Lib4RI

Federico Cantini (Lib4RI) <federico.cantini@lib4ri.ch>

Module 5: LaTeX

Lecture 2: Tables, Figures and Formulæ

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The `tabular` environment

Fruit	Price
Apple	0.49 $
Orange	10.1 $
Avocado	999.999 $

```
\begin{tabular}{c|c}
        Fruit & Price \\
        \hline
        Apple & 0.49 \$ \\
        Orange & 10.1 \$ \\
        Avocado & 999.999 \$ \\
\end{tabular}
```


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The `tabular` environment

```
\begin{tabular}[position]{columns specification}
        Fruit & Price \\
        \hline
        Apple & 0.49 \$ \\
        Orange & 10.1 \$ \\
        Avocado & 999.999 \$ \\
\end{tabular}
```

- *position*: `t`(op), `c`(entre), `b`(ottom). Adjusts the vertical position of the table relative to the baseline of the surrounding text;
- *columns specification* defines the format of the columns: Use `l`(eft), `r`(ight) or `c`(entred) to align the text inside the column. Use `p`{*width*} for justified text inside a column of width *width*. Separate columns by nothing or | for a vertical line;
- Inside the table, use & to separate cells, \\ to go to the next row and `\hline` for a horizontal line.

The `tabular` environment

Our prices are as follows:

Fruit	Price
Apple	0.49 $
Orange	10.1 $
Avocado	999.999 $

We actually don't have avocados.

```
Our prices are as follows:
\begin{tabular}{c|c}
        Fruit & Price \\
        \hline
        Apple & 0.49 \$ \\
        Orange & 10.1 \$ \\
        Avocado & 999.999 \$ \\
\end{tabular}
We actually don't have avocados.
```


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The `table` environment

```
\begin{table}[placement specifier]
        ...
        \caption{some_text}
        \label{some_label}
\end{table}
```

- the *placement specifier* is a combination of
  - `h`: place the float here (i.e. where the code occurred);
  - `t`: place the float on top of a page;
  - `b`: place the float on the bottom of a page;
  - `p`: place the float on a special page at the end of the document;
  - `!`: ignore æsthetical considerations and place the float even if the result is not so pretty
- Always place the label after the caption!

The `table` environment

```
Our prices are given in table~\ref{tab:prices}.
\begin{table}
        \begin{center}
                \begin{tabular}{c|c}
                        Fruit & Price \\
                        \hline
                        Apple & 0.49 \$ \\
                        Orange & 10.1 \$ \\
                        Avocado & 999.999 \$ \\
                \end{tabular}
                \caption{Fruit prices}
                \label{tab:prices}
        \end{center}
\end{table}
We actually don't have avocados.
```

Fruit	Price
Apple	0.49 $
Orange	10.1 $
Avocado	999.999 $

Table 1: Fruit prices

.

Our prices are given in table 1. We actually don't have avocados.

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Spanning columns

```
\begin{tabular}{c|c|c}
        \multicolumn{2}{c|}{{\bfseries Spanning %
                        columns}} & \\
        \cline{1-2}
        {\bfseries Col 1} & {\bfseries Col 2} &
{\bfseries Col 3} \\
        \hline
        Row 1     & - & - \\
        Row 2     & - & - \\
        Row 3     & - & - \\
        Row 4    & - & - \\
        Row 5    & - & - \\
\end{tabular}
```

Spanning columns		
Col 1	**Col 2**	**Col 3**
Row 1	-	-
Row 2	-	-
Row 3	-	-
Row 4	-	-
Row 5	-	-

Exercise

Open the file `Exercise_2a/ex_2a.pdf` and write the LaTeX code to produce the document.

Including graphics: the graphicx-package

- Have a png, jpg or pdf file;
- Load the graphicx-package using:
  \\usepackage{graphicx}
- Include the file using:
  \includegraphics[key=value,. . .]{file}
  - file is the filename without the extension (png/jpg)
  - key: width, height, angle, scale
  - value: a value in the proper unit (cm, in, ex, em, ...)
- Example:

```
\includegraphics[key=value,...]{file}
...
I love \includegraphics[height=1.75ex]{CH}!
```

produces:

I love  !

The `figure` environment

```
\begin{figure}[placement specifier]
        \includegraphics[key=value,...]{file}
        \caption{some_text}
        \label{some_label}
\end{figure}
```

- the *placement specifier* is a combination of
  - `h`: place the float here (i.e. where the code occurred);
  - `t`: place the float on top of a page;
  - `b`: place the float on the bottom of a page;
  - `p`: place the float on a special page at the end of the document;
  - `!`: ignore æsthetical considerations and place the float even if the result is not so pretty
- Always place the label after the caption!

Open the file `Exercise_2b/ex_2b.pdf` and write the LaTeX code to produce the document.
Optional: Open the file `Exercise_2c/ex_2c.pdf` and write the LaTeX code to produce the document.

Mathematical Formulæ

$$\lim_{n\to\infty} \sum_{k=1}^{n} \frac{(-1)^k}{2k-1} = \int_1^2 \frac{1}{x}\,dx = \ln 2$$

$$\lim_{n\to\infty} \sum_{k=1}^{n} \frac{(-1)^k}{2k-1} = \int_1^2 \frac{1}{x}\,dx = \ln 2$$

$$\forall x \in \mathbb{R} \setminus \{0\} : \quad x^2 > 0 \land \sqrt[4]{\frac{1}{x-4}} = |x|$$

$$|x| \neq \begin{cases} -x, & \text{if } x > 0, \\ 0, & \text{if } x = 0, \\ x, & \text{if } x < 0. \end{cases}$$

$$\vec{u} \cdot \vec{v} \leq \|\vec{u}\| \|\vec{v}\| \quad U \not\subset \left\{ z \in \mathbb{C} \;\middle|\; \mathrm{Re} z > 0, \mathrm{Im} z > 0 \right\}$$

$$\Gamma_{ij}^{k} = \tfrac{1}{2}(g^{-1})^{kl} \left(\partial_{x^i} g_{jl} + \partial_{x^j} g_{il} - \partial_{x^l} g_{ij} \right)$$

$$R^{\alpha}{}_{\gamma\mu\nu} = g^{\alpha\beta} R_{\beta\gamma\mu\nu}$$

Math modes and equation numbers

- Use the package $\mathcal{AMS}$-LaTeX (`\usepackage{amsmath}`)
- In line formulæ

```
Einstein is popular for the formula $E = mc^2$.
He did achieve so much more, though\ldots
```

Einstein is popular for the formula $E = mc^2$. He did achieve so much more, though...

- The `equation` environment

```
Einstein is popular for the formula given in
equation~\eqref{eq:emc2} below.
\begin{equation}
\label{eq:emc2}
E = mc^2
\end{equation}
```

Einstein is popular for the formula given in equation (1) below.

$$E = mc^2 \tag{1}$$

Examples

```
$a^2 + b^2 = c^2$
```

$a^2 + b^2 = c^2$

Examples

```
$\lim_{n \to \infty}\sum_{k=1}^n \frac{1}{k^2}=
\frac{\pi^2}{6}$.
```

$\lim_{n \to \infty}\sum_{k=1}^n \frac{1}{k^2}= \frac{\pi^2}{6}$.

```
\begin{equation}
\lim_{n \to \infty}
\sum_{k=1}^n \frac{1}{k^2}
= \frac{\pi^2}{6}
\end{equation}
```

$$\lim_{n \to \infty}\sum_{k=1}^n \frac{1}{k^2}= \frac{\pi^2}{6}$$

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Exercise

Open the file `Exercise_2d/ex_2d.pdf` and write the LaTeX code to produce the document.