# 15-150 LaTeX Reference Sheet

## 1  Introduction

This is meant to serve as a LaTeX reference sheet for students in 15-150 (or any other class). If you are new to LaTeX, start with some of the other introductory materials on the course website as this document does not give much explanation. I also recommend using the DeTeXify app! It's a reference for LaTeX symbols that allows you to search by drawing the symbol you want to find.

## 2  Formatting

## 3  Symbols

| Name | Command(s) | Appearance |
|---|---|---|
| For all | \forall | $\forall$ |
| There exists | \exists | $\exists$ |
| Is in | \in | $\in$ |
| Extensional equivalence | \cong | $\cong$ |
| Evaluates to a value | \hookrightarrow | $\hookrightarrow$ |
| Reduces in 0 or more steps | \Longrightarrow | $\Longrightarrow$ |
| Summations | \sum_{x=0}^n x^2+2x+1 | $\sum_{x=0}^{n} x^2 + 2x + 1$ |
| Big-O | \mathcal{O}(n^2) | $\mathcal{O}(n^2)$ |
| Work and span | \mathcal{W}_{fact}(n) | $\mathcal{W}_{fact}(n)$ |
| | \mathcal{O}_{fact}(n) | $\mathcal{S}_{fact}(n)$ |

| Name | Command(s) |
|---|---|
| Question | \question{Question number}{Title of question} |
| Part | \part{a} |
| Bold text | \textbf{I want this to be bold.} |
| Italicized text | \textit{I want this to be italicized.} |
| Quotations | `` (backticks) This is a quote. '' |
| Code snippets[1] | \verb|Code I want to format.| |
| | \texttt{Code I want to format.} |
| Code sections[2] | \begin{verbatim} |
| | ... |
| | \end{verbatim} |

[1] Use this for short sections of SML code.
[2] Use this for longer sections of SML code.

# 4 Lists

| Name | Command(s) |
|---|---|
| Unordered lists | `\begin{itemize}`<br>  `\item This is my first (unordered) point.`<br>  `\item This is my second (unordered) point.`<br>`\end{itemize}` |
| Ordered lists | `\begin{enumerate}`<br>  `\item This is my first (ordered) point.`<br>  `\item This is my second (unordered) point.`<br>`\end{enumerate}` |

# 5 Proofs

Use the `\begin{description} ... \end{description}` environment for inductive proofs. Use `\item[Base Case]` when in the `description` environment to make a new section.

Use the `\begin{align*} ... \end{align*}` environment for formatting steps of your proof. Use `&` to make things align, and use `\\` to start a new line. Additionally, the `align*` environment is already in math mode. If you want to write text, use the `\text{Text goes here!}` command.

## 5.1 LaTeX

```
\begin{description}
  \item[Base Case:] This is my base case.
  \item[Inductive Hypothesis:] This is my inductive hypothesis.
  \item[Inductive Step:]
    \begin{align*}
      x + 2 + 3 + 5 & = x + 2 + 7 \tag{justification} \\
      & = x + 9 \tag{justification} \\
      & = 100 \tag{wild guess}
    \end{align*}
\end{description}
```

## 5.2 Appearance

**Base Case:** This is my base case.

**Inductive Hypothesis:** This is my inductive hypothesis.

**Inductive Step:**

$$
\begin{aligned}
x + 2 + 3 + 5 &= x + 2 + 7 &&\text{(justification)} \\
&= x + 9 &&\text{(justification)} \\
&= 100 &&\text{(wild guess)}
\end{aligned}
$$

# 6 Trees

This requires the `forest` package.

## 6.1 LaTeX

```
\begin{forest}
  [Root node [This child is a leaf.]
             [This child has more children.
               [This is also a leaf!]
             ]
  ]
\end{forest}
```

## 6.2 Appearance

Root node

This child is a leaf.     This child has more children.

This is also a leaf!