Alternatives to Word Processing & Equation Editor to create Exams and Worksheets

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An alternative to word processing plus equation editor is using TeX and/or LaTeX. TeX was created as a major project by the notable computer scientist, Donald E. Knuth at Stanford University in 1977. The result was the enormous program called TeX pronounced *TECH*. LaTeX is a collection of macros built on top of TeX created by Leslie Lamport. LaTeX is used by mathematical journals across the world. It is simply the standard. TeX is very robust that it can be run in almost every operating system possible. It can be run in Linux, Unix, Macs, etc. A very reliable implementation is available for Windows (Win 9x, 2000, NT, XP) called MIKTEX, is available for free (`http://www.miktex.org`). You may get MIKTEX off the internet for free or you may decide to get the cd which is also available. MIKTEX comes with the following:

MiKTeX (pronounced mick-tech) is an up-to-date implementation of TeX and related programs for Window (all current variants) on x86 systems. TeX is a famous typesetting system invented by D. E. Knuth.

MiKTeXs main features include:

- easy to install

- complete

- enhanced TeX compiler capabilities: auto-insertion of source specials, C-style error messages,

- enhanced previewer capabilities: forward/inverse DVI search, supports graphics, color, magnifying glass

- open source

The MiKTeX distribution consists of the following components:

- TeX the classic TeX compiler

- pdfTeX, e-TeX, pdf-e-TeX, Omega various TeX variants

- Dvipdfm converts TeX output into PDF documents

- MetaPost converts picture specifications into PostScript commands

- macro packages TeX macro packages (including LaTeX2e)

- Type1 fonts Computer Modern, URW (standard Adobe replacements)

- Yap a viewer for TeX output

- TeXify a TeX compiler driver

- MiKTeX Options assists in configuring MiKTeX

- lots of utilities tools for the creation of bibliographies & indexes, PostScript utilities, and more

If you are serious about using TeX/LaTeX you should also take into consideration the following packages:
Ghostscript:
    Ghostscript (www.ghostscript.com) is an interpreter for the PostScript language. Yap uses Ghostscript to display embedded EPS graphics.
Adobe Acrobat Reader:
    Adobe Acrobat Reader (www.adobe.com/prodindex/acrobat/readstep.html) is a PDF file viewer.
TeXnicCenter:

TeXnicCenter (www.toolscenter.org) TeXnicCenter is an integrated development environment (IDE) for developing LaTeX-documents on Microsoft Windows (Windows 9x/ME, NT/2000).

TTH

TTH a TEX to HTML converter. create fast viewing web pages with mathematics.

A list of TEX/LATEX editors is available so that you can explore your options.

Files associated with TEX

*.tex – source file in plain ascii.

*.log – writes a summary about the the TEX compilation, error messages, etc.

*.dvi – DeVice Independent file. TEX output file where the results are encoded. One van view the dvi file using YAP which comes with the MIKTEX distribution.

Files associated with LATEX

The above files are also associated plus the following types

*.bib – bibliography file

*.aux – auxilary file

*.toc – table of contents

*.lof – list of figures

*.lot – list of tables

*.ind – index file

Both TEX and LATEX can be run in different modes. When one runs TEX in Dos, i.e. Dos Prompt one runs it in interactive mode. One can see/be informed of the error messages or other messages that the TEX compiler issues. The other mode that it runs is nonstop mode with source specials by looking at the dvi file we can go back and edit the source code.

What is needed to create a TEX or LATEX document. Any text editor like notepad, wordpad, Notetab, etc will work even MS Word, WordPerfect can also work, though you must save the file with the extension *.tex and not have taken advantage of the formatting, i.e., bold, italic, underline, etc..

The art of typesetting is that you do not need to put up with the word processor to equation editor to word processor cycle. You sacrifice what you have been used to and all you need to start is to download the latest MIKTEX version that is available and start working from there. You might want to try a TEX or LATEX editor but we should wait for a specialized list of those.

After the installation of MIKTEX on your computer and having restarted you can go to the dosprompt [START-PROGRAMS-MSDOS PROMPT] as follows which could any path maybe A: or the CDRW drive
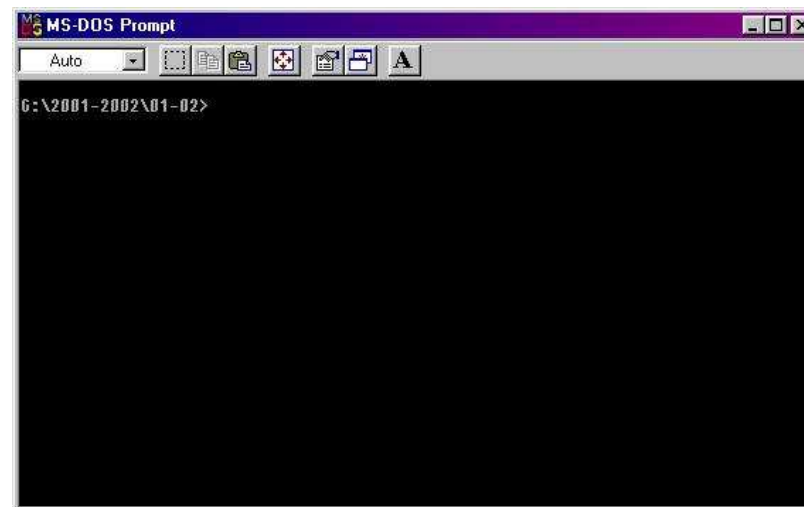
you type edit and type a file as shown in the example below
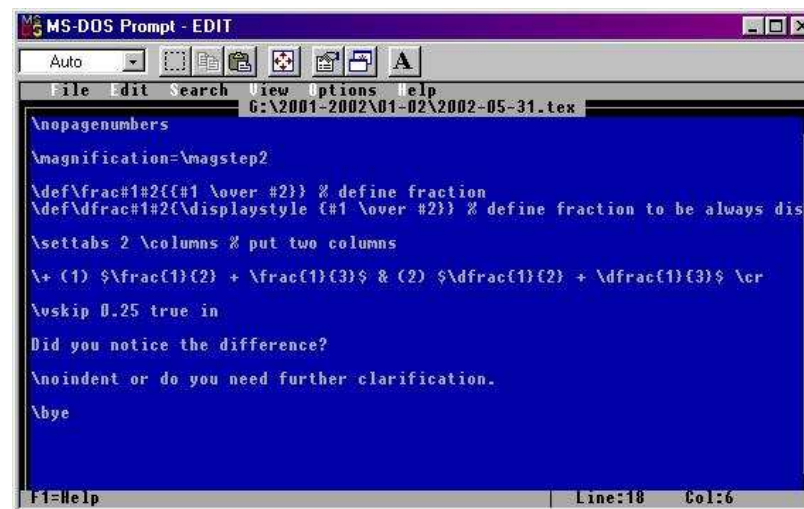
then you go back to the dosprompt and type
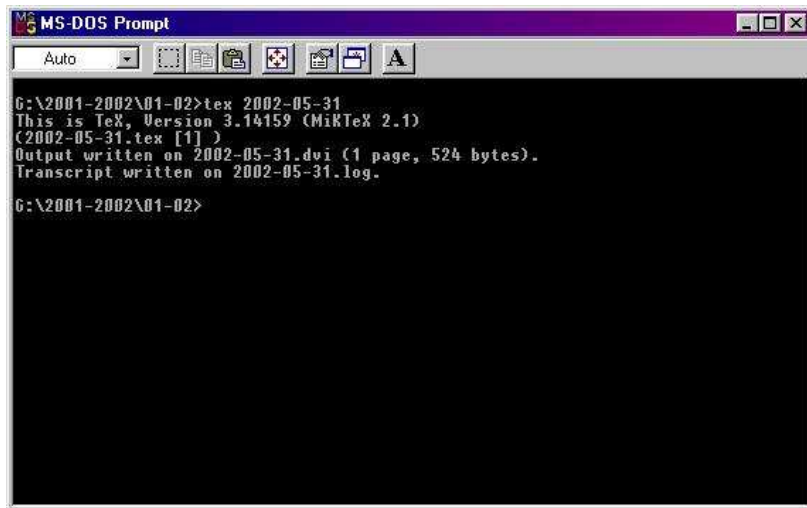
After this has been completed you may view the results that you have created
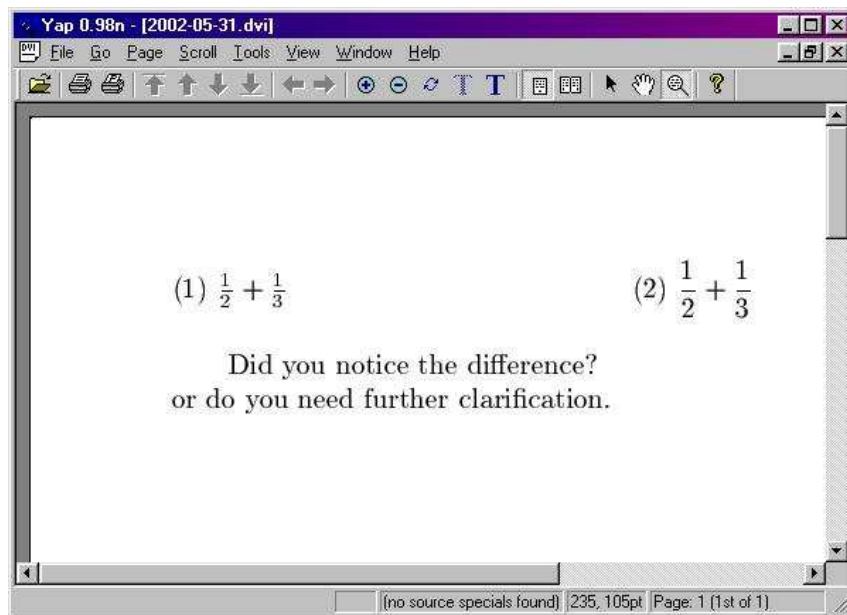
It is not as simple as that though. You will have to learn some commands to get started. We should discuss those and special character sequences.

How do you type mathematics? Simple you enclose the mathematical expression between dollar signs. For instance you want a math x you type `$x$` and you get x. In TeX, if you want the expression/equation to be centered you enclose it between double dollar signs. For instance the Pythagorean Theorem

$$x^2 + y^2 = z^2$$

is typed as

```
$$
x^{2} + y^{2} = z^{2}
$$
```

You can put an equation number by using the command \eqno{ }.

TeX and LaTeX are very different from word processors. Unlike a word processor which is a WYSIWYG (What you see is what you get), TeX is a typesetting system. You enter some text and commands and you get beautiful output. Math is very easy to typeset. Look at the structure of the documents

<div align="center">TeX document structure</div>

```
\nopagenumbers

\magnification=\magstep1

% font size range from magstep0 up to magstep5

\TeX{} can produce beautiful output.

\bye % tells the TeX compiler end of input
```

produces

> TeX can produce beautiful output.

<div align="center">LaTeX document structure</div>

```
\documentclass[12pt]{article}

\begin{document}

Hello world!  Welcome to the new world of \LaTeX{}

\end{document}
```

produces

> Hello world! Welcome to the new world of LaTeX.

Many commands can both be used in TeX and LaTeX. There are even some macros that you can incorporate into your work namely $\mathcal{AMS}$TeX and $\mathcal{AMS}$LaTeX.

<div align="center">Special character sequences</div>

$\backslash$ $\Rightarrow$ \, \# $\Rightarrow$ #, \$ $\Rightarrow$ \$, \% $\Rightarrow$ %, \& $\Rightarrow$ &,

<div align="center">TeX Text Commands</div>

{\rm Text in Roman} $\Rightarrow$ Text in Roman
{\it Text that is in italic} $\Rightarrow$ *Text that is in italic*
{\bf Text in boldface} $\Rightarrow$ **Text in boldface**
{\sl Text that is slanted} $\Rightarrow$ *Text that is slanted*
{\tt Text in Typewriter font} $\Rightarrow$ Text in Typewriter font
To get Sans Serif Font in TeX you need to declare it in the beginning. In the heading you put the following \font\sf = cmss10 and use

{\sf Text in Sans Serif Font} ⇒ Text in Sans Serif Font

LaTeX Text Commands

\emph{Text that is emphasized} ⇒ *Text that is emphasized*
\textmd{Medium Text} ⇒ Medium Text
\textrm{Text in Roman} ⇒ Text in Roman
\textit{Text that is in italic} ⇒ *Text that is in italic*
\textbf{Text in boldface} ⇒ **Text in boldface**
\textsc{Text in Small Caps} ⇒ TEXT IN SMALL CAPS
\textsf{Text in Sans Serif Font} ⇒ Text in Sans Serif Font
\textsl{Text that is slanted} ⇒ *Text that is slanted*
\texttt{Text in Typewriter font} ⇒ Text in Typewriter font

Spacing commands

Sample Code and then the results

```
Here is a regular sentence.

I am following after an empty line.

\smallskip

Now, I have a small skip after the other sentence.

\medskip

Well, what's the difference if any?  Let's try a bigger skip.

\bigskip

This the big skip that is suggested by the command.  How does it look.

If we need to skip 1 in we can use the command \vspace{1in}

\vspace{1in}

And you can measure to verify that 1 inch was skipped.
```

Here is a regular sentence.
I am following after an empty line.

Now, I have a small skip after the other sentence.

Well, what's the difference if any? Let's try a bigger skip.

This the big skip that is suggested by the command. How does it look.
If we need to skip 1 in we can use the command \vspace{1in}

And you can measure to verify that 1 inch was skipped.

MATHEMATICAL FUNCTIONS

\arccos x ⇒ $\arccos x$	\arcsin x ⇒ $\arcsin x$
\arctan y ⇒ $\arctan y$	\arg y ⇒ $\arg y$
\cos \theta ⇒ $\cos\theta$	\cosh \theta ⇒ $\cosh\theta$
\cot \varphi ⇒ $\cot\varphi$	\coth \varphi ⇒ $\coth\varphi$
\coth t ⇒ $\coth t$	\csc t ⇒ $\csc t$
\det A ⇒ $\det A$	\dim ⇒ $\dim$
\exp x^{2} ⇒ $\exp x^2$	\gcd (12,18) ⇒ $\gcd(12,18)$
\hom ⇒ $\hom$	\inf ⇒ $\inf$
\lim_{x \to 0^{+}} ⇒ $\lim_{x\to 0^+}$	\liminf ⇒ $\liminf$
\limsup ⇒ $\limsup$	\Rightarrow \ker $\ker$
\lg ⇒ $\lg$	\ln x ⇒ $\ln x$
\max ⇒ $\max$	\min ⇒ $\min$
\sec x ⇒ $\sec x$	\sin x ⇒ $\sin x$
\sinh y ⇒ $\sinh y$	\sup ⇒ $\sup$
\tan \theta ⇒ $\tan\theta$	\tanh \theta ⇒ $\tanh\theta$
x \quad y ⇒ $x \quad y$	x \qquad y ⇒ $x \qquad y$
x \, y 3/18 quad ⇒ $x\,y$	x \: y 4/18 quad ⇒ $x\,y$
x \! y −3/18 quad ⇒ xy	x \; y 5/18 quad ⇒ $x\,y$

```
\[
\sin^{2} \theta + \cos^{2} \theta = 1
\]
```

⇓

$$\sin^2\theta + \cos^2\theta = 1$$

is not the same as

```
\begin{equation}
\sin^{2} \theta + \cos^{2} \theta = 1
\end{equation}
```

⇓

$$\sin^2\theta + \cos^2\theta = 1 \tag{1}$$

Law of cosines: inline $c^2 = a^2 + b^2 - 2ab \cos C$

Law of cosines: displayed:

$$c^2 = a^2 + b^2 - 2ab \cos C$$

Law of cosines: equation:

$$c^2 = a^2 + b^2 - 2ab \cos C \qquad (2)$$

The pythagorean theorem, law of cosines and law of sines in a unnumbered equation array

```
\begin{eqnarray*}
&{}& a^{2} + b^{2} = c^{2} \\
&{}& c^{2} = a^{2} + b^{2} - 2ab\cos C \\
&{}& \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{C}
\end{eqnarray*}
```

$$a^2 + b^2 = c^2$$
$$c^2 = a^2 + b^2 - 2ab \cos C$$
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{C}$$

The pythagorean theorem, law of cosines and law of sines in a numbered equation array

```
\begin{eqnarray}
&{}& a^{2} + b^{2} = c^{2} \\
&{}& c^{2} = a^{2} + b^{2} - 2ab\cos C \\
&{}& \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{C}
\end{eqnarray}
```

$$a^2 + b^2 = c^2 \qquad (3)$$
$$c^2 = a^2 + b^2 - 2ab \cos C \qquad (4)$$
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{C} \qquad (5)$$

The quadratic formula

$$ax^2 + bx + c = 0$$
$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$
$$x^2 + \frac{b}{a}x + \frac{b^2}{(2a)^2} = -\frac{c}{a} + \frac{b^2}{(2a)^2}$$
$$x^2 + \frac{b}{a}x + \frac{b^2}{4a^2} = -\frac{c}{a} + \frac{b^2}{4a^2}$$
$$x^2 + \frac{b}{a}x + \frac{b^2}{4a^2} = -\frac{4a \cdot c}{4a \cdot a} + \frac{b^2}{4a^2}$$
$$x^2 + \frac{b}{a}x + \frac{b^2}{4a^2} = -\frac{4ac}{4a^2} + \frac{b^2}{4a^2}$$
$$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$$
$$\sqrt{\left(x + \frac{b}{2a}\right)^2} = \sqrt{\frac{b^2 - 4ac}{4a^2}}$$
$$x + \frac{b}{2a} = \frac{\sqrt{b^2 - 4ac}}{2a}$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The possibilities are endless.

In TeX the command \frac is not available. However, if we want to use this command to symbolize a fraction you can define the command on top of input file like

```
\def\frac#1#2{{#1 \over #2}}
\def\norm#1{\left\Vert#1\right\Vert}
\def\abs#1{\left\vert#1\right\vert}
\def\set#1{\left\{#1\right\}}
```

or you may declare \input amstex and you now may make use of the macros made available by the American Mathematical Society.

In LaTeX the above definitions with the exception of \frac would become

```
\newcommand{\norm}[1]{\left\Vert#1\right\Vert}
\newcommand{\abs}[1]{\left\vert#1\right\vert}
\newcommand{\set}[1]{\left\{#1\right\}}
```

If you want to use these definitions in TeX you would use

```
$$ \abs{x} = \cases{-x, & $x < 0$ \cr x, & $x > 0$} $$
```

$$|x| = \begin{cases} -x, & x < 0 \\ x, & x > 0 \end{cases}$$

and in LaTeX it would be similar with the exception of the \begin{cases} \end{cases}

The norm of f is defined as

$$\|f\| = \sqrt{\int_a^b f(x)\,dx}$$

Combinations and permutations are easy if you want $\binom{5}{3}$ you type `${5 \choose 3}$` in both TeX and LaTeX. However, $\mathcal{AMS}$TeX and $\mathcal{AMS}$LaTeX have the commands \binom, \dbinom and other commands.

Roots are easy in TeX you may type

```
$$
\root n \of {x^{2} + y^{2}}
$$
```

$$\sqrt[n]{x^2 + y^2}$$

in LaTeX it changes to

```
\[
\sqrt[n]{x^{2} + y^{2}}
\]
```

$$\sqrt[n]{x^2 + y^2}$$

If you want to include graphics you may use LaTeX and after the documentclass specification you declare the usespackage specification

```
\usepackage{graphicx}
```

and you may include graphic files in various formats. The ones that give less hassle are the *.bmp bitmap and *.eps encapsulated postscript. If we want to post assignments with graphics on the net it would be wise to use Ghostscript. After the LaTeX compilation we use the command Dvips which stands for dvi to Postscript and keep the file in Postscript form or convert it to PDF using the ps2pdf option in Ghostscript. You could ask your students the following:

(1) Graph: $y = 3x + 5$
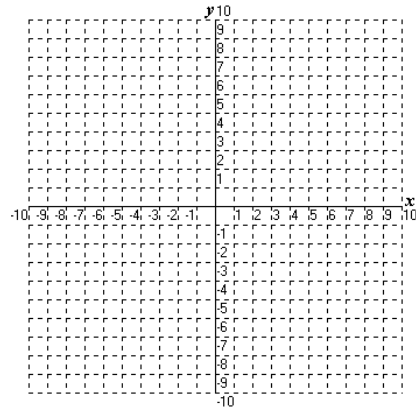
(2) Graph $y = \frac{2}{5}x - 3$
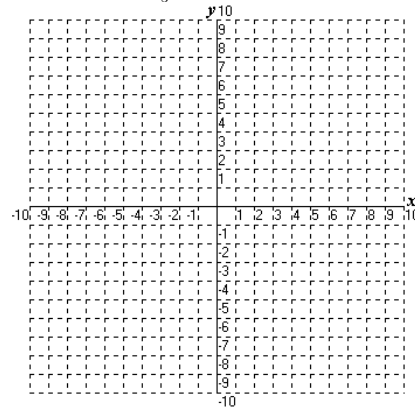
How did we get the graphs in there? We used the following specs

```
\begin{tabular}{ll}
(1) Graph: $y = 3x + 5$ & (2) Graph $y = \frac{2}{5}x - 3$ \\
\includegraphics[width=3.00in,height=3.00in]{10x10-00.bmp} &
\includegraphics[width=3.00in,height=3.00in]{10x10-00.bmp}
\end{tabular}
```

OPERATORS

MATH NAME	COMMAND NAME $\Rightarrow$ RESULT
less than or equal to	\leq $\Rightarrow \leq$
greater than or equal to	\geq $\Rightarrow \geq$
precedes	\prec $\Rightarrow \prec$
sucedes	\succ $\Rightarrow \succ$
triangle left	\triangleleft $\Rightarrow \triangleleft$
triangle right	\triangleright $\Rightarrow \triangleright$
not equal to	\neq $\Rightarrow \neq$
equivalent to	\equiv $\Rightarrow \equiv$
similar	\sim $\Rightarrow \sim$
approximate	\approx $\Rightarrow \approx$
congruent	\cong $\Rightarrow \cong$
perpendicular	\perp $\Rightarrow \perp$
propto	\propto $\Rightarrow \propto$
no space	xy $\Rightarrow xy$
negative space	x\!y $\Rightarrow xy$
4/18 quad space	x\:y $\Rightarrow x\,y$
5/18 quad space	x\;y $\Rightarrow x\;y$
normal space	x\ y $\Rightarrow x\ y$
ldots	\ldots $\Rightarrow \ldots$
cdots(center dots)	\cdots $\Rightarrow \cdots$
vdots(vertical dots)	\vdots $\Rightarrow \vdots$
ddots(diagonal dots)	\ddots $\Rightarrow \ddots$
hat	\hat{a} $\Rightarrow \hat{a}$
check	\check{a} $\Rightarrow \check{a}$
breve	\breve{a} $\Rightarrow \breve{a}$
acute	\acute{a} $\Rightarrow \acute{a}$
grave	\grave{a} $\Rightarrow \grave{a}$
tilde	\tilde{a} $\Rightarrow \tilde{a}$
bar	\bar{a} $\Rightarrow \bar{a}$
vector	\vec{a} $\Rightarrow \vec{a}$
dot	\dot{a} $\Rightarrow \dot{a}$
double dot	\ddot $\Rightarrow \ddot{a}$
plus minus	\pm $\Rightarrow \pm$
minus plus	\mp $\Rightarrow \mp$

MATH NAME	COMMAND NAME $\Rightarrow$ RESULT
times	`\times` $\Rightarrow \times$
divide	`\div` $\Rightarrow \div$
asterik	`\ast` $\Rightarrow *$
cdot	`\cdot` $\Rightarrow \cdot$
circle	`\circ` $\Rightarrow \circ$
big circle	`\bigcirc` $\Rightarrow \bigcirc$
bullet	`\bullet` $\Rightarrow \bullet$
circle times	`\otimes` $\Rightarrow \otimes$
circle plus	`\oplus` $\Rightarrow \oplus$
circle minus	`\ominus` $\Rightarrow \ominus$
circle dot	`\odot` $\Rightarrow \odot$
oslash	`\oslash` $\Rightarrow \oslash$
left arrow	`\leftarrow` $\Rightarrow \leftarrow$
right arrow	`\rightarrow` $\Rightarrow \rightarrow$
left right arrow	`\leftrightarrow` $\Rightarrow \leftrightarrow$
Left arrow	`\Leftarrow` $\Rightarrow \Leftarrow$
Right arrow	`\Rightarrow` $\Rightarrow \Rightarrow$
Left right arrow	`\Leftrightarrow` $\Rightarrow \Leftrightarrow$
Up arrow	`\uparrow` $\Rightarrow \uparrow$
down arrow	`\downarrow` $\Rightarrow \downarrow$
up down arrow	`\updownarrow` $\Rightarrow \updownarrow$
Up arrow	`\Uparrow` $\Rightarrow \Uparrow$
Down arrow	`\Downarrow` $\Rightarrow \Downarrow$
Up down arrow	`\Updownarrow` $\Rightarrow \Updownarrow$
left harpoon up	`\leftharpoonup` $\Rightarrow \leftharpoonup$
right harpoon up	`\rightharpoonup` $\Rightarrow \rightharpoonup$
left harpoon down	`\leftharpoondown` $\Rightarrow \leftharpoondown$
right harpoon down	`\rightharpoondown` $\Rightarrow \rightharpoondown$
maps to	`\mapsto` $\Rightarrow \mapsto$
long maps to	`\longmapsto` $\Rightarrow \longmapsto$
hook left arrow	`\hookleftarrow` $\Rightarrow \hookleftarrow$
hook right arrow	`\hookrightarrow` $\Rightarrow \hookrightarrow$
north east arrow	`\nearrow` $\Rightarrow \nearrow$
south east arrow	`\searrow` $\Rightarrow \searrow$
south west arrow	`\swarrow` $\Rightarrow \swarrow$
north west arrow	`\nwarrow` $\Rightarrow \nwarrow$
long left arrow	`\longleftarrow` $\Rightarrow \longleftarrow$
long right arrow	`\longrightarrow` $\Rightarrow \longrightarrow$
long left right arrow	`\longleftrightarrow` $\Rightarrow \longleftrightarrow$
Long left arrow	`\Longleftarrow` $\Rightarrow \Longleftarrow$
Long right arrow	`\Longrightarrow` $\Rightarrow \Longrightarrow$
Long left right arrow	`\Longleftrightarrow` $\Rightarrow \Longleftrightarrow$

not in	`\ni` $\Rightarrow \ni$
exists	`\exists` $\Rightarrow \exists$
for all	`\forall` $\Rightarrow \forall$
negation	`\neg` $\Rightarrow \neg$
wedge	`\wedge` $\Rightarrow \wedge$
vee	`\vee` $\Rightarrow \vee$
in	`\in` $\Rightarrow \in$
not in	`\notin` $\Rightarrow \notin$
union	`\cup` $\Rightarrow \cup$
intersection	`\cap` $\Rightarrow \cap$
big union	`\bigcup` $\Rightarrow \bigcup$
big intersection	`\bigcap` $\Rightarrow \bigcap$
subset	`\subset` $\Rightarrow \subset$
superset	`\supset` $\Rightarrow \supset$
subset or equal to	`\subseteq` $\Rightarrow \subseteq$
superset or equal to	`\supseteq` $\Rightarrow \supseteq$
partial derivative	`\partial` $\Rightarrow \partial$
nabla	`\nabla` $\Rightarrow \nabla$
infinity	`\infty` $\Rightarrow \infty$
imaginary	`\Im` $\Rightarrow \Im$
real	`\Re` $\Rightarrow \Re$
aleph	`\aleph` $\Rightarrow \aleph$
angle	`\angle` $\Rightarrow \angle$
bot	`\bot` $\Rightarrow \bot$
diamond	`\diamond` $\Rightarrow \diamond$
ell	`\ell` $\Rightarrow \ell$
wp	`\wp` $\Rightarrow \wp$
hbar	`\hbar` $\Rightarrow \hbar$
integral	`\int` $\Rightarrow \int$
sum	`\sum` $\Rightarrow \sum$
product	`\prod` $\Rightarrow \prod$
coproduct	`\coprod` $\Rightarrow \coprod$

invisible left, invisible right	`\left. \right.` $\Rightarrow$
left parentheses, right parenthesis	`\left( \right)` $\Rightarrow$ ()
left bracket, right bracket	`\left[ \right]` $\Rightarrow$ []
left brace, right brace	`\left\{ \right\}` $\Rightarrow$ {}
left floor, right floor	`\left\lfloor \right\rfloor` $\Rightarrow \lfloor \rfloor$
left ceiling, right ceiling	`\left\lceil \right\rceil` $\Rightarrow \lceil \rceil$
left langle, right rangle	`\left\langle \right\rangle` $\Rightarrow \langle \rangle$
left absolute value bar	`\left| \right|` $\Rightarrow ||$
norm	`\left| \right|` $\Rightarrow \|\|$
example of overbrace	`\overbrace{x^2+y^2=z^2}^{\hbox{Pythagorean Theorem}}`

$$\Rightarrow \overbrace{x^2 + y^2 = z^2}^{\text{Pythagorean Theorem}}$$

underbrace	`\underbrace{E=mc^{2}}_{Einstein}` $\Rightarrow \underbrace{E = mc^2}_{Einstein}$
fraction	`\frac{2}{3}` $\Rightarrow \frac{2}{3}$
regular fraction	`2/3` $\Rightarrow 2/3$
square root	`\sqrt{16}` $\Rightarrow \sqrt{16}$
cube root	`\sqrt[3]{x + y}` $\Rightarrow \sqrt[3]{x+y}$
supscripts	`2^{3}` $\Rightarrow 2^3$
superscripts	`x_{1}` $\Rightarrow x_1$
sup/sub scripts	`x^{2}_{i}` $\Rightarrow x_i^2$
summation	`\sum_{i=1}^{n} i = \frac{n(n + 1)}{2}` $\Rightarrow \sum_{i=1}^n i = \frac{n(n+1)}{2}$
summation	`\displaystyle \sum_{i=1}^{n} i = \frac{n(n + 1)}{2}`

$$\Rightarrow \sum_{i=1}^{n} i = \frac{n(n+1)}{2}$$

integral	`\int_{0}^{1} f(x)\,dx` $\Rightarrow \int_0^1 f(x)\,dx$
integral	`\displaystyle \int_{0}^{1} f(x)\,dx` $\Rightarrow \displaystyle\int_0^1 f(x)\,dx$
o integral	`\oint` $\Rightarrow \oint$
product	`\prod_{k=1}^{\infty} \frac{1}{k} \to 0` $\Rightarrow \prod_{k=1}^\infty \frac{1}{k} \to 0$
product	`\displaystyle \prod_{k=1}^{\infty} \frac{1}{k^{2}} \to 0`

$$\Rightarrow \prod_{k=1}^{\infty} \frac{1}{k^2} \to 0$$

coproduct	`\codprod` $\Rightarrow \coprod$
overline	`\overline{AB}` $\Rightarrow \overline{AB}$
underline	`\underline{CD}` $\Rightarrow \underline{CD}$
widehat	`\widehat{y}` $\Rightarrow \widehat{y}$
widetilde	`\widetilde{y}` $\Rightarrow \widetilde{y}$
stacking y on top of x	`\stackrel{y}{x}` $\Rightarrow \stackrel{y}{x}$
stacking x on top of y	`\stackrel{x}{y}` $\Rightarrow \stackrel{x}{y}$
Going TO	`\stackrel{TO}{\rightarrow}` $\Rightarrow \stackrel{TO}{\rightarrow}$
Going BACK	`\stackrel{BACK}{\leftarrow}` $\Rightarrow \stackrel{BACK}{\leftarrow}$
IN BOTH DIRECTIONS	`\stackrel{BOTHWAYS}{\leftrightarrow}` $\Rightarrow \stackrel{BOTHWAYS}{\leftrightarrow}$
Ray RS	`\stackrel{\rightarrow}{RS}` $\Rightarrow \stackrel{\rightarrow}{RS}$
Ray RQ	`\stackrel{\leftarrow}{QR}` $\Rightarrow \stackrel{\leftarrow}{QR}$
line TU	`\stackrel{\leftrightarrow}{TU}` $\Rightarrow \stackrel{\leftrightarrow}{TU}$
segment TU	`\overline{TU}` $\Rightarrow \overline{TU}$

GREEK LETTERS

`\alpha` $\Rightarrow \alpha$	`\beta` $\Rightarrow \beta$	`\chi` $\Rightarrow \chi$	`\delta` $\Rightarrow \delta$
`\epsilon` $\Rightarrow \epsilon$	`\phi` $\Rightarrow \phi$	`\varphi` $\Rightarrow \varphi$	`\gamma` $\Rightarrow \gamma$
`\eta` $\Rightarrow \eta$	`\iota` $\Rightarrow \iota$	`\kappa` $\Rightarrow \kappa$	`\lambda` $\Rightarrow \lambda$
`\mu` $\Rightarrow \mu$	`\nu` $\Rightarrow \nu$	`\o` $\Rightarrow o$	`\pi` $\Rightarrow \pi$
`\varpi` $\Rightarrow \varpi$	`\theta` $\Rightarrow \theta$	`\vartheta` $\Rightarrow \vartheta$	`\rho` $\Rightarrow \rho$
`\sigma` $\Rightarrow \sigma$	`\varsigma` $\Rightarrow \varsigma$	`\tau` $\Rightarrow \tau$	`\upsilon` $\Rightarrow \upsilon$
`\omega` $\Rightarrow \omega$	`\xi` $\Rightarrow \xi$	`\psi` $\Rightarrow \psi$	`\zeta` $\Rightarrow \zeta$
`\Delta` $\Rightarrow \Delta$	`\Gamma` $\Rightarrow \Gamma$	`\Lambda` $\Rightarrow \Lambda$	`\Pi` $\Rightarrow \Pi$
`\Theta` $\Rightarrow \Theta$	`\Sigma` $\Rightarrow \Sigma$	`\Upsilon` $\Rightarrow \Upsilon$	`\Omega` $\Rightarrow \Omega$
`\Xi` $\Rightarrow \Xi$	`\Psi` $\Rightarrow \Psi$		

The following code generates a grid that was seen repeatedly in the EOC and now could be seen in the new TAKS test. LATEX can help us with that also.

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\begin{tabular}{ll}
\begin{tabular}{|l|l|l|l|l|l|l|} \hline $\hspace{0.13in}$ &
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& $\hspace{0.13in}$ & $\hspace{0.13in}$ & $\hspace{0.13in}$ \\
& & & & \ . \ & & \\ %\vspace{0.05in}
\hline %& & & & & \\
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\end{picture} & \begin{picture}(0,0)
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\end{picture} & \begin{picture}(0,0)
\put(0.05,0.05){\circle{.2}} \put(0,0){$9$}%
\end{picture}  \\ \hline
\end{tabular}
```

				.		
⊕	⓪	⓪	⓪		⓪	⓪
⊖	①	①	①		①	①
	②	②	②		②	②
	③	③	③		③	③
	④	④	④		④	④
	⑤	⑤	⑤		⑤	⑤
	⑥	⑥	⑥		⑥	⑥
	⑦	⑦	⑦		⑦	⑦
	⑧	⑧	⑧		⑧	⑧
	⑨	⑨	⑨		⑨	⑨

After you installing MikTeX and TeXnicCenter you can customize it to suit your needs.

CUSTOMIZING TEXNICCENTER

TeXnicCenter is an integrated development environment (IDE) for developing LaTeX-documents on Microsoft Windows (Windows 9x/ME, NT/2000).

IDE means, that TeXnicCenter is an application, that integrates all the tools, needed to develop documents with LaTeX, in just one application. You have the editor to write your LaTeX files with, you can start the building process just by choosing a menu item and the output of the LaTeX compiler is written to a window of TeXnicCenter and analyzed, so that you can simply jump from one error, warning or bad box to another one.

Also viewing the generated output is easy with TeXnicCenter. Just choose a menu item and the correct viewer application will be started and if supported by the viewer, the output will be displayed at the position belonging to the current source position in TeXnicCenter.

TeXnicCenter's aim is to support the LaTeX-newbie by providing him/her the most important LaTeX constructs via menu and by abstracting the use of the LaTeX compiler and other tools like MakeIndex and BibTeX and even support the LaTeX-pro by providing a powerfull, fully customizable and integrated environment.

TeXnicCenter Creates 3 Profiles which are

```
LaTeX => DVI
LaTeX => PDF
LaTeX => PS
```

TeXnicCenter is customized to work with LaTeX. However, you may choose to use many other output profiles and take advantage of the packages that come with MIKTeX. For instance, I created the following profiles

```
TeX2PDF [DVIPDFM]
TeX => DVI
TeX => PDF
TeX => PS
TeX2PDF [DVIPDFM]
```

Now, One can take advantage of the GUI (Graphical User Interface) that TeXnicCenter provides. It is freeware. No need to register to remove nag screens. You can customize it as I did on the following pages are profiles which I created to make use of the utilities that come with MiKTeX. With this tool, we can create great looking exams & worksheets. We can also share our files with colleagues worldwide. The important file is the *.tex or source file we can send it to a friend as an attachment and it can be used also.
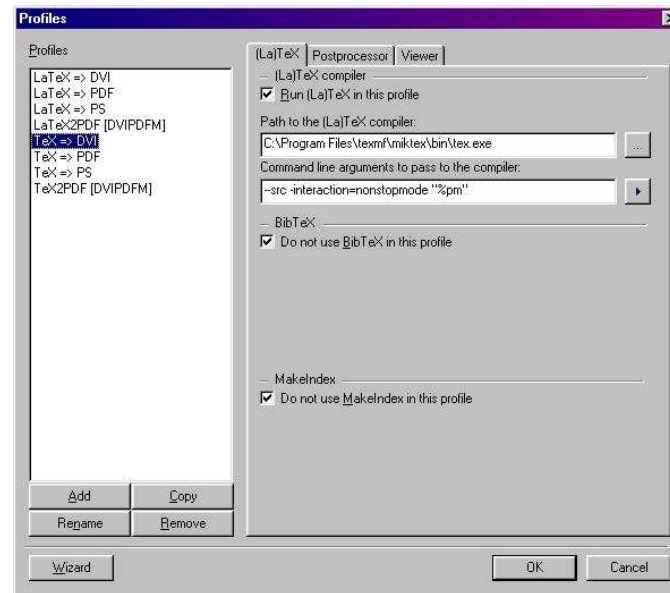

Figure 1: Profiles: (La)TeX compiler, Name: TeX => DVI

References

[1] gentle.pdf, "A Gentle Introduction to TeX" by Michael Doob

[2] lshort.pdf, "The not so short Introduction to LaTeX2e or LaTeX in 92 minutes" by Tobias Oetiker, Hubert Partl, Irene Hyna and Elisabeth Schlegl Version 3.19, 02 April, 2001

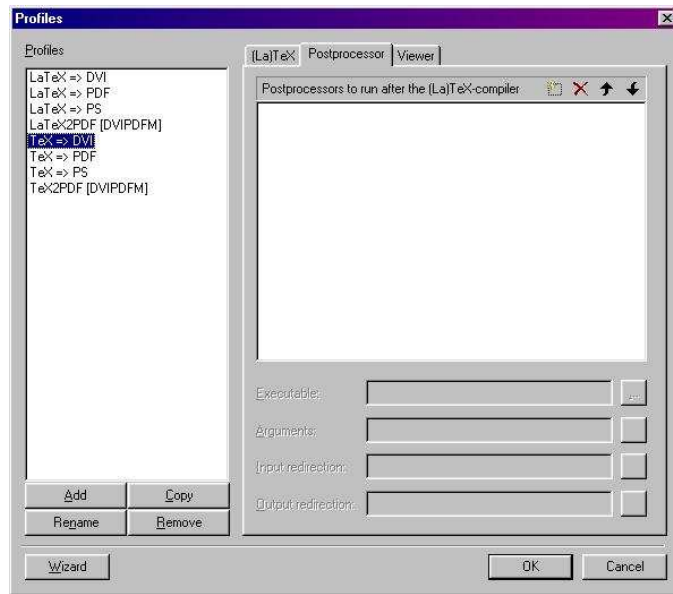[3] latex.ps, "A Simplified Introduction to LaTeX" by Harvey J. Greenburg.

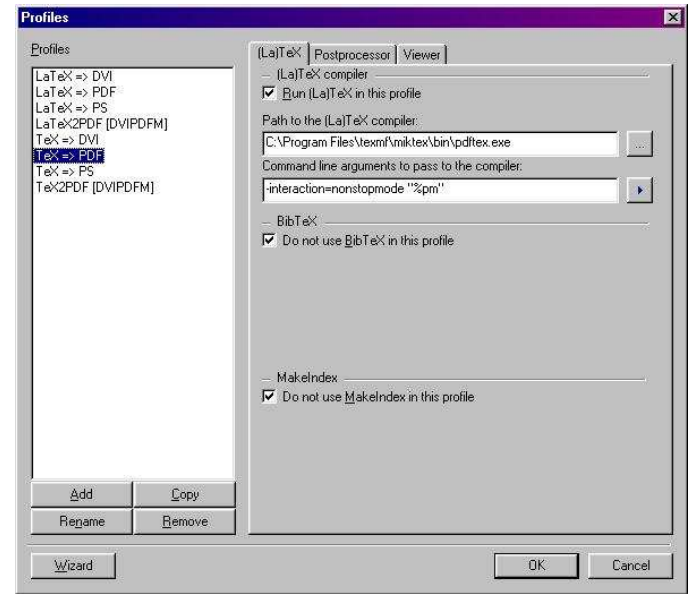Figure 2: Profiles: PostProcessor, Name: TeX => DVI

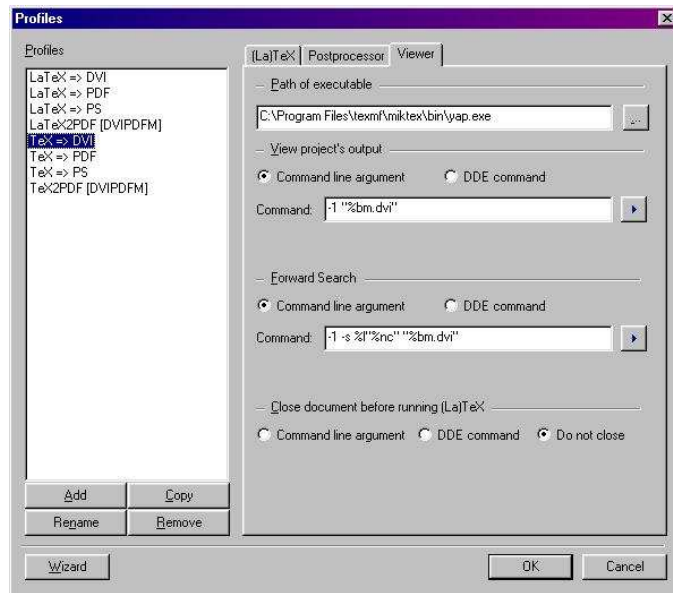Figure 4: Profiles: (La)TeX compiler, Name: TeX => PDF
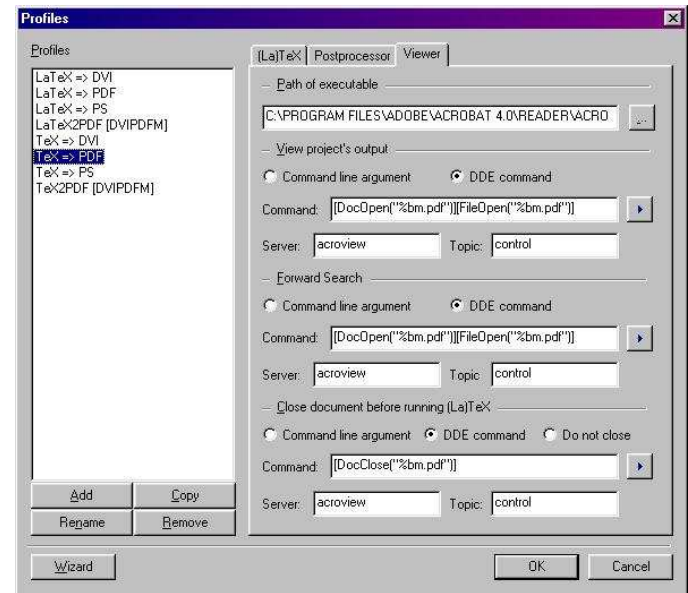

Figure 3: Profiles: Viewer, Name: TeX => DVI
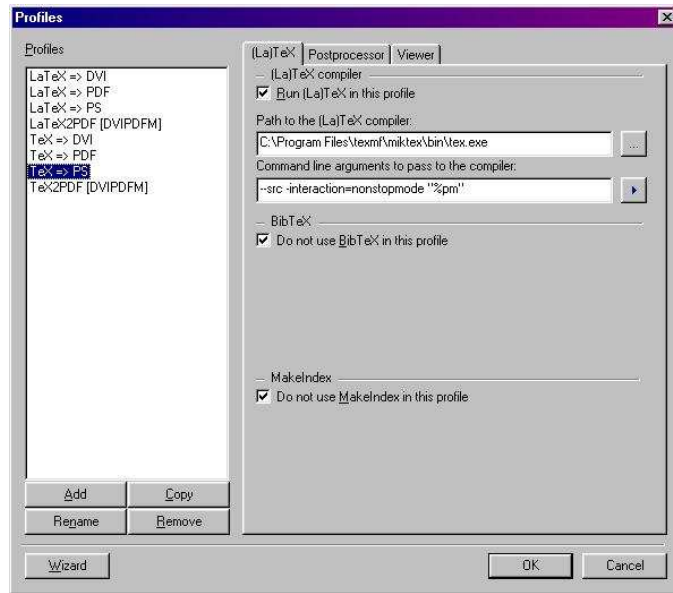

Figure 5: Profiles: Viewer, Name: TeX => PDF
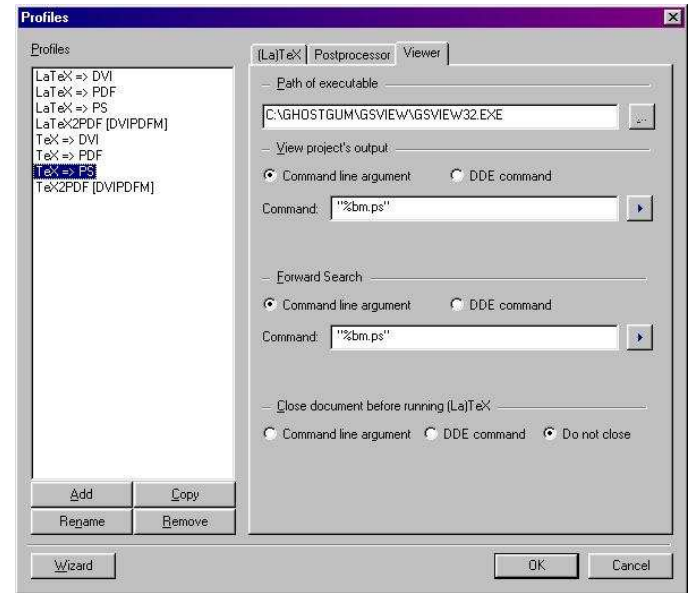
Figure 6: Profiles: (La)TeX compiler, Name: TeX => PS

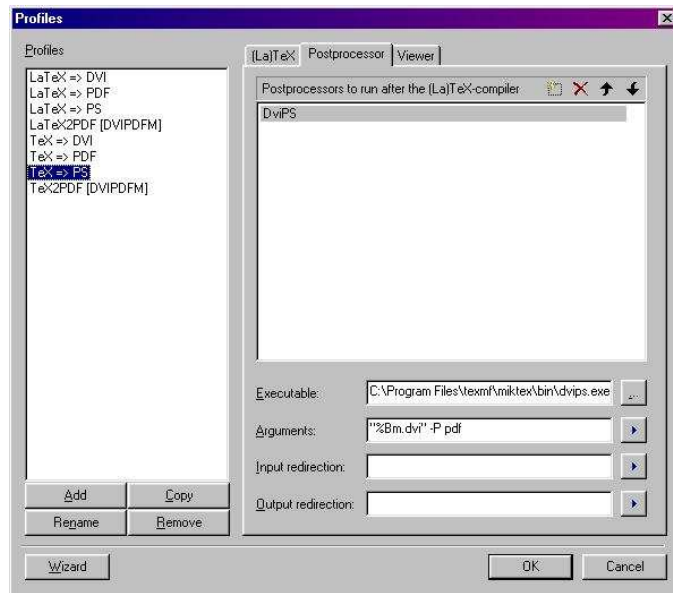Figure 7: Profiles: PostProcessor, Name: TeX => PS
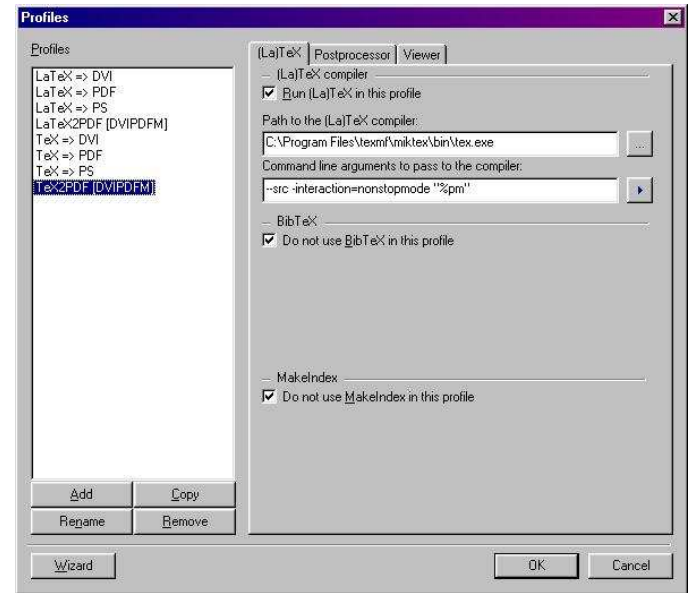

Figure 8: Profiles: Viewer, Name: TeX => PS

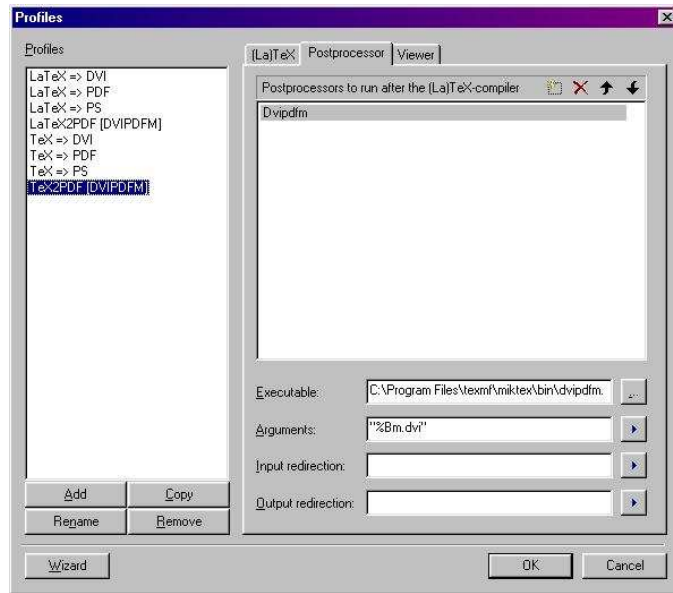Figure 9: Profiles: (La)TeX compiler, Name: TeX2Pdf [DVIPDFM]
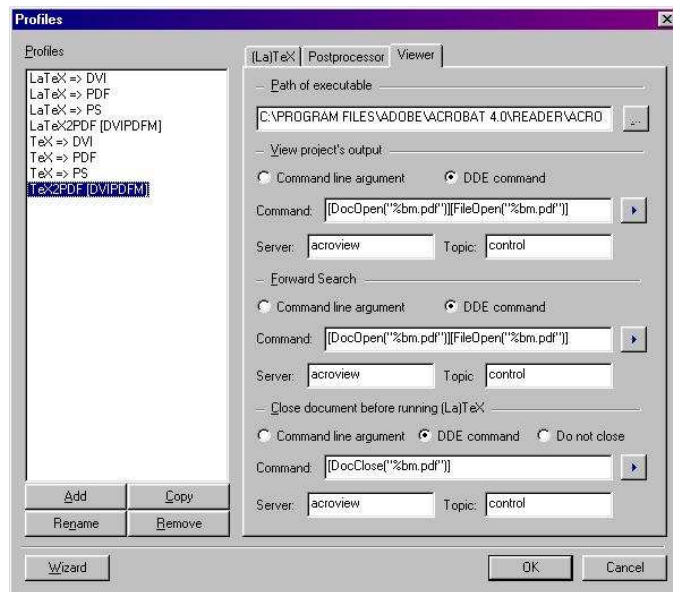
Figure 10: Profiles: PostProcessor, Name: TeX2Pdf [DVIPDFM]

Figure 11: Profiles: Viewer, Name: TeX2Pdf [DVIPDFM]