Eindhoven University of Technology

Coursecode: Coursename

Overleaf Formatting for Mathematics and Computer Science

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October 14, 2021

Abstract

In this document ...

Contents

1 Introduction

This document is a template and or guide to formatting your Overleaf projects. You can pick elements that you like the most from this project. To get rid of all the sections we wrote here to show you what you can do with Overleaf, simply remove the line \input{sections/help} in main.tex.

2 Layout

In order to space paragraphs apart from another vertically, people often mess around with \newline or \\.

This text is 10mm below the paragraph above. I used the \vspace command which stands for vertical space in order to achieve this. After that I use the command \noindent to remove indentation.

This text is 5mm below the paragraph above. I did not specify the noindent command. If you want to start writing on a new page you use the *\newpage* command.

subsection

This is a subsection that does not appear in the table of contents because I put $*$ after the \subsection command

2.0.1 subsubsection

This is a subsubsection that does appear in the table of contents.

3 Symbols & Operators

Consider $a \in \mathbb{Q}$, $b \in \mathbb{R}$ and $c \in \mathcal{A}$. Consider the function $\mu_k : \Omega \to \mathbb{R}$ given by $\mu_k(A) = k \cdot |A|$.

$$\arccos 1 = 2k\pi.$$

Sets:$\mathbb{NQCRZ}$. $\mathrm{Re}(x + iy) = x$, $\mathrm{Im}(x + iy) = y$. $\mathcal{ABEFHL}$.

4 Headers and Footers

In order to add header you can use the fancyhdr package. Look at the top of this tex file to see how we created these headers and changed how the page numbers are indicated.

5 Theorems

Theorem 1 (Pythagorean Theorem)**.** *Let a, b, c be the sides of a right triangle where $c > b$ and $c > a$. Then*

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

Proof. In order to prove this statement we consider $\varepsilon > 0 \ldots$ □

As we can see in the proof of Theorem 1, this theorem is not hard to prove.

6 Images

Putting images side by side

7 Algorithms

We have implemented an extended binary Euclidean algorithm in algorithm 1

8 Code

Check out the following block of code.

```
fib <- function(n) {
  if (n < 2)
    n
  else
    fib(n - 1) + fib(n - 2)
}
fib(10) # => 55
```

9 Referencing

To reference, you can use the package `natbib` or `biblatex`. There are others but the latter two are most commonly used. In order for the bibliography to show up you have to have references at least one item from the bilbiography somewhere in your document [JLW20]. We have also put in a reference to an article by Einstein but it will not show in the references because we have not cited it in this project yet. You can have different styles for your references. This is determined by what inside your square brackets when you import the `bibtlatex` package. In order to add the bibliography to your table of contents you have to specify that in square brackets after the \printbibliography command.

Algorithm 1: Extended Binary Euclidean Algorithm

Input: $a, b \in \mathbb{Z}$;
Output: $d, x, y \in \mathbb{Z}$ such that $d = \gcd(a, b) = xa + yb$;
$a' \leftarrow |a|$, $b' \leftarrow |b|$, $d \leftarrow 1$;
$x_1 \leftarrow 1$, $x_2 \leftarrow 0$;
$x_2 \leftarrow 0$, $y_2 \leftarrow 1$;
while a' and b' are both even do $a' \leftarrow \frac{1}{2}a'$, $b' \leftarrow \frac{1}{2}b'$, $d \leftarrow 2d$;
while $(b' > 0)$ **do**
  if (b' **is odd) then**
    if $(a' > b')$ **then**
      $a' \leftarrow a' - b'$;
      $x_1 \leftarrow x_1 - x_2$;
      $y_1 \leftarrow y_1 - y_2$;
    else
      if (b' **is odd) then**
        $b' \leftarrow b' - a'$;
        $x_2 \leftarrow x_2 - x_1$;
        $y_2 \leftarrow y_2 - y_1$;
      else
        if (b' **is even) then**
          $b' \leftarrow \frac{1}{2}b'$;
          if (x_2, y_2 **are even) then**
            $x_2 \leftarrow \frac{1}{2}x_2$, $y_2 \leftarrow \frac{1}{2}y_2$;
          else
            $x_2 \leftarrow \frac{1}{2}(x_2 + |b|)$, $y_2 \leftarrow \frac{1}{2}(y_2 - |a|)$;
          end
        end
      end
    end
  else
    if (a' **is even) then**
      $a' \leftarrow \frac{1}{2}a'$;
      if (x_1, y_1 **are even) then**
        $x_1 \leftarrow \frac{1}{2}x_1$, $y_1 \leftarrow \frac{1}{2}y_1$;
      else
        $x_1 \leftarrow \frac{1}{2}(x_1 + |b|)$, $y_1 \leftarrow \frac{1}{2}(y_1 - |a|)$;
      end
    end
  end
end
$d \leftarrow da'$;
if $a \geqslant 0$ then $x \leftarrow x_1$ else $x \leftarrow -x_1$;
if $b \geqslant 0$ then $y \leftarrow y_1$ else $y \leftarrow -y_1$;
output d,x,y;

Whole bibliography

[JLW20] Maoshen Jia, Tianhao Li, and Jing Wang. "Audio Fingerprint Extraction Based on Locally Linear Embedding for Audio Retrieval System". In: *Electronics* 9 (Sept. 2020), p. 1483. DOI: 10.3390/electronics9091483.