LaTeX for CIS 160
First, you need a document outline

\documentclass{article}
\usepackage{amsmath}
\usepackage{fullpage}
\include{prooftree}
\include{mathmac}
\include{mac}
\pagestyle{plain}
\title{Homework 1}
\author{Sam Panzer}
\begin{document}
\maketitle

\end{document}
What was all that?

• The first line tells LaTeX what kind of document it is handling

\documentclass{article}
What was all that?

• The next five lines instruct LaTeX to use a few libraries: two standard ones, and three that Prof. Gallier provides

\usepackage{amsmath}
\usepackage{fullpage}
\include{prooftree}
\include{mathmac}
\include{mac}
What was all that?

• The next line tells LaTeX to use no header or footer aside from page numbers

`\pagestyle{plain}`
What was all that?

- We then tell LaTeX what the document title and author are.

\title{Homework 1}
\author{Sam Panzer}

- This does not actually generate any text!
  - The \maketitle command does that.
Using the proof tree macros

- \texttt{\settree<n>{contents}} sets the tree labeled n to the contents inside.
  - Contents needs to be a tree itself
- \texttt{\starttree{contents}} starts a tree
- \texttt{\njointrees{tree1ID}{tree2ID}} places two trees as parents of the current level
- \texttt{\step{result}} creates a horizontal line above the result
- \texttt{\ligne{\hfill\box<n>\hfill}} actually displays tree n
\settreetree1{
    \starttree{P^x}
}\
\settreetree2{
    \starttree{\Gamma}
    \step{P \impl Q}$}
\settreetree1{
    \njointrees{1}{2}
    \step{Q}$}
\settreetree2{
    \starttree{\Gamma}
    \step{Q \impl R}$}
\settreetree1{
    \njointrees{1}{2}
    \step{R}$}
\jstep{P \impl R}{$x$}
How does this work?

\settree1{
  \starttree{P^x}
}
\settree2{
  \starttree{\Gamma}
  \step{\text{P} \impl Q}
}

- Sets tree 1 to $P^x$
- Sets tree 2 to $\Gamma$
- Sets tree 2 to $\frac{P \Rightarrow Q}{\Gamma}$

- These are set up to remember what tree 1 and tree 2 were
- Kind of like variables when programming
How does this work? (Part II)

\settree1{
  \njointrees{1}{2}
  \step{$Q$}
}
\settree2{
  \starttree{$\Gamma$}
  \step{$Q \impl R$}
}

• \njointrees places two trees as descendants of another.
  • That’s how I got the $P^x$ next to the $\frac{\Gamma}{P \Rightarrow Q}$
• \step draws the horizontal line
\textbf{How does this work? (Part III)}

- Sets tree 1 to
  \[
  \frac{P \rightarrow \Gamma}{Q} \frac{Q \rightarrow R}
  \]

- Sets tree 1 to
  \[
  \frac{P \rightarrow \Gamma}{Q} \frac{Q \rightarrow R} \frac{R \rightarrow \Gamma}{x}
  \]

- \texttt{jstep} is a justified step. It draws a line below the current tree
  - It also includes the discharge of \( x \)
  - \texttt{step} only shows a logical deduction
Comments

• It is also possible to display two proof trees next to each other
  – It requires a (more) complicated invocation of \ligne
  – LaTeX complains if the proof trees get too wide
• Don’t feel confined to just two trees!