

An introduction to LaTeX

Greg Taylor

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Document1 - Microsoft Word

Home Insert Page Layout References Mailings Review View Add-Ins Acrobat

Cut Copy Paste Format Painter

Font Paragraph Styles

Normal No Spac... Heading 1 Heading 2 Title AaBbCc Change Styles

My Research

It looks like you're writing a paper.

Would you like help?

- Get help with writing the paper.
- Just type the paper without help

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1. Introduction

|

Page: 1 of 1 | Words: 2 | English (United Kingdom) | 120%

The image shows a Microsoft Word document window. The title bar says "Document1 - Microsoft Word". The ribbon menu has tabs for Home, Insert, Page Layout, References, Mailings, Review, View, Add-Ins, and Acrobat. Under the Home tab, there are sections for Clipboard (Cut, Copy, Paste, Format Painter), Font (Calibri (Body), 11pt, AaBbCc), and Paragraph (Font, Alignment, Spacing, Indent, List, Style). The "Normal" style is selected in the Paragraph section. The main content area contains the text "My Research" in large, bold, yellow and orange 3D letters. Below it, a section titled "1. Introduction" is shown with a horizontal line underneath. A floating callout box with a yellow border appears on the right side of the page, containing the text "It looks like you're writing a paper." followed by "Would you like help?". It lists two options: "Get help with writing the paper." and "Just type the paper without help". There is also a checkbox for "Don't show me this tip again". At the bottom of the callout box is a cartoon paperclip character with googly eyes. The status bar at the bottom of the screen shows "Page: 1 of 1 | Words: 2 | English (United Kingdom) | 120%".

Outline

What is LaTeX and why should I use it?

How do I get LaTeX?

How do I use LaTeX?

Bibliography

Additional typesetting

Thesis

Customisation

Beamer

LATEX

A document mark-up language.

begin{proof} See Appendix \ref{sec:proofs}. \end{proof}

A more direct means of arriving at this result, which will prove useful in developing an intuition for the equilibrium mechanics, is to totally differentiate (\ref{eqn:q}) and (\ref{eqn:mu}).

$$\begin{aligned} &\text{begin}\{\text{equation}\}\text{label}\{\text{eqn:dqdM}\} \\ &\frac{\partial}{\partial M}(\text{eqn:q}^{\prime\prime}) = \frac{\partial}{\partial M}(C^*(\text{prime}|\text{prime})\left(q^{\prime\prime}\right))\left(\left(2\alpha_i - M\mu^{\prime\prime}\right)\frac{\partial}{\partial M}(q^{\prime\prime}) + \frac{\partial}{\partial M}(M^2)\frac{\partial}{\partial M}(q^{\prime\prime})\right). \\ &\text{end}\{\text{equation}\} \\ &\text{begin}\{\text{equation}\}\text{label}\{\text{eqn:dlmuM}\} \\ &\frac{\partial}{\partial M}(\text{eqn:mu}^{\prime\prime}) = F^*(\text{prime}(\kappa\mu^{\prime\prime}))\left(2M\left(1-q^{\prime\prime}\right) - \left(M^2 - k\right)\right)\frac{\partial}{\partial M}(q^{\prime\prime}) + \frac{\partial}{\partial M}(M^2)\frac{\partial}{\partial M}(q^{\prime\prime}). \\ &\text{end}\{\text{equation}\} \\ &\text{Combining } (\text{ref}\{\text{eqn:dqdM}\}) \text{ and } (\text{ref}\{\text{eqn:dlmuM}\}) \text{ yields } (\text{ref}\{\text{eqn:dqdM2}\}). \text{ The numerator of } (\text{ref}\{\text{eqn:dqdM2}\}) \text{ is positive for } \$q^{\prime\prime}, \$mu^{\prime\prime}, \$alpha_i > 0, \text{ so that an increase in } \$MS \text{ results in } \\ &C^*(\text{prime}|\text{prime})\left(q^{\prime\prime}\right) + F^*(\text{prime}(\kappa\mu^{\prime\prime}))\left(2M\left(1-q^{\prime\prime}\right) - \left(M^2 - k\right)\right) > 0. \\ &\text{note that when } SC^*(\text{prime}(\kappa\mu^{\prime\prime})) = 0, \text{ changing } \$MS \text{ does not affect the number of ad-viewing consumers and } \text{ref}\{\text{eqn:dlmuM}\} \text{ collapses to the simple case described in } \text{ref}\{\text{eqn:dqdM1}\}. \text{ The} \\ &\text{contradiction and } \text{ref}\{\text{eqn:dqdM2}\} \text{ are positive. From } \text{autoref}\{\text{prop:qdmblock}\} \text{ it is therefore clear that an increase in } \$MS \text{ must lead to an increase in quality if nuisance costs are sufficiently} \\ &\text{large.} \\ &\text{To see that this must be the case, suppose, on the contrary, that } \$k < M^2\$ \text{ and that } \$MS \text{ and } \$q\$ \text{ move in opposite directions. From } (\text{ref}\{\text{eqn:blockcondconcise}\}), \text{ both an increase in } \$MS \text{ and an} \\ &\text{increase in quality result in a decrease in consumer's non-blocking surplus when } \$k\$ \text{ is smaller than } M^2\$ \text{ so that } \$mu\$ \text{ must increase as a result. However, from } (\text{ref}\{\text{eqn:q}\}), \text{ an increase in } \$MS \text{ and } \$mu\$ \text{ is not compatible with the} \\ &\text{contradiction is thus produced.} \\ &\text{In fact, } M^2 > q\$ \text{ turns out to be a sufficient condition for uniqueness of the equilibrium quality level so that quality must unambiguously increase with targeting accuracy under such} \\ &\text{circumstances.} \\ &\text{begin}\{\text{proposition}\}\text{label}\{\text{prop:unique}\} \\ &\text{When } M^2 > q\$ \text{ there is a unique equilibrium } \$q^*\$, which is unambiguously increasing in } \$MS \text{ and decreasing in } \$k\$. \\ &\text{end}\{\text{proposition}\} \\ &\text{begin}\{\text{proof}\} \text{See Appendix \ref{sec:proofs}.} \end{proof}$$

similarly, if $SC^*(\text{prime}|\text{prime})(q)$ is sufficiently large in the neighbourhood of q^* then a small increase in $\$MS$ is always accompanied by an increase in $\$q$. Intuitively, if $SC^*(\text{prime}|\text{prime})(q)$ is small, the marginal benefit of providing quality result in relatively small quality increases (because marginal cost increases quickly with $\$q$). When quality increases are sufficiently small, the additional revenue from advertising to a consumer who previously did not receive an impression is small, so that the additional revenue from advertising to a consumer who previously received an impression is also small. This competition that they induce is more than offset by the effects of an accompanying increase in $\$MS$ (see \text{autoref}\{\text{Lemma:dPdM}\} and \text{autoref}\{\text{fig:epricecontour}\}) so that fewer consumers will be willing to pay the price $\$q$. This provides the increase in the marginal benefit of quality provision necessary to induce the posited increase in $\$q$. The various channels via which a change in $\$MS$ (or $\$k$) propagates are summarised in Figure \text{ref}\{\text{fig:feedback}\}.

If marginal quality costs increase slowly enough (if $SC^*(\text{prime}|\text{prime})\$$ is small enough) and $\$k > M^2$ then only a decrease in quality is compatible with equilibrium behaviour in the wake of such a change.

subsection(Repeat impressions)\label{sec:multipublisher}

In the model above I have maintained the assumption that the two publishers never impress the same advertiser upon a given consumer. In this section, I show how the results above emerge naturally in a more general model in which the publishers select at random from a shared pool of N advertisers. Thus, advertisers sometimes find that they are repeatedly exposed to the same firm, which may be a source of competition; however, the imperfect ability of the publishers to coordinate implies that this is not a wholly effective way to block other advertisers from contacting a consumer.

Practical barriers to any attempt to consistently expose a consumer to the same advertisement, amongst them: (i) consumers have highly idiosyncratic media consumption habits and consume media in different permutations so that it is hard to predict where a consumer will surf to next (and hence where a firm must advertise in order to make another impression); (ii) managing an ad campaign is difficult because ads are often served sequentially (e.g., in news feeds), and the ad platform market somewhat fragmented so that 'advertise everywhere' is not a viable solution in most cases; and (iii) there are many rival advertisers vying for access to a consumer's attention.

To simplify the pricing problem, I make the assumption that advertisers can price discriminate against consumers from different platforms---behaviour that is technically feasible online by placing a landing page with a platform-specific offer (a consumer that sees two ads by the same firm will, of course, buy at the lower of the firm's two advertised prices).\footnote{Ultimate consumers will choose not to exercise this ability to discriminate.} The possibility of discrimination implies that multi-homing firms can treat two ads as separate profit maximisation problems in the case described in Section \ref{sec:advertiser}.

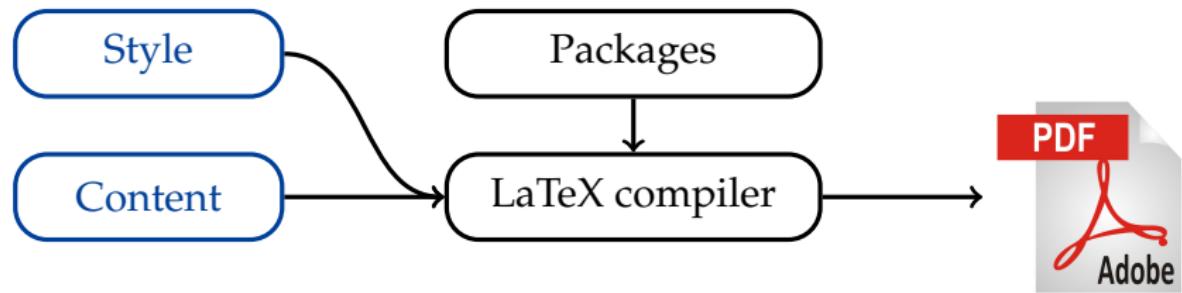
It is fairly straightforward to verify that pricing is analogous to the case described in Section \ref{sec:advertiser}: in particular, there exists a mixed strategy equilibrium of the advertising game. Advertiser revenues are drawn from a distribution having support $\{\underbrace{1}_{\text{advertiser}}\}_{i=1}^N$. The proof here is essentially the same as that for \text{autoref}\{\text{Lemma:mixing}\}. Expected advertiser revenues for any given consumer are equal to those of setting $p=1$ in order to induce mixing. Total expected advertiser revenues are thus

$$\begin{aligned} &\left[\frac{\mu}{M} \left(\frac{1}{2} \right) \right] \left(N + \frac{1}{M} \left(\frac{1}{2} \right) \right) + \frac{1}{M} \left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(N + \frac{1}{M} \left(\frac{1}{2} \right) \right) \\ &\text{where division by } N \text{ reflects the likelihood of an advertiser being impressed upon each given consumer when there are } N \text{ potential advertisers of type } \theta \text{ for each publisher to choose from.} \end{aligned}$$

Any advertiser could always opt to advertise only at $\$i\$$, in which case its revenue would be

$$\begin{aligned} &\left[\frac{\mu}{M} \left(\frac{1}{2} \right) \right] \left(N + \frac{1}{M} \left(\frac{1}{2} \right) \right) + \frac{1}{M} \left(\frac{1}{2} \right) \left(\frac{1}{2} \right) \left(N + \frac{1}{M} \left(\frac{1}{2} \right) \right) \\ &\text{which is less than the revenue obtained by advertising on both publishers, so such division must be unprofitable. Publishers } \text{ref}\{\text{fig:ad}\} \text{ thus expect more from each advertiser than the increase in profits that result from advertising on both publishers.} \end{aligned}$$

Content & style



Advantages to using LaTeX

- ▶ Donald Knuth's algorithms for gorgeous typesetting.

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	Word	InDesign	LaTeX
Number of hyphenations	9	10	4
SD of IWS (pt)	2.26	1.94	1.42
Max IWS (pt)	14.4	13.2	9.0
Lines with IWS > 9pt	5	2	0

IWS = inter-word spacing.

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Lines with IWS > 9pt	5	2	0

IWS = inter-word spacing.

- ▶ Full attention to typographical style, e.g.

- ▶ Proper kerning.
- ▶ Proper ligatures.
- ▶ Proper small caps.
- ▶ etc.

Table

Table

AAa AB BC CD
AAa AB Bc CD

fire flower fjörd
fire flower fjörd

Advantages to using LaTeX

- ▶ Proper mathematics & attractive tables.

$$\Phi(\Omega, \mathbf{y}, x) \equiv \int_{\mathbb{R}} [f(\Omega, \mathbf{y}) + x] g(x) dx$$

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- ▶ Very robust cross-referencing and citation systems.
- ▶ Content-style separation.

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$$\Phi(\Omega, \mathbf{y}, x) \equiv \int_{\mathbb{R}} [f(\Omega, \mathbf{y}) + x] g(x) dx$$

- ▶ Very robust cross-referencing and citation systems.
- ▶ Content-style separation.
- ▶ Long-document management.

Advantages to using LaTeX

- ▶ Platform agnostic & device independent.
- ▶ It's free.
- ▶ Plain text cross-compatibility.
- ▶ Plain text robustness.
- ▶ Formatting transparency.

An Example Latex Article

Greg Taylor

November 2, 2010

Abstract

This document is an example that shows how the commands introduced in the accompanying template file are used in practice and translate into a final output PDF.¹ It show how around a dozen LaTeX commands can be used to prepare a complete paper.

1 Introduction

This is an example document that shows how the commands introduced in the accompanying template file are used in practice, and how a .tex file translates into a final output PDF.¹ This section contains examples of the use of footnotes, such as that appended to the previous sentence, and citations such as Agarwal, Athey, and Yang (2009) or (Bagwell, 2007). Note that to have the citation appear correctly it is necessary to compile the document three times. Section 2 is populated with meaningless filler text. Section 3 offers a few concluding notes.

2 A section of nonsense text

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3 Conclusion

This document represents an example of the kind of output one can easily obtain with a very small selection of around a dozen LaTeX commands. Together, these commands can be used to prepare a complete paper. Later examples will demonstrate the usage of more advanced techniques that allow, for example, the production of tables and equations, the inclusion of figures, and more precise text formatting. Examples of other kinds of document such as letters, presentations, and theses will also be provided.

References

- AGARWAL, N., S. ATHEY, AND D. YANG (2009): "Skewed Bidding in Pay Per Action Auctions for Online Advertising," *American Economic Papers and Proceedings*, 99(2), 441–447.
- BAGWELL, K. (2007): "The Economic Analysis of Advertising," in *Handbook of Industrial Organization*, ed. by M. Armstrong, and R. Porter, vol. 3, pp. 1701–1844. Elsevier.

¹See ‘example01.pdf’.

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Web apps

- ▶ **Overleaf** (<https://www.overleaf.com>) lets you write, store, and compile LaTeX documents in the cloud with zero setup.
- ▶ An easy way to try LaTeX out.

LaTeX distributions

To compile LaTeX documents locally, you will need to install a distribution, which includes the core functionality and packages.

- ▶ Windows users: [MiKTeX](http://miktex.org/) (<http://miktex.org/>).
- ▶ Linux users: [TeXLive](http://www.tug.org/texlive/) (<http://www.tug.org/texlive/>) is the most common LaTeX implementation.
- ▶ OS X users: [MacTeX](http://www.tug.org/mactex/) (<http://www.tug.org/mactex/>), based on TeXLive.

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- ▶ OS X users: [MacTeX](http://www.tug.org/mactex/) (<http://www.tug.org/mactex/>), based on TeXLive.

You will also want an editor. See <https://tex.stackexchange.com/questions/339/latex-editors-ides>.

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An intro to LaTeX

- ▶ This is not a comprehensive introduction to LaTeX, just the bare minimum to get up and running!
- ▶ Since LaTeX is open source, there is a vast amount of help material available on-line.
 - ▶ Good resource: tex.stackexchange.com.

Very briefly, on typography

- ▶ Supplement LaTeX with proper attention to typographical style.
 - ▶ Heading stacks.
 - ▶ Font & colour schemes.
 - ▶ Spacing.
 - ▶ Table formatting (and caption placement).
 - ▶ Consistency e.g. fonts in figures.
- ▶ If in doubt, pick a respectable book or journal and imitate.

A basic document step-by-step

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

\begin{document}
Hello world.
\end{document}
```

Save this as a .tex file and compile to generate a PDF.

Hello world.

1

A basic document step-by-step

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

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Hello world.
\end{document}
```

- ▶ LaTeX *commands* start with a backslash \.
- ▶ Arguments go in { ... } .
- ▶ Options go in [...] .

A basic document step-by-step

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Hello world.
\end{document}
```

- ▶ LaTeX *commands* start with a backslash \.
- ▶ Arguments go in { ... } .
- ▶ Options go in [...] .
- ▶ Everything before \begin{document} is called the *preamble*.

Typesetting a title block

```
\documentclass[12pt]{article}
\title{A LaTeX Example}
\author{Greg Taylor}
\begin{document}
\maketitle
This is paragraph 1...
This is paragraph 2...
\end{document}
```

Typesetting a title block

```
\documentclass[12pt]{article}
\title{A LaTeX Example}
\author{Greg Taylor}
\begin{document}
\maketitle
This is paragraph 1...
This is paragraph 2...
\end{document}
```

Paragraphs are separated by an empty line.

A LaTeX Example

Greg Taylor

November 2, 2010

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A basic document step-by-step

- ▶ To fix the margins we put this into the preamble:

```
\usepackage[a4paper,margin=2.5cm]{geometry}
```

- ▶ This loads the geometry *package* with the options specified in [].

A basic document step-by-step

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```

- ▶ This loads the *geometry package* with the options specified in [].
- ▶ There are many such packages for LaTeX. Packages have a standardised documentation format.

A LaTeX Example

Greg Taylor

November 2, 2010

Lore ipsum dolor sit amet, consectetur adipiscing elit. Aliquam ut massa et tortor convallis molestie. Pellentesque sodales leo magna. Mauris nec nunc est, at tincidunt risus et tincidunt. Suspendisse ac magna felis. Ut fuscios elit ut elit viverra semper mollis ligula eleifend. Integer dolor elit, cursus nec aliquam vulputate, dignissim nec justo. Vestibulum gravida dapibus mi, vel volutpat tellus fuscios quis. Nam quis mi ac eros interdum incilis nec non tellus.

Praesent eleifend sollicitudin orci in consequat. Ut gravida imperdiet eros, at porttitor erat porta id. Sed augue lacinia, euismod nec nunc turpis vita, vestibulum vitae nisi. Praesent erat urna, varius sed bibendum et, consequat non arcu. Nullam metus velit, tincidunt et elementum ac, phasellus id nulla. Nam turpis justo, gravida non lobortis at, posuere ultricies purus. Morbi malesuada cursus enim, eu volutpat nisi ullamcorper et. Etiam lectus massa et mauris fermentum ac tempor nibh facilisis. Etiam sagittis mi ut nisi aliquam ac adipiscimus dui posuere. Suspendisse ultrices nunc. Donec facilisis pellentesque velit, a convallis est dapibus et. Sed enim tellus, consectetur placerat rutrum sit amet, lectus vel elit. Pellentesque ornare eleifend ultricies. Sed posuere mollis ante ut tempus. Praesent sit amet odio nisi. Duis morbi nisi, viverra id convallis vel, tristique vel massa.

Sed lacus dignissim suscipit. Duis egyp dolor tristique turpis vehicula consequet sed varius purus. Sed elementum consecetur molestie. Aenean condimentum volutpat fringilla. Sed farciens nunc sit amet tortor accumsan sed aliquip diam sagittis. Mauris accumsan accumsan felis, sed sodales metus suscipit ac. Sed bibendum, erat nec dapibus tincidunt, lectus diam pretium leo, non scelerisque urna massa a augue. Praesent eleifend metus ac quam convallis ac scelerisque dolor accumsan. Duis eu nulla ut ligula enim consequet. Suspendisse feugiat, tellus a blandit ornare, massa quam fuscibus nisi, sit amet convallis urna massa a nibh. Aliquam blandit, nibh quis sollicitudin tempor, metus ligula viverra tortor, sit amet auctor eros felis sed velit. Nulla facilisi. Morbi imperdiet porttitor tellus, non commodo turpis laoreet condimentum. Nulla volutpat tortor felis, nec blandit libero. Nulla ultricies lobortis leo, non malesuada, non lobortis, non blandit. Sed sapien nulla, adipiscimus porttitor id, cursus ut metus. Etiam et enimod lectus. Vivamus metus dolor, dapibus in lobortis ac, rutrum sit amet leo. Vivamus ultrices viverra tortor ac vehicula. Fusce quis condimentum velit. Nam est dui, cursus vitae consequat sed, vehicula ultricies turpis. Nunc egyp dapibus elit. Etiam pharetra, felis sit amet auctor vehicula, orci risus pretium nisi, at rutrum ipsum leo dapibus tellus. Integer cursus viverra ante, egyp viverra purus feugiat nec. Nulla blandit leo sit amet nibh elementum ut pellentesque dai dapibus.

A basic document step-by-step

Thus, our document now looks like this:

```
\documentclass[12pt]{article}
\usepackage[a4paper,margin=2.5cm]{geometry}
\title{A LaTeX Example}
\author{Greg Taylor}
\begin{document}
\maketitle
This is paragraph 1...
This is paragraph 2...
\end{document}
```

A basic document step-by-step

We can split the paper into sections using the \section command where we want a new section to start

```
\section{Introduction}
```

In a similar way we can create a hierarchy of sections:

```
\subsection{Literature Review}  
\subsubsection{...}
```

A LaTeX Example

Greg Taylor

November 2, 2010

1 Introduction

1.1 Motivation

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam ut massa et tortor comellis molestie. Pellentesque sodales leo magna. Mauris nec nunc est, at tincidunt urna. Sed lacinia placerat lorem, nec pretium nunc auctor id. Proin condimentum sagittis risus et tincidunt. Suspendisse ac magna felis. Ut faucibus elit ut elit viverra semper mollis ligula eleifend. Integer dolor elit, cursus nec aliquam vulputate, dignissim nec justo. Vestibulum gravida dapibus nisi, vel volutpat tellus faucibus quis. Nam quis nisl ac eros interdum laiculi non tellus.

Praesent elementum sollicitudin orci in consequat. Ut gravida imperdiet eros, at pretium purus porta id. Sed ampm; lorem, euismod nec ullamcorper vitae, vestibulum vitae nisi. Proin erat urna, varius sed bibendum et, consequat non arcu. Nullam metus velit, tincidunt et elementum ac, placerat id nulla. Nam turpis justo, gravida non lobortis at, posuere ultricies purus. Morbi malesuada cursus enim, eu volutpat nisi ullamcorper et. Etiam luctus massa et mauris fermentum ac tempor nibh facilisis. Etiam sagittis mi ut nisi aliquam ac adipiscing duis posuere. Suspendisse eu ultrices nunc. Donec facilisis pellentesque velit, a convallis est dapibus et. Sed enim tellus, consectetur placerat rutrum sit amet, blandit vel elit.

Sed lacinia sollicitudin scipit. Duis ept dolor tristique tempus vehicula consequat sed vamus purus. Sed elementum consectetur molestie. Aenean condimentum volutpat fringilla. Sed faucibus nunc sit amet tortor accumsan sed aliquet diam sagittis. Mauris accumsan accumsan felis, sed sodales metus scipit ac. Sed bibendum, ex ut dapibus tincidunt, lectus diam pretium leo, non scelerisque urna massa a augue. Praesent eleifend metus ac quam convallis ac scelerisque dolor accumsan. Duis eu nulla ut ligula euismod consectetur. Suspendisse fengiat, tellus a blandit ornare, massa quam faucibus nisi, sit amet convallis urna massa a nibh. Aliquam blandit, nibh quis sollicitudin tempor, metus ligula viverra tortor, sit amet auctor eros felis sed velit. Nulla facilisi.

1.2 Literature Review

Massimas bibendum est tristique quam interdum ac interdum arcu blandit. Sed sapien nulla, adipiscing scipit portitor id, cursus ut metus. Etiam ut euismod lectus. Vivamus metus dolor, dapibus in lobortis ac, rutrum sit amet leo. Vivamus ultrices viverra tortor ac vehicula. Fusce quis condimentum velit.

Cross-referencing 101

LaTeX uses labels for automatic cross referencing.

```
\section{Introduction}\label{foo}  
\subsection{Literature Review}\label{bar}
```

This literature review is in Subsection \ref{bar},
part of Section \ref{foo}.

compiles to:

Cross-referencing 101

LaTeX uses labels for automatic cross referencing.

```
\section{Introduction}\label{foo}  
\subsection{Literature Review}\label{bar}
```

This literature review is in Subsection \ref{bar},
part of Section \ref{foo}.

compiles to:

1 Introduction

1.1 Literature Review

This literature review is in Subsection 1.1, part of Section 1.

with the numbering updating automatically.

Cross-referencing 101

LaTeX uses labels for automatic cross referencing.

```
\section{Introduction}\label{foo}  
\subsection{Literature Review}\label{bar}
```

This literature review is in Subsection \ref{bar},
part of Section \ref{foo}.

compiles to:

1 Introduction

1.1 Literature Review

This literature review is in Subsection 1.1, part of Section 1.

with the numbering updating automatically. Note: need to compile twice to have numbering properly update.

Outline

What is LaTeX and why should I use it?

How do I get LaTeX?

How do I use LaTeX?

Bibliography

Additional typesetting

Thesis

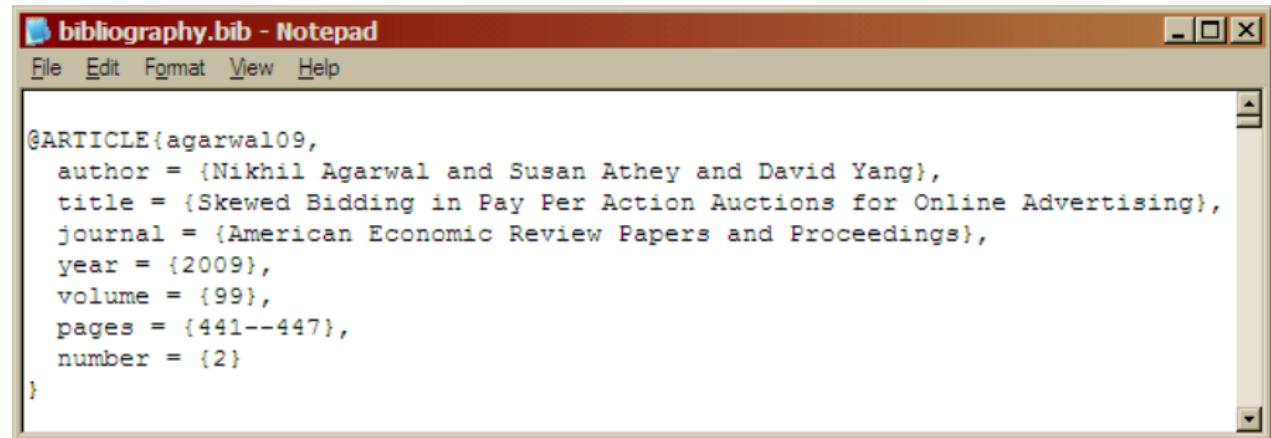
Customisation

Beamer

BiBTeX database

BiBLaTeX is LaTeX's way of handing referencing/citation.

To start, we need a bibliographic *.bib* database.



The screenshot shows a Windows Notepad window titled "bibliography.bib - Notepad". The menu bar includes File, Edit, Format, View, and Help. The main text area contains a BibTeX entry:

```
@ARTICLE{agarwal09,
  author = {Nikhil Agarwal and Susan Athey and David Yang},
  title = {Skewed Bidding in Pay Per Action Auctions for Online Advertising},
  journal = {American Economic Review Papers and Proceedings},
  year = {2009},
  volume = {99},
  pages = {441--447},
  number = {2}
}
```

This a common format, and most online databases allow you to export accordingly.

Articles in the database

```
@ARTICLE{arbitraryRef01,  
author = {Joe Blogs and Jon Smith and Jenny Smith},  
title = {An Interesting Paper},  
journal = {Journal of Interesting Stuff},  
year = {2009},  
volume = {99},  
pages = {441--447},  
number = {2}  
}
```

Unpublished manuscripts

```
@UNPUBLISHED{arbitraryRef02,  
    author = {Ambrus, Attila and Reisinger, Markus},  
    title = {Exclusive vs Overlapping Viewers},  
    note = {mimeo},  
    year = {2006}  
}
```

Book

```
@BOOK{arbitraryRef03,  
    title = {The Economic Theory of Product Differentiation},  
    publisher = {Oxford University Press},  
    year = {1991},  
    author = {John Beath and Yannis Katsoulacos},  
    address = {Oxford, UK}  
}
```

Book chapter

```
@INCOLLECTION{arbitraryRef04,  
    author = {Chapter Author},  
    title = {My Chapter Title},  
    booktitle = {Handbook of Blah},  
    publisher = {Elsevier},  
    year = {2007},  
    editor = {Jon Editor and Jane Editor},  
    pages = {1701--1844}  
    address = {Amsterdam, The Netherlands}  
}
```

A basic document step-by-step

```
\documentclass{article}
\usepackage[natbib=true, style=authoryear,
            backend=bibtex8]{biblatex}
\addbibresource{myBibliography.bib}
\begin{document}
```

In a recent contribution \citet{arbitraryRef01}
show ...
can not be ruled out \citep{arbitraryRef01}.
...

```
\printbibliography
\end{document}
```

Notes: myBibliography.bib is the name of the .bib database file.

A basic document step-by-step

```
\documentclass{article}
\usepackage[natbib=true, style=authoryear,
            backend=bibtex8]{biblatex}
\addbibresource{myBibliography.bib}
\begin{document}
```

In a recent contribution \citet{arbitraryRef01}
show ...
can not be ruled out \citep{arbitraryRef01}.
...

```
\printbibliography
\end{document}
```

Notes: myBibliography.bib is the name of the .bib database file. Need to compile *three* times to reflect a change in references.

1 Literature Review

In a recent contribution Agarwal, Athey, and Yang (2009) show ...

... can not be ruled out (Agarwal, Athey, and Yang, 2009).

References

AGARWAL, N., S. ATHEY, AND D. YANG (2009): "Skewed Bidding in Pay Per Action Auctions for Online Advertising," *American Economic Review Papers and Proceedings*, 99(2), 441–447.

Outline

What is LaTeX and why should I use it?

How do I get LaTeX?

How do I use LaTeX?

Bibliography

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Thesis

Customisation

Beamer

Footnotes

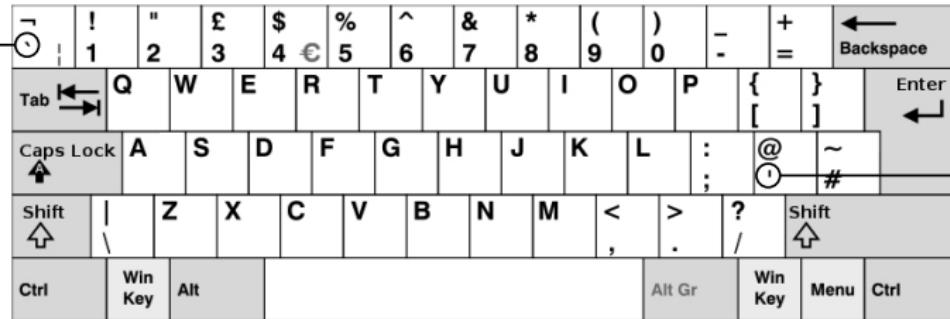
Fusce facilisis sapien in orci sollicitudin ultricies. Suspendisse quis vehicula lectus. Nulla dui lacus, dictum vel dapibus ac, convallis vel neque. Nam ut elit at libero consequat dignissim.¹

¹This is a footnote.

```
...dignissim.\footnote{This is a footnote.}
```

Quoting

open
quote



close
quote

To typeset: 'This is a quote.', we use

'This text is a quote.'

To typeset: "This is a quote.", we use

"This text is a quote."

Long quotations

...Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Curabitur id mauris eget nisl vestibulum pharetra vel vel sem.

Cras non convallis ipsum. Integer lobortis condimentum pharetra. In vel nulla et dolor cursus aliquet. Vivamus fermentum gravida tellus, faucibus rhoncus nisi mollis sed. Etiam in egestas lectus. Cum sociis natoque penatibus et magnis dis parturient montes.

Nam elit tortor, feugiat tempus ultricies vel, elementum sed enim. Morbi metus purus, scelerisque vitae congue eu, consectetur eu nibh. Quisque eget erat ut justo laoreet scelerisque et eget lorem...

```
...
\begin{quotation}
<long quote text>
\end{quotation}
...
```

Long quotations

...Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Curabitur id mauris eget nisl vestibulum pharetra vel vel sem.

Cras non convallis ipsum. Integer lobortis condimentum pharetra. In vel nulla et dolor cursus aliquet. Vivamus fermentum gravida tellus, faucibus rhoncus nisi mollis sed. Etiam in egestas lectus. Cum sociis natoque penatibus et magnis dis parturient montes.

Nam elit tortor, feugiat tempus ultricies vel, elementum sed enim. Morbi metus purus, scelerisque vitae congue eu, consectetur eu nibh. Quisque eget erat ut justo laoreet scelerisque et eget lorem...

```
...
\begin{quotation}
<long quote text>
\end{quotation}
...
```

Long quotations are an example of *environments*.

A basic document step-by-step

```
...
\maketitle
\begin{abstract}
...
\end{abstract}
...
```

A LaTeX Example

Greg Taylor

November 2, 2010

Abstract

Masenca bilbendum erat tristisque quam interdum ac interdum arcu blandit. Sed sapient nulla, adipiscere excepti pretitio id, cursor ut metus. Etiam ut cuimod lectus. Vivamus metus dolor, dapibus in lobortis ac, rutrum sit amet leo. Vivamus ultrices viverra tortor ac vehicula. Fusce quis condimentum velit. Morbi malesuada cursus enim, eu volutpat nisi ullamcorper et. Etiam luctus massa et mauris fermentum ac tempor nibh facilis. Etiam sagittis mi ut nisl aliquam ac adipiscere dui posuere. Suspendisse ex ultrices nunc. Donec facilis pellentesque velit, a convallis est dapibus et. Sed enim tellus, consectetur placerat rutrum sit amet, luctus vel elit.

1 Introduction

1.1 Motivation

Loem ipsum dolor sit amet, consectetur adipiscere elit. Aliquam ut massa et tortor convallis molestie. Pellentesque sodales leo magna. Mauris nec nunc est, at tincidunt urna. Sed lacina placerat lorem, nec pretium nunc auctor id. Proin condimentum sagittis risus et tincidunt. Suspendisse ac magna felis. Ut faucibus elit ut elit viverra semper mollis ligula eleifend. Integer dolor elit, cursus nec aliquam vulputate, dignissim nec justo. Vestibulum gravida dapibus mi, vel volutpat tellus faucibus quis. Nam quis nisl ac eros interdum iaculis sed tellus.

Prasent sheetum sollicitudin orci in consequet. Ut grada impedit eros, at pretium purus porta id. Sed augue lacus, euismod nec ullamcorper vitae, vestibulum vitae nisi. Prasent erat urna, varius sed bilbendum et, consequet non arcu. Nullam metus velit, tincidunt et elementum ac, placerat id nulla. Nam turpis justo, grada non lobortis at, posuere ultricies purus. Morbi malesuada cursus enim, eu volutpat nisi ullamcorper et. Etiam luctus massa et mauris fermentum ac tempor nibh facilis. Etiam sagittis mi ut nisl aliquam ac adipiscere dui posuere. Suspendisse ex ultrices nunc. Donec facilis pellentesque velit, a convallis est dapibus et. Sed enim tellus, consectetur placerat rutrum sit amet, luctus vel elit.

Sed lacina dignissim suscipit. Duis egit dolor tristique turpis vehicula consequet sed varius purus. Sed elementum conetur molestie. Aenean condimentum volutpat fringilla, nisl id tincidunt, tincidunt tincidunt diam. Ut dignissim. Morbi accumsan accumsan felis, sed sodales metus suscipit ac. Sed bilbendum, erat nec dapibus tincidunt, lectus diam pretium leo, non scelerisque urna massa a augue. Prasent eleifend metus ac quam convallis ac scelerisque dolor accumsan.

Lists

Bulleted lists are created with

```
\begin{itemize}
  \item This is the first bulleted item.
  \item This is the second bulleted item.
\end{itemize}
```

Lists

Bulleted lists are created with

```
\begin{itemize}
  \item This is the first bulleted item.
  \item This is the second bulleted item.
\end{itemize}
```

Numbered lists are created with

```
\begin{enumerate}
  \item This is the first bulleted item.
  \item This is the second bulleted item.
\end{enumerate}
```

Typesetting mathematics

Simple inline mathematics is enclosed within \$ signs:

Equation $5+2x=15$ implies $x=5$.

Typesetting mathematics

Simple inline mathematics is enclosed within \$ signs:

Equation $5+2x=15$ implies $x=5$.

Equation $5 + 2x = 15$ implies $x = 5$.

Typesetting mathematics

Simple inline mathematics is enclosed within \$ signs:

Equation $5+2x=15$ implies $x=5$.

Equation $5 + 2x = 15$ implies $x = 5$.

Displayed equations are typeset thus:

The equation

```
\[  
 5+2x=15  
\]
```

can be solved for x .

Typesetting mathematics

Simple inline mathematics is enclosed within \$ signs:

Equation $5+2x=15$ implies $x=5$.

Equation $5 + 2x = 15$ implies $x = 5$.

Displayed equations are typeset thus:

The equation

```
\[  
 5+2x=15  
\]
```

can be solved for x .

The equation

$$5 + 2x = 15$$

can be solved for x .

Typesetting mathematics

Displayed equations can also be typeset as:

```
The equation  
\begin{equation}\label{eqn:x}  
5+2x=15  
\end{equation}  
can be solved for \$x$.
```

which results in automatic numbering.

The equation

$$5 + 2x = 15 \tag{1}$$

can be solved for x .

Typesetting mathematics

Displayed equations can also be typeset as:

```
The equation  
\begin{equation}\label{eqn:x}  
5+2x=15  
\end{equation}  
can be solved for \$x$.
```

which results in automatic numbering.

The equation

$$5 + 2x = 15 \tag{1}$$

can be solved for x .

As with sections, the label can be used for cross referencing.

Hyphens & dashes

To typeset e-mail (hyphen), we use

```
e-mail
```

Hyphens & dashes

To typeset e-mail (hyphen), we use

```
e-mail
```

To typeset ... pages 192–203 (en-dash), we use

```
...192--203
```

Hyphens & dashes

To typeset e-mail (hyphen), we use

```
e-mail
```

To typeset ... pages 192–203 (en-dash), we use

```
...192--203
```

To typeset ... blah blah—parenthetical remark—blah blah...
(em-dash), we use

```
...blah blah---parenthetical remark---blah blah...
```

Manual text formatting (avoid where possible)

This text is *italic*, **bold**, underlined.

```
This text is \textit{italic}, \textbf{bold},  
 \underline{underlined}.
```

Manual text formatting (avoid where possible)

This text is *italic*, **bold**, underlined.

```
This text is \textit{italic}, \textbf{bold},  
\underline{underlined}.
```

This text is centred.

```
\begin{center}  
This text is centred.  
\end{center}
```

Tables

Blah	Blop	Clop
4	5	6
7	8	9

Tables

Blah	Blop	Clop
4	5	6
7	8	9

```
\begin{table}
\caption{Put caption text here}
\label{tab:label}
```

```
\begin{tabular}{ l | c || r }
Blah & Blop & Clop \\
\hline
4 & 5 & 6 \\
7 & 8 & 9
\end{tabular}
```

```
\end{table}
```

Here `table` is a *float* environment, and `tabular` is the table itself.

Praesent non nulla sit amet dui commodo sagittis et ut sapien. Fusce egestas augue ac libero tempor venenatis. Nulla facilisi. Cras nec ornare nulla. Maecenas accumsan massa eget risus condimentum condimentum. Suspendisse nulla dui, hendrerit id dictum non, sollicitudin in nibh. Etiam vulputate metus accumsan erat malesuada sollicitudin.

TABLE 1
Estimated effects of *STR* on test scores controlling for the presence of English learners.

Regressor	Model			
	(1)	(2)	(3)	(4)
<i>STR</i>	-1.72** (0.50)	-0.69* (0.27)	-0.67** (0.29)	-0.64** (0.27)
<i>STR</i> ²			-0.70 (0.70)	-0.68 (0.74)
English Learners		-0.41 (0.31)	-0.45 (0.20)	-0.44 (0.30)
<i>HE</i> × <i>STR</i>		-0.52** (0.07)		-0.58** (0.30)
Constant	739.6** (8.6)	682.4** (11.5)	734.0** (25.2)	744.0** (21.3)

Pellentesque aliquet vehicula cursus. Phasellus volutpat accumsan mauris vitae sollicitudin. Donec velit augue, vehicula et mollis et, malesuada at lacus. Pellentesque quis enim purus. Etiam commodo, nibh id dictum lacinia, nisi elit tempor velit, sit amet tristique leo ante non purus. Aliquam nec vulputate enim. Pellentesque ut ipsum quis urna ullamcorper laoreet. Vivamus at lacus et est elementum rhoncus a vitae justo. Integer dictum vulputate nisi et aliquam. Vivamus risus erat, semper vitae malesuada ac, viverra sit amet lorem. Praesent ultricies dui dolor, sit amet venenatis dolor. Pellentesque euismod ultricies libero at laoreet. Phasellus eros turpis,

```

\begin{table}[tbhp]
\caption{Estimated effects of $STR\$ on test scores controlling for the presence of English learners.}
\begin{center}
\begin{tabular}{ l c c c c }
\hline\hline
&\multicolumn{4}{c}{Model} \\
\cline{2-5}
Regressor & (1) & (2) & (3) & (4) \\
\hline
$STR\$ & & & & \\
& & & & \\
& & & & \\
$STR^2\$ & & & & \\
& & & & \\
& & & & \\
English & & & & \\
Learners & & & & \\
$HE \times STR\$ & & & & \\
& & & & \\
& & & & \\
Constant & & & & \\
& & & & \\
& & & & \\
\end{tabular}
\end{center}
\label{table:welfare}
\end{table}

```

Draw a horizontal line from column 2 to column 5.

Acceptable table location(s): h=here, b=bottom, t=top, p=on its own page.

```
\begin{table}[tbhp]
\caption{Estimated effects of $STR\$ on test scores controlling for the presence of English learners.}
\begin{center}
\begin{tabular}{ 1 c c c c c }
\hline\hline
& \multicolumn{4}{c}{Model} \\
\cline{2-5}
```

```
Regressor & (1) & (2) & (3) & (4) \\
\hline
```

```
$STR\$ & -1.72^{**} & -0.69^{*} & -0.67^{**} & -0.64^{**} \\
& (0.50) & (0.27) & (0.29) & (0.27)
```

```
$STR^2\$ & & & & \\
& & & & \\
& & & & \\
English & & -0.41 & -0.45 & -0.44 \\
Learners & & (0.31) & (0.20) & (0.30)
```

```
$SHE\times STR\$ & -0.52^{**} & & & \\
& (0.07) & & & \\
& & & & \\
Constant & 739.6^{**} & 682.4^{**} & 734.0^{**} & 744.0^{**} \\
& (8.6) & (11.5) & (25.2) & (21.3)
```

```
\end{tabular}
\end{center}
\label{table:welfare}
\end{table}
```

Create a table with 5 columns having text aligned left, centre, centre, centre, centre

create a row that spans 4 columns with centre alignment.

creates
a new line

'&' functions as the
column delimiter

\hline draws a horizontal
line across all columns

creates a new line
after a vertical space of 2mm.

Tables

Good resource for learning LaTeX tables:

<http://en.wikibooks.org/wiki/LaTeX/Tables>

A basic document step-by-step

Figures are included thus:

```
\usepackage{graphicx}  
\begin{document}
```

```
\begin{figure}[htbp]  
  \begin{center}  
    \includegraphics[width=1\textwidth]{filename.ext}  
    \caption{Put caption text here}  
    \label{fig:label}  
  \end{center}  
\end{figure}  
...
```

Here `figure` is a *float* environment.

A basic document step-by-step

Figures are included thus:

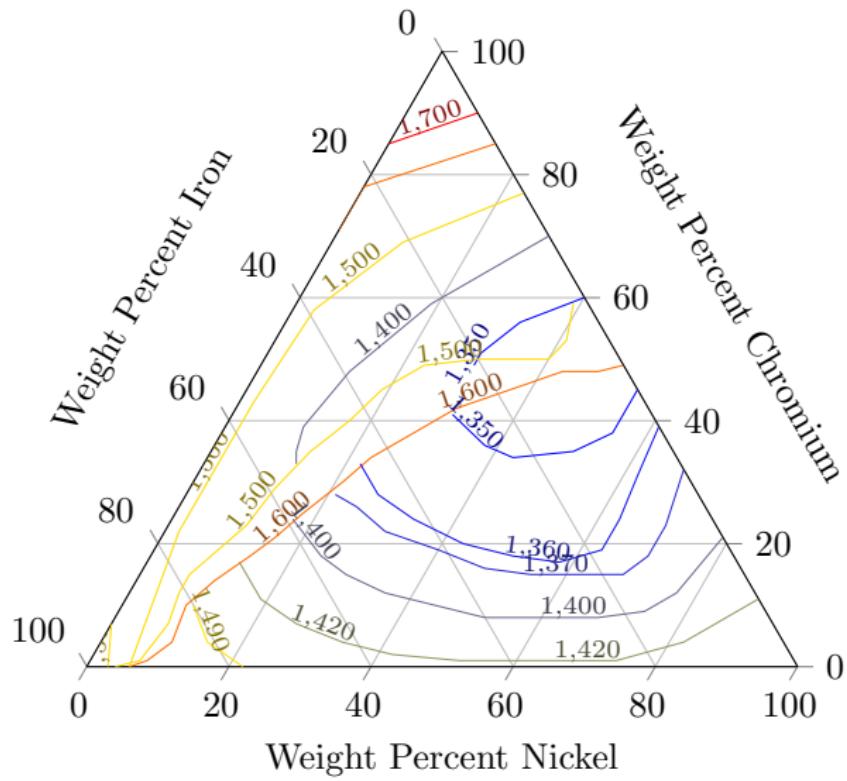
```
\usepackage{graphicx}  
\begin{document}
```

```
\begin{figure}[htbp]  
  \begin{center}  
    \includegraphics[width=1\textwidth]{filename.ext}  
    \caption{Put caption text here}  
    \label{fig:label}  
  \end{center}  
\end{figure}  
...
```

Here `figure` is a *float* environment.

LaTeX can also draw nice figures with the `tikz` package and PGFplots.

Want-be-Stainless Steel



Misc layout tweaks

To double space, or one and a half space your text the code for your preamble is

```
\usepackage [doublespacing] {setspace}
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\usepackage [onehalfspacing] {setspace}
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By default, LaTeX indents the first line of paragraphs. To have it leave a blank line instead use the following in the preamble:

```
\setlength{\parskip}{12pt plus 1pt minus 1pt}  
\setlength{\parindent}{0in}
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Note: don't do this if you have one and a half or double spacing!

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Note: don't do this if you have one and a half or double spacing!

You can use

```
\renewcommand{\familydefault}{\sfdefault}
```

to change the document-wide default font to sans-serif, but don't do this.

Escaping special characters

- ▶ Anything that appears after % on a line will be a comment (can also put a % at the start of a line to temporarily hide a paragraph of text).
- ▶ We have seen that some characters such as %, \$, &, { have a special meaning in the LaTeX language.
- ▶ These characters can be typeset by preceding them with a backslash.
- ▶ Type \\ to force a new line.

Computer Modern (default):

For mange Aar siden levede en Keiser, som holdt saa uhyre meget af smukke nye Klæder, at han gav alle sine Penge ud for ret at blive pyntet. Han brød sig ikke om sine Soldater, brød sig ei om Comedie eller om at kjøre i Skoven, uden alene for at vise sine nye Klæder. Han havde en Kjole for hver Time paa Dagen, og ligesom man siger om en Konge, han er i Raadet, saa sagde man altid her:
»Keiseren er i Garderoben!« –

New Century Schoolbook(\usepackage{fouriernc})

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Fonts

- ▶ For more LaTeX fonts, see <http://www.tug.dk/FontCatalogue/>.
- ▶ There are lots of high quality fonts in the standard LaTeX distribution with proper kerning tables / math spacing etc.

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- ▶ There are lots of high quality fonts in the standard LaTeX distribution with proper kerning tables / math spacing etc.
- ▶ Using XeLaTeX in place of the ordinary LaTeX compiler, one can load ordinary open type and true type fonts via the `fontspec` package.

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What is LaTeX and why should I use it?

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Thesis

Customisation

Beamer

A basic document step-by-step

To typeset a thesis or book:

```
\documentclass{report}
\title{An Example LaTeX Thesis}
\author{Greg Taylor}
\begin{document}
\maketitle
\begin{abstract}...\end{abstract}
\tableofcontents
\chapter{Introduction}
\section {Motivation}
...
\end{document}
```

An Example LaTeX Thesis

Greg Taylor

August 1984

Abstract

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed id dolor at urna libendum pretium at sed erit. Quisque a luctu erit. Nulla a urna dui, et vehicula velit. Praesent fermentum est nec leo pharetra aliquam. Donec sit amet nisi eu tellus nec nunc nec. Nulla viverra lectus urna. Quisque gravida id libero orci nec nec nec. Nulla viverra lectus urna. Vestibulum a leo in tellus laoreet posuere in vitae et. Nulla viverra lectus urna ascipt et feugiat enim feugiat. Sed sed sed augue.

Contents

1	Introduction	2
1.1	Motivation	2
1.2	Background	3
2	Literature	4
2.1	Theory	4
2.2	Empirics	4
3	Methods	5
4	Data	6
4.1	Dependent Variable	6
4.2	Explanatory Variables	6
4.3	Hypotheses	6
5	Analysis	7
6	Conclusion	8

Chapter 1

Introduction

1.1 Motivation

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed ut dolor at urna libidinosus, sed erit. Quisque a turdo omni. Nulla a urso doli, et vehicula volit. Praesent fermentum erat nec leo pulvinar aliquam. Donec sit amet nisi volt. Maecenas nec nunc augue. Nam plavert, aero et tristique gravida, dai libero ornare magna, nec porttitor dai mi non nunc. Vestibulum a leo, auctor nisl, auctor nisl. Nullam viverra lectus vitae una sociquet et fringilla enim feugiat. Sed sed cibus auge.

Vivamus mauris sit, blandi non libidinosus nec, fringilla non odio. Etiam ullamcorper lectus vitae velit ultricies ultricies. Donec plavert neque ut aero blandi, auctor nisl, auctor nisl. Nullam viverra lectus vitae una sociquet et fringilla enim feugiat. Congue id pedeconcepse ac, societate nec felis. Praesent magna massa, posuere ac molestie vel, malesuada estet nuptio. Donec mauris dui, porta vitae laoreet sit amet, facilis sodales justo. In venenatis aliquip tempus.

Mauris sit amet, auctor nisl, auctor nisl, auctor nisl. Integer laoreet, nunc sit amet, vehicula tempor, tunc enim posuere nunc, quis pedeconcepse acru enus quis nunc. Curabitur tincidunt nisi libidinosus nece laoreet vel clickend auctor aliquip. Nam tellus nisl, posuere sit amet porttis at, interdum quis metus. Aenean auctor nisl, auctor nisl, auctor nisl. Nullam viverra lectus vitae una sociquet. Phasellus vel lorem justo. Faeces rina nilla, sagittis nec fringiat quis, vacua sed ordi. Pedeconcepse sociquet tristique magna id volutpat. Aenean laoreet magna vel dai tempor, non pulvinar los libidinosus. Praesent orci sapien, congettetur ac tunc, auctor nisl, auctor nisl, auctor nisl. Nam posuere ac fringilla enim sociquet, dai velit varius quam, et aliquam augue nec congue parus. Quisque sit amet rutrum nunc. Pedeconcepse tincidunt rhinocer lectus vel tempor. Cum auctor natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam rapido lido, interdum sed tempor

The input command

The input command is useful for long documents such as theses

```
\input{ch1.tex}
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has the same effect as taking the contents of ch1.tex and pasting it in at the current point.

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has the same effect as taking the contents of ch1.tex and pasting it in at the current point.

This allows you to keep each chapter in a separate file and keeps everything more robust and manageable.

Note: only include the preamble and begin document / end document commands in the main file, not the sub-files.

The input command

main.tex

```
\documentclass{report}
\title{An Example LaTeX Thesis}
\author{Greg Taylor}
\begin{document}
\maketitle
\begin{abstract}...\end{abstract}
\tableofcontents
\input{chapter1.tex}
\end{document}
```

chapter1.tex

```
\chapter{Introduction}
Your intro text goes here...
```

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Custom commands

You can create your own LaTeX commands

```
\newcommand{\name}[num]{definition}
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```
\myNameIs{Greg}
```

Produces

My name is *Greg*.

Custom commands

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\newcommand{\name}[num]{definition}
```

For example,

```
\newcommand{\myNameIs}[1]{My name is \textit{#1}.}
```

```
\myNameIs{Greg}
```

Produces

My name is Greg.

`\renewcommand` can be used to change the definition of existing commands.

Custom environments 1

One can define theorem-like environments by putting into the preamble

```
\usepackage{amsthm}  
\newtheorem{definition}{Definition}
```

The environment is then used with

```
\begin{definition}\label{mydeflab}  
...  
\end{definition}
```

Useful for typesetting hypothesis, examples, etc.

sagittis augue. Aliquam rhoncus diam non dui condimentum commodo. Suspendisse laoreet massa eu nisl vehicula tempus.

Definition 1 *Aliquam rhoncus diam non dui condimentum commodo. Suspendisse laoreet massa eu nisl vehicula tempus. Nam tempus, ligula non elementum rhoncus, dolor erat lacinia erat, lacinia ullamcorper dui est sed enim. Vestibulum et vehicula magna. Sed eget sapien nec enim vestibulum mollis. Fusce tempor, elit at scelerisque faucibus, dolor velit condimentum augue, eget lacinia sem turpis vel libero.*

It has been observed by Agarwal, Athey, and Yang (2009) that vulputate vulputate erat, a pulvinar dui porttitor sed. Morbi auctor, erat quis interdum ullamcorper, mi quam bibendum

Can cross reference to the defined label in the same way as sections.

Custom environments 2

You can also create more general custom environments

```
\newenvironment{name}[num]{before}{after}
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For example,

```
\newenvironment{bigCen}{\begin{center}\huge}{\end{center}}
```

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\newenvironment{name}[num]{before}{after}
```

For example,

```
\newenvironment{bigCen}{\begin{center}\huge}{\end{center}}
```

```
\begin{bigCen}  
Test  
\end{bigCen}
```

Produces

Test

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```
\documentclass{beamer} ←
\title{Your Title Here}
\subtitle{Subtitle goes here.}
\author{Your Name}
\institute{Oxford Internet Institute\\University of Oxford}

\begin{document}

\begin{frame} ←
\titlepage
\end{frame}

\begin{frame}
\frametitle{This is the title for the frame (slide)}
\begin{itemize}
\item This is the first bullet point.\pause ←
\item LaTeX pauses for input before the second bullet point is shown.
\begin{itemize}
\item Lists nested inside one another behave in a natural fashion.
\end{itemize}\pause
\item This is the third bullet point.
\item There is no pause between the third and fourth bullet point.
\end{itemize}
\end{frame}

\end{document}
```

Your Title Here

Subtitle goes here.

Your Name

Oxford Internet Institute
University of Oxford

November 8, 2010

This is the title for the frame (slide)

- ▶ This is the first bullet point.
- ▶ LaTeX pauses for input before the second bullet point is shown.
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- ▶ There is no pause between the third and fourth bullet point.