HEC MONTRÉAL

Writing with \title{LaTeX}

The Basics

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Writing with
\title{LATEX}

Part One : The Basics
HEC Montréal Edition, revised and extended (english version)

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Training Session Summary

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A TeX and LaTeX Presentation

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What is T_EX and L^AT_EX?

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What is TeX?

DONALD KNUTH

© Jacob Appelbaum, 2005

- A typesetting system created by Donald Knuth.

- "The most powerful formatting program for producing book-quality text of scientific and technical works."[a]

- A mature, stable, complete, bug-free system.

- A set of primitive commands perfect for typographic and programmatic functions.

- "*typesetter-level program*"

---

[a]Kopka & Daly, p. 6

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What is LaTeX?

LESLIE LAMPORT

- A set of markup commands created by Leslie Lamport to facilitate TeX's use.

- Doesn't require any knowledge of typography in general and TeX particularly.

- Typographic and logical markup language used to set the text layout (like HTML).

- Cross-platform language, identical from one operating system to the other and extensible with packages.

- "*author-level program*"

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LATEX Document Creation Process

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Writing with a new perspective

- You write your document in plain text and you use commands to describe **what the text is** and **not what it should look like**.

- You focus on your **content**.

- You let LATEX do its work, that is taking care of the **container**.

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LaTeX Document Creation Process

writing and markup
with a text editor

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LaTeX Document Creation Process

compilation with a
TeX compiler from
the command line

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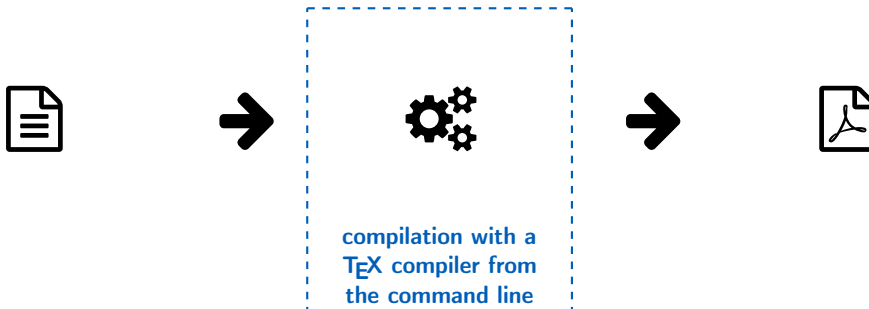
visualization with an
external reader

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Some Things Done Simply with LaTeX...

... and not necessarily with a word processor

- Title page
- Table of contents
- Page numbering
- Figures and tables: display on a page, numbering, reference
- Equations: display, numbering and reference
- Citations and bibliographies
- Hyphenation
- Two-sided documents

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Tools you'll need

- A TeX distribution
  - TeX Live (Windows and Unix/Linux)
  - MacTeX, derived from TeX Live (Mac OS)
  - MiKTeX (Windows, Mac OS and Unix/Linux)

- An integrated writing environment
  - Too many to list them all. . .
  - The library uses and recommends TeXStudio

- A command line terminal

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The Basics

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Document structure

A LaTeX document always has two parts:

```
\documentclass[11pt,french]{article}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
\usepackage{babel}
\usepackage[autolanguage]{numprint}

\begin{document}

  \section{Primo}

  Ac class dis donec erat facilisis magna mattis
  placerat potenti praesent primis sed tellus turpis
  ut vehicula. Ad amet eleifend eros fames habitant
  imperdiet integer laoreet leo magna magnis neque
  netus senectus taciti torquent.

  \section{Deuxio}

  Cursus dui egestas eget eros et hac magna massa mollis
  natoque penatibus sagittis sed tellus urna velit
  vestibulum vitae vulputate.
\end{document}
```

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A LaTeX document always has two parts:

```
\documentclass[11pt,french]{article}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
\usepackage{babel}
\usepackage[autolanguage]{numprint}
```

← **Preamble**

```
\begin{document}

  \section{Primo}

  Ac class dis donec erat facilisis magna mattis
  placerat potenti praesent primis sed tellus turpis
  ut vehicula. Ad amet eleifend eros fames habitant
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  natoque penatibus sagittis sed tellus urna velit
  vestibulum vitae vulputate.
\end{document}
```

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Document structure

A LaTeX document always has two parts:

```latex
\documentclass[11pt,french]{article}
\usepackage[utf8]{inputenc}
\usepackage[T1]{fontenc}
\usepackage{babel}
\usepackage[autolanguage]{numprint}
\begin{document}

  \section{Primo}

  Ac class dis donec erat facilisis magna mattis
  placerat potenti praesent primis sed tellus turpis
  ut vehicula. Ad amet eleifend eros fames habitant
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  \section{Deuxio}

  Cursus dui egestas eget eros et hac magna massa mollis
  natoque penatibus sagittis sed tellus urna velit
  vestibulum vitae vulputate.
\end{document}
```

← **Document body**

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Preamble
Document Class

The preamble's **first command** usually is the document class declaration.

```
\documentclass[options]{class}
```

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Preamble
Document Class

The preamble's **first command** usually is the document class declaration.

```
\documentclass[options]{class}
```

MAIN CLASSES

- article, book, letter, report
- memoir, **hecthese**
- slides, beamer, **hecppt**

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Preamble
Document Class

The preamble's **first command** usually is the document class declaration.

```
\documentclass[options]{class}
```

MAIN CLASSES

- article, book, letter, report
- memoir, **hecthese**
- slides, beamer, **hecppt**

MAIN OPTIONS

- 10pt, 11pt, 12pt
- oneside, twoside
- openright, openany
- english, french

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Preamble
Packages

Packages allow you to **modify existing commands** and to **add features** to the system.

They are loaded in the preamble with the \usepackage[options]{package} command.

```
\documentclass[options]{class}

\usepackage{package}
\usepackage[options]{package}
\usepackage{package1,package2,package3,...}
```

Each package's documentation can be found on the Comprehensive TeX Archive Network Website.

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Commands

- Always begin with a \

- Three main forms:
```
\commandname[optional_args]{mandatory_args}
\commandname*[optional_args]{mandatory_args}
\commandname
```

- Mandatory arguments between { and }

- Optional arguments between [and]

- Commands without arguments: the command's name ends with any character that isn't a letter or with a blank space.

- A command's scope is limited between { and }.

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Environments

- Delimited by

```
\begin{environment}
   ...
\end{environment}
```

- An environment's content is treated differently from the remainder of the text.

- Changes apply only to the environment's content.

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Writing

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Writing

- You write your text in the `document` environment:

```
\begin{document}
  The content of your document goes here...
\end{document}
```

- You write your document in plain text and use commands and environments to structure your text;

- You write your text like anywhere else:
  - Words are separated by one or more blank spaces;
  - Paragraphs are separated by one or more empty lines;
  - All extra white space is deleted on compilation.

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Reserved Characters
TeX's Reserved Characters

\#   Argument number in commands

\$ Math Mode delimiter

&   Table column delimiter

%   Starts a comment

_   Indices (math)

^   Exponents (math)

~   No-break space

{   Opens a command or an environment definition

}   Closes a command or an environment definition

Reserved Characters
TₑX's Reserved Characters

#	Argument number in commands	
$	Math Mode delimiter	
&	Table column delimiter	
%	Starts a comment	
_	Indices (math)	
^	Exponents (math)	
~	No-break space	
{	Opens a command or an environment definition	
}	Closes a command or an environment definition	

TO USE THE CHARACTERS:
\#
\$
\&
\%
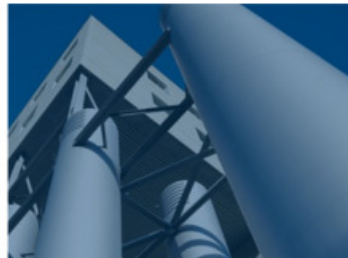_
\textasciicircum
\textasciitilde
\{
\}

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Reserved Characters

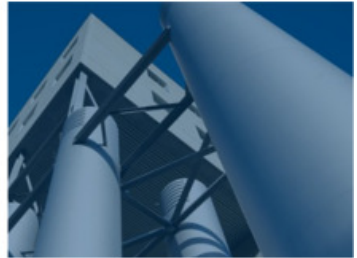- Quotation marks
  - The quotation marks " found on a keyboard are not used in typesetting.
  - Single (') or double (") beginning marks and single (') or double (") end marks are used to surround quotes.

- We type hyphens once (−), twice (−−) or three times (−−−) to produce hyphens, *en dash*es and *em dash*es.

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Document Organization

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Parts of a Document

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Class Choice

The first thing you need to do when writing a LaTeX document is to choose a document class.

Class	Divisions	Organization	Header	Footer
article	parts, sections, . . .	one-sided	empty	centered page number
report	parts, chapters, sections, . . .	one-sided	empty	centered page number
book	parts, chapters, sections, . . .	two-sided	page numbers, titles	empty
hecthese	chapiters, sections, subsections	two-sided	empty	centered page number

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Titles and Title Page

Automatic layout:

```
% Preamble commands
\title[short title]{long title}
\author[short author name]{long author name}
\date[short date]{long date}
[...]

% Document body command
\maketitle
```

Manual layout:

STANDARD CLASSES

```
\begin{titlepage}
  ...
\end{titlepage}
```

MEMOIR AND HECTHESE CLASSES

```
\begin{titlingpage}
  ...
\end{titlingpage}
```

In the **hecthese** document class, title pages are automatically generated.

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Abstract

- **article**, **report** or **memoir** classes : abstract generated with the abstract environment

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

- **hecthese** class: french and english abstracts treated as normal, unnumbered chapters

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Sections

- The document is subdivided with the following commands:

```
\part[short title]{long title}
\chapter[short title]{long title}
\section[short title]{long title}
\subsection[short title]{long title}

\subsubsection[short title]{long title}    % avoid using in books

\paragraph[short title]{long title}      % evil! never use!
\subparagraph[short title]{long title}  % EVIL! never EVER use!
```

- Automatic numbering

- Commands followed by an * = unnumbered section

- Short title as an optional argument

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Appendices

- Appendices are sections and chapters with an alphanumeric numbering (A, A.1, . . .).
- Sections following the `\appendix` command are all considered appendices.
- In the title, "Chapter" is changed into "Appendix".

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A Book's Logical Structure
book, memoir, hecthese classes

\frontmatter

- preface, table of contents, etc.
- roman page numbering (i, ii, . . .)
- unnumbered chapters

\mainmatter

- the book's content
- arabic page numbering, starting at 1
- numbered chapters

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A Book's Logical Structure
book, memoir, hecthese classes

`\backmatter`

- everything else (bibliography, index, etc.)
- the page numbering continues
- unnumbered chapters

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Table of Contents

- The table of contents is automatically generated with `\tableofcontents` .

- Needs **more than one** compilation to be generated.

- Unnumbered sections are not included.

- With the **hyperref** package, `\tableofcontents` generates the .pdf file's table of contents.

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Table of Contents

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- `\tableofcontents*` , from the memoir document class, doesn't include the table of contents in the table of contents.

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Table of Contents

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- Needs **more than one** compilation to be generated.
- Unnumbered sections are not included.
- With the **hyperref** package, `\tableofcontents` generates the .pdf file's table of contents.
- `\tableofcontents*` , from the memoir document class, doesn't include the table of contents in the table of contents.
- `\listoffigures` generates the list of figures.
- `\listoftables` generates the list of tables.

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Labels and Automatic Referencing
Because your computer will do it better than you...

- **Never** refer manually to a section, an equation, a table, etc.

- "Name" an element with `\label`

- Refer to that label with `\ref`

- Needs 2 to 3 compilations to generate

```
\section{Definitions}
  \label{sec:definitions}

  Lorem ipsum dolor sit amet, consectetur adipiscing elit,
  sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.
  Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris
  nisi ut aliquip ex ea commodo consequat.

\section{History}
  As seen in Section \ref{sec:definitions}...
```

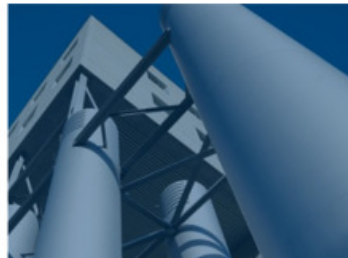HEC MONTRÉAL

Labels and Automatic Referencing
Because your computer will do it better than you...

- The **hyperref** package generates hyperlinks to the references in the .pdf files.
- The `\autoref{}` command...
  1. automatically identifies the reference type (section, equation, table, etc.);
  2. generates a hyperlink with the text **and** number of the reference.

  ```
  As seen in \autoref{sec:definitions}...
  ```

- The `\pageref{}` command refers to a page number.
- The **amsmath** package provides the `\eqref{}` command to refer to equations.

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Apparence du texte

Polices de caractères

Polices de caractères

- Par défaut, tous les documents LaTeX utilisent la même police, Computer Modern.

- Privilégier les polices de grande qualité et très complètes (lettres accentuées, grand choix de symboles)

- Peu de polices sont adaptées pour les mathématiques : Palatino, Times, Lucida ($) sont des choix sûrs

- Dans la classe **hecthese**, les paquetages mathptmx et mathpazo sont chargés par défaut afin d'offrir les polices de caractères Times et Palatino.

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Changement d'attribut de la police

familles		
romain	\rmfamily	\textrm{<texte>}
largeur fixe	\ttfamily	\texttt{<texte>}
sans empattements	\sffamily	\textsf{<texte>}
formes		
droit	\upshape	\textup{<texte>}
italique	\itshape	\textit{<texte>}
penché	\slshape	\textsl{<texte>}
PETITES CAPITALES	\scshape	\textsc{<texte>}
séries		
moyen	\mdseries	\textmd{<texte>}
gras	\bfseries	\textbf{<texte>}

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Changement d'attribut de la police

familles		
romain	`\rmfamily`	`\textrm{<texte>}`
largeur fixe	`\ttfamily`	`\texttt{<texte>}`
sans empattements	`\sffamily`	`\textsf{<texte>}`
formes		
droit	`\upshape`	`\textup{<texte>}`
italique	`\itshape`	`\textit{<texte>}`
penché	`\slshape`	`\textsl{<texte>}`
PETITES CAPITALES	`\scshape`	`\textsc{<texte>}`
séries		
moyen	`\mdseries`	`\textmd{<texte>}`
gras	`\bfseries`	`\textbf{<texte>}`

s'applique à tout le texte qui suit

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Changement d'attribut de la police

familles		
romain	\rmfamily	\textrm{<texte>}
largeur fixe	\ttfamily	\texttt{<texte>}
sans empattements	\sffamily	\textsf{<texte>}
formes		
droit	\upshape	\textup{<texte>}
italique	\itshape	\textit{<texte>}
penché	\slshape	\textsl{<texte>}
PETITES CAPITALES	\scshape	\textsc{<texte>}
séries		
moyen	\mdseries	\textmd{<texte>}
gras	\bfseries	\textbf{<texte>}

s'applique au texte en argument

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Italique

Lorsque l'italique est utilisé pour mettre l'*emphase* sur une partie du texte, on privilégie la commande sémantique suivante:

```
\emph{texte}
```

Les commandes \emph{<texte>} peuvent être imbriquées une dans l'autre. Le texte mis en italique redevient droit et vice versa.

```
C'était un peu \emph{rough} par
moments.
```
C'était un peu *rough* par moments.

```
Il m'a dit: " \emph{Enough
\emph{poutine} for the week!"}
```
Il m'a dit: « *Enough* poutine *for the week!*»

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Taille de la police

Commandes standards	Rendu
\tiny	vraiment petit
\scriptsize	encore plus petit
\footnotesize	plus petit
\small	petit
\normalsize	normal
\large	grand
\Large	plus grand
\LARGE	encore plus grand
\huge	énorme
\Huge	encore plus énorme

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Disposition du texte

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Listes

- Deux principales sortes de listes:
  1. **à puce** avec l'environnement \itemize
  2. **numérotée** avec l'environnement \enumerate
- Possibilité de les imbriquer les unes dans les autres
- Marqueurs adaptés automatiquement jusqu'à quatre niveaux

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Listes

- Deux principales sortes de listes:
    1. **à puce** avec l'environnement \itemize
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- Possibilité de les imbriquer les unes dans les autres
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```
\begin{itemize}
  \item Deux principales sortes de listes :
  \begin{enumerate}
    \item \textbf{à puce} avec l'environnement \verb=itemize=
    \item \textbf{numérotée} avec l'environnement \verb=enumerate=
  \end{enumerate}
  \item Possibilité de les imbriquer les unes dans les autres
  \item Marqueurs adaptés automatiquement jusqu'à quatre niveaux
\end{itemize}
```

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Listes

- Deux principales sortes de listes:
  1. **à puce** avec l'environnement \itemize
  2. **numérotée** avec l'environnement \enumerate
- Possibilité de les imbriquer les unes dans les autres
- Marqueurs adaptés automatiquement jusqu'à quatre niveaux

```
\begin{itemize}
  \item Deux principales sortes de listes :
  \begin{enumerate}
    \item \textbf{à puce} avec l'environnement \verb=itemize=
    \item \textbf{numérotée} avec l'environnement \verb=enumerate=
  \end{enumerate}
  \item Possibilité de les imbriquer les unes dans les autres
  \item Marqueurs adaptés automatiquement jusqu'à quatre niveaux
\end{itemize}
```

- Une troisième liste est disponible : description

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On utilise l'environnement `quote` pour insérer une citation courte (un paragraphe) dans le texte.

```
\begin{quote}
  Life is what happens to you while
  you're busy making other plans.
  -- John Lennon
\end{quote}
```

Life is what happens to you while you're busy making other plans. – John Lennon

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Citations
Citations longues

On utilise l'environnement `quotation` pour insérer une citation longue (plus d'un paragraphe).

```
\begin{quotation}
  I've missed more than 9000 shots in my
  career. I've lost almost 300 games. 26
  times I've been trusted to take the game
  winning shot and missed.

  I've failed over and over and over again
  in my life. And that is why I succeed.
  -- Michael Jordan
\end{quotation}
```

I've missed more than 9000 shots in my career. I've lost almost 300 games. 26 times I've been trusted to take the game winning shot and missed.

I've failed over and over and over again in my life. And that is why I succeed. – Michael Jordan

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Notes de bas de page

- Une note de bas de page est insérée avec la commande suivante:

```
\footnote{texte de la note}
```

- La commande doit suivre immédiatement le texte à annoter.

- Méthode recommandée :

```
... fera remarquer que Pierre Lasou\footnote{%
Spécialiste en ressources documentaires} %
fut une grande aide dans la préparation de ...
```

- La numérotation et la disposition sont automatiques.

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Code source

- Pour rédiger du code source en bloc, on utilise l'environnement `verbatim`

```
\begin{verbatim}
    Texte disposé tel qu'il est saisi
    dans une police à largeur fixe.
\end{verbatim}
```

- Pour rédiger du code source à même le texte, on utilise la commande `\verb` , dont la syntaxe est `\verbcsourcec` où *c* est un caractère quelconque ne se trouvant pas dans *source*.

- Pour un usage plus intensif, consultez la documentation du *package* **listings**.

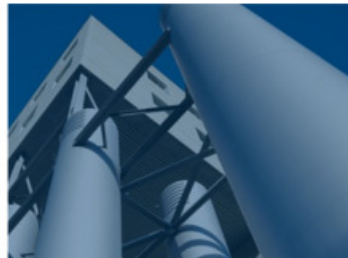[1]tiré du site r4stats.com.

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Code source

Un exemple[1] :

```
# ---Writing Your Own Functions (Macros)---

# A good function that just prints.
mystats <- function(x) {
    print( mean(x, na.rm = TRUE) )
    print(   sd(x, na.rm = TRUE) )
}
mystats(myvar)

# A function with vector output.
mystats  <- function(x) {
    mymean <- mean(x, na.rm = TRUE)
    mysd   <-   sd(x, na.rm = TRUE)
    c(mean = mymean, sd = mysd )
}
mystats(myvar)
myVector <- mystats(myvar)
myVector
```

---

[1] tiré du site r4stats.com.

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Classe de document hecthese

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Classe de document hecthese

- Classe de document conçue spécifiquement pour les étudiant(e)s à la maîtrise et au doctorat à HEC Montréal;

- Disponible à l'adresse https://ctan.org/pkg/hecthese;

- Mise en page conforme aux règles de présentation du Guide pour la rédaction d'un travail de 1er, 2e ou 3e cycles;

- Basée sur la classe **memoir**;

- Quelques nouvelles commandes pour la création de la page de titre et plus. . .

- De nouveaux environnements adaptés;

- Partir d'un gabarit (disponibles après l'installation de la classe dans un répertoire de travail);

- Utiliser des fichiers séparés pour chaque chapitre de la thèse ou du mémoire.

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Bibliographie

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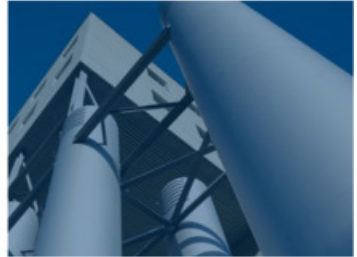
Bibliographie
Pour les nostalgiques de l'odeur de l'encre

📕 Kopka, Helmut et Patrick W. Daly (2004).
Guide to LaTeX, Fourth Edition,
Addison-Wesley,
ISBN 978-0-321-17385-0, 597 p.

📕 Mittelbach, Frank *et al.* (2004).
The LaTeX Companion, Second Edition,
Addison-Wesley,
ISBN 978-0201362992, 1120p.

📕 Goossens, Michel et Franck Mittelbach (2007).
The LaTeX Graphics Companion, Second Edition,
Addison-Wesley,
ISBN 978-0321508928, 976p.

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Bibliographie
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formation-latex-ul – Introductory LaTeX course in French,
Comprehensive TeX Archive Network,
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🌐 Lees-Miller, John D. (2018).
Free & Interactive Online Introduction to LaTeX,
Overleaf,
Consulté le 22 février 2018 à https://www.overleaf.com/latex/learn/free-online-introduction-to-latex-part-1

🌐 ShareLaTeX Documentation,
ShareLaTeX,
Consulté le 22 février à https://fr.sharelatex.com/learn/Main_Page

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Pour les consciencieux de la forêt boréale

- LaTeX WikiBook

- ShareLaTeX Documentation

- TeX - LaTeX Stack Exchange

- LaTeX Community

- Comprehensive TeX Archive Network

- UK List of TEX Frequently Asked Questions

- Google. . .

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Période de questions

Documentation de la formation

http://bit.ly/ltxhec1

Évaluation de la formation

http://bit.ly/ltxsurvey1

Support TEXnique

Benoit Hamel : <benoit.2.hamel@hec.ca>

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