTeX to Interact with WinEdt

When T<sub>E</sub>X/L<sup>A</sup>T<sub>E</sub>X finds an error, we want to return to WinEdt *at the line where the error was made*.

1. Open `miktex.ini` in the folder `c:\texmf\miktex\config`.
2. Under the [TeX] environment variable, you will find a number of editors listed: notepad, emacs, etc. One of them is WinEdt. The line containing WinEdt needs to be uncommented so that *the E of Editor is in the first column*. Comment the existing editor (probably notepad) in a manner similar to the commenting method of the remaining editors.
3. Save and close the file `miktex.ini`.

## **Important Step**

**Reboot your  
computer!**

# Testing Your T<sub>E</sub>X Installation

It's time to test your T<sub>E</sub>X installation.

1. Open WinEdt, and choose New Document from the Project menu. Select T<sub>E</sub>X document.
2. Enter the following text, **precisely** as it appears below!

```
Hello \TeX\ world!  
\bye
```

*Note: T<sub>E</sub>X is case-sensitive!*

3. Save the file as hello.tex. *You must type the file extension, as in hello.tex*
4. Select Set Main File from the Project menu.
5. Select TeX from the Accessories menu. If all is well, you will receive no errors. Press any key to

close the DOS box. The  $\text{T}_{\text{E}}\text{X}$  compiler creates a DVI (device independent) file, `hello.dvi`.

6. You need a previewer to view the file `hello.dvi`. Select DVI Preview from the Accessories menu. Your file should be displayed in the DVI previewer YAP.
7. Return to WinEdt and select Menu Setup from the Options menu. Double-click `&Accessories` in the Items dialog. Single-click `&DVIPS` and check the check-box Save Input File to Disk.
8. Select DVIPS from the Accesories menu. This changes the DVI file (`hello.dvi`) to a postscript file (`hello.ps`). If all is well, you will receive no errors. Press any key to close the DOS box.
9. Select GSView from the Accessories menu. The file `hello.ps` should open for viewing in GSView.

# Testing Your L<sup>A</sup>T<sub>E</sub>X Installation

L<sup>A</sup>T<sub>E</sub>X is a collection of T<sub>E</sub>X macros designed to ease the writer's task in creating fine documents. We must structure our file `hello.tex` differently if we wish to use L<sup>A</sup>T<sub>E</sub>X.

1. In WinEdt, select New Document from the Project menu. For the moment, refrain from selecting any of the L<sup>A</sup>T<sub>E</sub>X styles, and select T<sub>E</sub>X document.
2. Enter the following text.

```
\documentclass{article}

\begin{document}
Hello \LaTeX\ world!
\end{document}
```

*Note: L<sup>A</sup>T<sub>E</sub>X is case-sensitive!*

This special format in the source file distinguishes L<sup>A</sup>T<sub>E</sub>X files from T<sub>E</sub>X files.

3. Save the file as `hello2.tex`. *You must type the file extension, as in `hello2.tex`.*
4. Select Set Main File from the Project menu.
5. Select LaTeX from the Accesories menu. If all is well, you will receive no errors. Press any key to close the DOS box. T<sub>E</sub>X has created the DVI (device independent) file `hello.dvi`.
6. Select DVI Preview from the Accessories menu. Your file should be displayed in the DVI previewer YAP.
7. You may also return to WinEdt and create a postscript file with DVIPS. Then you can view the file in GSView.

# Adding Files to the MiKTeX Directory Tree

Any time that you add a file to the MiKTeX directory tree, you need to refresh the MiKTeX file database.

1. Download the file `gentle.tex` from <http://ctan.tug.org/ctan-search.html>. It's the link A Gentle Introduction to TeX. Download it to the directory `c:\texmf\doc`.
2. Open the file `gentle.tex` in WinEdt. Select Set Main File from the Project menu, then TeX from the Accessories menu. Note that MiKTeX cannot find the file `gentle.tex`.
3. Click the Start button, select Programs, select Miktex, select Maintenance, then select Refresh Filename Database. Close the DOS box when the refresh is complete.

4. Select TeX from the Accessories menu. This time there should be no errors.
5. Select DVI Preview from the Accessories menu. This will open the file `gentle.dvi` in YAP.

*Note that `gentle.tex` is a wonderful introduction to the  $\text{T}_{\text{E}}\text{X}$  typesetting system. You might want to print the file at a later date for closer study.*

## Spaces and Paragraphs

1. T<sub>E</sub>X and L<sup>A</sup>T<sub>E</sub>X ignore spaces and newlines. In WinEdt, add spaces and a new line to `hello.tex`, as shown below, T<sub>E</sub>X the result, and preview.

```
Hello          \TeX\  
World!  
\bye
```

2. You need to separate paragraphs in your source file with a blank line to produce a new paragraph. In WinEdt, click `Wrap` on the status bar to turn off wrapping, make the following changes to `hello.tex`, T<sub>E</sub>X the result, and preview.

```
Now is the time for all good  
men to come  
to the aid of their  
country.
```

```
Now is the time for all good men to come  
to the aid of their country.
```

```
\bye
```

# Changing Fonts

1. The following typefaces are available in T<sub>E</sub>X.

<b>T<sub>E</sub>X switch sequence</b>	<b>Sample of Typeface</b>
<code>\rm</code>	This is roman type
<code>\bf</code>	<b>This is boldface type</b>
<code>\it</code>	<i>This is italic type</i>
<code>\sl</code>	<i>This is slanted type</i>
<code>\tt</code>	This is typewriter type
<code>\cal</code>	<i>SOME SCRIPT LETTERS</i>

Experiment with them in `hello.tex`. For example, add the following text to `hello.tex` (anywhere before `\bye`), then T<sub>E</sub>X and preview.

If you change to `\it` italic `\rm` you must remember to change back to roman. If you change to `\bf` boldface and forget to change back to roman, all of your remaining text will be boldface.

2. Grouping (curly braces) limits the scope of the typeface. Add these lines to `hello.tex`.

```
\rm Grouping with curly braces limits the scope
of {\bf bold typeface}. This is the most
{\it efficient} way to change typefaces.
```

# Special Characters

$\TeX$  and  $\LaTeX$  reserve special characters for a number of important uses.

Character	Purpose	Literal Output
<code>\</code>	Special symbols and instructions	<code>\backslash</code>
<code>{</code>	Open group	<code>\{</code>
<code>}</code>	Close group	<code>\}</code>
<code>%</code>	Comments	<code>\%</code>
<code>&amp;</code>	Tabs and table alignments	<code>\&amp;</code>
<code>~</code>	Unbreakable space	<code>\~{}</code>
<code>\$</code>	Starting or ending math text	<code>\\$</code>
<code>^</code>	Math superscripts	<code>\^{}</code>
<code>_</code>	Math subscripts	<code>\_{}</code>
<code>#</code>	Defining replacement symbols	<code>\#</code>

Add the following to `hello.tex`,  $\TeX$  the result, and preview.

```
%This is a comment
Almost 100\% of the \$300 is {\bf gone}! If
 $x_1^2-2x_1=3$ , then find the value of  $x_1$ 
and use this result in exercise \#1.
```

# Mathematics in T<sub>E</sub>X

1. Inline mathematical expressions are enclosed in `$. . . $`. You *display* mathematical expressions by including them in a double `$$ . . . $$` pair. Add the following text to `hello.tex`, T<sub>E</sub>X the result, and preview.

If `$f$` is continuous on `$$[a,b]$$`, differentiable on `$(a,b)$`, then there exists a `$c$` in `$(a,b)$` such that

`$$`

$$f'(c) = \frac{f(b) - f(a)}{b - a}.$$

`$$`

2. Remember, T<sub>E</sub>X ignores spaces and newlines in the source of item #1, so you could just as easily type your source as follows. Try it!

If `$f$` is continuous on `$$[a,b]$$`, differentiable on `$(a,b)$`, then there exists a `$c$` in `$(a,b)$` such that `$$ f'(c) = \frac{f(b) - f(a)}{b - a} . $$`

However, your source will become difficult to read unless you adopt a source formatting strategy similar to that in item #1.

# Quote and Dashes

1. To surround a word or phrase in quotes, begin the quote by striking two consecutive opening single quotes (located on the key to the left of the key containing the numeral 1), then end the quote by striking two consecutive ending single quotes (located below the double quote near the Enter key). Add the following to `hello.tex`,  $\text{T}_{\text{E}}\text{X}$ , then preview.

`‘‘Merrily we roll along,’’` cried the Mad Hatter.

2. There are several types of dashes in  $\text{T}_{\text{E}}\text{X}/\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ . Each has a specific purpose.

<b>Name</b>	<b><math>\text{T}_{\text{E}}\text{X}</math> input</b>	<b><math>\text{T}_{\text{E}}\text{X}</math> output</b>
hyphen	-	-
en-dash	--	—
em-dash	---	---
minus sign	$\$-\$$	—

Add the following to `hello.tex`,  $\text{T}_{\text{E}}\text{X}$ , then preview.

My mother-in-law did exercises 11--22 in her  
workbook---a thoroughly difficult assignment  
---while it was  $\$-20\$$  degrees outside.