

Basic Examples Using Tikz for Creating Images

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CU Denver Graduate Seminar

September 26, 2014

The Tikz Environment

In order to use Tikz, you must include the package:

```
\usepackage{tikz}
```

There are numerous libraries you may want/need to include as well:

```
\usetikzlibrary{shapes,arrows,spy,positioning,snakes}
```

Build your image within the tikzpicture environment:

```
\begin{tikzpicture}[<options>]
```

```
    <environment contents for image>
```

```
\end{tikzpicture}
```

A common option is 'scale' which is defaulted 1 unit = 1 cm

Coordinates

Typical xyz coordinates are specified by

`(x,y,z)`

where omitting the z coordinate assumes 2D.

Polar coordinates are specified by

`(angle_deg:r)`

You can name coordinates to reference by name later using

`\coordinate (name) at (coordinate);`

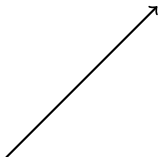
Note that all command lines must end in a semicolon;

Drawing Lines

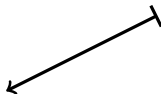
```
\begin{tikzpicture}  
  \draw (0,0) -- (1,1);  
\end{tikzpicture}
```



```
\begin{tikzpicture}[scale=2]  
  \draw [thick,->  
        (0,0) -- (1,1);  
\end{tikzpicture}
```



```
\begin{tikzpicture}[xscale=2]  
  \draw [<-|,very thick]  
        (0,0) -- (1,1);  
\end{tikzpicture}
```



```
\begin{tikzpicture}[yscale=2]  
  \draw [ultra thick,<->  
        (0,0) -- (1,1);  
\end{tikzpicture}
```



Customizing Lines

```
\coordinate (c) at (1,1);  
\draw (0,0) -- (1,0) --  
      (c) -- (90:1) -- cycle;
```



```
\draw (1,0)  
      [rounded corners] -- +(0,1)  
      [sharp corners] -- ++(-1,1)  
      -- +(0,-1);
```



```
\draw (0,0) to [out=-45,in=135]  
      (1,0) to [out=-30,in=-30]  
      (1,1) to [out=180,in=0]  
      (0,1) to [out=330,in=135] (0,0);
```



```
\draw[dotted] (0,0)--(1,0);  
\draw[dashed] (1,0)--(1,1);  
\draw[dash dot] (1,1)--(0,1);  
\draw[dash dot dot] (0,1)--(0,0);
```

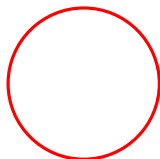


Drawing Shapes

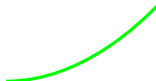
```
\draw [blue]  
  (0,0) rectangle (1,1);
```



```
\draw [red]  
  (0,0) circle [radius=1];
```



```
\draw [green]  
  (0,0) parabola (2,1);
```



```
\draw [magenta, domain=-1:1]  
  plot (\x, {\x^3});
```



Nodes

```
\node at (0,0) {Plain};  
\node[draw, rectangle] at (2,0) {Rectangle};  
\node[draw, circle] at (4,0) {Circle};  
\node[draw, forbidden sign] at (6,0) {Forbid};  
\node[draw, cross out] at (0,-2) {Cross Out};  
\node[draw, diamond] at (2,-2) {\tiny Diamond};  
\node[draw, regular polygon, regular polygon sides=7]  
    at (4,-2) {\tiny Reg Polygon};  
\node[draw, star, star points=6, star point ratio=.6]  
    at (6,-2) {Star};
```

Plain

Rectangle

Circle

Forbid

Cross Out

Diamond

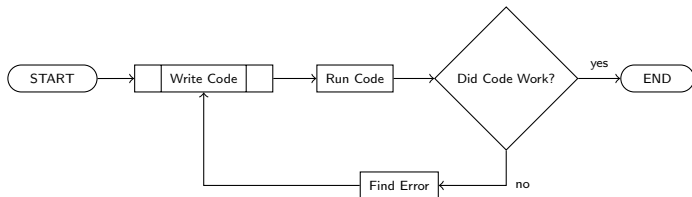
Reg Polygon

Star

Flow Chart

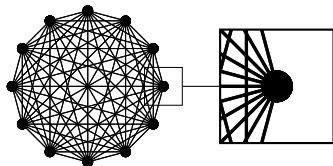
```
\usepackage{flowchart}
\begin{tikzpicture}[node distance = 2cm, font=\tiny]

\node [draw, terminal] (start) at (0,0) {START};
\node [draw, predproc, right of=start] (write) {Write Code};
\node [draw, process, right of=write] (run) {Run Code};
\node [draw, decision, right of=run] (work) {Did Code Work?};
...
\draw[->] (work) -- node[above] {yes} (end);
\draw[->] (work) |- node[right] {no} (debug);
\draw[->] (debug) -| (write);
```



Other Stuff

```
\begin{tikzpicture}
    [spy using outlines]
\foreach \x in {1,...,12}
    \foreach \y in {1,...,12} {
    \draw (\x*30:1) --
        (\y*30:1);
    \fill (\x*30:1)
        circle (2pt); }
\spy [height=20mm,
    width=20mm,
    magnification=2,
    connect spies] on (1,0)
    in node at (2.5,0);
```



```
\draw[white] (-1,-3) rectangle
    (2,0);
\draw<2-> [dotted, blue] (0,0)
    -- (1,0) node[pos=.5,above]
    {\color{red}Tikz};
\draw<3-4> [dashed, red] (0,-1)
    -- (1,-1) node[right]
    {\color{blue}is};
\draw<4-> [dash dot, pink] (1,-2)
    to[bend left=45] (0,-2)
    node[left] {Awesome!};
```

Tikz
.....

----- is

Awesome! 

References

Minimal Intro

<http://cremeronline.com/LaTeX/minimaltikz.pdf>

Tikz Manual

<http://www.texample.net/media/pgf/builds/pgfmanualCVS2012-11-04.pdf>

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