LaTeX

Create Snazzy Documents

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Outline

What Is It?

- pronounced either lay-tech or lah-tech
- a set of macros on top of TeX, a markup and programming language originally created by Donald Knuth
- a language designed to let the writer focus on content, while taking care of layout

Uh...Why Can't I Just Type What I Want?

- consistent and professional typography
- fully customizable and extendable
- no special file formats
- vast amount of packages available for almost any application

Installation

Various incarnations of the TeXLive package are available:

- typically available in Linux package managers
- MacTex package for OSX
- MikTeX for Windows

Editor support is widely available:

- vim - vim-latex-suite
- emacs - auctex
- sublime text - LaTeXTools
- a large number of dedicated editors for LaTeX

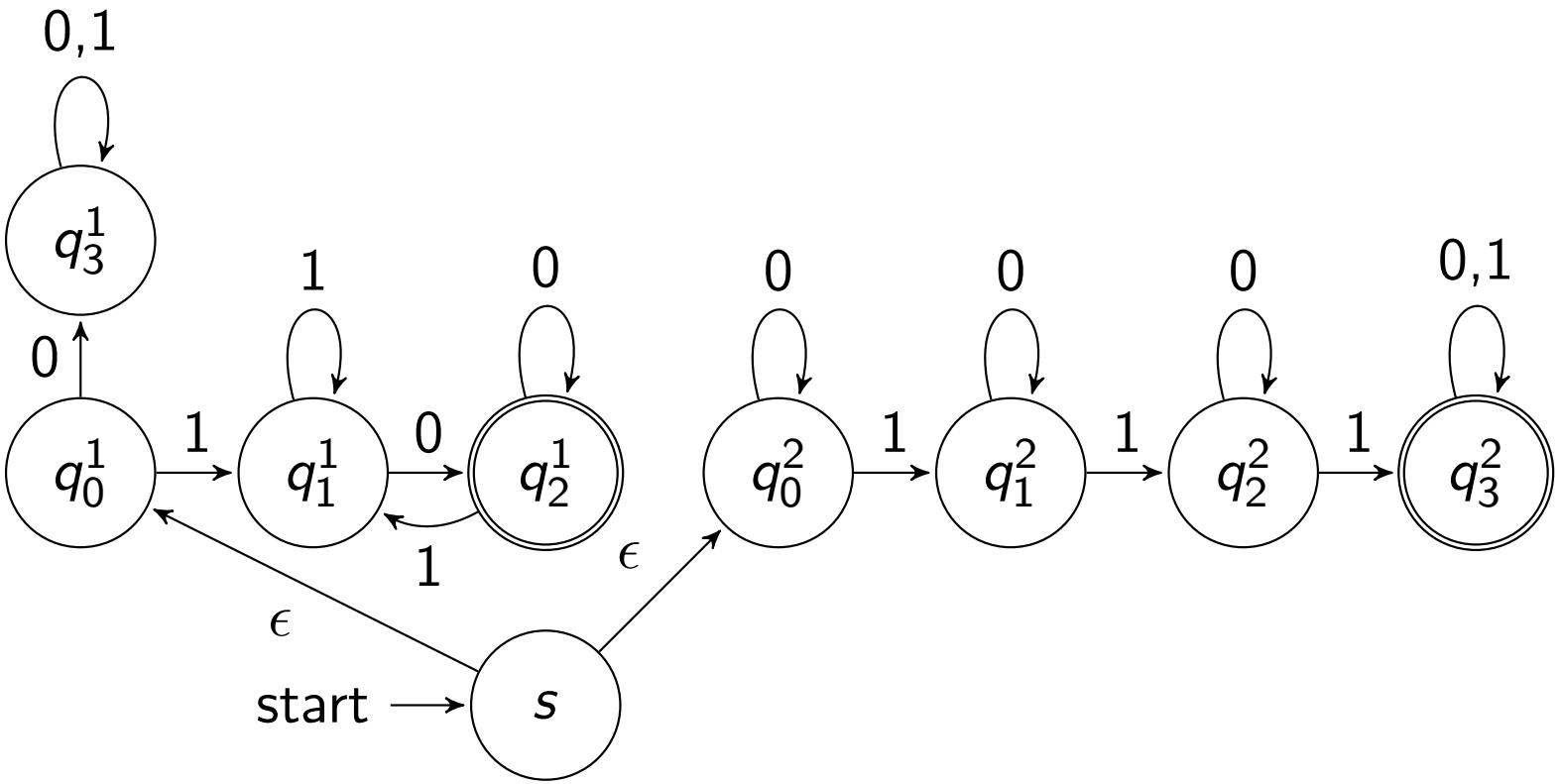
Basics

A simple "Hello World" example:

```
\documentclass{article}

\begin{document}
Hello world!
\end{document}
```

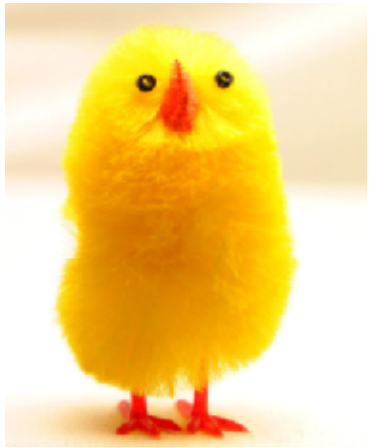
Finite Automata



Packages

The `tikz` package and `automata` and `arrows` `tikz` libraries are required for this.

Images



Packages

The `graphicx` package is required to import images.

Math Environments

There are two main methods of inserting mathematical statements into your text:

- inline: `$<maths>$`
- the math environment: `\[ maths \]`

There are a handful of specialized math environments which can come in handy:

- `align` and `align*` - align each line on arbitrary characters (e.g. the equals sign)
- `proof` - a bit of extra formatting typically seen in proofs

Not Your Average Environment

Many things are different in the math environments, so make sure to read through the Mathematics and Advanced Mathematics sections in the WikiBook

Basic Tables

ID	Kernel	Degree	γ	Cost	Cross-Validated Error (%)
1	Linear			0.01	20.8
2	Linear			0.1	22.1
3	Polynomial	2		0.01	40.0
4	Polynomial	2		0.1	34.8
5	Polynomial	2		1	19.4
6	Polynomial	2		10	18.1
7	Polynomial	2		100	19.3
8	Polynomial	3		1	18.7
9	Radial		0.125	1	18.3
10	Radial		0.125	10	19.0
11	Radial		0.1	1	18.0
12	Radial		0.05	1	19.0
13	Radial (tuned)		0.0625	8	16.8

Table: Results from model search

Basic Tables, ctd


```
\begin{table}[h]
  \centering

  \begin{tabular}{l l c r r c}
    ID & Kernel & Degree & $\gamma$ & Cost &
    Cross-Validated Error (\%) \\
    \hline
    1  & Linear          &   &       & 0.01 & 20.8 \\
    2  & Linear          &   &       & 0.1  & 22.1 \\
    3  & Polynomial      & 2 &       & 0.01 & 40.0 \\
    4  & Polynomial      & 2 &       & 0.1  & 34.8 \\
    5  & Polynomial      & 2 &       & 1    & 19.4 \\
    6  & Polynomial      & 2 &       & 10   & 18.1 \\
    7  & Polynomial      & 2 &       & 100  & 19.3 \\
    8  & Polynomial      & 3 &       & 1    & 18.7 \\
    9  & Radial          &   & 0.125 & 1    & 18.3 \\
    10 & Radial          &   & 0.125 & 10   & 19.0 \\
    11 & Radial          &   & 0.1   & 1    & 18.0 \\
    12 & Radial          &   & 0.05  & 1    & 19.0 \\
    13 & Radial (tuned)  &   & 0.0625 & 8   & 16.8 \\
    \hline
  \end{tabular}
  \caption{Results from model search}
\end{table}
```

Code Listings

Code listings are used to display source code in a document.

- `lstlisting` - listing environment
- many options available to customize and designate language

Package Required

The `listings` package is required to use code listings.

Macros

There are a handful of commands to abstract some common routines

- `newcommand` - takes a name, num of arguments, and a definition
- `newenvironment` - takes a name, num of arguments, and `begin` and `end` blocks
- basic programming constructs like conditionals and loops are also available to use

Getting Help

LaTeX is crazy complicated - where do you even start?

- LaTeX WikiBook: not exhaustive, but a great source
- TeX.stackexchange.com: like StackOverflow, but for TeX
- packages have documentation on CTAN (Comprehensive TeX Archive Network)
- examples are a great place to find snippets (like this document!)
- ask me!