

Installing Latex

- MikTeX (<http://miktex.org/>) - for Windows
- proTeXt (<http://www.tug.org/protext>) - for Windows
- MacTeX (<http://www.tug.org/mactex/>) - for Mac

- Sharelatex (www.sharelatex.com) - Online
- Overleaf (www.overleaf.com) - Online

Introduction

- It is pronounced as Lay-tech or Lah-tech
- It is a markup language similar to HTML (instructions mentioned in tags and text)
- Used widely in academia
- Written as $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$

Why Latex?

- Intended for authors to focus on writing instead of formatting and visualization while writing
- Easy to include math equations
- Good for large documents (cross-referencing)
- Automatic generation of bibliography
- Looks pretty compared to MS Office!
- Its free!

Structure

- There are many files generated while creating a latex document including .log, .tex, .bib
- .tex is the file we will be editing

Structure

- Document Class
 - {article, report, book, letter}, font, fontsize
 - `\documentclass[12pt]{article}`
- Packages
 - Graphics, math, formatting
 - `\usepackage{geometry}`
- Main Body
 - Text, sections and bibliography

Example

```
\documentclass{article}  
\usepackage{  
\title{Introduction to Latex}  
\author{Anita Bahmanyar}  
\date{November 9, 2016}  
\begin{document}  
\maketitle  
Hello world!  
\end{document}
```

Example

```
\documentclass{article}
```

Document Class

```
\usepackage{}
```

```
\title{Introduction to Latex}
```

```
\author{Anita Bahmanyar}
```

```
\date{November 9, 2016}
```

```
\begin{document}
```

```
\maketitle
```

```
Hello world!
```

```
\end{document}
```

Example

```
\documentclass{article}
```

```
\usepackage{}
```

Packages

```
\title{Introduction to Latex}
```

```
\author{Anita Bahmanyar}
```

```
\date{November 9, 2016}
```

```
\begin{document}
```

```
\maketitle
```

```
Hello world!
```

```
\end{document}
```


Example

```
\documentclass{article}  
\usepackage{  
\title{Introduction to Latex}  
\author{Anita Bahmanyar}  
\date{November 9, 2016}
```

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

Main Body

Example

Introduction to Latex

Anita Bahmanyar

November 9, 2016

Hello world!

Lists

Lists

- Numeric

```
\begin{enumerate}  
  \item point 1  
  \item point 2  
\end{enumerate}
```

1. point 1

2. point 2

Lists

- Numeric

```
\begin{enumerate}  
  \item point 1  
  \item point 2  
\end{enumerate}
```

1. point 1
2. point 2

- Points

```
\begin{itemize}  
  \item point 1  
  \item point 2  
\end{itemize}
```

- point 1
- point 2

Nested Lists

```
\begin{enumerate}
  \item point 1
  \begin{enumerate}
    \item nested point 1
    \begin{enumerate}
      \item nested nested point 1
    \end{enumerate}
  \end{enumerate}
\end{enumerate}
\item point 2
\end{enumerate}
```

Nested Lists

```
\begin{enumerate}
```

```
\item point 1
```

```
\begin{enumerate}
```

```
\item nested point 1
```

```
\begin{enumerate}
```

```
\item nested nested point 1
```

```
\end{enumerate}
```

```
\end{enumerate}
```

```
\item point 2
```

```
\end{enumerate}
```

1. point 1

(a) nested point 1

i. nested nested point 1

2. point 2

Images

- `\usepackage{graphicx}`

```
\begin{figure}[H]  
    \centering  
    \includegraphics[scale=size]{filename}  
    \caption{}  
    \label{fig:label}  
\end{figure}
```


Images

- `\usepackage{graphicx}`

```
\begin{figure}[H]  
  \centering  
  \includegraphics[scale=size]{filename}  
  \caption{}  
  \label{fig:label}  
\end{figure}
```

[h] : here	[t] : top
[b] : bottom	[p] : separate page



Figure 1: write your caption here

Tables

Tables

```
\begin{table}[h!]  
\caption{Title} % title of Table  
\centering      % used for centering table  
\begin{tabular}{| c | c | c | c | } % centered columns (4 columns)  
\hline %inserts double horizontal lines  
& Column 1 & Column 2 & Column 3 & \\\ [0.5ex] % inserts table  
  
%heading  
\hline % inserts single horizontal line  
  
Row 1 & 1 & 2 & 3 & \\\ \hline  
Row 2 & 4 & 5 & 6 & \\\ \hline  
Row 3 & 7 & 8 & 9 & \\\%[1ex] %adds vertical space  
\hline %inserts single line  
\end{tabular}  
\label{table:table1} % is used to refer this table in the text  
\end{table}
```

Tables

Table 1: Title

	Column 1	Column 2	Column 3
Row 1	1	2	3
Row 2	4	5	6
Row 3	7	8	9

Equations

- `\usepackage{amsmath}` for math equations

Equations

- `\usepackage{amsmath}` for math equations

Example:

- `\begin{equation}`
$$f(x) = \frac{x^2 + 1}{5} \int x \, dx$$
- `\end{equation}`

Equations

- `\usepackage{amsmath}` for math equations

Example:

- `\begin{equation}`
$$f(x) = \frac{x^2 + 1}{5} \int x dx$$
- `\end{equation}`

$$f(x) = \frac{x^2 + 1}{5} \int x dx$$

Equations

- Inline math mode can be inserted using $math$ equation here $$

Equations

- Inline math mode can be inserted using `$ math equation here$`

Example:

We can use inline math such as `$f(x) = 2x^3 + 5x$` in between text.

Equations

- Inline math mode can be inserted using `$ math equation here$`

Example:

We can use inline math such as `$f(x) = 2x^3 + 5x$` in between text.

We can use inline math such as $f(x) = 2x^3 + 5x$ in between text.

Online Equation Editors

- [Daum Equation Editor](#)
- [Codecogs](#)

Bold/ *Italic/ underlined*

Bold/ Italic/ underlined

- `\textbf{text}` : bold face text

text

Bold/ Italic/ underlined

- `\textbf{text}` : bold face text
- `\textit{text}` : italic text

text

text

Bold/ Italic/ underlined

- `\textbf{text}` : bold face text
- `\textit{text}` : italic text
- `\underlined{text}` : underlined text

text

text

text

Cross-referencing

- Use `\label{}` to reference figures, tables, equations, sections, etc
- For reference:
`\label{fig:labelname}`
- For calling the label:
`\ref{fig:labelname}`

fig, sec, eq, etc

Bibliography

Method 1:

Bibliography inside the file

```
\begin{thebibliography}{}  
    \bibitem{reference 1}  
    \bibitem{reference 2}  
\end{thebibliography}
```

We can cite it as: **\cite{reference 1}**

Bibliography

Method 2:

Using a separate .bib file:

Inside .tex file:

```
\bibliographystyle{bibstyle}
```

```
\bibliography{filename}
```

Bibliography styles can be found at:

[https://www.sharelatex.com/learn/
Bibtex_bibliography_styles](https://www.sharelatex.com/learn/Bibtex_bibliography_styles)

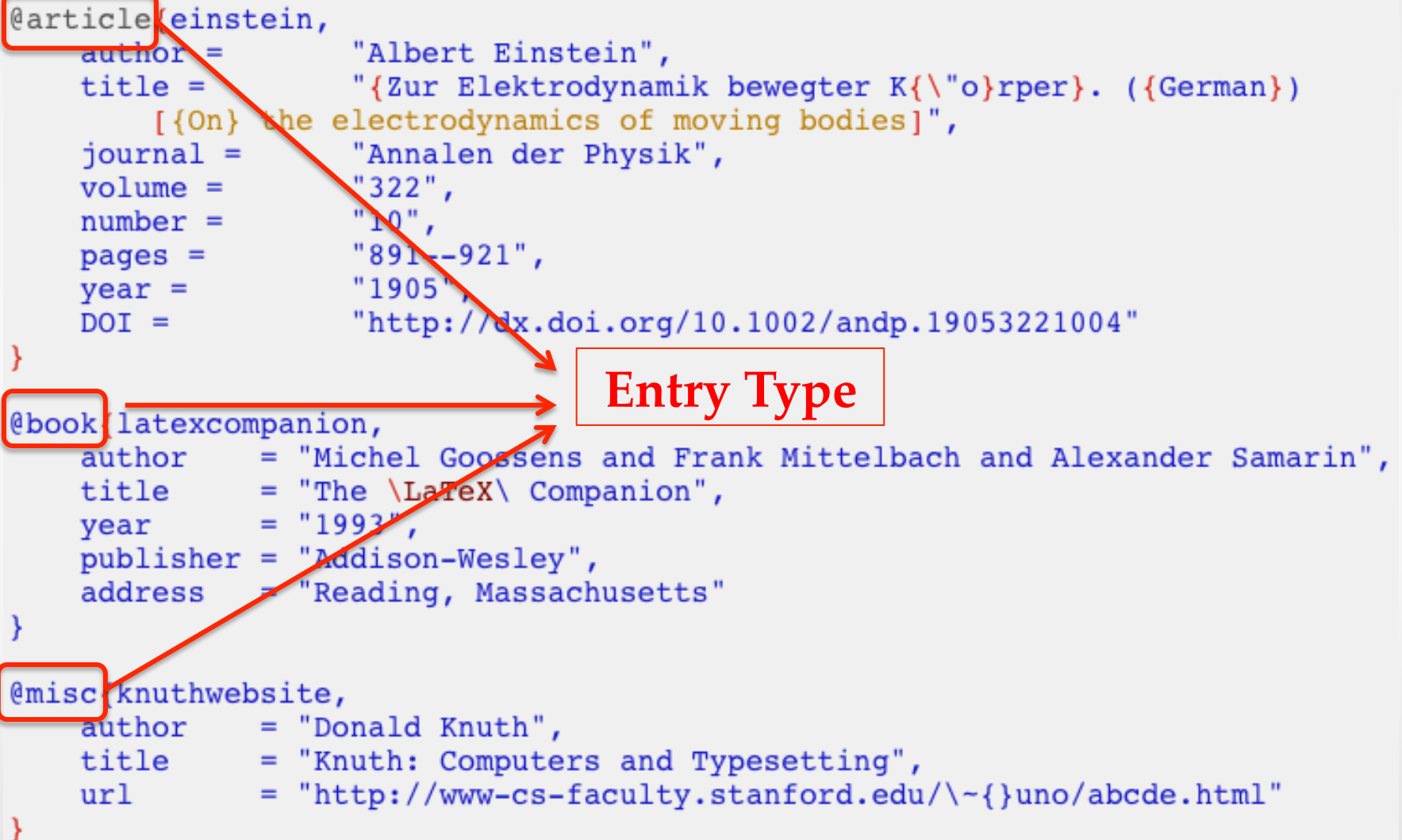
Bibliography

```
@article{einstein,  
  author =      "Albert Einstein",  
  title =      "{Zur Elektrodynamik bewegter K{\\"o}rper}. ({German})  
    [{On} the electrodynamics of moving bodies]",  
  journal =     "Annalen der Physik",  
  volume =     "322",  
  number =     "10",  
  pages =      "891--921",  
  year =       "1905",  
  DOI =        "http://dx.doi.org/10.1002/andp.19053221004"  
}  
  
@book{latexcompanion,  
  author      = "Michel Goossens and Frank Mittelbach and Alexander Samarin",  
  title       = "The \LaTeX\ Companion",  
  year        = "1993",  
  publisher   = "Addison-Wesley",  
  address     = "Reading, Massachusetts"  
}  
  
@misc{knuthwebsite,  
  author      = "Donald Knuth",  
  title       = "Knuth: Computers and Typesetting",  
  url         = "http://www-cs-faculty.stanford.edu/~{}uno/abcde.html"  
}
```

Bibliography

```
@article{einstein,  
  author = "Albert Einstein",  
  title = "{Zur Elektrodynamik bewegter K{\\"o}rper}. ({German})  
    [{On} the electrodynamics of moving bodies]",  
  journal = "Annalen der Physik",  
  volume = "322",  
  number = "10",  
  pages = "891--921",  
  year = "1905",  
  DOI = "http://dx.doi.org/10.1002/andp.19053221004"  
}  
  
@book{latexcompanion,  
  author = "Michel Goossens and Frank Mittelbach and Alexander Samarin",  
  title = "The \LaTeX\ Companion",  
  year = "1993",  
  publisher = "Addison-Wesley",  
  address = "Reading, Massachusetts"  
}  
  
@misc{knuthwebsite,  
  author = "Donald Knuth",  
  title = "Knuth: Computers and Typesetting",  
  url = "http://www-cs-faculty.stanford.edu/~{}uno/abcde.html"  
}
```

Entry Type



Bibliography

```
@article{einstein,  
  author = "Albert Einstein",  
  title = "{Zur Elektrodynamik bewegter K{\\"o}rper}. ({German})  
    [{On} the electrodynamics of moving bodies]",  
  journal = "Annalen der Physik",  
  volume = "322",  
  number = "10",  
  pages = "891--921",  
  year = "1905",  
  DOI = "http://dx.doi.org/10.1002/andp.19053221004"  
}  
  
@book{latexcompanion,  
  author = "Michel Goossens and Frank Mittelbach and Alexander Samarin",  
  title = "The \LaTeX\ Companion",  
  year = "1993",  
  publisher = "Addison-Wesley",  
  address = "Reading, Massachusetts"  
}  
  
@misc{knuthwebsite,  
  author = "Donald Knuth",  
  title = "Knuth: Computers and Typesetting",  
  url = "http://www-cs-faculty.stanford.edu/~{}uno/abcde.html"  
}
```

The diagram illustrates the mapping of BibTeX entry keys to a reference name. A red box labeled "Reference name" is positioned in the center. Three red arrows point from the entry keys "einstein", "latexcompanion", and "knuthwebsite" to this box. The "einstein" key is highlighted with a red box in the first entry. The "latexcompanion" key is highlighted with a red box in the second entry. The "knuthwebsite" key is highlighted with a red box in the third entry.

Bibliography

```
@article{einstein,  
  author = "Albert Einstein",  
  title = "{Zur Elektrodynamik bewegter K{\\"o}rper}. ({German})  
    [{On} the electrodynamics of moving bodies]",  
  journal = "Annalen der Physik",  
  volume = "322",  
  number = "10",  
  pages = "891--921",  
  year = "1905",  
  DOI = "http://dx.doi.org/10.1002/andp.19053221004"  
}
```

Reference Information

```
@book{latexcompanion,  
  author = "Michel Goossens and Frank Mittelbach and Alexander Samarin",  
  title = "The \LaTeX\ Companion",  
  year = "1993",  
  publisher = "Addison-Wesley",  
  address = "Reading, Massachusetts"  
}
```

```
@misc{knuthwebsite,  
  author = "Donald Knuth",  
  title = "Knuth: Computers and Typesetting",  
  url = "http://www-cs-faculty.stanford.edu/~{}uno/abcde.html"  
}
```

References

- https://www.sharelatex.com/learn/Bibliography_management_with_bibtex
- https://www.sharelatex.com/learn/Bibtex_bibliography_styles
- <http://www.howtotex.com/download/FiveMinuteGuideToLaTeX.pdf>