Example on a LaTeX report

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Abstract

This document demonstrates the most basic syntax for writing LaTeX reports. A much more comprehensive, yet compact, introduction to LaTeX is The not so short introduction to LaTeX.

1 Some calculations

In this section, we will introduce some basic calculations that will be implemented in Python in Section 2.

1.1 Addition

Given $a = 4$ and $b = 5$, we can compute the sum

$$a + b = 9. \tag{1}$$

1.2 Subtraction

Instead of adding numbers, as done in Section 1.1 (see Equation (1)), we can subtract them:

$$a - b = -1.$$

Practical application. The mathematician was asked, after having observed that a people entered a house and b came out after a while: "How many people are in the house?" He said, *given the particular data in Section 1.1: minus one guy!*

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2 Implementation

The following code implements the calculations from Section 1:

```
def add(a, b):
    """Return the sum of a and b."""
    return a + b

def sub(a, b):
    """Return the difference of a and b."""
    return a - b

def test_add():
    a = 4
    b = 5
    exact = 9
    result = sum(a, b)
    success = result == exact
    msg = 'sum(%g, %g) = %g != %g' (a, b, result, exact)
    assert success, msg

def test_sub():
    assert sub(4, 5) == -1, 'sub cannot subtract'
```

Remark. This nice typesetting of code is produced by the Pygments package. You must enclose the code in `\begin{minted}{python}` and `\end{minted}{python}`. Pygments is installed by `sudo apt-get install python-pygments` on an Ubuntu computer, but it is also very easy to install the package by downloading the Python source code and running `sudo python setup.py install` in the usual way.

3 Figures

Figures can be in PDF, PNG or JPEG formats. This is the syntax for including a figure in the file `figs/my_fig.pdf` in a LaTeX document:

```
\begin{figure}
\includegraphics[width=0.9\linewidth]{figs/my_fig.pdf}
\caption{
Here goes the figure caption with explanations.
}
\end{figure}
```

A How to compile this document

LaTeX documents are stored in with names files ending in `.tex`. Such files must be *compiled* with the `pdflatex` program:

```
Terminal> pdflatex -shell-escape mydoc
Terminal> pdflatex -shell-escape mydoc
```

You have to run twice (or sometimes a third time) to get all cross references in the document right. The option `-shell-espace` is necessary only if you use Pygments (the `minted` environment) for typesetting code.