LaTeX in Collaboration

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ISR/IST

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Outline

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- Readers are lazy ... need self contained and easy to read material
- LaTeX can help

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- LaTeX keeps text, sections, figures, etc. globally well spaced using cool optimization algorithms!
- LaTeX is better to keep uniform the material contributed by different authors.

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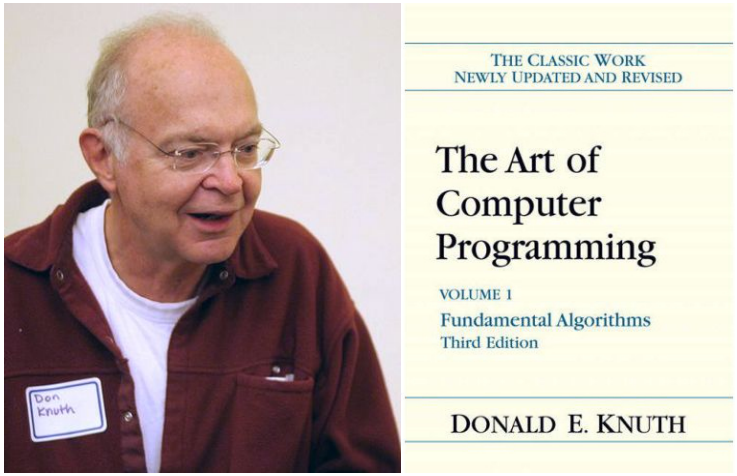

Donald Knuth
Computer Scientist
Born January 10, 1938 (age 77)

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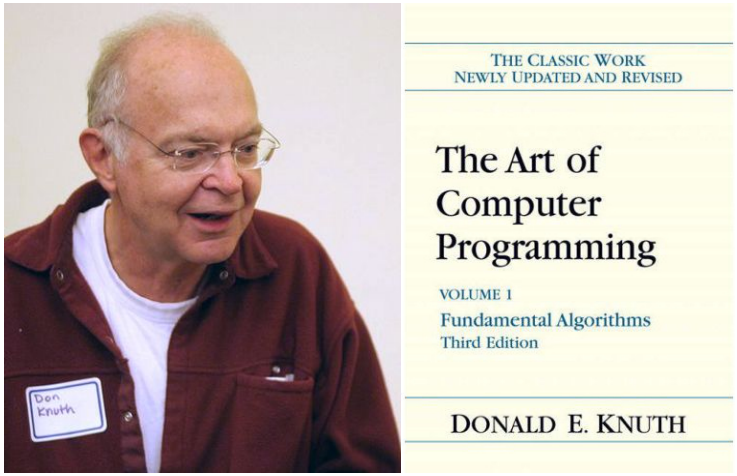

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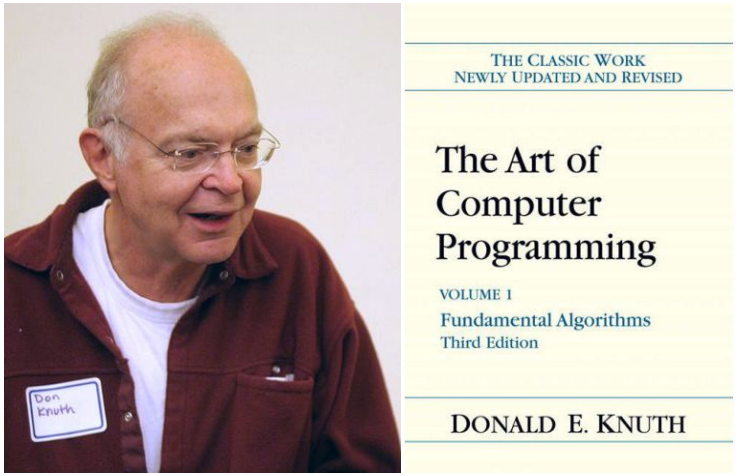
  - Cross-compatibility



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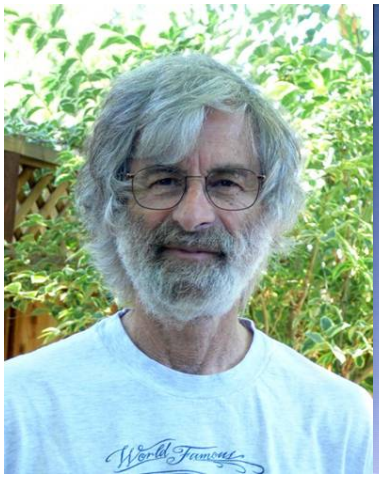
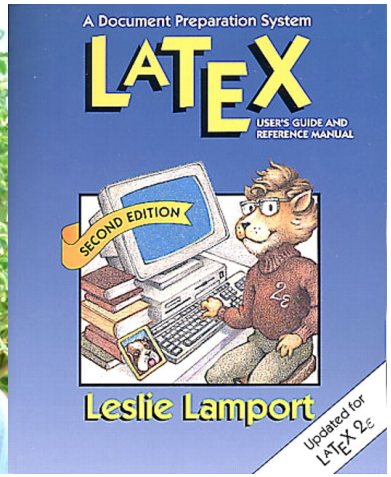
- Code – Compile – Visualize

- LaTeX = Leslie Lamport's TeX





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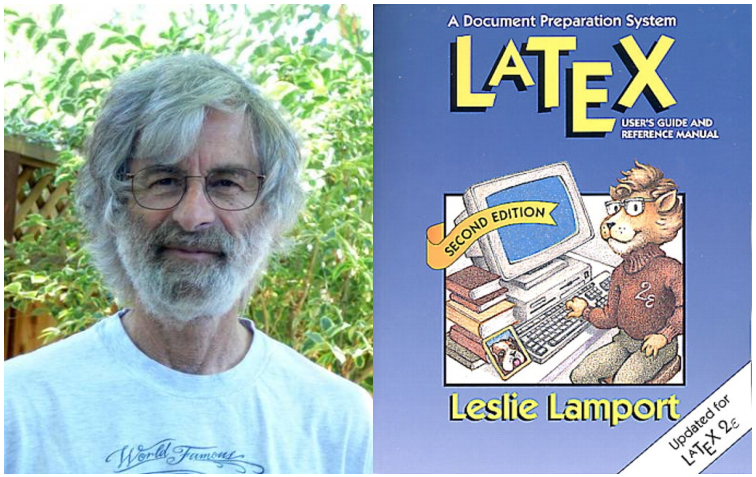

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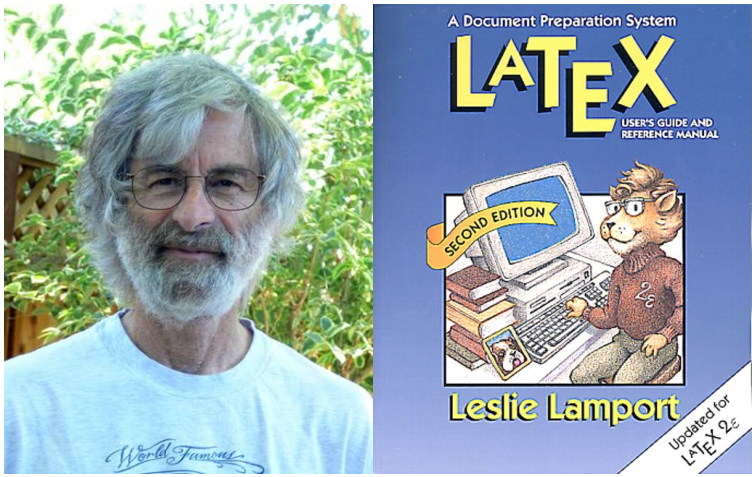

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- LaTeX = Leslie Lamport's TeX
- Initial Release in 1984
- A macro package for TeX with:
  - Document Types
  - Chapter Headings
  - Footnotes
  - Cross-references
  - Bibliographies
  - Environments (Tables, Figures, Equations)

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Editors and Compilers

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Please give me Mb of space on Overleaf

https://www.overleaf.com/signup?ref=d1806010dac8

Hello LaTeX World!

```
\documentclass{article}
%This is a comment
\begin{document}
Hello \LaTeX{} World!
\end{document}
```

Hello LaTeX World!

More structure

```
\documentclass[10pt, a4paper]{article}
%Notice the options [10pt, a4paper]
\title{My paper}
\author{My self}
\date{\today}
%
\begin{document}
\maketitle
\begin{abstract}
This is a summary of my paper.
\end{abstract}
\tableofcontents
%
\section{Introduction}
Start describing your work.
For a new paragraph put an empty line.

Now you are in a new paragraph.
%
\subsection{Concepts}
This is a subsection.
\subsubsection{Algorithms}
This is a subsubsection.
\paragraph{This is a paragraph}
\subparagraph{This is a subparagraph}
%
\appendix
\section{Appendix}
You may add appendices.
\end{document}
```

My paper

My self

March 8, 2015

Abstract

This is a summary of my paper.

Contents

1 Introduction

Start describing your work. For a new paragraph put and empty line.
Now you are in a new paragraph.

1.1 Concepts

This is a subsection.

1.1.1 Algorithms

This is a subsubsection.

This is a paragraph

This is a subparagraph

A Appendix

You may add appendices.

1

Team work

```
\documentclass[draft]{book}

\title{Team Work}
\author{Tom and Paul and Mary and Liz
      }
\date{\today}

\includeonly{Paul_file}

\begin{document}
\maketitle
\tableofcontents

\frontmatter
\chapter{Tom's chapter}
\include{Tom_file}

\mainmatter
\part{Part I}
\chapter{Paul's chapter}
\include{Paul_file}

\part{Part II}
\chapter{Mary's chapter}
\include{Mary_file}

\backmatter
\chapter{Liz's chapter}
\include{Liz_file}

\end{document}
```

- Using the `include` macro, each author can work on an independent file.
- To compile only a set of files, use the macro `includeonly`
- Welcome to team work in LaTeX!

Outline

LaTeX Basics

- Documents
- Fonts and Styles
- Text Symbols
- Paragraphs
- Lists
- Cross References
- Tables
- Math Symbols
- Equations
- Figures
- Bibliography

Documents

Classes:

- `book`
- `article`
- `report`
- `letter`
- `slides`
- `beamer`
- `IEEETran`
- `minimal`
- ...

Options:

- `10pt, 11pt, 12pt`
- `a4paper, letterpaper,...`
- `fleqn, leqno`
- `titlepage, notitlepage`
- `twocolumn`
- `twoside, oneside`
- `landscape`
- `openright, openany`
- `draft`

Fonts and Styles

`\textrm{Hello}`	Hello	`{\tiny Hello}`	Hello
`\textsf{Hello}`	Hello	`{\scriptsize Hello}`	Hello
`\texttt{Hello}`	Hello	`{\footnotesize Hello}`	Hello
`\textmd{Hello}`	Hello	`{\small Hello}`	Hello
`\textbf{Hello}`	**Hello**	`{\normalsize Hello}`	Hello
`\textup{Hello}`	Hello	`{\large Hello}`	Hello
`\textit{Hello}`	*Hello*	`{\Large Hello}`	Hello
`\textsl{Hello}`	*Hello*	`{\LARGE Hello}`	Hello
`\underline{Hello}`	Hello	`{\huge Hello}`	Hello
`\textsc{Hello}`	Hello	`{\Huge Hello}`	Hello

Text Symbols

\$	$	‘‘	“	\oe	œ
\&	&	’’	”	\OE	Œ
\%	%	"	”	\ae	æ
\#	#	\’a	á	\AE	Æ
\S	§	\‘a	à	\o	ø
\LaTeX{}	LaTeX	\~a	ã	\O	Ø
A_B	A_B	\^a	â	\l	ł
\textbar	|	\c a	ą	\L	Ł
\textbullet	•	\"a	ä	\i	ı
\textbackslash	\	\v a	ă	\j	ȷ
\ldots	...	\H a	a̋	\aa	å
\~{}	~	\=a	ā	\AA	Å
\^{}	^	\d a	ạ	A-B	A-B
\textless	<	\.a	ȧ	A--B	A–B
\textgreater	>	\b a	a̲	A---B	A—B

Paragraphs

```
\begin{center}
Please give me space on Overleaf
\end{center}
```

Please give me space on Overleaf

```
\begin{flushleft}
Please give me space on Overleaf
\end{flushleft}
```

Please give me space on Overleaf

```
\begin{flushright}
Please give me space on Overleaf
\end{flushright}
```

Please give me space on Overleaf

```
\begin{quote}
Please give me space on Overleaf
\end{quote}
```

Please give me space on Overleaf

```
\begin{quotation}
Please give me space on Overleaf
\end{quotation}
```

Please give me space on Overleaf

```
\begin{verse}
Please give me space on Overleaf
\end{verse}
```

Please give me space on Overleaf

Paragraphs

```
\begin{itemize}
\item One item
\item Another item
\end{itemize}
```

- One item
- Another item

```
\begin{enumerate}
\item First item
\item Second item
\end{enumerate}
```

1. First item
2. Second item

```
\begin{description}
\item[Lion] A mammal
\item[Shark] A fish
\end{description}
```

Lion A mammal

Shark A fish

```
\begin{itemize}
\item A list inside a list
\begin{enumerate}
\item Lists
\item can be
\item recursive
\end{enumerate}
\end{itemize}
```

- A list inside a list
  1. Lists
  2. can be
  3. recursive

Cross References

- Use macro `\label{`*some–identifier*`}` to set a mark.
- Use macro `\ref{`*some–identifier*`}` to retrieve the number of the item where the mark is defined.
- Use macro `\pageref{`*some–identifier*`}` to retrieve the page number where mark is defined.

```
\label{marcador}
This is slide \ref{marcador}. \\
It is in page \pageref{marcador}.
```

This is slide 21.
It is in page 35.

Tables

```
\begin{table}
\begin{tabular}{ l | c | r | p{6cm}}
Name & Age & Height & Email \\
\hline
Alex & 44 & 1,80m & alex@isr.ist.utl.pt \\
\end{tabular}
\caption{JEEC 2015 Monday Workshop Participants}
\end{table}
```

Name	Age	Height	Email
Alex	44	1,80m	alex@isr.ist.utl.pt

Table 1: JEEC 2015 Monday Workshop Participants

Math Symbols

```
Equation $E_c=\frac{mv^2}{2}$ is true
```

Equation $E_c = \frac{mv^2}{2}$ is true

```
Equation \[E_c=\frac{mv^2}{2}\] is true
```

Equation

$$E_c = \frac{mv^2}{2}$$

is true

\sqrt[n]{x}	$\sqrt[n]{x}$	\alpha	α
\sum_{k=1}^N	$\sum_{k=1}^{N}$	\beta	β
\int_{k=1}^N	$\int_{k=1}^{N}$	\leq	$\leq$
\prod_{k=1}^N	$\prod_{k=1}^{N}$	\geq	$\geq$
\overbrace{ab}	$\overbrace{ab}$	\infty	∞
\widetilde{ab}	$\widetilde{ab}$	\times	$\times$
\Rightarrow	$\Rightarrow$	\forall	$\forall$
\Updownarrow	$\Updownarrow$	\exists	$\exists$
\tilde{a}	$\tilde{a}$	\in	$\in$
\hat{a}	$\hat{a}$	\pm	$\pm$
\dot{a}	$\dot{a}$	\neq	$\neq$
\ddot{a}	$\ddot{a}$	\mid	$\mid$
\arctan	$\arctan$	\subset	$\subset$
\limsup	$\limsup$	\cup	$\cup$
\bigotimes	$\bigotimes$	\angle	$\angle$
\bigodot	$\bigodot$	\cdots	$\cdots$
\approx	$\approx$	\flat	$\flat$
\doteq	$\doteq$	\Box	$\Box$
\emptyset	$\emptyset$	\partial	∂

Equations

The `equation` environment automatically numbers equations.
If numbering is not needed use `equation*`.

```
\begin{equation}
\label{eq:matrix_transpose}
\left[\begin{array}{ccc} a_{11} & \cdots & a_{1n} \\
\vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn}
\end{array}\right]^T=
\left[\begin{array}{ccc} a_{11} & \cdots & a_{n1} \\
\vdots & \ddots & \vdots \\ a_{1n} & \cdots & a_{nn}
\end{array}\right]
\end{equation}
```

$$\left[\begin{array}{ccc} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{array}\right]^T = \left[\begin{array}{ccc} a_{11} & \cdots & a_{n1} \\ \vdots & \ddots & \vdots \\ a_{1n} & \cdots & a_{nn} \end{array}\right] \tag{1}$$

Figures

Graphics files (*.jpg, *.png, *.pdf, etc) can be displayed in a `figure` environment, using command `\includegraphics` from the `graphicx` package.

```
\usepackage{graphicx}
\begin{figure}[!htpb]
\label{fig:leslie}
\includegraphics[width=2.5
    cm]{leslie.jpg}
\includegraphics[width=2.5
    cm]{texbook.jpg}
\caption{Leslie Lamport and
     his TeXbook.}
\end{figure}
```

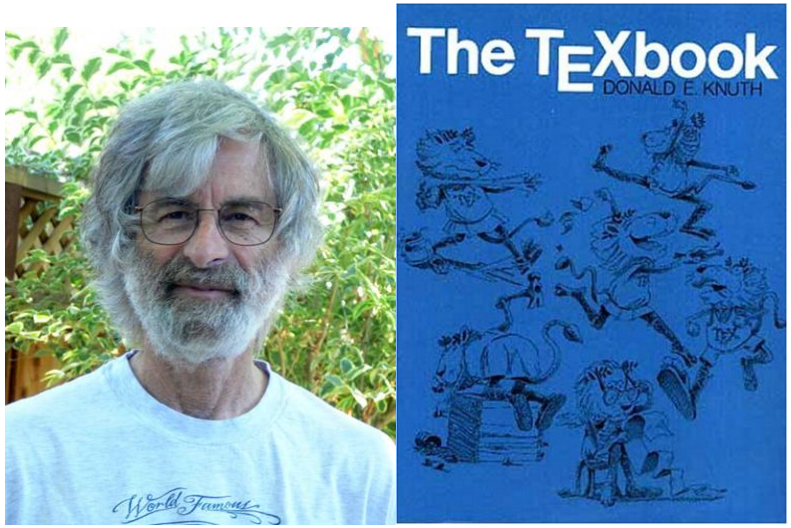

Figure 1: Leslie Lamport and his textbook.

Bibliography

Use BibTeX. Put your bibliography in a separate file (e.g. biblio.bib):

```
@book{lamport86 ,
      author =     "Leslie Lamport" ,
      title =      "\LaTeX: A Document Preparation System" ,
      publisher = "Addison--Wesley Pub.\ Co." ,
      year =       "1986" ,
      address =    "Reading, MA" }
```

Now use it in your main file.

```
In \cite{lamport86} is
    given a detailed
    description of the use
    of BibTeX.
...
\bibliographystyle{plain}
\bibliography{biblio.bib}
```

In [1] is given a detailed description of the use of BibTeX.

Leslie Lamport.
LaTeX: A Document Preparation System.
Addison–Wesley Pub. Co., Reading, MA, 1986.

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Conclusion

The ideal situation occurs when the things that we regard as beautiful are also regarded by other people as useful.

– Donald Knuth