

L^AT_EX

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<http://aiguy.org>



Vad är LaTeX?

- Formaterar och typsätter professionella och akademiska dokument
- Innehåll separeras från utseende
- Använder mallar med formatering
- Byte av utseende på ett dokument kräver oftast bara byte av mall
- Enkel (automatisk) hantering av t.ex. innehållsförteckning och referenser

Vad är LaTeX?

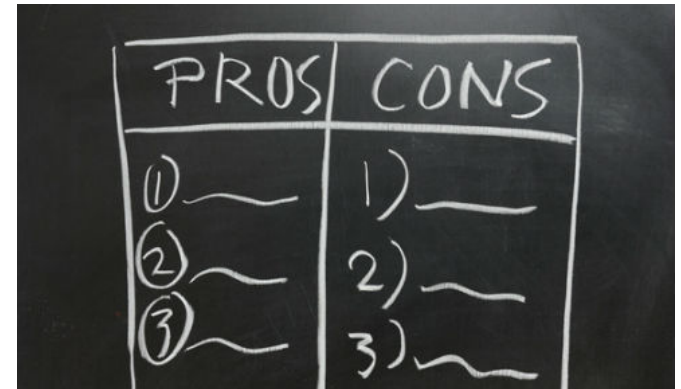
- Bygger på taggar likt HTML/CSS
- Taggar berättar vad du vill göra, vid kompilering skapas dokumentet
- Figurer och formler ser oftast bättre ut än i ordbehandlare, och är lättare att placera korrekt
- Färdiga mallar för var du vill publicera:
 - IEEE
 - AAAI
 - ...

Vad är LaTeX?

- Använd en mall för arbetsdokument, byt till korrekt mall när du är klar
- Kan kräva lite handpåläggning beroende på marginaler etc.
- Massor av paket för avancerade funktioner, t.ex. programkod och formler

För- och nackdelar

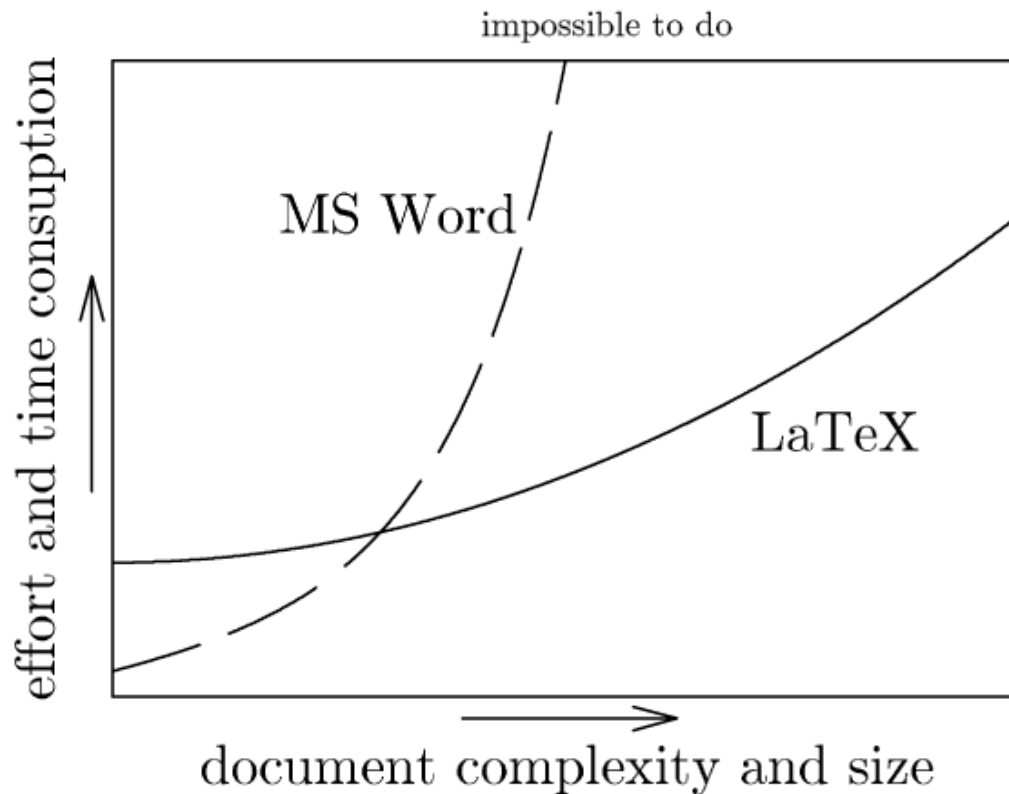
- För:
 - Snygga dokument, speciellt formler och figurer
 - Enkelt att byta utseende
 - Automatisk hantering av referenser etc.
 - Deterministiskt!
- Emot:
 - Krångligt att komma in i
 - Vissa saker är krångliga att få till
 - Ändring av mallar kräver detaljerade kunskaper
 - Genererar PDF. Begränsade möjligheter till spårning av ändringar



A hand-drawn table on a chalkboard with two columns labeled 'PROS' and 'CONS'. Each column has three rows, numbered 1, 2, and 3. Each row contains a wavy line representing a list item.

PROS	CONS
① ~~~~~	1) ~~~~~
② ~~~~~	2) ~~~~~
③ ~~~~~	3) ~~~~~

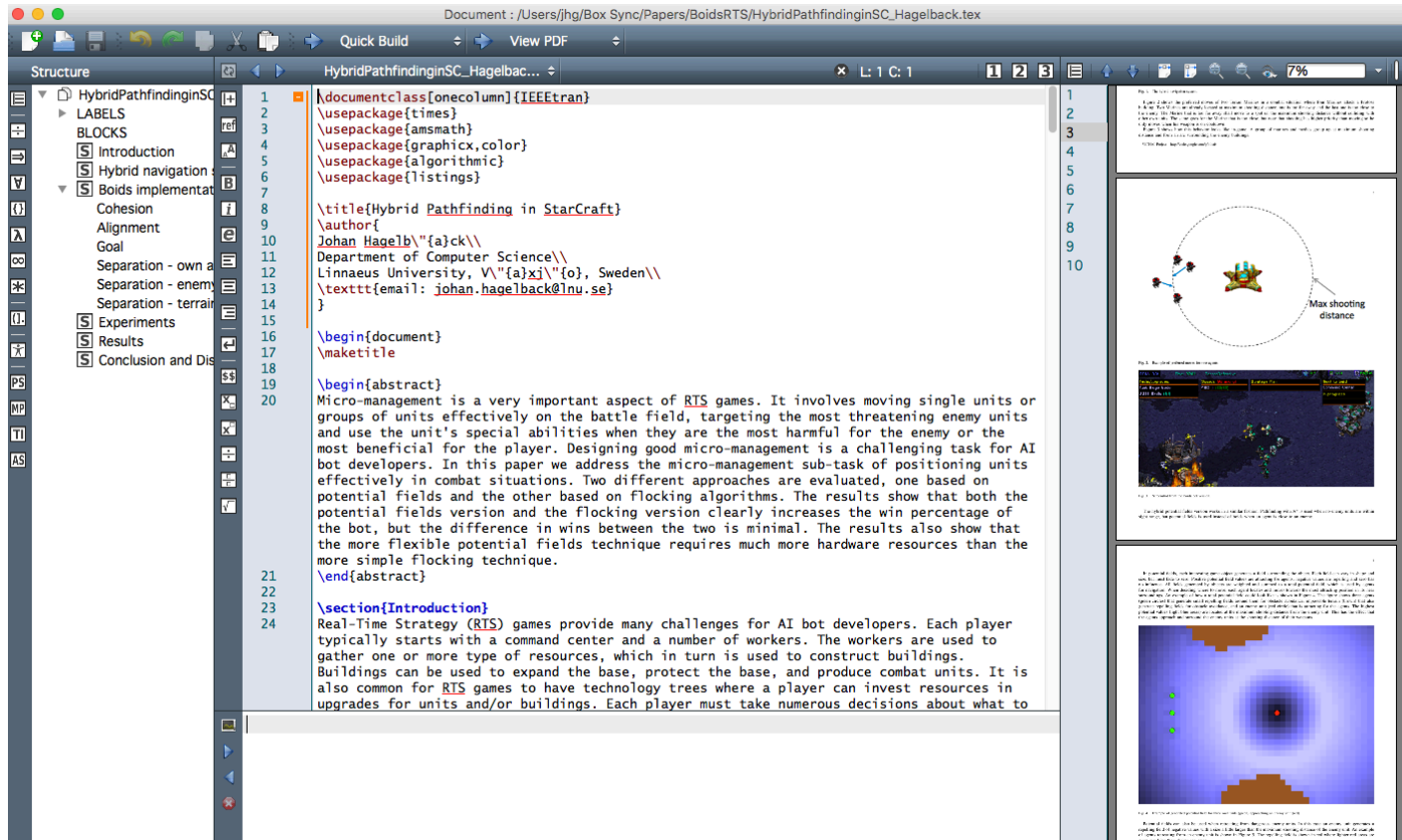
När ska man använda LaTeX?



Ladda ner LaTeX

- Skillnad mellan LaTeX kompilatorn och editor
- Windows:
 - MiKTeX (www.miktex.org) - Kompilator
 - TeXnicCenter (www.texniccenter.org) - Editor
 - Texmaker (www.xm1math.net/texmaker) - Editor
- Mac:
 - MacTeX (www.tug.org/mactex) – Kompilator
 - Texmaker (www.xm1math.net/texmaker) - Editor
- Linux:
 - Finns i regel paket för respektive distribution
- Online:
 - LaTeX Base (<https://latexbase.com/>)

Texmaker

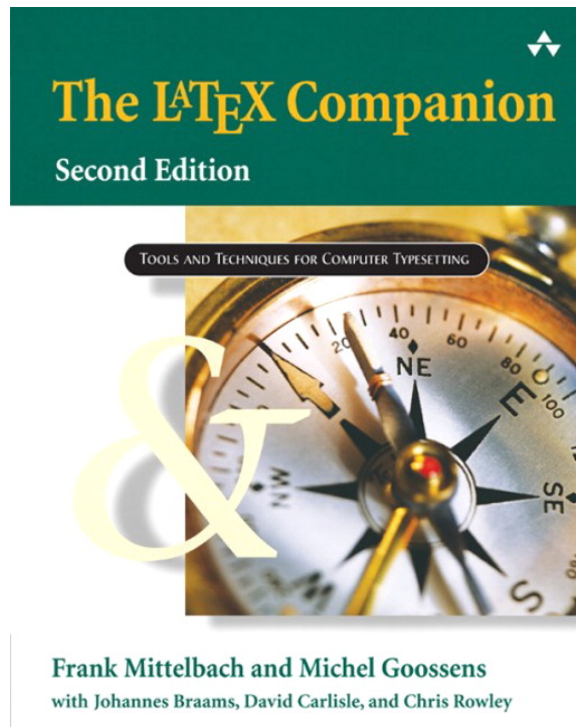


Hjälpresurser

- Allt och lite till
 - <http://en.wikibooks.org/wiki/LaTeX/>
- Specialtecken och symboler
 - <http://en.wikibooks.org/wiki/LaTeX/Accents>
- Matematik och formler
 - <http://web.ift.uib.no/Fysisk/Teori/KURS/WRK/TeX/symALL.html>



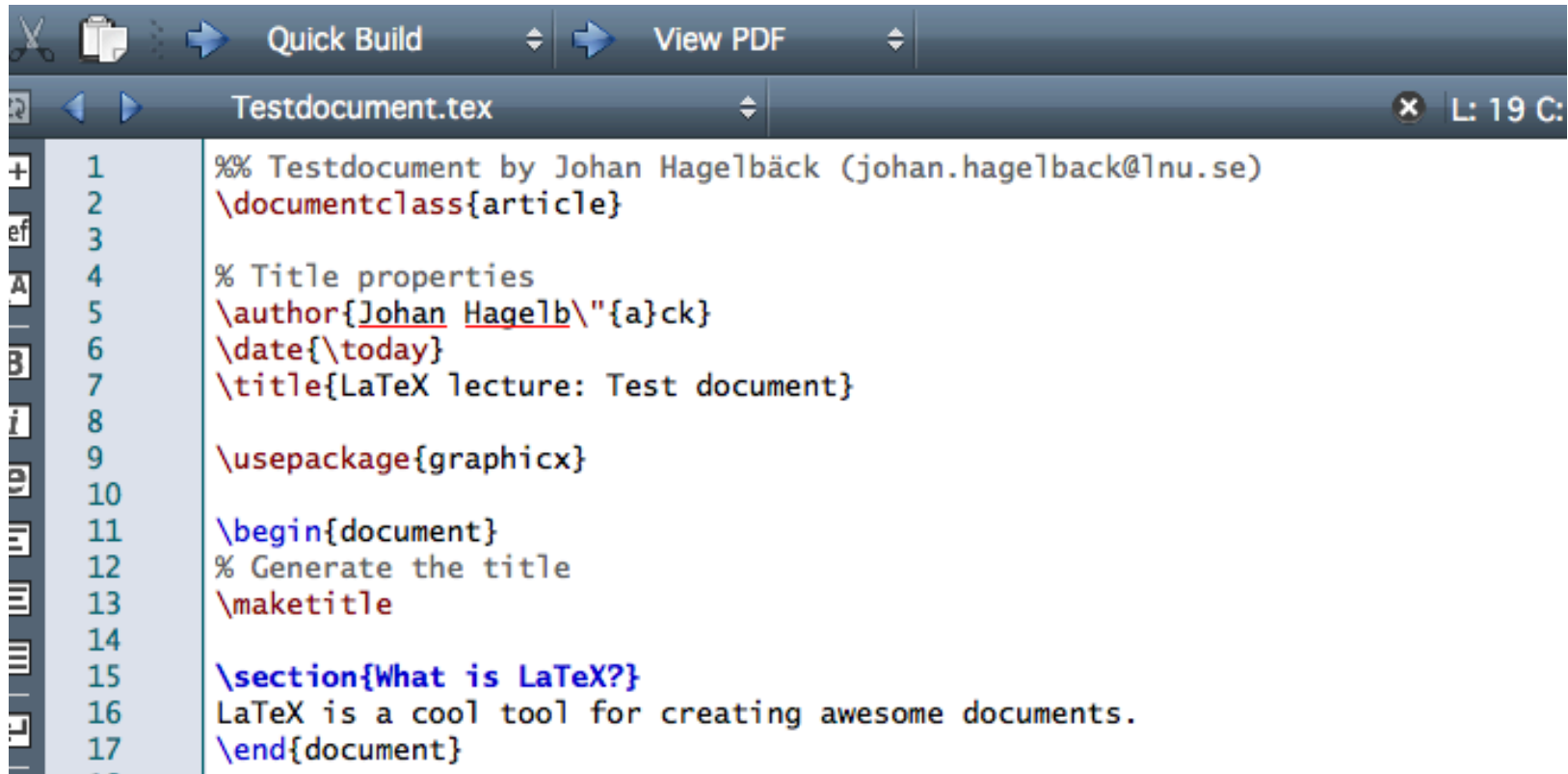
Hjälpresurser



LaTeX bibeln

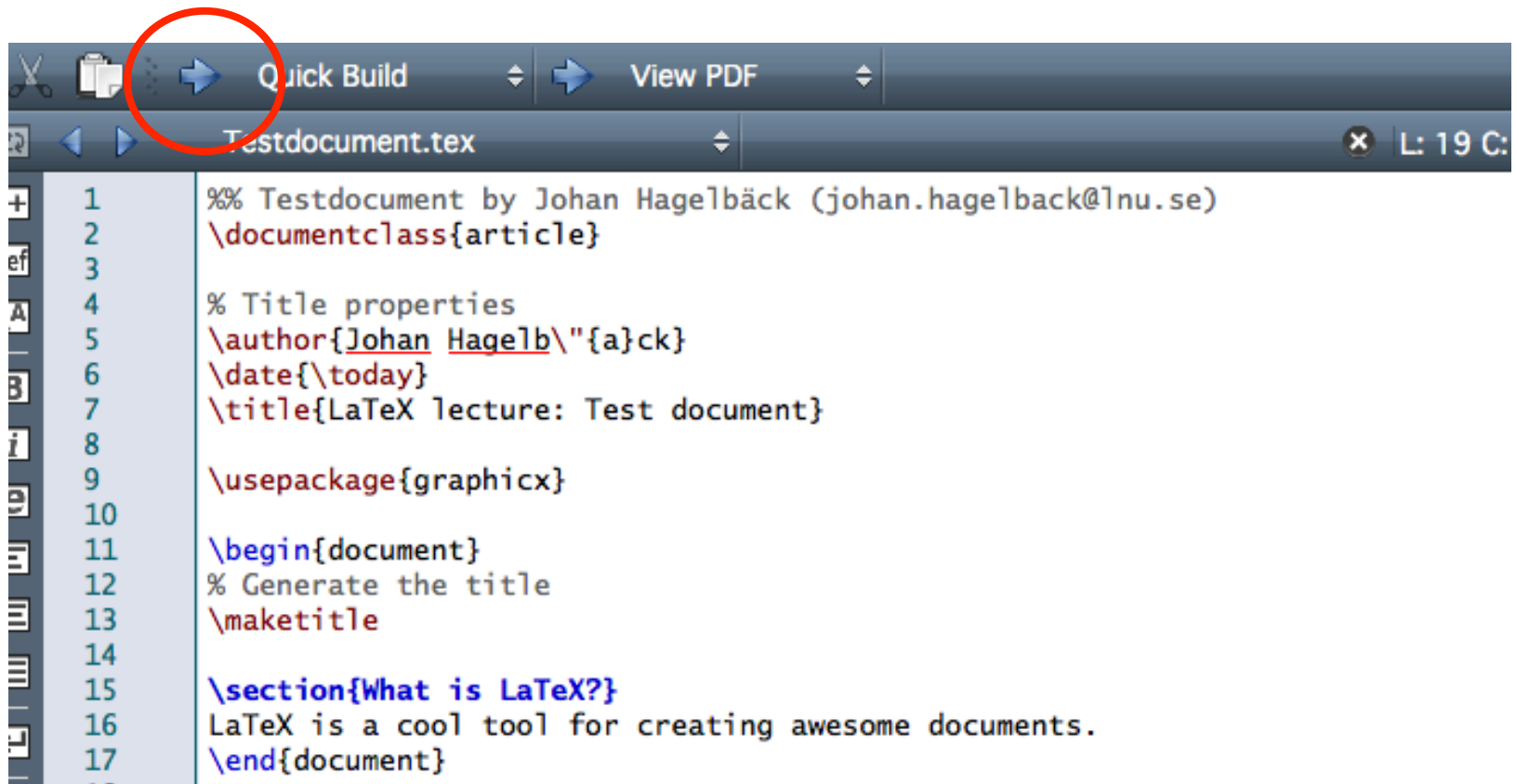


Vi börjar med ett exempel

A screenshot of a LaTeX editor window. The title bar shows 'Testdocument.tex' and 'L: 19 C:'. The editor contains LaTeX source code for a document. The code includes a comment, document class, title properties, package loading, and document structure commands. Line numbers 1 through 17 are visible on the left margin.

```
1 %% Testdocument by Johan Hagelbäck (johan.hagelback@lnu.se)
2 \documentclass{article}
3
4 % Title properties
5 \author{Johan Hagelbäck}
6 \date{\today}
7 \title{LaTeX lecture: Test document}
8
9 \usepackage{graphicx}
10
11 \begin{document}
12 % Generate the title
13 \maketitle
14
15 \section{What is LaTeX?}
16 LaTeX is a cool tool for creating awesome documents.
17 \end{document}
```

Kompilering



The screenshot shows a LaTeX editor window with a toolbar at the top. A red circle highlights the 'Quick Build' button, which is represented by a blue arrow pointing to the right. To its right is the 'View PDF' button, also with a blue arrow. Below the toolbar, the document title bar shows 'Testdocument.tex' and a status indicator 'L: 19 C:'. The main editing area displays a LaTeX source file with line numbers 1 through 17. The code includes a comment, document class declaration, title properties, package loading, and document structure commands.

```
1 %% Testdocument by Johan Hagelbäck (johan.hagelback@lnu.se)
2 \documentclass{article}
3
4 % Title properties
5 \author{Johan Hagelbäck}
6 \date{\today}
7 \title{LaTeX lecture: Test document}
8
9 \usepackage{graphicx}
10
11 \begin{document}
12 % Generate the title
13 \maketitle
14
15 \section{What is LaTeX?}
16 LaTeX is a cool tool for creating awesome documents.
17 \end{document}
```

Kompileringsalternativ

- *latex*
 - Dokument (.tex) till DVI
 - Kan hantera EPS (Encapsulated Postscript) bilder
- *pdflatex*
 - Dokument (.text) till PDF
 - Kan inte hantera EPS bilder
- *dvipdfm*
 - DVI till PDF
 - Om du måste ha EPS bilder i en PDF
- *Quick Build*
 - Konfigurerbar (default *pdflatex* + *View PDF*)

Observera

- Kompilering genererar PDF över ett pass
- Referenser (interna/externa) genereras till en separat fil (.bbl)
 - `Figure \ref{chap1:diagram}`
- Därför måste du kompilera minst två (ibland tre) gånger om du har referenser
 1. PDF skapas men ingen referensfil hittas och inkluderas. Alla referenser ser ut som "Figure ??". Referensfil (.bbl) skapas
 2. Nu hittas referensfilen som inkluderas

Tumregel

- Hittar du "Figure ??" eller "[?]" i PDF dokumentet?
 - Kompilera igen
- Fortfarande fel?
 - Kompilera igen (tredje passet)
- Fortfarande fel?
 - Då har du förmodligen skrivit fel tagg eller gjort något annat fel

Status/fel/log

- Det är ofta väldigt svårt att tolka output och felmeddelanden från kompilatorn
- Ofta hjälper editorn till att tolka vad som är fel
- Felsökning kan dock ofta vara problematiskt...

```
File: size10.clo 2014/09/29 v1.4h Standard LaTeX file (size option)
)
\c@part=\count79
\c@section=\count80
\c@subsection=\count81
\c@subsubsection=\count82
```


Status/fel/log

- `\author{Johan Hagelb}\{ack}`
 - Saknas en måsvinge efter a

File	Type	Line	Message
> Testdocument.tex	Error	line 8	! Paragraph ended before \author was complete.<to be read again>\par
Testdocument.tex	Error	line 13	! LaTeX Error: No \title given.See the LaTeX manual or LaTeX Companion for explanation.
Testdocument.tex	Warning	line 1	No \author given.

Resultatet

LaTeX lecture: Test document

Johan Hagelbäck

September 6, 2018

1 What is LaTeX?

LaTeX is a cool tool for creating awesome documents.

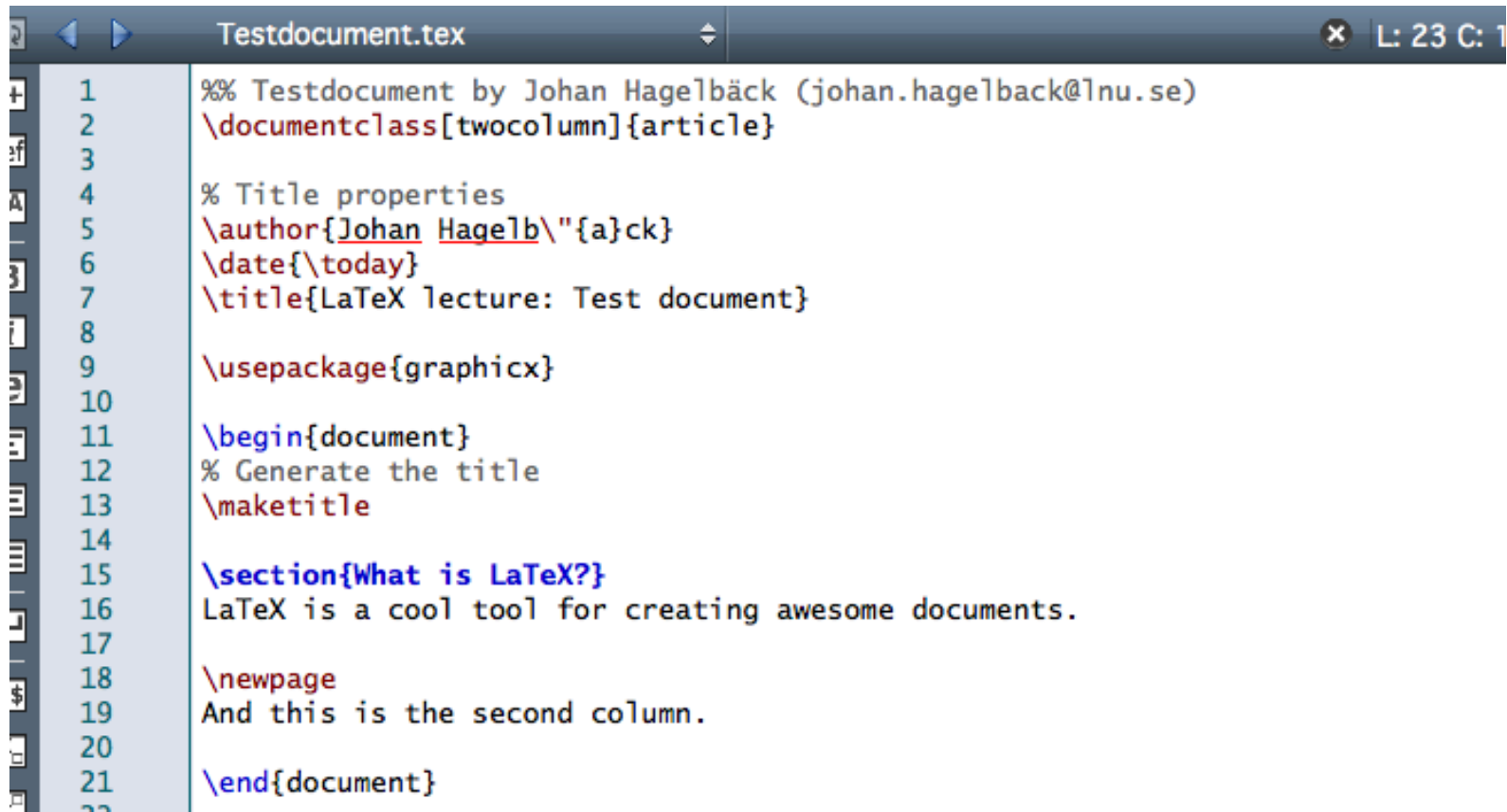
Macros och parametrar

`\documentclass[twocolumn]{article}`

- Macro börjar med `\` och sen namnet på macro
- Sen följer alternativ, `[ ]`
- Därefter parametrar, `{ }`
- Reserverade tecken:
`# $ % ^ & _ { } ~ \`
- ... får vi lösa med:

```
\# \$ \% \textasciicircum{} \& \_ \{ \} \~{} \textbackslash{}
```

Text i två kolumner

A screenshot of a LaTeX editor window titled 'Testdocument.tex'. The window shows a list of line numbers on the left and LaTeX code on the right. The code sets up a two-column document using the 'twocolumn' class, includes the 'graphicx' package, and contains a section titled 'What is LaTeX?' followed by two paragraphs of text. The second paragraph is on a new page, demonstrating two columns.

```
1 %% Testdocument by Johan Hagelbäck (johan.hagelback@lnu.se)
2 \documentclass[twocolumn]{article}
3
4 % Title properties
5 \author{Johan Hagelbäck}
6 \date{\today}
7 \title{LaTeX lecture: Test document}
8
9 \usepackage{graphicx}
10
11 \begin{document}
12 % Generate the title
13 \maketitle
14
15 \section{What is LaTeX?}
16 LaTeX is a cool tool for creating awesome documents.
17
18 \newpage
19 And this is the second column.
20
21 \end{document}
```

Resultatet

LaTeX lecture: Test document

Johan Hagelbäck

September 6, 2018

1 What is LaTeX?

And this is the second column.

LaTeX is a cool tool for creating awesome documents.



Kapitel, formatering etc.

```
\begin{document}  
% Generate the title  
\maketitle
```

Kapitel och underkapitel

```
\section{What is LaTeX?}
```

LaTeX is a cool tool for creating awesome documents. It is a bit tricky to learn, but since we are nerds and nerds like awesome documents and don't mind complex stuff we use LaTeX!

Leave a blank line for a new paragraph like we do here.

```
% this is a comment
```

```
\subsection{Formatting stuff}
```

This is `\textit{italic text}.`

This is `\textbf{bold text}.`

This is `\underline{underlined text}.`

We can also use `\$` to write math stuff like $n < n^2$

```
\newpage
```

And this is the second column.

```
\end{document}
```

Kapitel, formatering etc.

```
\begin{document}
% Generate the title
\maketitle

\section{What is LaTeX?}
LaTeX is a cool tool for creating awesome documents. It is a bit tricky to learn, but since we
are nerds and nerds like awesome documents and don't mind complex stuff we use LaTeX!

Leave a blank line for a new paragraph like we do here.
% this is a comment
\subsection{Formatting stuff}
This is \textit{italic text}.\n
This is \textbf{bold text}.\n
This is \underline{underlined text}.\n

We can also use \$ to write math stuff like $n < n^2$

\newpage
And this is the second column.

\end{document}
```

Textstilar.
\\ anger radbrytning

Kapitel, formatering etc.

```
\begin{document}
% Generate the title
\maketitle

\section{What is LaTeX?}
LaTeX is a cool tool for creating awesome documents. It is a bit tricky to learn, but since we
are nerds and nerds like awesome documents and don't mind complex stuff we use LaTeX!

Leave a blank line for a new paragraph like we do here.
% this is a comment
\subsection{Formatting stuff}
This is \textit{italic text}.\n
This is \textbf{bold text}.\n
This is \underline{underlined text}.\n

We can also use \$ to write math stuff like $n < n^2$

\newpage
And this is the second column.

\end{document}
```

Reserverade tecken

Kapitel, formatering etc.

```
\begin{document}
% Generate the title
\maketitle

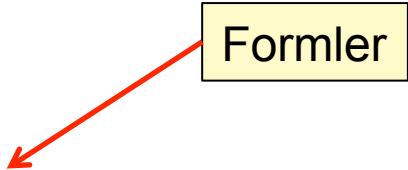
\section{What is LaTeX?}
LaTeX is a cool tool for creating awesome documents. It is a bit tricky to learn, but since we
are nerds and nerds like awesome documents and don't mind complex stuff we use LaTeX!

Leave a blank line for a new paragraph like we do here.
% this is a comment
\subsection{Formatting stuff}
This is \textit{italic text}.\n
This is \textbf{bold text}.\n
This is \underline{underlined text}.\n

We can also use \$ to write math stuff like $n < n^2$

\newpage
And this is the second column.

\end{document}
```



Formler

Resultatet

LaTeX lecture: Test document

Johan Hagelbäck

September 6, 2018

1 What is LaTeX?

And this is the second column.

LaTeX is a cool tool for creating awesome documents. It is a bit tricky to learn, but since we are nerds and nerds like awesome documents and don't mind complex stuff we use LaTeX!

Leave a blank line for a new paragraph like we do here.

1.1 Formatting stuff

This is *italic text*.

This is **bold text**.

This is underlined text.

We can also use \$ to write math stuff like $n < n^2$



Figurer

Leave a blank line for a new paragraph like we do here. Below is a good reason why you should use LaTeX.

Skapa figursektion

```
\begin{figure}[h]
\begin{center}
\includegraphics*[width=0.9\columnwidth]{LatexVsWord.png}
\end{center}
\caption{LaTeX vs. Word}
\label{latexvsword}
\end{figure}
```

- Alternativ:
 - [h!tbp]
 - "here", "put it here, you bastard!", "top", "bottom", och på separat sida.
- Annars kan LaTeX placera bilden där den tycker den passar, vilket inte alltid är var du vill...

Figurer

Leave a blank line for a new paragraph like we do here. Below is a good reason why you should use LaTeX.

```
\begin{figure}[h]
\begin{center}
\includegraphics*[width=0.9\columnwidth]{LatexVsWord.png}
\end{center}
\caption{LaTeX vs. Word}
\label{latexvsword}
\end{figure}
```

Storlek (90% av kolumbbredden).

width=n.nn\columnwidth – Två kolumner

width=n.nn\textwidth – En kolumn

{figure*} – Visa figur över båda kolumnerna

Figurer

Leave a blank line for a new paragraph like we do here. Below is a good reason why you should use LaTeX.

```
\begin{figure}[h]
\begin{center}
\includegraphics*[width=0.9\columnwidth]{LatexVsWord.png}
\end{center}
\caption{LaTeX vs. Word}
\label{latexvsword}
\end{figure}
```

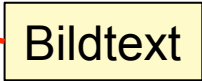


Bildfil vi vill inkludera

Figurer

Leave a blank line for a new paragraph like we do here. Below is a good reason why you should use LaTeX.

```
\begin{figure}[h]
\begin{center}
\includegraphics*[width=0.9\columnwidth]{LatexVsWord.png}
\end{center}
\caption{LaTeX vs. Word}
\label{latexvsword}
\end{figure}
```



Bildtext

Figurer

Leave a blank line for a new paragraph like we do here. Below is a good reason why you should use LaTeX.

```
\begin{figure}[h]
\begin{center}
\includegraphics*[width=0.9\columnwidth]{LatexVsWord.png}
\end{center}
\caption{LaTeX vs. Word}
\label{latexvsword}
\end{figure}
```

Label/tagg för referens

Observera

- Vi måste inkludera paketet *graphicx* för att använda figurer

```
\date{\today}  
\title{LaTeX lecture: Test document}  
  
\usepackage{graphicx}  
  
\begin{document}  
% Generate the title
```


Referenser till kapitel/figurer

Leave a blank line for a new paragraph like we do here. In Figure~\ref{latexvsword} you see a good reason why you should use LaTeX. In Section~\ref{formatting} you can see some text formatting options.

```
\begin{figure}[h]
\begin{center}
\includegraphics*[width=0.9\columnwidth]{LatexVsWord.png}
\end{center}
\caption{LaTeX vs. Word}
\label{latexvsword}
\end{figure}
```

Label/tagg för referens

```
% this is a comment
\subsection{Formatting stuff}
\label{formatting}
This is \textit{italic text}.\n
This is \textbf{bold text}.\n
This is \underline{underlined text}.\n
```

Referenser till kapitel/figurer

Leave a blank line for a new paragraph like we do here. In Figure~\ref{latexvsword} you see a good reason why you should use LaTeX. In Section~\ref{formatting} you can see some text formatting options.

```
\begin{figure}[h]
\begin{center}
\includegraphics*[width=0.9\columnwidth]{LatexVsWord.png}
\end{center}
\caption{LaTeX vs. Word}
\label{latexvsword}
\end{figure}
```

```
% this is a comment
\subsection{Formatting stuff}
\label{formatting}
This is \textit{italic text}.\n
This is \textbf{bold text}.\n
This is \underline{underlined text}.\n
```

Referenser

Kompilering pass 1

should use LaTeX. In Section ?? you can see some text formatting options.

	Testdocument.tex	Warning	line 1	There were undefined references.
	Testdocument.tex	Warning	line 1	Label(s) may have changed. Rerun to get cross-references right.

Krävs att vi kör ett till kompileringspass!

Kompilering pass 2

Leave a blank line for a new paragraph like we do here. In Figure 1 you see a good reason why you should use LaTeX. In Section 1.1 you can see some text formatting options.

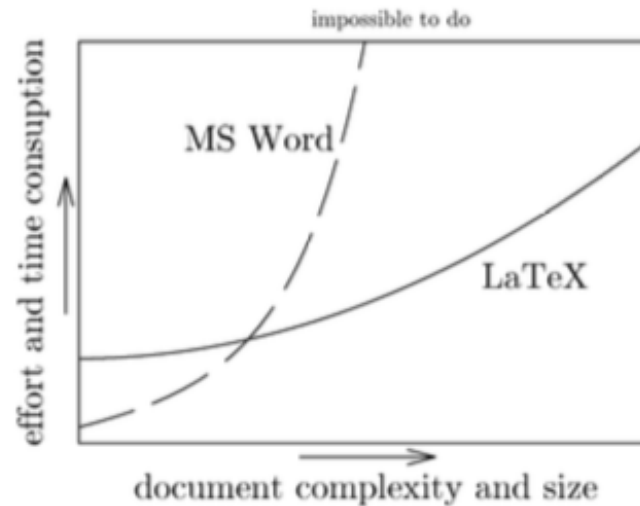


Figure 1: LaTeX vs. Word

1.1 Formatting stuff

Listor

```
\end{figure}
```

Some good things about LaTeX:

```
\begin{itemize}
```

```
\item Documents look awesome
```

```
\item Ease to change looks and formatting
```

```
\item References are handled automatically
```

```
\end{itemize}
```

```
% this is a comment
```

Punktlista

```
\end{figure}
```

Some good things about LaTeX:

```
\begin{enumerate}
```

```
\item Documents look awesome
```

```
\item Ease to change looks and formatting
```

```
\item References are handled automatically
```

```
\end{enumerate}
```

```
% this is a comment
```

Numrerad lista

Resultatet

Some good things about LaTeX:

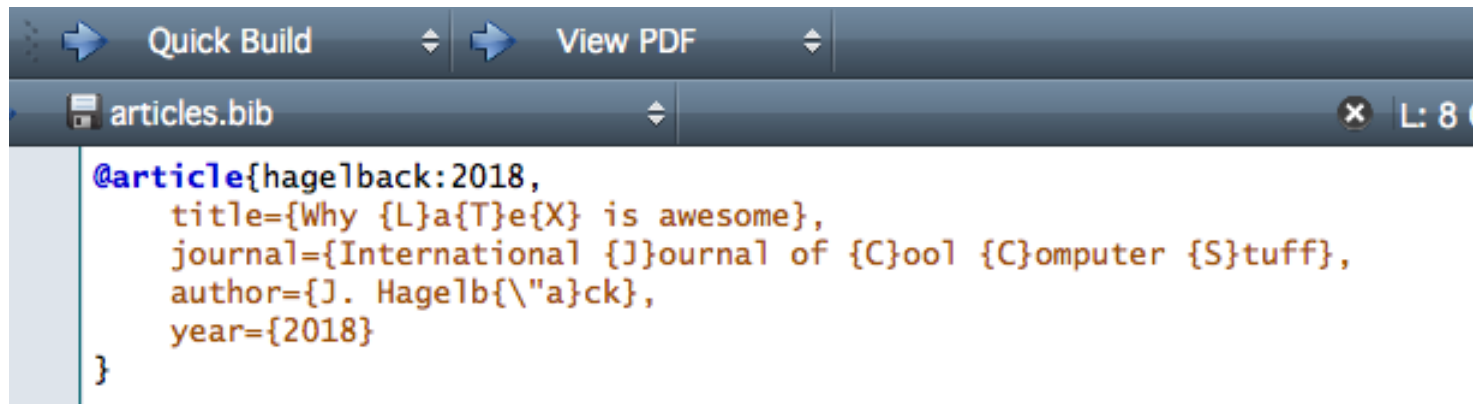
- Documents look awesome
- Ease to change looks and formatting
- References are handled automatically

Some good things about LaTeX:

1. Documents look awesome
2. Ease to change looks and formatting
3. References are handled automatically

Referenser till artiklar

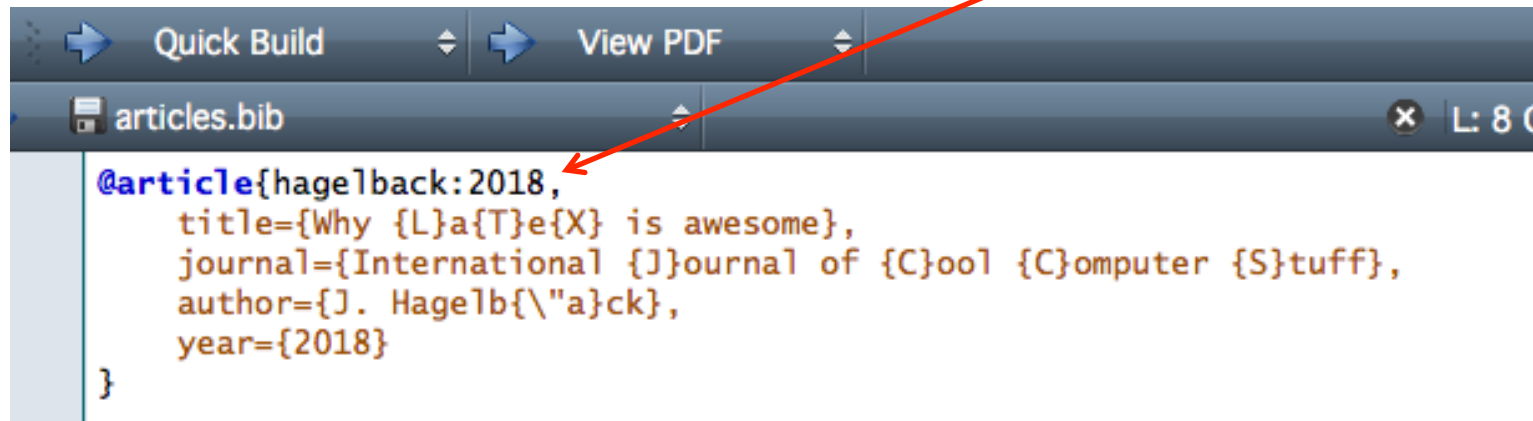
- Alla referenser (artiklar, böcker, tidskrifter, webbresurser) sparas i en separat referensfil (.bib)
- Referenser kan även inkluderas direkt i dokumentet
- Att ha dem i en separat fil gör det enklare att återanvända referenser



```
Quick Build View PDF
articles.bib
@article{hagelback:2018,
  title={Why {L}a{T}e{X} is awesome},
  journal={International {J}ournal of {C}ool {C}omputer {S}tuff},
  author={J. Hagelb{"a"}ck},
  year={2018}
}
```

Referenser till artiklar

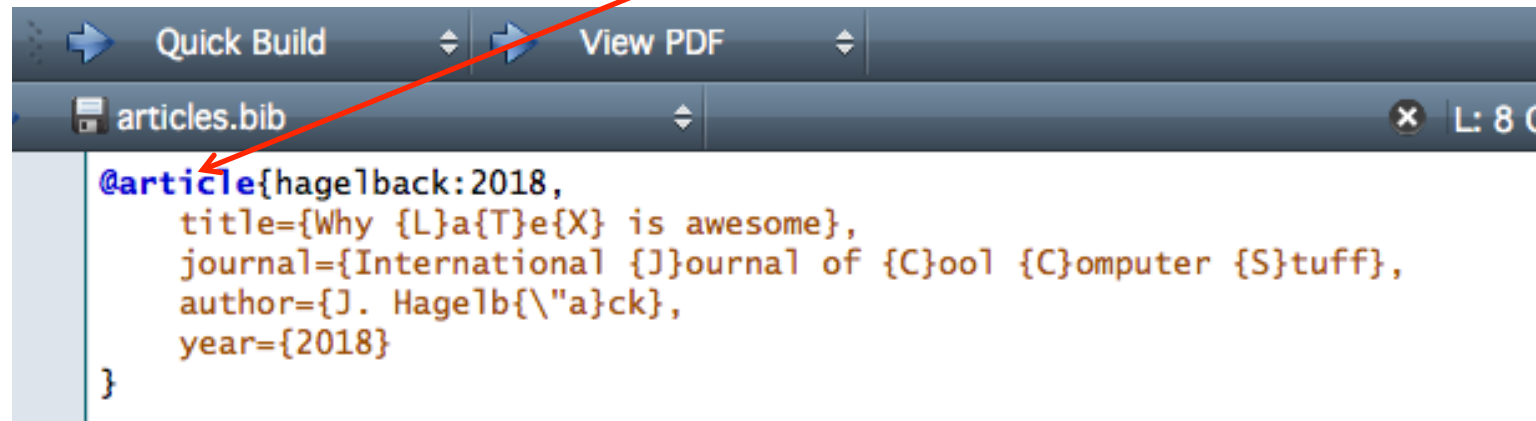
Unikt ID till artikeln



```
Quick Build View PDF
articles.bib
@article{hagelback:2018,
  title={Why {L}a{T}e{X} is awesome},
  journal={International {J}ournal of {C}ool {C}omputer {S}tuff},
  author={J. Hagelb{"a"}ck},
  year={2018}
}
```


Referenser till artiklar

Typ av referens



The screenshot shows a LaTeX editor interface. At the top, there are buttons for 'Quick Build' and 'View PDF'. Below these, a file named 'articles.bib' is open. The editor displays a BibTeX entry for an article. A red arrow points from the text 'Typ av referens' to the '@article' command in the entry.

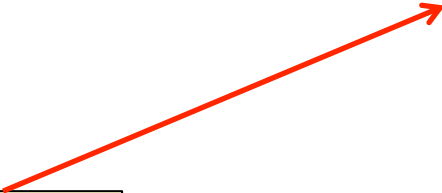
```
@article{hagelback:2018,  
  title={Why {L}a{T}e{X} is awesome},  
  journal={International {J}ournal of {C}ool {C}omputer {S}tuff},  
  author={J. Hagelb{"a"}ck},  
  year={2018}  
}
```

Referera till en artikel

You can find a detailed discussion about LaTeX in `\cite{hage1back:2018}`.

```
\bibliographystyle{plain}  
\bibliography{./articles}  
\end{document}
```

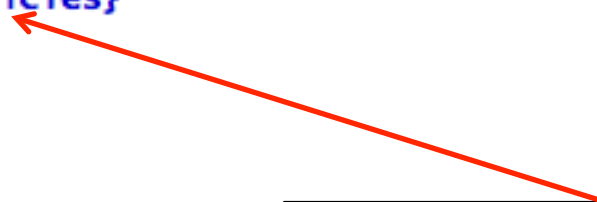
Artikel ID



Referenslista

You can find a detailed discussion about LaTeX in `\cite{hage1back:2018}`.

```
\bibliographystyle{plain}  
\bibliography{./articles}  
\end{document}
```



Path till vår referens (.bib) fil

Referenslista

You can find a detailed discussion about LaTeX in `\cite{hagelback:2018}`.

```
\bibliographystyle{plain}  
\bibliography{./articles}  
\end{document}
```

- Hur våra referenser ska se ut
- Andra alternativ är *abbrv*, *ieeetr* och *alpha*
- Mallar kan också ha egen-
definierade referensstilar

Kompilering pass 1

Testdocument.tex	Warning	line 47	Citation `hagelback:2018' on page 2 undefined
Testdocument.tex	Warning	line 1	There were undefined references.

You can find a detailed discussion about LaTeX in
[?].

1. Kompilera med *BibTeX*
2. Kompilera med *Quick Build* igen

Resultatet

You can find a detailed discussion about LaTeX in [1].

References

- [1] J. Hagelbäck. Why LaTeX is awesome. *International Journal of Cool Computer Stuff*, 2018.

Notis: övriga filer

- .aux
 - Kompilerade refs och labels
- .bbl
 - Kompilerade referenser
- .blg
 - *BibTeX* log fil
- .log
 - *Pdflatex* log file med eventuella felmeddelanden
- .sty/.bst/.cls
 - Filer för stilmallar

```
\newlabel{formatting}{{1.1}{1}}  
\newlabel{eq1}{{1}{1}}
```

```
\begin{thebibliography}{1}  
\bibitem{hagelback:2018}
```

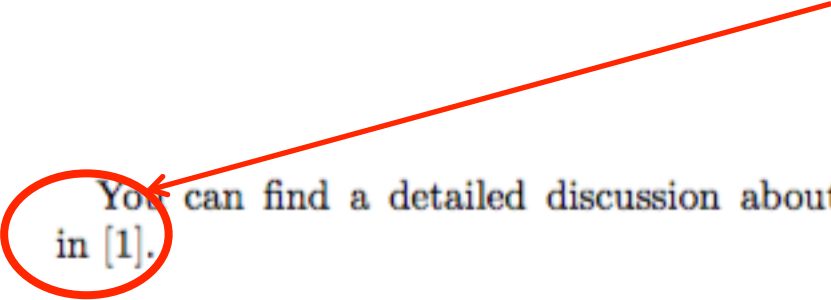


Notis: ~

- Tecknet ~ används för att undvika radbrytning

```
You can find a detailed discussion about LaTeX in~\cite{hagelback:2018}.
```

You can find a detailed discussion about LaTeX
in [1].



Formler

We can also use `\$` to write math stuff like `$n < n^2$`. Equation~\ref{eq1} shows the sigmoid function.

```
\begin{equation}
\label{eq1}
S(x) = \frac{1}{1 + e^{-x}}
\end{equation}
```

We can also use `$` to write math stuff like `$n < n^2$` . Equation 1 shows the sigmoid function.

$$S(x) = \frac{1}{1 + e^{-x}} \quad (1)$$

Formler

```
\begin{equation}  
f(x) = x^{2x + 1} + 2\pi \cdot n_1  
\end{equation}
```

- Upphöjt: ^
- Nedsänkt: _
- \cdot ger snyggare multiplikation än *

$$f(x) = x^{2x+1} + 2\pi \cdot n_1 \quad (2)$$

Mer formler

```
Pi can be approximated using Equation~\ref{eq2}. It is correct for the first 11 decimals.  
\begin{equation}  
\label{eq2}  
\pi = \sqrt{12}\sum^{\infty}_{k=0} \frac{(-3)^{-k}}{2k + 1}  
\end{equation}
```

Pi can be approximated using Equation 3. It is correct for the first 11 decimals.

$$\pi = \sqrt{12} \sum_{k=0}^{\infty} \frac{(-3)^{-k}}{2k + 1} \quad (3)$$

Tabeller

```
\begin{tabular}{l c r}  
1 & 2 & 3\\  
4 & 5 & 6\\  
7 & 8 & 9  
\end{tabular}
```

1	2	3
4	5	6
7	8	9

- *tabular* för att skapa tabell
- Parametrar är placering i kolumnerna
 - l (left), c (center) och r (right)
- & separerar kolumner
- \\ används för ny rad

Tabeller

```
\begin{tabular}{||c|r|}  
\hline  
1 & 2 & 3\\  
\hline  
4 & 5 & 6\\  
\hline  
7 & 8 & 9\\  
\hline  
\end{tabular}
```

1	2	3
4	5	6
7	8	9

- Använd | och || för enkel respektive dubbel ram
- \hline för linjer under rader

Tabeller

```
\begin{tabular}{|l|c|r|}  
\hline  
\multicolumn{3}{|c|}{Matrix}\\  
\hline  
1 & 2 & 3\\  
\hline  
4 & 5 & 6\\  
\hline  
7 & 8 & 9\\  
\hline  
\end{tabular}
```

Matrix		
1	2	3
4	5	6
7	8	9

- *\multicolumn* för celler som ska täcka flera kolumner, t.ex. för tabellhuvud
- *\multirow* för att täcka flera rader

Tabeller

```
\begin{table}[h]
\begin{center}
\begin{tabular}{|l|c|r|}
\hline
\multicolumn{3}{|c|}{Matrix}\\
\hline
1 & 2 & 3\\
\hline
4 & 5 & 6\\
\hline
7 & 8 & 9\\
\hline
\end{tabular}
\end{center}
\caption{A matrix}
\end{table}
```

Matrix		
1	2	3
4	5	6
7	8	9

Table 1: A matrix

- `\begin{table}` för mer formateringsalternativ

Exempel

Table 1. The placement of the electrodes used for the GSR, EMG and ECG signals.

Signal	Placement
EMGC	Corrugator supercilli (eyebrow)
EMGZ	Zygomaticus major muscles (edge of the mouth)
ECG	Sternum top (chest) Sternum bottom (chest)
GSR	Medial phalanx (middle joint on left index and ring finger)
Ground / Reference	Earlobe Zygomatic bone (cheek bone)

Exempel

```
\begin{table}[ht]
\centering
\caption{The placement of the electrodes used for the \textsc{Gsr}, \textsc{Emg} and
\textsc{Ecg} signals.}
\begin{tabular}{p{1.8cm}l}
\hline\noalign{\smallskip}
Signal & Placement \\
\hline\smallskip
\textsc{Emgc} & Corrugator supercilli (eyebrow) \\
\textsc{Emgz} & Zygomaticus major muscles (edge of the mouth) \\
\textsc{Ecgc} & Sternum top (chest) \\
& & Sternum bottom (chest) \\
\textsc{Gsr} & & Medial phalanx (middle joint on left index and ring finger) \\
Ground / & & Earlobe \\
Reference & & Zygomatic bone (cheek bone) \\
\hline
\end{tabular}
\label{electrodes}
\end{table}
```

Mer om tabeller

`\usepackage{booktabs}`

- Ger bättre formateringsmöjligheter.

```
83
84 \begin{table}
85 \begin{tabular}{ccccc}
86 \toprule
87 {Heading 1} & {Heading 2} & \multicolumn{3}{c}{Heading 3} \\
88 \cmidrule{3-5}
89 {} & {} & {Heading 3.1} & {Heading 3.3} & {Heading 3.3} \\
90 \midrule
91 One & One & 1 & 2 & 3 \\
92 Two & One & 2 & 3 & 4 \\
93 Three & Two & 3 & 4 & 5 \\
94 \bottomrule
95 \end{tabular}
96 \end{table}
97
```

Resultatet

Heading 1	Heading 2	Heading 3		
		Heading 3.1	Heading 3.3	Heading 3.3
One	One	1	2	3
Two	One	2	3	4
Three	Two	3	4	5

<http://www.ctan.org/tex-archive/macros/latex/contrib/booktabs/>

Svenska tecken

```
\usepackage[swedish]{babel}  
\usepackage[utf8]{inputenc}
```

Annars måste vi skriva t.ex. ä som
`\"{a}`

Programkod

\usepackage{listings}

- Stödjer flera språk, t.ex. html och de vanligaste programmeringsspråken
- Syntax highlighting genom att fetmarkera reserverade ord
- Mer info:

<http://ctan.uib.no/macros/latex/contrib/listings/listings.pdf>



Exempel

```
82  
83 \begin{lstlisting}[language=java]  
84 public class MyClass  
85 {  
86     public static void main(String[] args)  
87     {  
88         int a = 1;  
89         System.out.println("a=" + a);  
90     }  
91 }  
92 \end{lstlisting>  
93
```

Resultatet

```
public class MyClass
{
    public static void main(String [] args)
    {
        int a = 1;
        System.out.println("a=" + a);
    }
}
```

Ändra dokumentstil

```
\documentclass[conference]{IEEEtran}
```

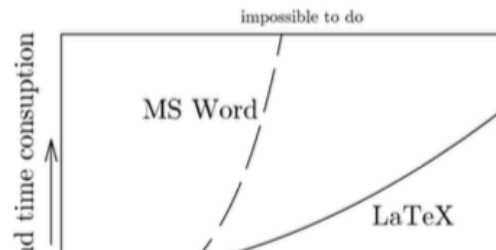
LaTeX lecture: Test document

Johan Hagelbäck

I. WHAT IS L^AT_EX?

LaTeX is a cool tool for creating awesome documents. It is a bit tricky to learn, but since we are nerds and nerds like awesome documents and don't mind complex stuff we use LaTeX!

Leave a blank line for a new paragraph like we do here. In Figure 1 you see a good reason why you should use LaTeX. In Section I-A you can see some text formatting options.



Matrix		
1	2	3
4	5	6
7	8	9

TABLE I
A MATRIX

REFERENCES

- [1] J. Hagelbäck. Why LaTeX is awesome. *International Journal of Cool Computer Stuff*, 2018.

LaTeX till HTML

- TTH
<http://hutchinson.belmont.ma.us/tth/>
- Skapar html sidor i stället för PDF

u. The charged particle undergoing acceleration emits electromagnetic radiation in all directions.
 n is the scattered wave.

i in free space, whose unperturbed orbit is given by position $\mathbf{r}(t)$, scattering a monochromatic input

$$\mathbf{E}_i(\mathbf{r}, t) = \mathbf{E}_i \exp i(\mathbf{k}_i \cdot \mathbf{r} - \omega_i t) \quad . \quad (5.1)$$

from basic electromagnetic theory that this electron produces a scattered field at a distant point $\mathbf{x}$
 ral component a scattered frequency ω_s is

$$\mathbf{E}_s(\omega_s) = \frac{r_e e^{i\mathbf{k}_s \cdot \mathbf{x}}}{2\pi x} \int_{T'} \kappa' \overset{\leftrightarrow}{\Pi} \cdot \mathbf{E}_i e^{i(\omega t' - \mathbf{k} \cdot \mathbf{r}')} dt' \quad . \quad (5.2)$$

TikZ

- Skapar grafik direkt i LaTeX
 - Stapeldiagram
 - Flödesdiagram
 - Grafer
 - ...

```
\usepackage{tikz}  
\usepackage{pgfplots}  
\usetikzlibrary{shapes,arrows}  
\pgfplotsset{compat=1.4}
```

Stapeldiagram

```
\begin{figure}[ht!]  
\begin{center}  
\begin{tikzpicture}  
\begin{axis}[  
scale only axis,  
ybar,  
width=3.5in,  
height=1.5in,  
symbolic x coords={KNN,RT,BNT,SVM,ANN},  
xtick=data,  
nodes near coords,  
yticklabel=\pgfmathprintnumber{\tick}\,,\$\\%$,  
nodes near coords,  
ymin=40, ymax=60,  
axis on top]  
\addplot[  
ybar,  
bar width=0.2in,  
bar shift=0in,  
fill=black!50,  
draw=black] coordinates {(KNN,52.44) (RT,52.44) (BNT,52.44) (SVM,56.10)  
(ANN,47.78)};  
\end{axis}  
\end{tikzpicture}  
\end{center}  
\caption[ ]{Results from classifying EEG data for all subjects.}  
\label{expAllFig}  
\end{figure}
```

Generella inställningar
för diagrammet

Namn på staplar

Område i y-led

Staplar (färg, form och värde)

Resultatet

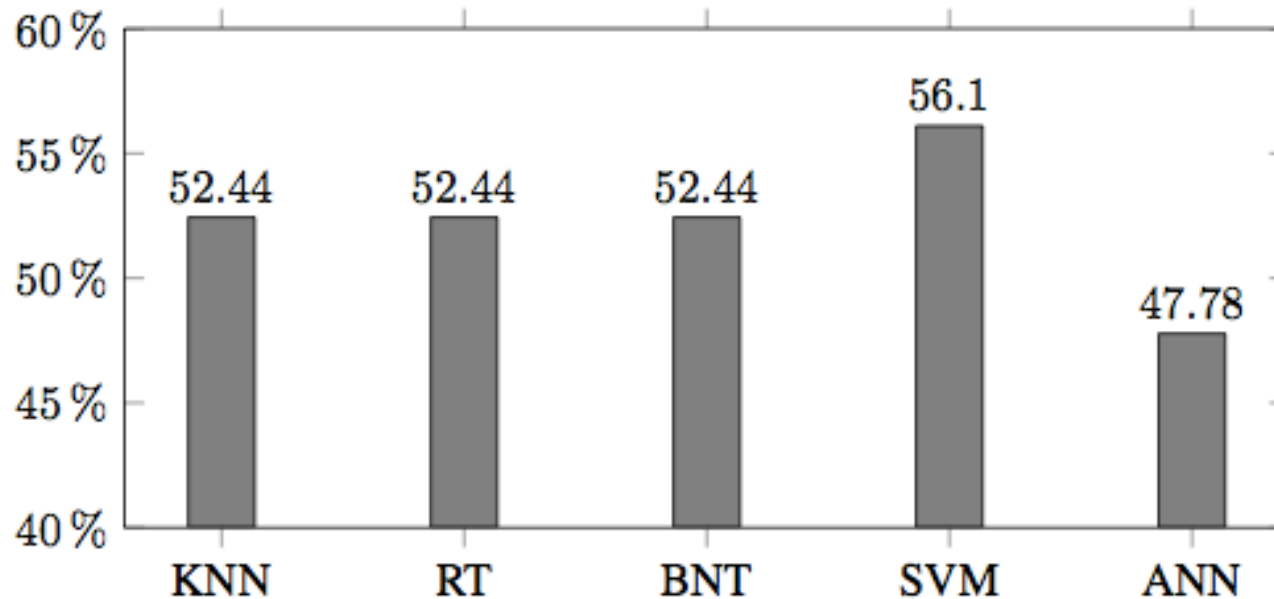


Fig. 2. Results from classifying EEG data for all subjects.

Grupperade staplar

```
\addplot[
  ybar,
  bar width=0.2in,
  fill=black!100,
  draw=black] coordinates {(KNN,70.4) (RT,63.0) (BNT,59.3) (SVM,77.8) (ANN,70.4)};
\addlegendentry{Dataset 1}
\addplot[
  ybar,
  bar width=0.2in,
  fill=black!40,
  draw=black] coordinates {(KNN,51.4) (RT,46.0) (BNT,48.7) (SVM,51.4) (ANN,43.2)};
\addlegendentry{Dataset 2}
\addplot[
  ybar,
  bar width=0.2in,
  fill=black!5,
  draw=black] coordinates {(KNN,66.7) (RT,44.4) (BNT,55.4) (SVM,70.3) (ANN,61.1)};
\addlegendentry{Dataset 3}
```

Grupp 1 (färg och värden)

Grupp 2

Resultatet

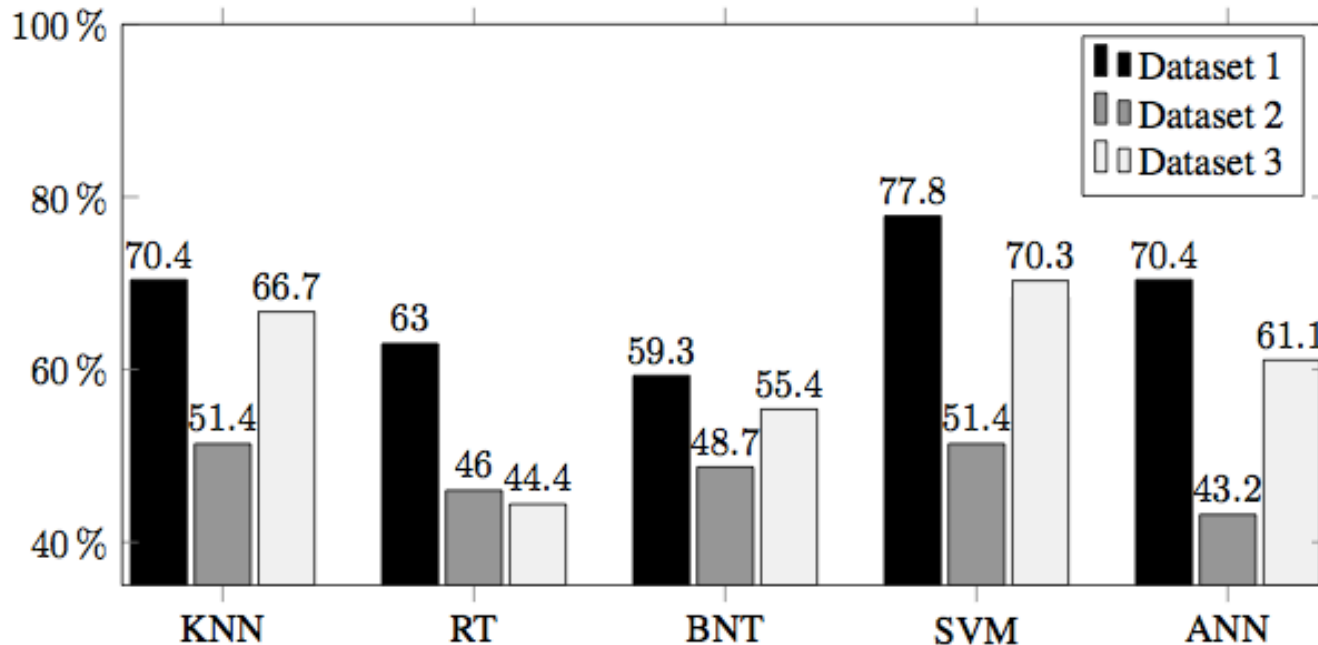


Fig. 3. Results from classifying datasets of five subjects each.

Flödesdiagramm

```
\tikzstyle{block} = [rectangle, draw, fill=black!2,  
    text width=6em, text centered, rounded corners, minimum height=4em]  
\tikzstyle{line} = [draw, -latex']  
\begin{figure}[ht]  
\begin{center}  
\begin{tikzpicture}[node distance = 2cm, auto]  
    % Place nodes  
\node [block] (init) {BioSemi ActiveTwo System};  
\node [block, right of=init, node distance=3cm] (two) {EEG Data Recording and  
Storing};  
\node [block, right of=two, node distance=3cm] (three) {EEG Data Screening using  
SAM};  
\node [block, below of=three, node distance=2cm] (four) {Feature Selection and  
Extraction};  
\node [block, left of=four, node distance=3cm] (five) {Dataset Modeling and  
Formulation};  
\node [block, left of=five, node distance=3cm] (six) {Dataset Analysis and  
Classification};  
\path [line] (init) -- (two);  
\path [line] (two) -- (three);  
\path [line] (three) -- (four);  
\path [line] (four) -- (five);  
\path [line] (five) -- (six);  
\end{tikzpicture}  
\end{center}  
\caption[ ]{The process for capturing, processing and classifying the EEG data.}  
\label{captureprocess}  
\end{figure}
```

Noder

Kopplingar

Resultatet

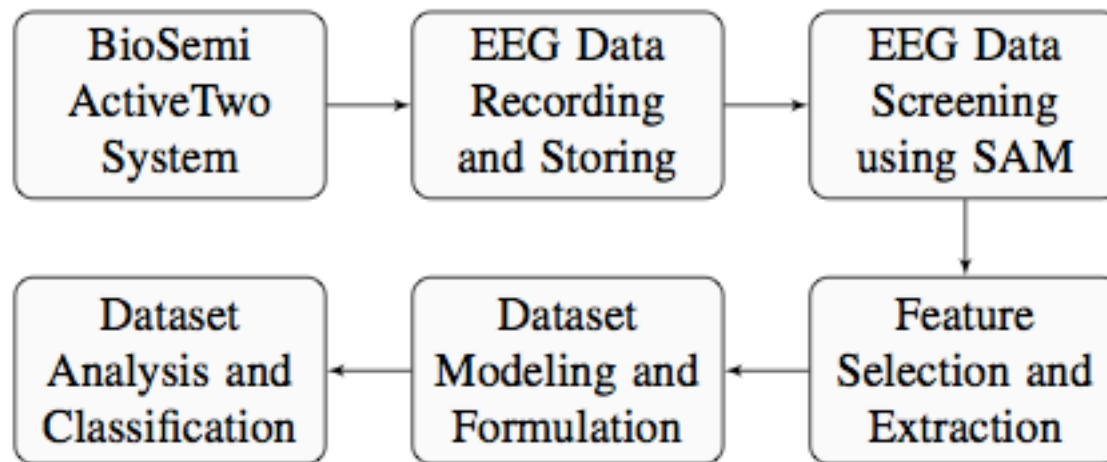
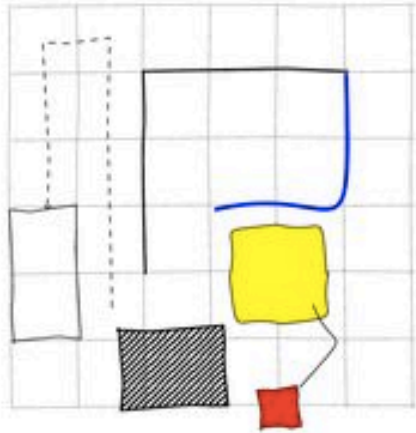


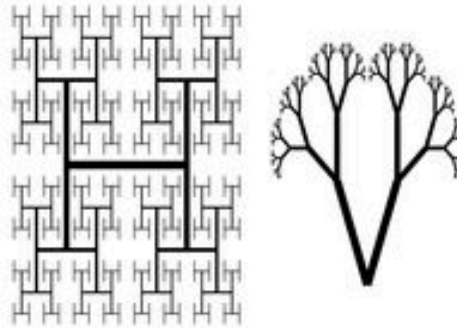
Fig. 1. The process for capturing, processing and classifying the EEG data.

TikZ kan mycket mer...

<http://www.texample.net/tikz/examples/>



Simulating hand-drawn lines with
TikZ
[PDF] [TEX] [Open in writeLaTeX]

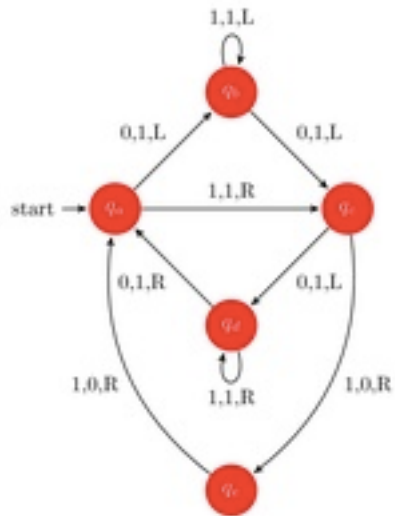


H-tree and b-tree
[PDF] [TEX] [Open in writeLaTeX]



Egg
[PDF] [TEX] [Open in writeLaTeX]

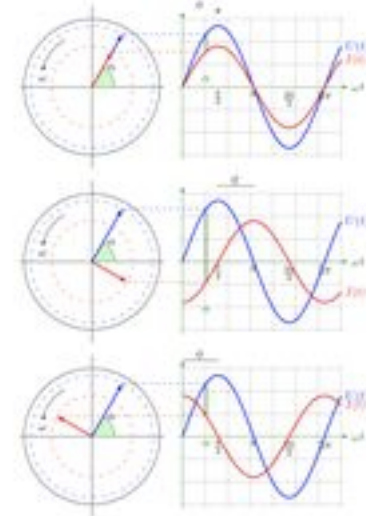
TikZ kan mycket mer...



State machine
[PDF] [TEX] [Open online]



Christmas tree plotted
[PDF] [TEX] [Open online]



Phasor diagram
[PDF] [TEX] [Open online]

Julgranen

```
\begin{tikzpicture}
\begin{axis}[
  hide axis, clip=false,
  y domain=0:2*pi,
  samples=30,axis equal, view={45}{20}]
\addplot3 [domain=0:4,surf,shader=flat,z buffer=sort,fill=green!50!brown,
draw=green!50!black, line join=bevel]
  (((1.3*x-floor(x))*x^0.5*cos(deg(y))),
  {(1.3*x-floor(x))*x^0.5*sin(deg(y))},
  {-5*x});
\addplot3 [domain=0:4.5, samples=10, samples y=0, fill=yellow!85!red, draw=yellow!
55!red] ({0},{sin(x/5*360) * (1 - x + floor(x)) },{cos(x/5*360) * (1 - x + floor(x)) + 0.5})
-- cycle;
\end{axis}
\end{tikzpicture}
```



Sammanfattning

- LaTeX ger snygga, professionella dokument
- Enkelt att ändra mallar
- Det går att göra komplicerade diagram, formler, tabeller, etc.
- Använd LaTeX på större rapporter och uppsatser, och Word eller Google Docs för enklare dokument