5 Word Processing

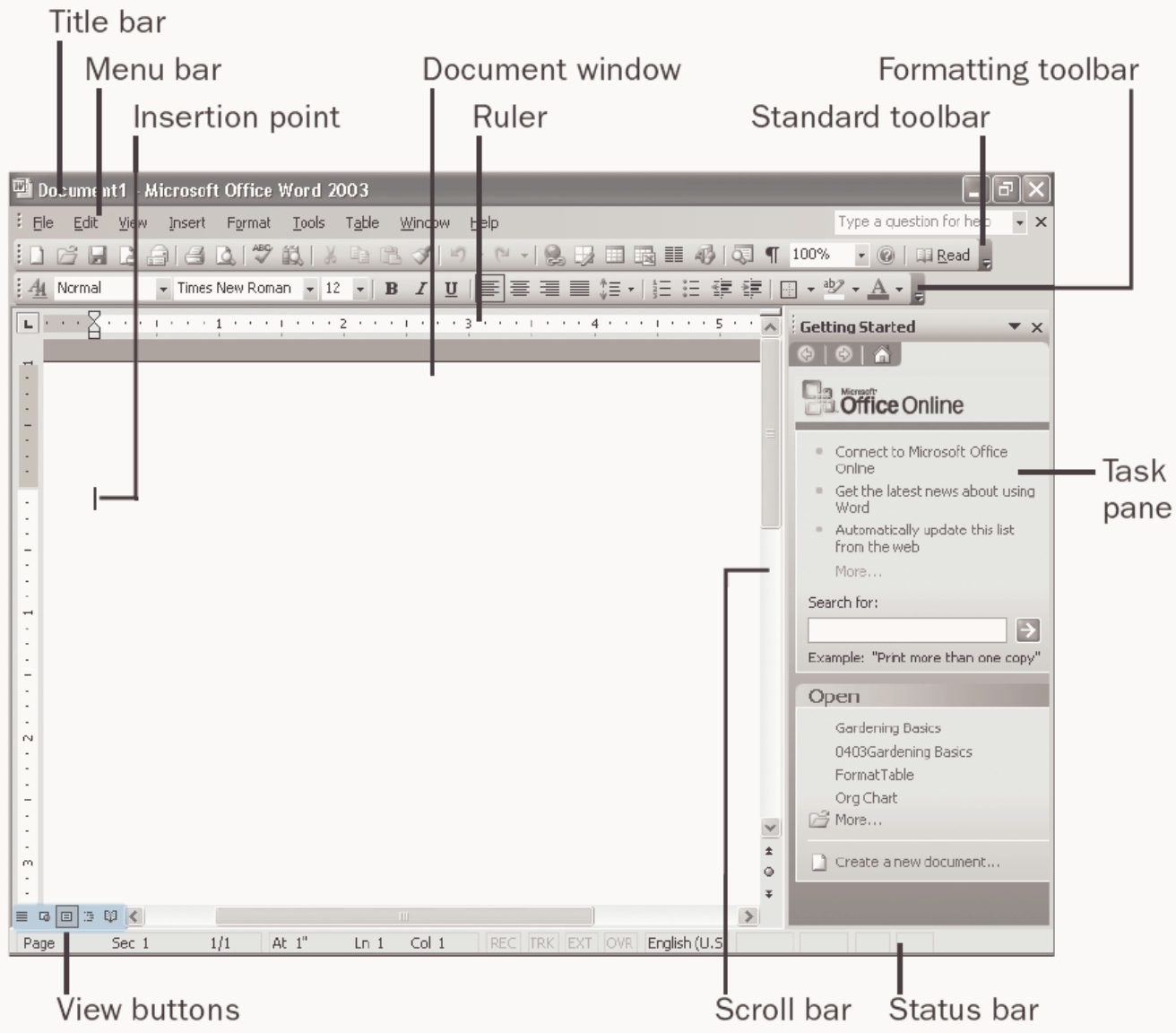
Content

- Create documents, research papers, resumes using Microsoft Word
- Open, Print, and Save in Microsoft Word
- Format the contents of Microsoft Word documents
- Identify and correct errors using Spell check and other features

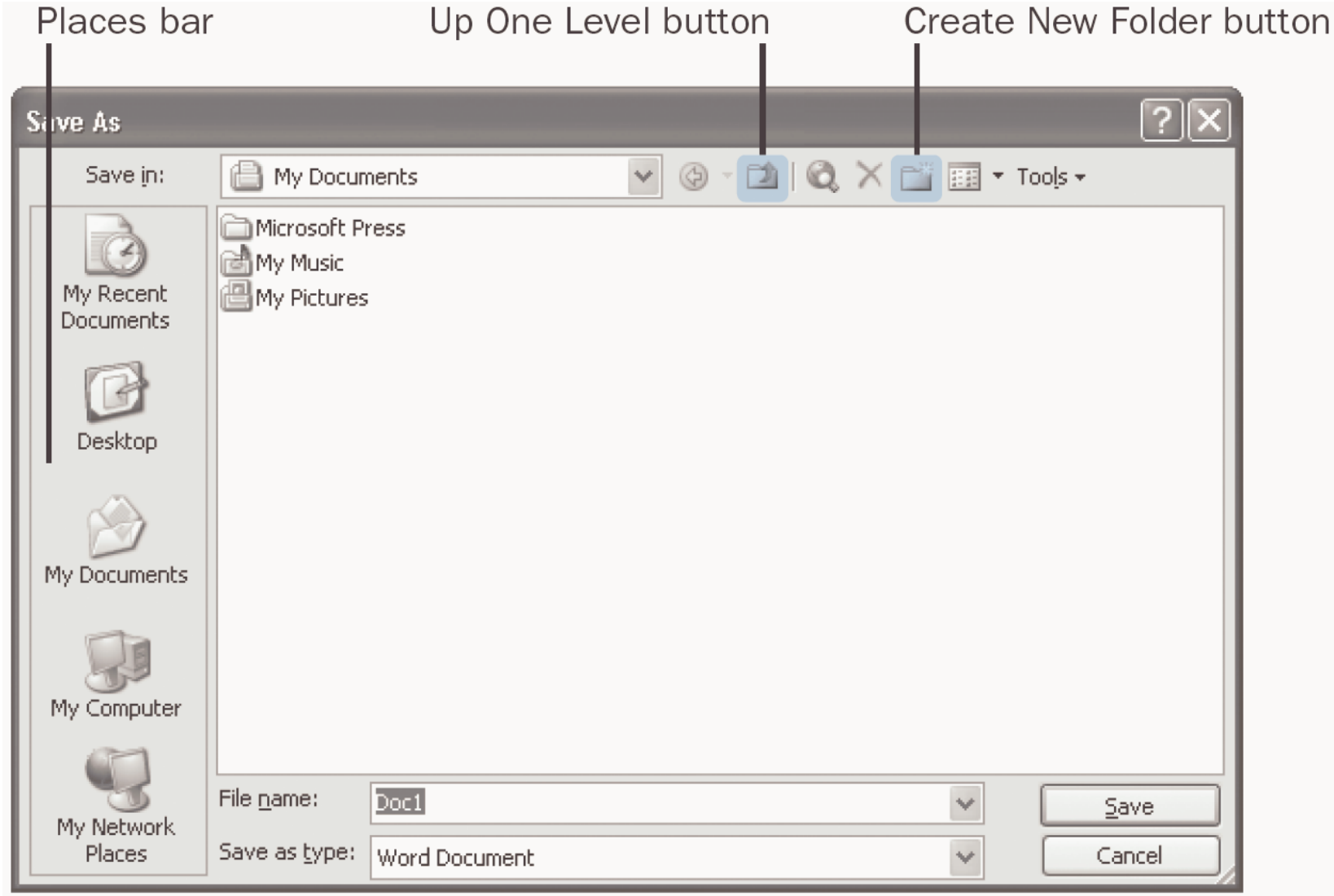
Why should you learn Microsoft Office?

- Microsoft Office is the dominant suite of application software in use today.
- It is estimated that Microsoft Office has over a 90% share of the application suite market.
- Still it is not the only solution: Open Office

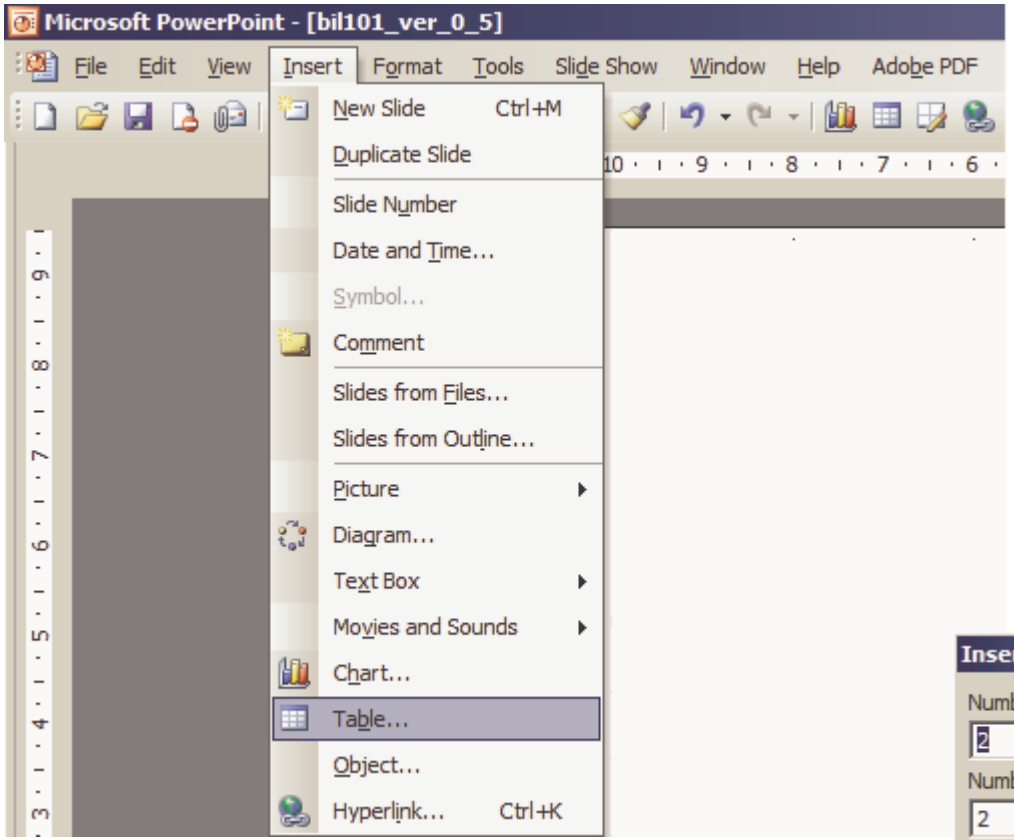
Working with Documents

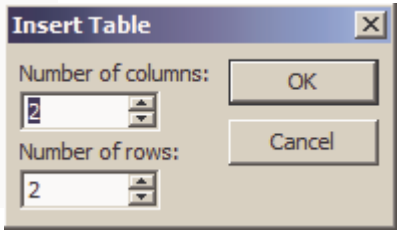


Saving Document

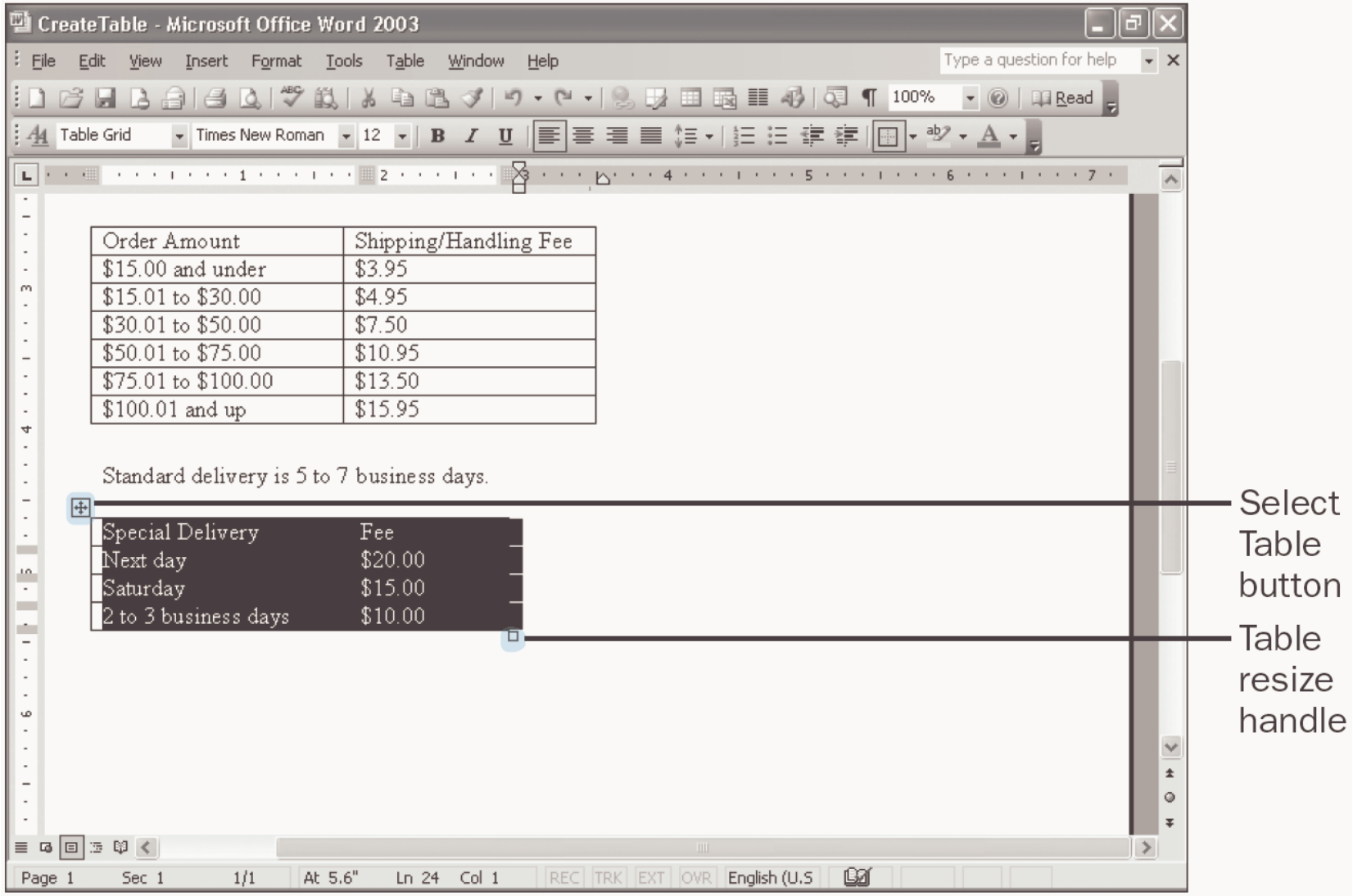


Presenting Information in Tables and Columns





Presenting Information in Tables and Columns



LaTeX

What is LaTeX?

- A powerful typesetting system designed for scientific documents
- Example: A trivial TEX document

```
Hello! \end
```

What is LaTeX?

- Every sequence of the type \x where x is a string of letters a-z A-Z is a single unit.
- Every other symbol is a command or a syntax constructor.
- \x can be either
  - a *primitive command*
  - a *predefined* or *user-defined macro*
  - a name of *a variable*

Advantages *of* $LaTeX$

- *Flexibility*
- *Full-power programming language allows:*
  - higher level of abstraction
  - automation of typesetting
- *Nicer output*
- *Easy global changes*
- *Free*

Advantages *of* $LaTeX$

- *Well-programmed*
  - Produces nice paragraphs, formulas, tables, …
- *Architecture independent*

  works the same on any hardware/OS
- *Can use any PostScript font*
- *Can incorporate PostScript code* to add fancy graphics and effects, *e.g. rotating and scaling text, including graphic objects*

Disadvantages *of* $LaTeX$

- *TeX is not WYSIWYG*
- *Designed for traditional typesetting*
  - fancy typesetting might get complicated & cumbersome.
- *Not easy to learn*
  - needs to memorize many commands but a lot of good documentation is available.

What is LaTeX?

- A set of *TeX* macros to make typesetting easier
- *TeX* has 300 primitive commands
- So-called *Plain TeX* defines 600 basic macros
- *LaTeX* is much larger, containing:
  - different structuring macros for typesetting different types of documents: *letter*, *article*, *report*, *book*, ...

$LaTeX2\varepsilon$

- Many incompatible $LaTeX$ formats were developed.
- This caused problems for system maintainers (who had to keep several software packages running).
- It wasn't always clear what package a source file had been written for.
- $LaTeX2e$ is an attempt at standardization.
- It is easy to spot a $LaTeX2e$ document: it starts with \documentclass – not \documentstyle.

What is $LaTeX$?

$LaTeX$ also contains:

- Automatic production of a table of contents, list of figures, list of tables, footnotes, header, title page, bibliography
- Font management macros, e.g. \textit \large, \textsc
- Easy table creation macros
- Easy macros for complex mathematical formulas
- Cross-referencing macros

Developing a $LaTeX$ Document

- ***Step 1***: *Prepare* an input file for LATEX using your favorite editor.
- The input file should be plain text, with .tex as its extension, for example: test1.tex

Developing a $LaTeX$ Document

- ***Step 2***: *Run* LATEX under Unix with your input file as the argument to the command,

```
$latex test1.tex
```

- If errors are reported, return to *Step 1* and correct them; *otherwise:*
- LATEX will have produced an output file with the extension .dvi, for example test1.dvi

Developing a $LaTeX$ Document

- ***Step 3***: *Convert* the .dvi output into a form suitable for viewing or driving a PostScript printer, for instance using the translator:

  `$xdvi test1.dvi`

- `dvips` will produce an PostScript file with the extension ps, for example test1.ps

  or `$dvipdf test1.dvi`

- ***Step 4***: *Print* the PostScript file on your chosen printer

  `$lpr test1.ps`

A Simple $LaTeX$ Document # 1

```
\documentclass[12pt]{article}
% Use PS palatino fonts
\usepackage{palatino}
\begin{document}
Hello!
\end{document}
```

sample1.tex

- **Compulsory** arguments of macros are enclosed in **{ }**
- **Optional** arguments are enclosed in **[ ]**

A Simple $LaTeX$ Document # 2

- Commands can have a number of optional arguments.
- At most *one* compulsory argument is allowed for each command and follows optional arguments.
- The macro \documentclass{} is the first thing you have to write. Its only mandatory argument is the type of document. Its optional argument is a list of comma-separated options
- e.g. a4paper, 1Opt,11pt,12pt, landscape,...

A Simple $LaTeX$ Document # 3

- The macro \usepackage{<package-name>} loads additional macros from the file:

  `<package-name>.sty`

- Watch out for *reserved characters*. These have to be represented by:

#	\#	$	\$
%	\%	&	\&
_	_	\	$\backslash$

A Simple $LaTeX$ Article # 1

```
\documentclass[12pt]{article}
% The document preamble
\usepackage{times} % Use PS times fonts
% Details of the titlepage
\title{Adaptive $\lambda\tau$-Space Representation}
\author{\textit{B. Kurt and H.T. Demiral}}
\date{\today} % Use the system date
```

article1.tex

A Simple $LaTeX$ Article # 2


```
\begin{document}
\maketitle
\section{Introduction}
This is the first paragraph. Paragraphs must end with an
empty line this like this. This is another paragraph.
Let's force a line break: \\
Now, we would like to continue with this paragraph.
```

article1.tex

A Simple $LaTeX$ Article # 3


```
paragraph.
\subsection{Aim of this lecture}
Blah, \dots %'\dots' makes 3 nice dots
A footnote looks
this \footnote{I'm a footnote.}
\section{Conclusion}
This is it! Easy!!!
\end{document}
```

article1.tex

Output

Adaptive $\lambda\tau$-Space Representation

B. Kurt and H.T. Demiral

October 26, 2005

1 Introduction

This is the first paragraph. Paragraphs must end with an empty line this like this.
This is another paragraph. Let's force a line break:
Now, we would like to continue with this paragraph. paragraph.

1.1 Aim of this lecture

Blah, ... A footnote looks this [1]

2 Conclusion

This is it! Easy!!!

[1] I'm a footnote.

```
\documentclass[12pt]{article}
% The document preamble
\usepackage{times} % Use PS times fonts
% Details of the titlepage
\title{Adaptive $\lambda\tau$-Space
Representation}
\author{\textit{B. Kurt and H.T. Demiral}}
\date{\today} % Use the system date
\begin{document}
\maketitle
\section{Introduction}
This is the first paragraph. Paragraphs must
end with an empty line this like this. This is
another paragraph.
Let's force a line break: \\
Now, we would like to continue with this
paragraph. paragraph.
\subsection{Aim of this lecture}
Blah, \dots %'\dots' makes 3 nice dots
A footnote looks this \footnote{I'm a footnote.}
\section{Conclusion}
This is it! Easy!!!
\end{document}
```

$LaTeX$ Tables # 1

- Each table begins with:

  `\begin{tabular}{<table-specification>}`
- Table specification “lcr” means:
  - 3 columns
  - *1st column:* left justified
  - *2nd column:* centred
  - *3rd column:* right justified
- Column entries separated by “&” and lines ended by “\\”

$LaTeX$ Tables # 2

- % A Simple Table

```
\begin{tabular}{lcr}
Date & : & \today \\
Time & : & 10 a.m. \\
Venue & : & Computer Engineering \\
\end{tabular}
```

table1.tex

Date	:	October 26, 2005
Time	:	10 a.m.
Venue	:	Computer Engineering

$LaTeX$ Tables # 3

- The table specification in the following example uses "|" to separate each column by a vertical line

```
\begin{tabular}{|c|p{8cm}|}
```

  - The first column is centered.
  - The second column is justified and is 8 cm wide.
- Horizontal lines in the table are specified by adding **\hline** after the line ending command "\\".

$LaTeX$ Tables # 4


```
% A table with border and
% fixed column width
\begin{tabular}{|c|p{8cm}|}\hline
\textbf Phrasal Verb & \textbf Meaning \\
\hline
fish for & If you {\textbf fish for}
information or praise, you try
and get it from someone in an
indirect way. \\ \hline
% one entry omitted from slide
\end{tabular}
```

table2.tex

Output

Phrasal Verb	Meaning
fish for	If you fish for information or praise, you try and get it from someone in an indirect way.

Including Figures # 1

- The first thing is, of course, to have a figure to insert.

```
\begin{figure}[hbpt]
\begin{verbatim}
procedure CreateEntry (NextTerm :
Termptr;
CopyEntry : EntryRec);
end; {of CreateEntry}
\end{verbatim}
\caption{Pascal algorithm}
\label{pascal_alg}
\end{figure}
```

figure1.tex

Output


```
procedure CreateEntry (NextTerm : Termptr; CopyEntry : EntryRec);
end; {of CreateEntry}
```

Figure 1: Pascal algorithm

Including Figures # 2

```
\begin{figure}[hbpt]
```

- The following text is a figure.
  - h: place here if there is room
  - b: place at the bottom of a text page
  - p: place on a “page of floats”
  - t: place at top of next text page

Including Figures # 3

```
\caption{Pascal algorithm}
```

- The text that will appear with the figure. Note, you don't have to include (eg) "Figure 2"

```
\label{pascal_alg}
```

- A label by which we can refer to this figure within the document.

Including Figures # 4

- We are sure to want to refer to figures from within our text, but:
  - we may add more figures or remove figures
  - we may move the order of figures around
- To avoid manually renumbering figures, we use in the text:

```
...given in Figure~\ref{pascal_alg}.
```

- This automatically adds (usually) a number into the text.

Adding a Postscript Figure # 1

- Adding a PostScript file is only a little more complicated than adding a normal figure.
- Step 1: *Prepare* a graphic using your favorite package

  e.g. XFig or PhotoShop

  (or simply download one from the course web page)
- *Step 2: Save* your graphic in *Encapsulated PostScript* format **sample1.eps**

What is Postscript?

- The **PostScript**(TM) is a popular language used to create complex documents.
- Postscript printers and postscript display software use an interpreter to convert the page description into the displayed graphics.
- Postscript files are (generally) plain text files and as such they can easily be generated by hand or as the output of user written programs.
- Postscript uses a stack to store programs and data.
- A postscript interpreter places the postscript program on the stack and executes it, instructions that require data will read that data from the stack.

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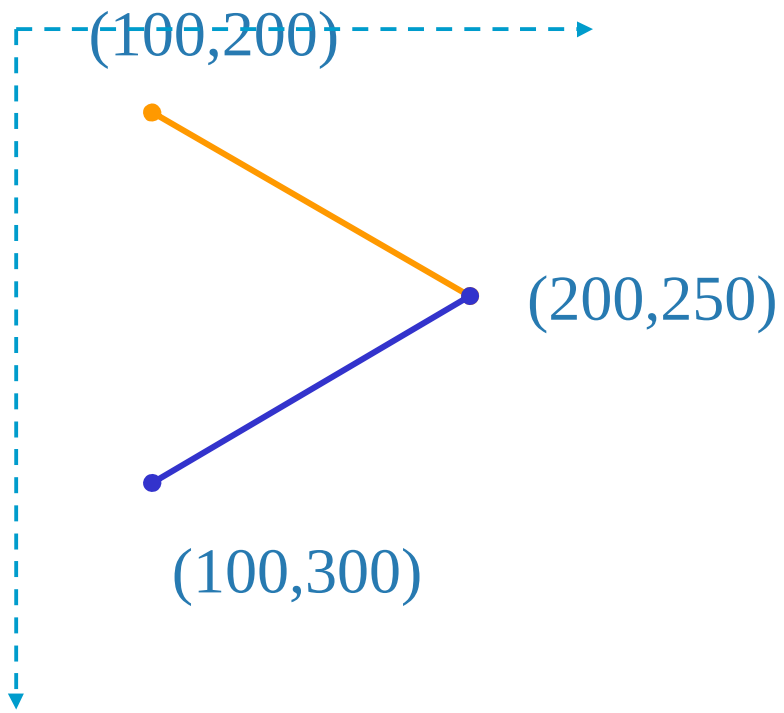
- A postscript interpreter places the postscript program on the stack and executes it, instructions that require data will read that data from the stack.

Example

```
newpath
100 200 moveto
200 250 lineto
100 300 lineto
2 setlinewidth
stroke
```



What is EPS?

- EPS (Encapsulated PostScript) is normal postscript with a few restrictions and a few comments in a specified format that provides more information about the postscript that follows.
- It was design to make it easier for applications to include postscript generated elsewhere within their own pages.

Adding a Postscript Figure # 2

- In the preamble, add the following:

```
\usepackage{epsfig}
```

- Then the illustration can be added to your text by using \begin{figure} as before:

```
\begin{figure}
\epsfig{file=sample1.eps}
\caption{EPS diagram}
\label{eps_diagram}
\end{figure}
```

figure2.tex
sample1.eps

Output

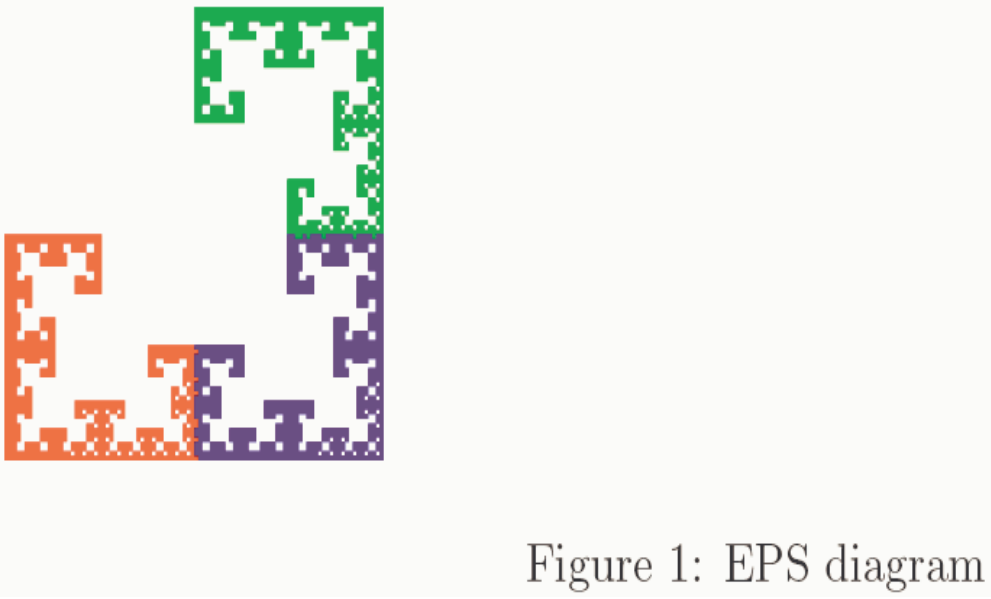


Figure 1: EPS diagram

Spaces

- For those use to WYSIWYG, spaces in LATEX are confusing.
- Space, tab and end-of-line are treated “end of word”.
- Lots of space = one space.
- Space after “\…” commands is ignored - hence use \LaTeX{} likes

Introduction to the “Math Mode”

$$\frac{x^n - 1}{x - 1} = \sum_{k=0}^{n-1} x^k$$

```
$$

\frac{x^n-1}{x-1} =
\sum_{k=0}^{n-1}x^k

$$
```

Greek Letters

α is \alpha

β is \beta

γ is \gamma

δ is \delta

ϵ is \epsilon

ε is \varepsilon

ζ is \zeta

η is \eta

θ is \theta

ϑ is \vartheta

ι is \iota

κ is \kappa

λ is \lambda

μ is \mu

ν is \nu

ξ is \xi

o is o

π is \pi

ϖ is \varpi

ρ is \rho

ϱ is \varrho

σ is \sigma

ς is \varsigma

τ is \tau

υ is \upsilon

ϕ is \phi

φ is \varphi

χ is \chi

ψ is \psi

ω is \omega

Γ is \Gamma

Δ is \Delta

Θ is \Theta

Λ is \Lambda

Ξ is \Xi

Π is \Pi

Σ is \Sigma

Υ is \Upsilon

Φ is \Phi

Ψ is \Psi

Ω is \Omega

Exponents and Subscripts

x^2 produces

$$x^2$$

$x^21 \ne x^{21}$ produces

$$x^21 \ne x^{21}$$

$x_21 \ne x_{21}$ produces

$$x_21 \ne x_{21}$$

Above and Below


```
$$
\left(
\begin{array}{c}
m+n\\
m
\end{array}
\right)
= \frac{(m+n)!}{m!n!}
= \frac
{\overbrace{(m+n)(m+n-1)\cdots(n+1)}^\mbox{$m$ factors}}
{\underbrace{m(m-1)\cdots 1}_\mbox{$m$ factors}}
$$
```

$$\left(\begin{array}{c} m+n \\ m \end{array} \right) = \frac{(m+n)!}{m!n!} = \frac{\overbrace{(m+n)(m+n-1)\cdots(n+1)}^{m \text{ factors}}}{\underbrace{m(m-1)\cdots 1}_{m \text{ factors}}}$$

Above and Below

```
$\overline{x+\overline{y}} = \overline{x}+y$
```

$$\overline{x+\overline{y}} = \overline{x}+y$$

Fractions

Fractions can be written in two ways:

1. with a diagonal fraction bar

   a/b

$$x/y$$

2. horizontal one

```
$$
\frac{a/b-c/d}{e/f-g/h}
$$
```

$$\frac{a/b - c/d}{e/f - g/h}$$

Functions

- LaTeX uses italics in math mode for variables to make them stand out, but Roman (non-italic) for function names.
- How is LaTeX to know the difference between “sin” as function name and “sin” as the product of the variables s, i, and n?
- Use a backslash in front of “sin” and other function names to let LaTeX know that you want the function, not the product of variables.

Functions

- Here is a list of function names:

\arccos \arcsin \arctan \arg \cos \cosh \cot
\coth \csc \deg \det \dim \exp \gcd
\hom \inf \ker \lg \lim \liminf \limsup
\ln \log \max \min \Pr \sec \sin
\sinh \sup \tan \tanh

Sums, Integrals, and Limits

```
$$
\sum_{k=0}^\infty\frac{(-1)^k}{k+1} =
  \int_0^1\frac{dx}{1+x}
$$
```

$$\sum_{k=0}^{\infty} \frac{(-1)^k}{k+1} = \int_0^1 \frac{dx}{1+x}$$

```
$$
\lim_{x\rightarrow 0} \frac{\sin x}{x} = 1
$$
```

$$\lim_{x \to 0} \frac{\sin x}{x} = 1$$

Roots

```
$\sqrt{\frac{a}{b}}$
```

$$\sqrt{\frac{a}{b}}$$

```
$\sqrt[10]{\frac{a}{b}}$
```

$$\sqrt[10]{\frac{a}{b}}$$

Text in Math Displays

```
$$
\int_0^{2\pi}\cos(mx)\,dx = 0 \hspace{1cm}
\mbox{if and only if} \hspace{1cm} m\ne 0
$$
```

$$\int_0^{2\pi} \cos(mx)\,dx = 0 \qquad \text{if and only if} \qquad m \neq 0$$

Operators

Operator	Command	Operator	Command
$\pm$	\pm	$\times$	\times
$\mp$	\mp	$\div$	\div
$\cdot$	\cdot	$*$	\ast
$\star$	\star	$\dagger$	\dagger
$\ddagger$	\ddagger	$\amalg$	\amalg
$\cap$	\cap	$\cup$	\cup
$\uplus$	\uplus	$\sqcap$	\sqcap
$\sqcup$	\sqcup	$\vee$	\vee
$\wedge$	\wedge	$\oplus$	\oplus
$\ominus$	\ominus	$\otimes$	\otimes
$\circ$	\circ	$\bullet$	\bullet
$\diamond$	\diamond	$\oslash$	\oslash
$\odot$	\odot	$\bigcirc$	\bigcirc
$\bigtriangleup$	\bigtriangleup	$\bigtriangledown$	\bigtriangledown
$\triangleleft$	\triangleleft	$\triangleright$	\triangleright
$\setminus$	\setminus	$\wr$	\wr

Relations

Relation	Command	Relation	Command
$\leq$	\le	$\geq$	\ge
$\neq$	\ne	$\sim$	\sim
$\ll$	\ll	$\gg$	\gg
$\doteq$	\doteq	$\simeq$	\simeq
$\subset$	\subset	$\supset$	\supset
$\approx$	\approx	$\asymp$	\asymp
$\subseteq$	\subseteq	$\supseteq$	\supseteq
$\cong$	\cong	$\smile$	\smile
$\equiv$	\equiv	$\frown$	\frown
$\sqsubseteq$	\sqsubseteq	$\sqsupseteq$	\sqsupseteq
$\propto$	\propto	$\bowtie$	\bowtie
$\in$	\in	$\ni$	\ni
$\prec$	\prec	$\succ$	\succ
$\vdash$	\vdash	$\dashv$	\dashv
$\preceq$	\preceq	$\succeq$	\succeq
$\models$	\models	$\perp$	\perp
$\parallel$	\parallel	$\mid$	\mid

Negated Symbols

Operator	Command	Operator	Command
$\not<$	\not<	$\not>$	\not>
$\not\le$	\not\le	$\not\ge$	\not\ge
$\neq$	\not=	$\not\equiv$	\not\equiv
$\not\prec$	\not\prec	$\not\succ$	\not\succ
$\not\preceq$	\not\preceq	$\not\succeq$	\not\succeq
$\not\sim$	\not\sim	$\not\simeq$	\not\simeq
$\not\subset$	\not\subset	$\not\supset$	\not\supset
$\not\subseteq$	\not\subseteq	$\not\supseteq$	\not\supseteq
$\not\approx$	\not\approx	$\not\cong$	\not\cong
$\not\sqsubseteq$	\not\sqsubseteq	$\not\sqsupseteq$	\not\sqsupseteq
$\not\asymp$	\not\asymp	$\notin$	\notin

More Symbols

Symbol	Command
$\aleph$	\aleph
$\emptyset$	\emptyset
∇	\nabla
∂	\partial
$\forall$	\forall
$\exists$	\exists
$\neg$	\neg
$\angle$	\angle
$\therefore$	\therefore
$\mathbb{N}$	\mathbb{N}
$\mathbb{Q}$	\mathbb{Q}
$\mathbb{R}$	\mathbb{R}
$\mathbb{Z}$	\mathbb{Z}