

# TikZ commends tutorial

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January 3, 2018

The TikZ commands can be inside the environment `\begin{tikzpicture} ... \end{tikzpicture}` or simply use `\tikz` clause. We run `pdflatex` or `latex` followed by `dvips` to execute the TikZ commands.

## 1 Preliminary

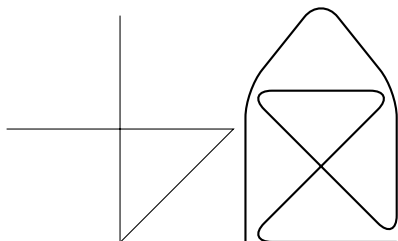
### 1.1 Straight Path Construction

Usage:

```
\draw[options] (x1,y1) -- (x2,y2) -- (x3,y3);
```

Example:

```
\draw (-1.5,0) -- (1.5,0) -- (0,-1.5) -- (0,1.5);  
\draw[thick, rounded corners=10pt]  
  (0,0) -- (0,2) -- (1,3.25) -- (2,2) -- (2,0) -- (0,2) -- (2,2) -- (0,0) -- (2,0);
```



### 1.2 Circle Path Construction

Usage:

```
\draw[options] (x,y) circle (radius);  
\draw[options] (x,y) ellipse (radius1 and radius2);
```

Example:

```
\draw (0,0) circle (2pt);  
\draw[red] (1,0) circle (3pt);  
\draw[fill=red] (2,0) circle (4pt);  
\draw[red,fill=red] (3,0) circle (5pt);  
\filldraw[blue,rotate=30] (3.5,-2) ellipse (10pt and 5pt);
```



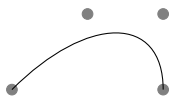
## 1.3 Curved Path Construction

Usage:

```
\draw[options] (x1,y1) .. controls (x2,y2) and (x3,y3) .. (x4,y4)
```

Example:

```
\filldraw[gray] (0,0) circle (2pt) (1,1) circle (2pt)
                (2,1) circle (2pt) (2,0) circle (2pt);
\draw (0,0) .. controls (1,1) and (2,1) .. (2,0);
```



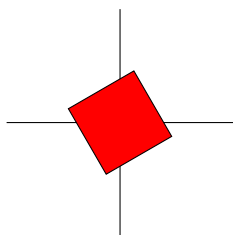
## 1.4 Rectangle Path Construction

Usage:

```
\draw[options] (x1,y1) rectangle (x2,y2);
```

Example:

```
\draw (-1.5,0) -- (1.5,0);
\draw (0,-1.5) -- (0,1.5);
\draw[rotate=30, fill=red] (-0.5,-0.5) rectangle (-1,-1);
```



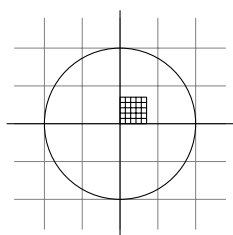
## 1.5 Grid Path Construction

Usage:

```
\draw[options] (x1,y1) grid (x2,y2);
```

Example:

```
\draw[step=.5cm, gray, very thin] (-1.4,-1.4) grid (1.4,1.4);
\draw (-1.5,0) -- (1.5,0);
\draw (0,-1.5) -- (0,1.5);
\draw (0,0) circle (1cm);
\draw[step=2pt] (0,0) grid (10pt,10pt);
```



## 1.6 Adding a Touch Style

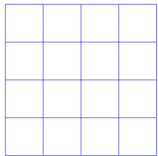
Styles are predefined sets of options that can be used to organize how a graphic is drawn. To define a style globally, we can use the `\tikzset` command at the beginning of the document.

Usage:

```
\tikzset{style_name/.style={options}}
```

Example:

```
\tikzset{blue_thin_lines/.style={color=blue!50,very thin}}
\begin{tikzpicture}
  \draw[blue_thin_lines] (0,0) grid (5,5);
\end{tikzpicture}
```



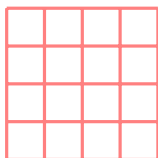
To define a style locally, we use a pair of square bracket “[ ]” to define styles at the beginning of a picture.

Usage:

```
[style_name/.style={options}]
```

Example:

```
\begin{tikzpicture}
  [red_thick_lines/.style={color=red!50,very thick}]
  \draw[step=0.5cm, red_thick_lines] (0,0) grid (2,2);
\end{tikzpicture}
```



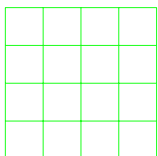
One can also define styles hierarchically.

Usage:

```
\tikzset{style_name1/.style={style_name2, options}}
```

Example:

```
\tikzset{green_help_lines/.style={help lines, color=green!90}}
\begin{tikzpicture}
  \draw[step=0.5cm, green_help_lines] (0,0) grid (5,5);
\end{tikzpicture}
```



Styles can also be used with a parameter.

Usage:

```
[style_name/.style={options}, style_name/.default={options}]
```

Example:

```
\begin{tikzpicture}
  [para_color/.style={help lines,color=#1!50}, para_color/.default=blue]
  \draw[step=0.5cm, para_color] (0,0) grid (2,2);
  \draw[step=0.5cm, para_color=red] (2,0) grid (4,2);
\end{tikzpicture}
```

