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Writing Scientific Papers in L^AT_EX

David Arnold

September 21, 2001

1. Introduction

We assume that our readers¹ have a working $\text{T}_{\text{E}}\text{X}$ system on their computers. If this is not the case, see Section 5, [Getting and Installing a TeX System](#).

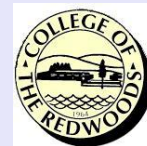
There are a number of editors that work well with $\text{T}_{\text{E}}\text{X}$, but Microsoft Word is not one of them (unless you save the Word files as pure text). These editors range in complexity, from the simple Notepad program that comes with all Windows systems, to [GNU Emacs](#), a powerful text editor, perhaps the favorite of the math and science community. However, we will use a shareware program called [WinEdt](#) in all of our demonstrations in these pages. There are two reasons for this choice:

1. WinEdt is installed on all of our systems at [College of the Redwoods](#).
2. WinEdt comes configured to run with [MiKTeX](#), making it infinitely easier to install a $\text{T}_{\text{E}}\text{X}$ system on your home computer.

This article does not pretend to be a complete introduction to $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$. There are plenty of tutorials written on the internet that already give complete descriptions of the $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ language (see Section 6, entitled [Support and Reference Materials](#), for a number of books and tutorials on $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ and $\text{T}_{\text{E}}\text{X}$). Rather, we have a simple goal: get you up to speed on using $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$ to type the project paper due at the end of the term.

With that goal in mind, we begin by writing a simple “Hello, World!” document, just to get you up and running. We then show how to set the title page and abstract and spend some time discussing section headers. We will spend quite some time discussing mathematics, but again, this is by no means a complete discussion. See the reference texts in [Support and Reference Materials](#) for further assistance in typesetting mathematics. Also, you might want to investigate

¹Note that this document is fully hyperlinked. Some links are obvious (see the control panel at the right), but there are others that may not immediately be apparent. In general, colored text in the narrative has a high probability of being a link. One color is used for links within the document, another color for URL's and links to documents outside this document. Passing your mouse over a link will reveal the nature of the link. Click these links for more information, then use the “Back” in the panel at the right or in your browser to return to your previous position in this document and continue reading.



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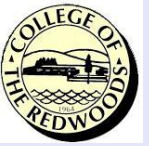
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the American Mathematical Society’s **User’s Guide**. Any good scientific writer will eventually need to reference sections, equations, figures, etc., so we spend a bit of time on referencing, then we complete our discussion with a word about bibliographies. These are the main ingredients of any well written scientific article.

Let’s begin.

2. Hello World!

Every programming class opens with a “Hello, World!” program, whether it be C++ or Fortan or Lisp. The idea is to write and compile an extremely simple program, just to get you started. We will follow that lead here. Open WinEdt, create a new document, then enter the following source code.

```
\documentclass{article}
\begin{document}
Hello, World!
\end{document}
```

Save the document as `intro.tex`.² After saving your file, click the \LaTeX icon on WinEdt’s toolbar. A DOS box will open and you can watch a number of responses scroll by as your file is compiled. If there are no errors, close the DOS box (if it doesn’t close itself) and return to WinEdt. If there are errors, close the DOS box, fix the errors (see Section 2.2, **A Word on Errors**), then recompile by clicking the \LaTeX icon on WinEdt’s toolbar.

Once you’ve successfully compiled `intro.tex`, click the Explorer icon on WinEdt’s toolbar. This will open Window’s Explorer in the directory (folder) containing `intro.tex`. Note that

²A word about file organization. It is not a good idea to lump all files into one common directory. Good organization of directories (folders) is a must. So, for this activity, create a folder called **Intro** on your hard drive (or in your network folder at school) and save the file `intro.tex` in this folder. Later, when you are working on your final project, create a folder called **Project** and place all files associated with your project in your **Project** folder.

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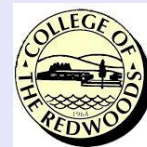
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there are now several files in this directory that weren't there before you compiled `intro.tex`, files with names like `intro.aux`, `intro.log`, and `intro.dvi`. The file `intro.aux` is used to manage references and you need not pay any attention to this file. The file `intro.log` contains a complete log of the compilation process and is accessible from the Project menu in WinEdt. It is useful for debugging purposes, but you will rarely have need of this file. However, the third file, `intro.dvi`, is called a “device independent file (DVI),” and is the direct result of our compiling `intro.tex`. This DVI file is the file that allows you to read your work in textbook form. Click the DVI preview icon in WinEdt. This will open the file `intro.dvi` in the previewer for viewing.

Return to WinEdt³ and click the `dvi` → `ps` icon. This action takes the device independent file, `intro.dvi`, and creates from it a Postscript file having the same name but a different extension, `intro.ps`. Return to the Windows Explorer and note the existence of this new file. Return to WinEdt and note that the little Ghost icon on the WinEdt tool bar has lit up and is now enabled. Click the Ghost icon and the file `intro.ps` will open in GSView, an application designed for viewing Postscript files. GSView is the application of choice for printing the final draft of your document.

2.1. New Paragraphs

You start a new paragraph by entering a blank line in your source code (two consecutive striking of the Enter key). At this point, it would be a good exercise to just do some normal typing to get the feel of how easy L^AT_EX can be. So, type in a few paragraphs, separating each with a blank line in the source, then recompile and view the resulting DVI file in YAP.

³The best way to toggle between running applications on a Windows platform is the Alt+Tab keystroke combination. Hold the Alt key down with your left thumb, then reach up and press the Tab key the appropriate number of times until the WinEdt icon is selected. Release all keys. Of course, you can also use the mouse to select the WinEdt icon from the taskbar, but this necessitates removing your hands from the keyboard, an annoying waste of time.

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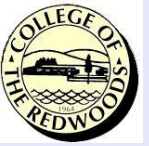
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2.2. A Word on Errors

As you enter your source code in WinEdt, you will constantly make errors. Sometimes you will catch these errors as you type, but more often than you would like to see, errors will show up when you compile your document. For example, edit the first line of `intro.tex` so that the file reads as follows.

```
\documentclass{article
\begin{document}
Hello, World!
\end{document}
```

Note that we left off the closing brace after the word ‘article.’ Click the \LaTeX icon to compile the file. On our system, the DOS box remains open and reports the following error.

```
Runaway argument? {article \begin {document} Hello, World! \end
{document} ! File ended while scanning use of \@fileswithoptions.
(inserted text)
\par
(*) Intro.tex
?
```

First time users of \TeX systems are often frustrated with the error messages supplied by the compiler. Not to worry, even advanced \TeX users find these error messages somewhat cryptic. However, a little common sense and the patience to read the error message will usually cure the error. In this case, for example, the compiler is reporting a “Runaway argument.” This usually means that we’ve left off a closing brace on the argument to some command, as is certainly the case here in the first line where we have entered `\documentclass{article}`.

Note how the system has paused, printing a question mark on the screen, and is awaiting a response from the user. At this point you can enter the letter `h` and hit the Enter key. The compiler will attempt to provide some help.

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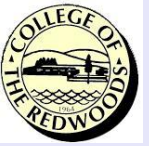
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? h I suspect you have forgotten a '}', causing me to read past where you wanted me to stop. I'll try to recover; but if the error is serious, you'd better type 'E' or 'X' now and fix your file.

?

Hitting `x` followed by the Enter key closes the DOS box and returns to the editor. Hitting the letter `e` followed by the Enter key also closes the DOS box, but, if your system is configured properly, this will also instruct the compiler to return to the line in the source where the error occurred. This is very useful in the debugging process.

One final command is useful, and that is the keystroke combination `Ctrl+Z`. This will usually close the DOS box in sticky situations and return to the editor. One final desperate measure is the keystroke combination `Ctrl+Break`, should something go horribly wrong.

Important! Don't leave DOS boxes open. If you don't take care of the error and leave a DOS box open, it will probably interfere with subsequent compilations.

3. Scientific Papers in LaTeX

Every well written scientific paper contains these key ingredients: the title, author, and date, an abstract, logically arranged sections and subsections, good references throughout, and a bibliography citing references.

Let's begin with the title page.

3.1. The Title Page

The area in the source that lies between the opening `\documentclass{article}` and the line indicating the beginning of the main body, `\begin{document}`, is called the *preamble* of the document. It is in this area that you initialize the title, author, and date.

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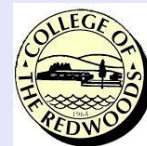
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Add this additional code to your source, `intro.tex`, recompile and view the result in YAP.⁴

```
\documentclass{article}
\title{Hello, World!}
\author{Your Name}
\date{Today's Date}
\begin{document}
\maketitle
Hello, World!
\end{document}
```

Note that the title, author, and date are initialized in the preamble, but the actual making of the title is accomplished with the `\maketitle` command, which is placed immediately following the `\begin{document}` command.

Sometimes it is preferred to have a separate title page. This is easily accomplished with one of the many options available to the `\documentclass` command. Adjust your source as follows, recompile, then view the resulting DVI file in YAP.

```
\documentclass[titlepage]{article}
\title{Hello, World!}
\author{Your Name}
\date{Today's Date}
\begin{document}
\maketitle
Hello, World!
\end{document}
```

Next, every good article must have an abstract.

⁴There are a large number of DVI viewers available on the internet. MiKTeX's viewer is called YAP, which stands, somewhat facetiously, for "Yet Another Previewer."

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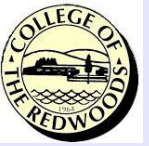
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3.2. The Abstract

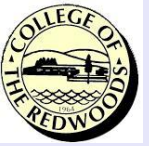
An abstract is a short synopsis of your article. The basic idea is simple. It must be short and to the point, but it must also be a hook. You want people to read further. It is often the case, due to the vast amount of information available on the internet and in databases, that readers will read no further if they don't find what they need in your abstract. So, writing a good abstract is essential to the success of your article.

As our abstract is for demonstration purposes only, we'll keep it short. Adjust your source to include the new lines that follow, recompile, and view the result in YAP. Note that we've removed the `titlepage` option.

```
\documentclass{article}
\title{Hello, World!}
\author{Your Name}
\date{Today's Date}
\begin{document}
\maketitle
\begin{abstract}
This is a very short abstract.
\end{abstract}
Hello, World!
\end{document}
```

Replace the `titlepage` option (as in `\documentclass[titlepage]{article}`) and recompile. In this case, the abstract is put on a separate page, which may be desirable in articles that run for many pages. However, in the case of a ten-page term paper, it might be better to have the abstract on the same page as the title and the opening lines of text. This is accomplished by removing the `titlepage` option as was done in the source above.

Any good scientific paper must have sound logical structure. This is best accomplished by breaking your ideas into sections and subsections.



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3.3. Section Headers

A section is similar in form to the paragraph. A good paragraph has a topic sentence, and when you begin to move away from the central theme introduced by your topic sentence, it's time to start a new paragraph. Sections are similar. A section discusses a central idea, but it is usually composed of several paragraphs. However, all of the paragraphs are usually constructed about a unifying central idea. When the flow of the writing moves on to another central idea, it might be time to create a new section.

Within each section, you might feel the need to break your central idea into smaller logical units to ease the explanation of the central idea. If this is the case, then use subsections. An excellent way to organize your writing is to craft a good outline. Think of the sections and subsections of your paper as the headers and subheaders listed in your outline.

Once you've decided on the logical structure of your paper, it is an easy task to set sections and subsections. There are even subsections, but the good writer will be careful not to get too carried away. Just because you can do something, doesn't mean you should. Without further ado, we add a simple section and subsection to our source code. Make these changes to `intro.tex`, recompile, and view the result in YAP.

```
\documentclass{article}
\title{Hello, World!}
\author{Your Name}
\date{Today's Date}
\begin{document}
\maketitle
\section{Introduction}
\subsection{Proclomation}
Hello, World!
\end{document}
```

By necessity, scientific papers are likely to contain a lot of mathematical expressions and symbols. This is the main reason that \TeX and \LaTeX are used to typeset mathematical and

scientific papers. With $\text{T}_\text{E}\text{X}$ and $\text{L}^{\text{A}}\text{T}_\text{E}\text{X}$, you get textbook quality typesetting of mathematics.

3.4. Typesetting Mathematics

It is beyond the scope of this introductory article to give a complete rendition of mathematical typesetting. Rather, we have a less lofty intent. We just want to learn enough to get you on your way. After that, you will learn new mathematical typesetting routines as the need arises.

To save space, we will no longer display the entire source file. Rather, we will give you fragments of code that you are to insert and test in the file `intro.tex`. It is best to put these fragments directly after the line `Hello, World!` in the source. Then recompile and view the result. Let's begin.

There are two basic types of mathematical typesetting, in-line code and displayed code. In-line mathematics appears right in the line of type, as in $f(x) = a_1x^2 + a_2x + a_3$. But displayed mathematics appears on separate lines, centered in the middle of the paper or screen for affect.

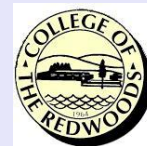
$$f(x) = a_1x^2 + a_2x + a_3$$

There are two basic types of mathematical typesetting, in-line code and displayed code. In-line mathematics appears right in the line of type, as in `$f(x)=a_1x^2+a_2x+a_3$`. But displayed mathematics appears on separate lines, centered in the middle of the paper or screen for affect.

```
$$f(x)=a_1x^2+a_2x+a_3$$
```

Just surround in-line mathematics with single-dollar signs, and displayed mathematics with double-dollar signs. What could be simpler? Note that the symbol `^` takes the very next character and typesets it as a superscript, while the symbol `_` (the underscore) is used for subscripts. To typeset a_{ij} , use braces as grouping symbols, as in `a_{ij}`.

In many situations, one can almost guess the appropriate $\text{L}^{\text{A}}\text{T}_\text{E}\text{X}$ command. For example, `\frac` is used to construct fractions.



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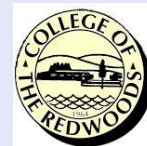
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In line fractions should be typeset differently than displayed fractions. For example, the form $f(x) = (x + 1)/(x - 1)$ is most appropriate for inline display, but the displayed fraction should be typeset as follows.

$$f(x) = \frac{x + 1}{x - 1}$$

In line fractions should be typeset differently than displayed fractions. For example, the form $f(x)=(x+1)/(x-1)$ is most appropriate for inline display, but the displayed fraction should be typeset as follows.

```
$$f(x)=\frac{x+1}{x-1}$$
```

If we had used the `\frac` command inline, it would have caused an inordinate amount of spacing to appear between lines. Again, just because something is possible, it doesn't mean that its use is appropriate in all situations.

It's easy to guess the command for square root, and trig functions and greek letters are naturally defined.

$$\sqrt{1 - \sin^2 \theta} = \cos \theta$$

It's easy to guess the command for square root, and trig functions and greek letters are naturally defined.

```
$$\sqrt{1-\sin^2\theta}=\cos\theta$$
```

Use your mouse and right-click WinEdt's toolbar. From the resulting popup menu, check **Show GUI Page Control**. There are literally hundreds of icons on this toolbar. Click on any one of them and note that WinEdt places the corresponding L^AT_EX code for the symbol in your document.

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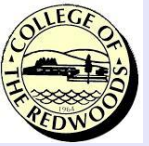
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3.5. AMS Math

The American Mathematical Society provides an additional set of macros for typesetting mathematics. In the preamble of your documents, enter the command `\usepackage{amsmath}`. You now have access to literally hundreds of new commands.

The `amsmath` package provides a number of commands for typesetting matrices. The ampersand `&` is used to separate elements in a row and `\\` is used to signal the end of a row.

A 3×3 Hilbert matrix is defined by $H = (h_{ij})$, where

$$h_{ij} = \frac{1}{i + j - 1}.$$

The Hilbert matrix in this case is

$$H = \begin{pmatrix} 1 & 1/2 & 1/3 \\ 1/2 & 1/3 & 1/4 \\ 1/3 & 1/4 & 1/5 \end{pmatrix}.$$

```
A 3\times 3 Hilbert matrix is defined by $H=(h_{ij})$, where
$$h_{ij}=\frac{1}{i+j-1}.$$
The Hilbert matrix in this case is
$$H=\begin{pmatrix}
1 & 1/2 & 1/3\\
1/2 & 1/3 & 1/4\\
1/3 & 1/4 & 1/5
\end{pmatrix}.$
```

The delimiters `\begin{bmatrix}... \end{bmatrix}` produce bracketed matrices, while the delimiters `\begin{vmatrix}... \end{vmatrix}` are used to typeset the determinant.

The `amsmath` package also provides a number of environments for typesetting displayed equations in your document. For example, to number and label an equation for future reference,

use the equation environment.

$$\ln x = \int_1^x \frac{1}{t} dt \quad (1)$$

Now you can refer to this equation (1) later in the narrative.

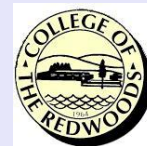
For example, to number and label an equation for future reference, use the equation environment.

```
\begin{equation}\label{eq:1}
\ln x = \int_1^x \frac{1}{t} dt
\end{equation}
```

Now you can refer to this equation[~]\eqref{eq:1} later in the narrative.

The `align` environment is used to align a sequence of equations. For example, if $a_k = 1/k - 1/(k + 1)$, then

$$\begin{aligned} \sum_{k=1}^n a_k &= \sum_{k=1}^n \left(\frac{1}{k} - \frac{1}{k+1} \right) \\ &= \left(1 - \frac{1}{2} \right) + \left(\frac{1}{2} - \frac{1}{3} \right) + \cdots + \left(\frac{1}{n} - \frac{1}{n+1} \right) \\ &= 1 - \frac{1}{n+1} \end{aligned}$$



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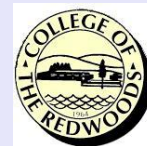
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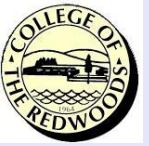
```
For example, if  $a_k = 1/k - 1/(k+1)$ , then
\begin{align*}
&\sum_{k=1}^n a_k \\
&= \sum_{k=1}^n \left( \frac{1}{k} - \frac{1}{k+1} \right) \\
&= \left( 1 - \frac{1}{2} \right) + \left( \frac{1}{2} - \frac{1}{3} \right) \\
&\quad + \cdots + \left( \frac{1}{n} - \frac{1}{n+1} \right) \\
&= 1 - \frac{1}{n+1} \\
\end{align*}
```

Note that the ampersand & is used to align the equations, in this case, on the equal sign on each line. Further, note that a new line is indicated with `\\`. The construct `\left(`, which must always be matched with a corresponding `\right)`, provides parentheses that expand in height to match what is contained between them. Note that we used `align*`, which suppresses the numbering of equations. Try the above code in a `\begin{align} . . . \end{align}` environment and note the difference.

The `amsmath` package provides a method for numbering and labelling a block of equations. For example, solve the system

$$\begin{aligned} x_1 + 2x_2 - 3x_3 &= 1 \\ 2x_1 + x_2 + 4x_3 &= 0 \\ -x_1 - x_2 + 5x_3 &= 0 \end{aligned} \tag{2}$$

for x_1 , x_2 , and x_3 . Is system (2) nonsingular?



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```
For example, solve the system
\begin{equation}\label{sys:1}
\begin{aligned}
x_1+2x_2-3x_3&=1\\
2x_1+x_2+4x_3&=0\\
-x_1-x_2+5x_3&=0
\end{aligned}
\end{equation}
for  $x_1$ ,  $x_2$ , and  $x_3$ . Is \eqref{sys:1} nonsingular?
```

The packages from the American Mathematical Society also provide a variety of new symbols. If you place `\usepackage{amssymb}` in the preamble of your document source, then `\mathbb{R}` will produce the symbol used for the set of real numbers by mathematicians.

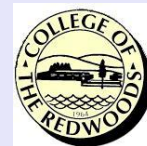
3.6. The Bibliography

Any good writer will include a list of references at the end of her paper. Researchers with vast arrays of reference materials will use an application called BiBTeX to manage citations. However, for smaller papers, it is probably easier to manage your own references. So, how to proceed?

At the end of your paper, start a new section between a `\begin{thebibliography}{99}... \end{thebibliography}` pair. In this scenario, citations will be numbered in the output. The number 99 is used to save space. It is not saying that you expect to list 99 references. Rather, you are reserving space for the numbers of your references, and you don't expect that any number in your list will take up more space than the number 99.

Once you have started your environment, list your references with the `\bibitem` command. For numbered citations, use `\bibitem{label}`. For example,

```
\bibitem{kn:gnus} D. E. Knudson. {\em 1966 World Gnus Almanac.}
```



A completed bibliography will look something like this.

```
\begin{thebibliography}{99}
\bibitem{kn:gnus} D. E. Knudson. {\em 1966 World Gnus Almanac.}
\end{bibliography}
```

Finally, in your source, should you want to reference one of the works in your bibliography, use `\cite{kn:gnus}`.

4. Homework Exercise

Consider the matrix

$$A = \begin{pmatrix} 2 & 2 & -4 \\ 4 & 4 & 0 \\ -3 & 2 & 1 \end{pmatrix}$$

1. By hand, perform an LU decomposition of matrix A . In your writeup, on notebook paper, craft an explanation of the steps of your process similar to what you would read in a textbook. Use lots of prose explaining how you went from matrix to matrix in the decomposition process. Give your paper a title, author name, date, and abstract. Label equations and make references in the narrative to labelled equations, systems, and/or matrices. Create a bibliography at the end, listing any reference materials used. This handwritten paper is due Friday, at the beginning of class.
2. Once your handwritten paper is complete, typeset your paper using \LaTeX . This typeset version is due at the beginning of class the following Friday.

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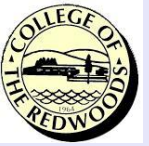
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5. Getting and Installing a TeX System

The first step is downloading all of the software that you will need. We list the appropriate links for you here. Note that a complete TeX system requires extensive downloading of files, which really takes a long time using modem and dial up connections. Therefore, you might want to bring a zip disk to school and see me for the files. I will copy all of them onto your zip disk for you. Alternatively, if you want personal experience downloading the required files, you can download the necessary files in the lab and transfer them to a zip disk.

- You will need Ghostscript. The software you download depends on your platform, all of which can be found at <http://www.cs.wisc.edu/~ghost/doc/AFPL/get700.htm>. For Windows 95, 98, and 2000, you want to download and install

<ftp://mirror.cs.wisc.edu/pub/mirrors/ghost/AFPL/g700/g700w32.exe>.

It is an easy install, simply double-click the downloaded file and accept all of the defaults.

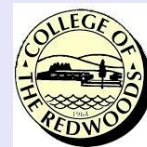
- You will also need to download and install the Ghostscript viewer so that you can view postscript and encapsulated postscript files. It is called GSView and is located on the same page as Ghostscript. For windows 95, 98, and 2000, download and install

<ftp://mirror.cs.wisc.edu/pub/mirrors/ghost/ghostgum/gsv40w32.exe>.

It is an easy install, simply double-click the downloaded file and accept all of the defaults.

- The next download is a bit more involved. First, go to <http://www.miktex.org/>. There you will find a number of important links regarding the MiKTeX software. However, the download page is located at

<http://www.miktex.org/2.1/index.html>



Here, click the “MiKTeX Install Now” icon. This will open a Save As dialog. Click the Save button to save the file `setup.exe` to your machine.

1. Once the download is complete, double-click the file `setup.exe`, starting the MiKTeX setup wizard. Click Next to proceed.
 2. Select “Download only,” then click Next to proceed.
 3. You must choose your package set. At this point, you could select “Small,” and later use MiKTeX’s Package Installer to install new packages as you need them, but selecting “Large” at this stage has always been a good choice for the applications I use in my daily work with \TeX and \LaTeX . Click the Next button.
 4. You must now select a download site (some are slow, others are quicker). I have had fair success with the Sunsite addresses. Click Next.
 5. You are asked where you want the files stored. Accept the default or change locations and click Next. I like to put the download files in the same directory where I placed the `setup.exe` file. Click Next after making your directory selection.
 6. You will be given a screen reviewing the choices you’ve made. Click Next and the download begins. Go and get a cup of coffee.
- Once the download of the MiKTeX installation files is complete, transfer the files to your zip disk and take it home with you. Once home, transfer the files to your hard disk as the installation will be faster. Double-click the `setup.exe` file again to start the installation.
 1. Click the Next button to begin.
 2. Select the “Install” radio button and click Next.
 3. Select the same package size and you selected during the download process and click Next.
 4. Locate the directory where you placed the files on your home system and click Next.

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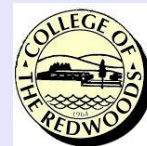
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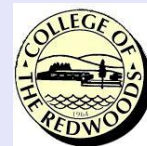
5. You will be asked for a destination to install Miktex. Typically, a first installation recommends C:/Program Files/Miktex. However, spaces in file names are a big NoNo, so I recommend C:/Miktex, or on another partition, D:/Miktex, or the like. Click Next.
 6. Accept the Program Folder default name and click Next.
 7. Create a local TEXMF tree. This is used to store fonts that are created on-the-fly, and it is also an area to save changes local to your system. I typically use C:/localtexmf, or the like, abhorring spaces in filenames with a passion. Click Next after making this selection.
 8. Don't add any additional TEXMF trees. Click Next to continue.
 9. You are given a chance to review setup information. Click Next to start the installation.
 10. I would normally say "Go and get a cup of coffee," but it is informative to watch what files and applications are being installed. No need to take notes, it happens too fast, but you may remember some of the names later.
- The next step is to download WinEdt, the editor that is preconfigured to run with MiKTeX. Be careful to note the spelling, WinEdt. It is not WinEdit. Be careful, there is actually a page, <http://www.winedit.com>, which is another editor completely unrelated to our task. The correct download site is

<http://www.winedt.com/>

where you can find all of the information you need about WinEdt. The actual file is downloaded at the following link.

<ftp://ctan.tug.org/tex-archive/systems/win32/winedt/winedt5.exe>

Clicking this link will open a Save As dialog. Click Save to store `winedt5.exe` on your system. Remember where you place the file.



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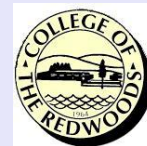
- Installing WinEdt is a two-step process.
 1. First, double-click `winedt5.exe` to unzip all of the files for the installation process. Select a folder destination and click Unzip.
 2. Move to the folder where the installation files were unzipped. Double-click the `setup.exe` file. Accept all the defaults. Easy installation.
 3. Once WinEdt is installed, start the program. You will be presented with a configuration screen that is way too complicated to worry about. Close it up and you can begin using WinEdt. Later, when you become more expert in the use of WinEdt, you can revisit this screen and make changes, should you deem them necessary.
- There are a couple of configuration tasks to be done.
 1. From WinEdt, open the file `/Miktex/miktex/config/miktex.ini`. Make these changes to the ini file.

```
;; Editor=notepad "%f"  
Editor=f:\winedt\winedt.exe " [Open(|%f|);SelLine(%l,7)] "  
;; Editor=emacs +%l "%f"  
;; Editor=notepad "%f"
```

Here, the double-semicolons are comments. Note that I've commented out the notepad editor, uncommented the WinEdt editor, and made some changes. Note that my WinEdt may be located on a different drive and in a different directory than on your system. Make the appropriate changes. Save and close the `miktex.ini` file.

2. In America, we use US Letter size paper as the default. In WinEdt, open `/Miktex/dvips/config/config.ps` and rearrange printing lines in the following order. This assures that US Letter is selected by default.

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



```
@ letter 8.5in 11in
@+ %%BeginPaperSize: Letter
@+ letter
@+ %%EndPaperSize

@ a4 210mm 297mm
@+ ! %%DocumentPaperSizes: a4
@+ %%BeginPaperSize: a4
@+ a4
@+ %%EndPaperSize
```

- Registration of WinEdt is free for 30 days. After that you must register the product. Student registration costs \$30 and information regarding registration can be located at

<http://www.winedt.com/registration.html>

Pay the \$30! This is the finest editor around, worth every penny! I use it for everything, HTML, Perl, \TeX programming in C, to writing letters of recommendation.

- Finally, in fairness, there is an alternate plan for installation, one that involves \MiKTeX , \AucTeX , and Emacs, one of the world's most powerful editors, usually used by people on UNIX and Linux systems, but now being ported to Windows. All of the applications named are freeware. The installation is a bit more involved, but Claus Dethlefsen has written an excellent set of instructions, should you choose this path.

<http://www.math.auc.dk/~dethlef/Tips/>

6. Support and Reference Materials

There is a huge amount of information on \TeX and \LaTeX on the web. There are also a large variety of texts written on \TeX and \LaTeX . Let's begin with the books.

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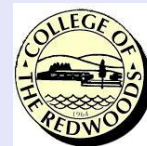
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- *The T_EXBook*, Donald Knuth, Addison Wesley. This is the *definitive* source on T_EX written by the person who created T_EX. Any serious mathematics and/or science student should have this text on their shelf.
- *L^AT_EX, A Document Preparation System. User's Guide and Reference Manual*, Leslie Lamport, Addison Wesley. This is the definitive guide for L^AT_EX, written by the creator of L^AT_EX.
- There are a number of free tutorials on the web. I list four of the finest I know about.
 1. A *Gentle Introduction to T_EX* is just that, one of the easiest introductions to the T_EX language I've seen. About 100 pages, and once you're through, you are pretty proficient in the use of plain T_EX.

<http://www.ctan.org/tex-archive/info/gentle/gentle.pdf>

2. The *Not So Short Introduction to L^AT_EX2 ϵ* is an excellent beginner's tutorial for the L^AT_EX language.

<http://www.ctan.org/ctan/tex-archive/info/lshort/english/lshort.pdf>

3. For graphics in L^AT_EX documents, there is no finer introduction than *Using Imported Graphics in L^AT_EX2 ϵ* .

<http://www.ctan.org/tex-archive/info/epslatex.pdf>

4. Finally, an excellent introduction to the math constructs of the American Mathematical Society's `amsmath` package is the *Short Math Guide for L^AT_EX*.

<ftp://ftp.ams.org/pub/tex/doc/amsmath/short-math-guide.pdf>

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