MANIPAL UNIVERSITY
JAIPUR

Workshop on "Document typesetting and Processing using LaTeX"

Session: Hello LaTeX

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Motivation: Why LaTeX

1. LaTeX allows you to **"clearly separate the content from the format of your document"**.

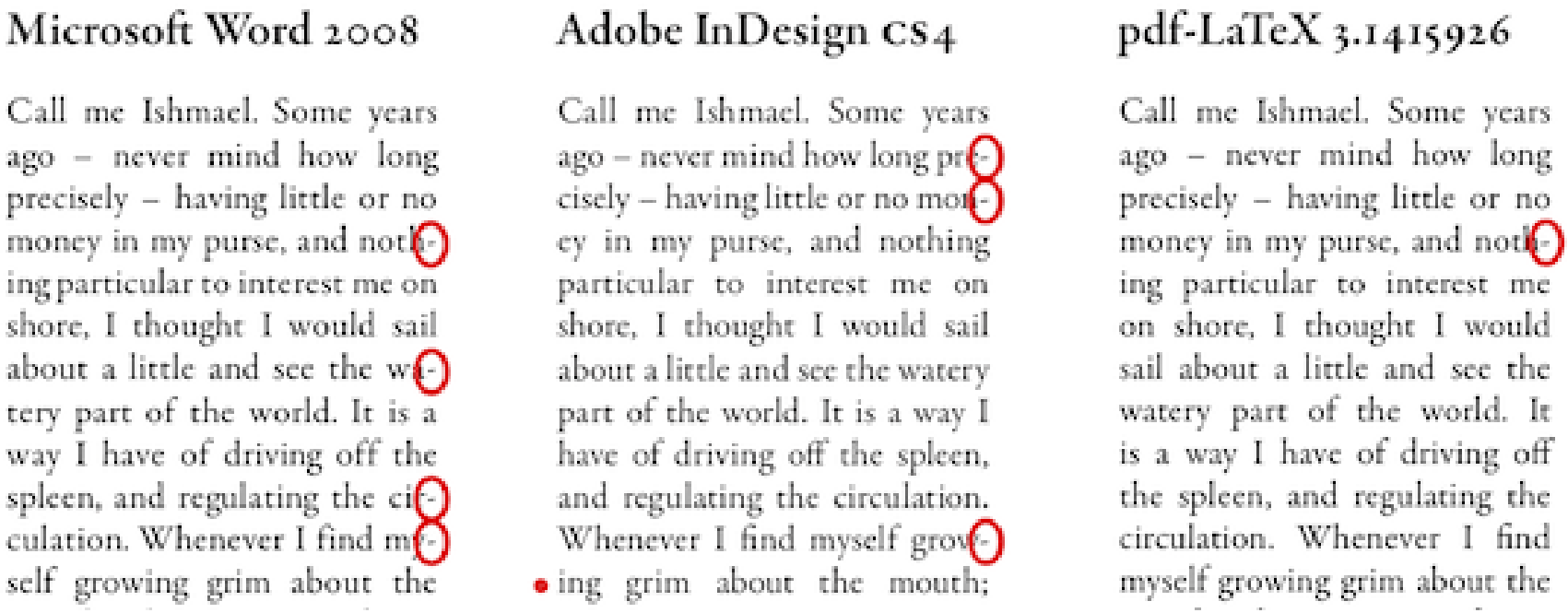
   This gives you the opportunity to focus on the "what", the creative part of your work, rather than the "how" is it going to look printed out in paper.

2. LaTeX provide **"high typographical quality of the document"**.

Let us start with the "Typographical quality" of LaTeX. The Format issues will clear itself by the end of the day.

Typographical Quality I

Justification and hyphenation I



LaTeX uses the highly sophisticated algorithms for optimizing "justification and hyphenation" for an entire paragraph.

This results among other in irregular spacing and a high number of hyphenated words.

Typographical Quality II

Justification and hyphenation II

Statistics on word spacing in the comparison document above.

Hyphenation and inter-word spacing statistics

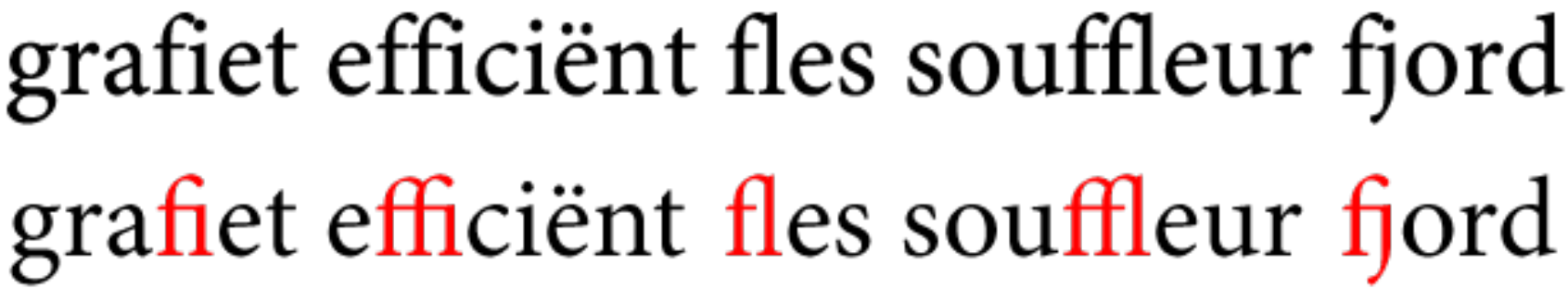
	Word 2007	InDesign	LaTeX
Number of hyphenations	9	10	4
SD of IWS (pt)	2.26	1.94	1.42
Maximum IWS (pt)	14.4	13.2	9.0
Number of lines with IWS $>$ 9pt	5	2	0

SD = Standard Deviation, IWS= Inter Word Spacing

Typographical Quality III

Ligatures

Some letters clash with one another if they are printed next to each other. Familiar examples are the combinations ‘fl’ and ‘fi’, in which the ‘f’ touches the dot of the ‘i’ or the top of the ‘l’.



MS Word (top) does not automatically use ligatures. LaTeX (bottom) automatically uses all supported ligatures.

Typographical Quality IV

Real smallcaps

For titles, headers and abbreviations one often uses smallcaps: capitals that are just as high as normal lowercase letters.

MS Word (top) uses scaled capitals instead of real smallcaps. LaTeX (bottom) uses the real smallcaps provided in the typeface.

Typographical Quality V

Kerning

Kerning is placing letters closer together or further apart if the form of the letters necessitates it. This results in a much more balanced spacing, enhancing readability.

MS Word (top) uses the wrong, average kerning for the letter pairs 'Ta', 'AV' and 'VA'. LaTeX (below) uses the right kerning as prescribed in the font's kerning tables.

Typographical Quality VI

Mathematical Writing

Compare by yourself:

$$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cos\frac{n\pi x}{L} + b_n \sin\frac{n\pi x}{L} \right)$$

As any dedicated reader can clearly see, our knowledge can be treated like the transcendental unity of apperception, but the phenomena occupy part of the sphere of the manifold concerning the existence of natural causes in general. $f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cos\frac{n\pi x}{L} + b_n \sin\frac{n\pi x}{L} \right)$ *(From Word's Insert Equation menu)* Whence comes the architectonic of natural reason, the solution of which involves the relation between necessity and the Categories? $f(x) = a_0 + \sum_{n=1}^{+\infty} (a_n \cos\frac{n\pi x}{L} + \sin\frac{n\pi x}{L})$ *(From Phillipe Goutet's comment)* Natural causes (and it is not at all certain that this is the case) constitute the whole content for the paralogisms. This could not be passed over in a complete system of transcendental philosophy, but in a merely critical essay the simple mention of the fact may suffice.

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MS Word (top) and LaTeX (below) uses the right kerning as prescribed in the font's kerning tables.

Other Advantage of LaTeX over Word Processors

1. The consistency of the layout
2. Easily produce PDFs with hyperlinks, table of contents, indices, etc.
3. Guaranteed backward compatibility (Word 2007 and 2013 have different format)
4. The excellent referencing system
5. Extremely customizable
6. Free of cost

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Disadvantage of LaTeX I

1. A very steep learning curve. Our first slide was coded as:

```
\begin{frame}[fragile]{Motivation: Why \LaTeX{}}
\begin{enumerate}
\item \LaTeX{} allows you to \textbf{``clearly separate
 the content from the format of your document"}. \par
\vspace{0.2cm}

This gives you the opportunity to focus on the ``what",
the creative part of your work, rather than the ``how"
is it going to look printed out in paper.\par
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\item \LaTeX{} provide  {\bf ``high typographical
quality of the documents"}.\par
\end{enumerate}

\end{frame}
```

Disadvantage of LaTeX II

2. Distributed information on modules
3. Absence of collaborative editing
4. Grammatical check is missing
5. Layout changes are difficult
6. Adding picture and table is relatively difficult compared to MS Word, although better output is obtained.

Now that we have decided to use LaTeX, let us get started with first, with the word TEX.

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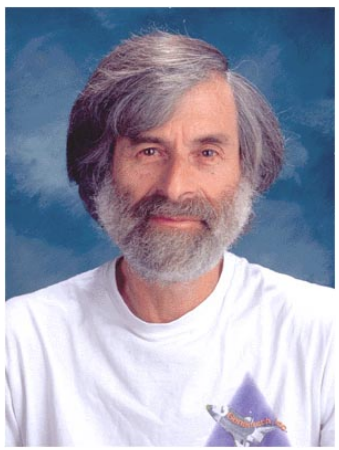
The LaTeX History

Donald E. Knuth

TeX(= tau epsilon chi, and pronounced similar to 'tech') is a computer language designed by Donald E. Knuth of Stanford University. The first version of TeX was released in 1978 and the current version is 3.1415926 (absolutely bug free that the version is converging to the value of π)

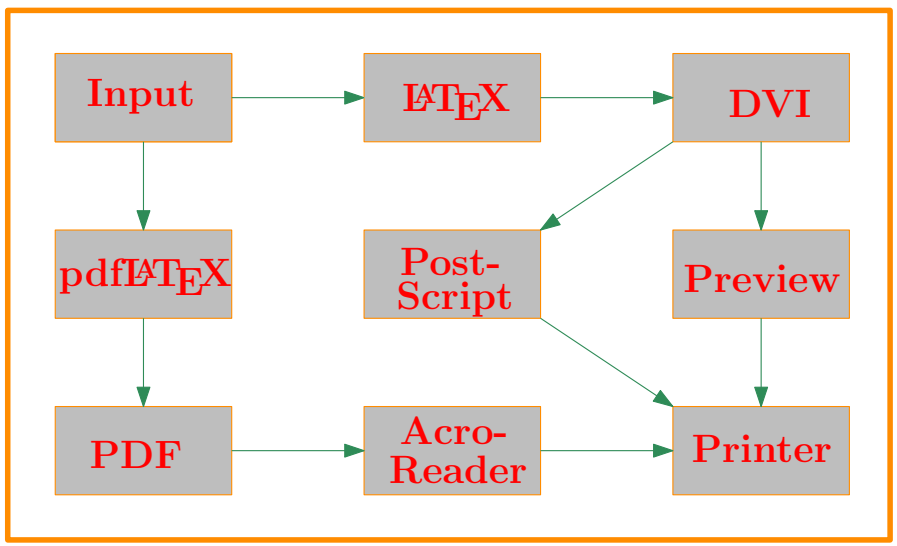
Then what is LaTeX?


Leslie Lamport

LaTeX is a document preparation based on the TeX formatter developed by Leslie Lamport. This system adds a set of functions that makes the language more friendlier than using the primitives provided in TeX. Thus, we use LaTeX and not TeX

Getting Started with LaTeX

That we know LaTeX is rather a coding, let us find that we need to run our code. The figure below will illustrate.



We require:

1. An input system: A text editor, we will use **TeXstudio**
2. A LaTeXprocessor
3. A PDF reader

Next, we install a LaTeX system.

Installing. . .,

Next, your first LaTeX document.