INTRODUCTION TO
COMPUTER SCIENCE

Rutgers University

6. Input / Output- continued



http://introcs.cs.rutgers.edu



DOWNLOAD and ADD to your program folder (from Canvas: Files->Trees->Code)

- StdDraw.java

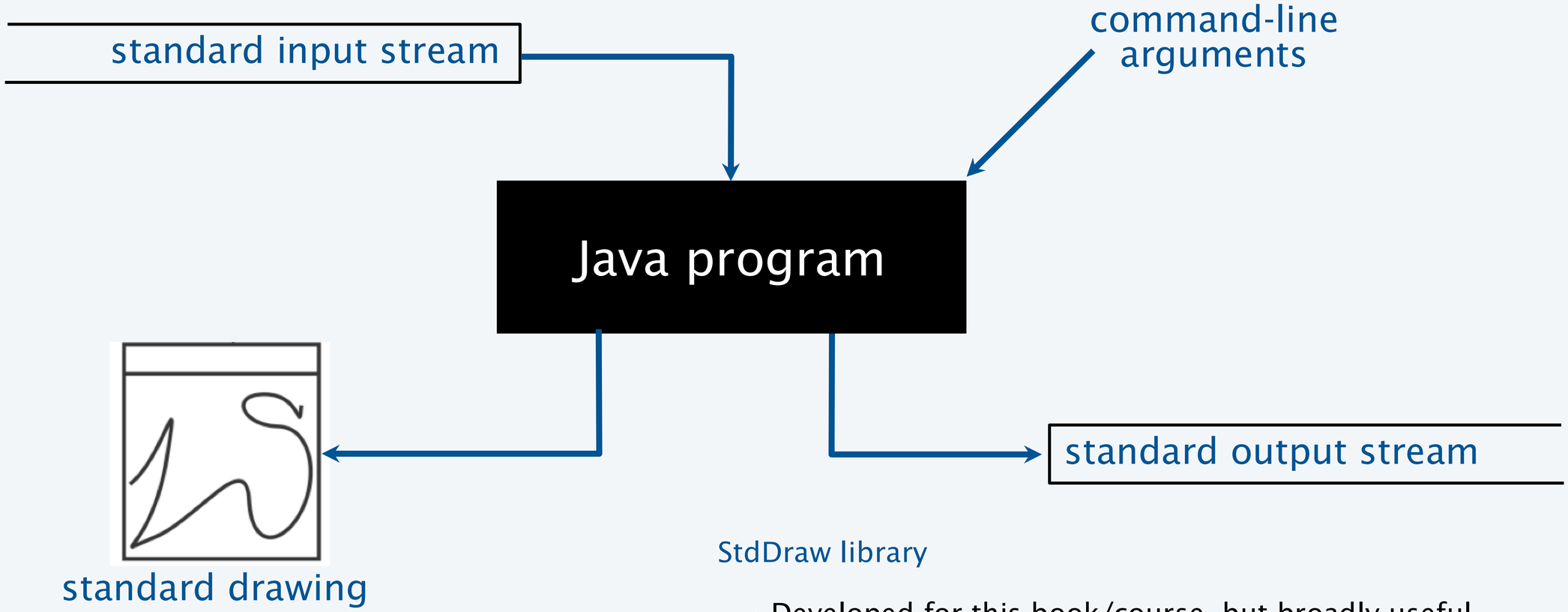


4. Input and Output

- Standard input and output
- Standard drawing
- Fractal drawings
- Animation

Further improvements to our I/O abstraction

Add the ability to create a *drawing*.



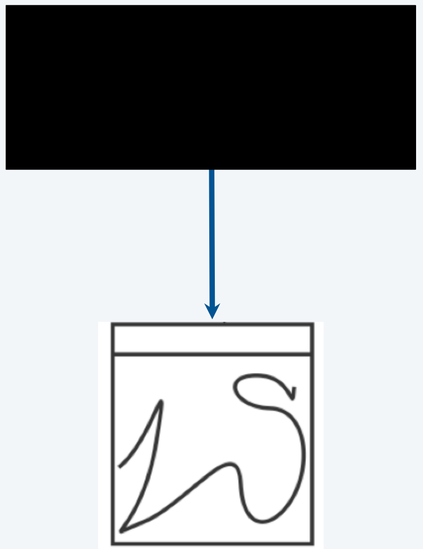
StdDraw library

- Developed for this book/course, but broadly useful.
- Available for download at booksite.
- Included in introcs software.

StdDraw library

public class StdDraw	
void line(double x0, double y0, double x1, double y1)	
void point(double x, double y)	
void text(double x, double y, String s)	
void circle(double x, double y, double r)	
void square(double x, double y, double r)	
void polygon(double x, double y, double r)	
void picture(double x, double y, String filename)	*place* .gif, .jpg *or* .png *file*
void setPenRadius(double r)	
void setPenColor(Color c)	
void setXscale(double x0, double x1)	*reset x range to* [x_0, x_1)
void setYscale(double y0, double y1)	*reset y range to* [y_0, y_1)
void show(int dt)	*show all; pause* dt *millisecs*

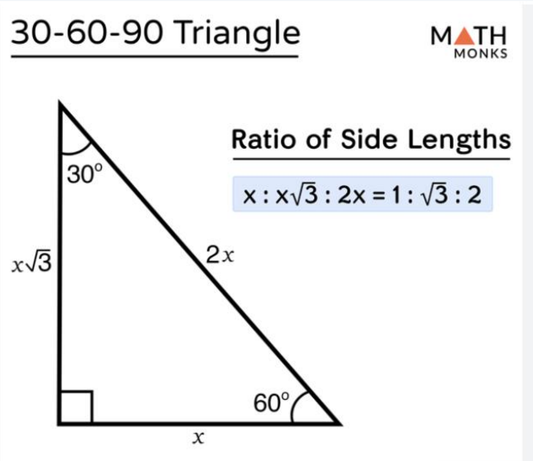
also filledCircle(), filledSquare(), and filledPolygon()



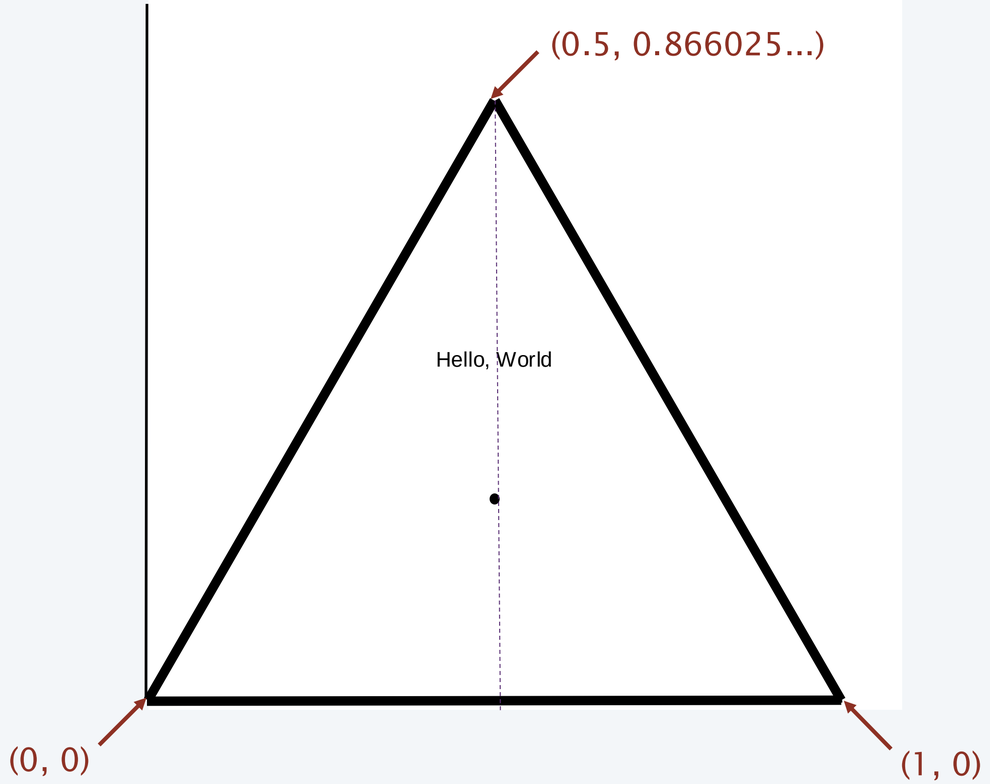
standard drawing

"Hello, World" for StdDraw

```
public class Triangle
{
   public static void main(String[] args)
   {
     double c = Math.sqrt(3.0) / 2.0;
     StdDraw.setPenRadius(0.01);
     StdDraw.line(0.0, 0.0, 1.0, 0.0);
     StdDraw.line(1.0, 0.0, 0.5, c);
     StdDraw.line(0.5, c, 0.0, 0.0);
     StdDraw.point(0.5, c/3.0);
     StdDraw.text(0.5, 0.5, "Hello, World");
   }
}
```



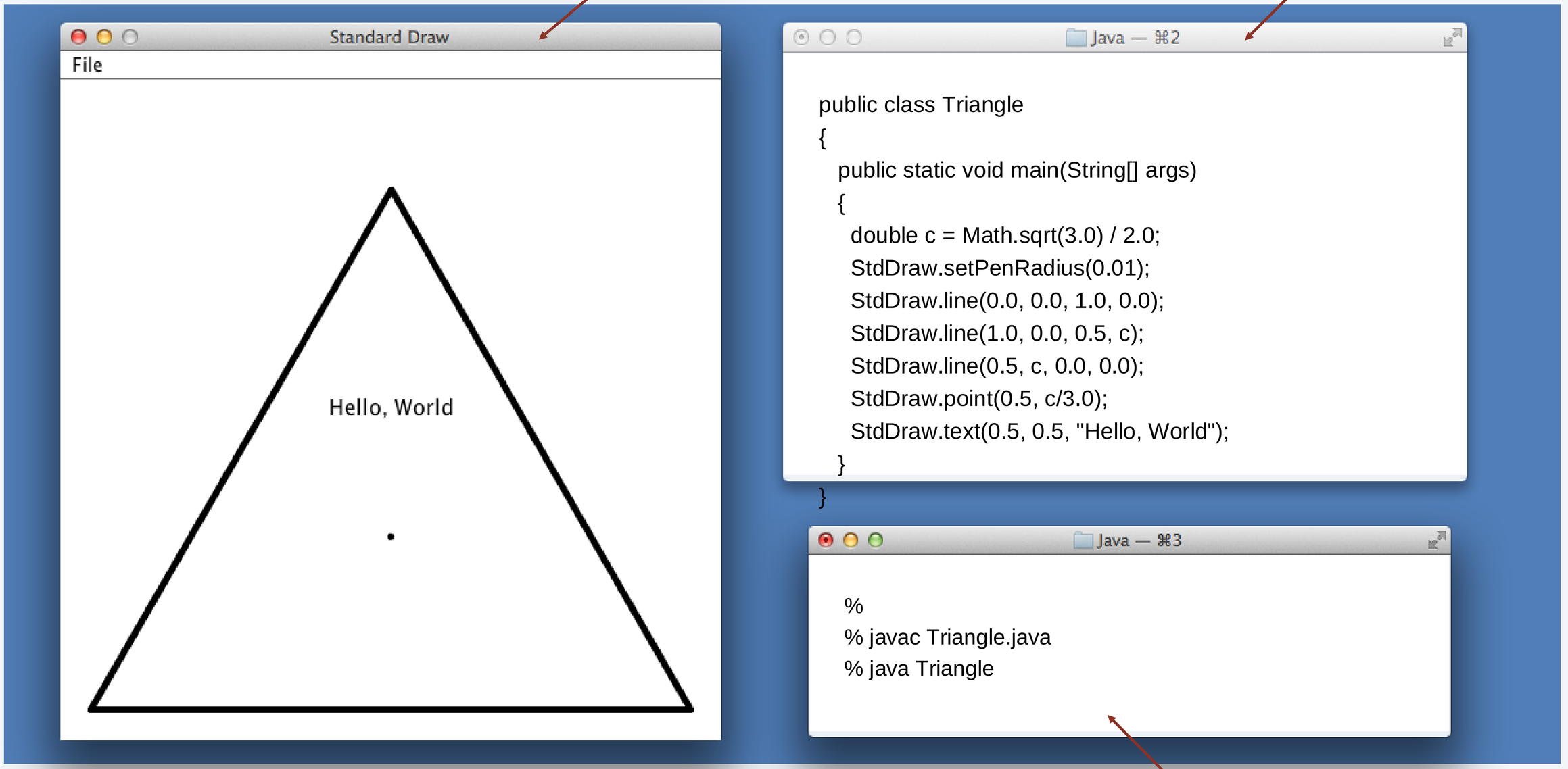
Trace of drawing



"Hello, World" for StdDraw

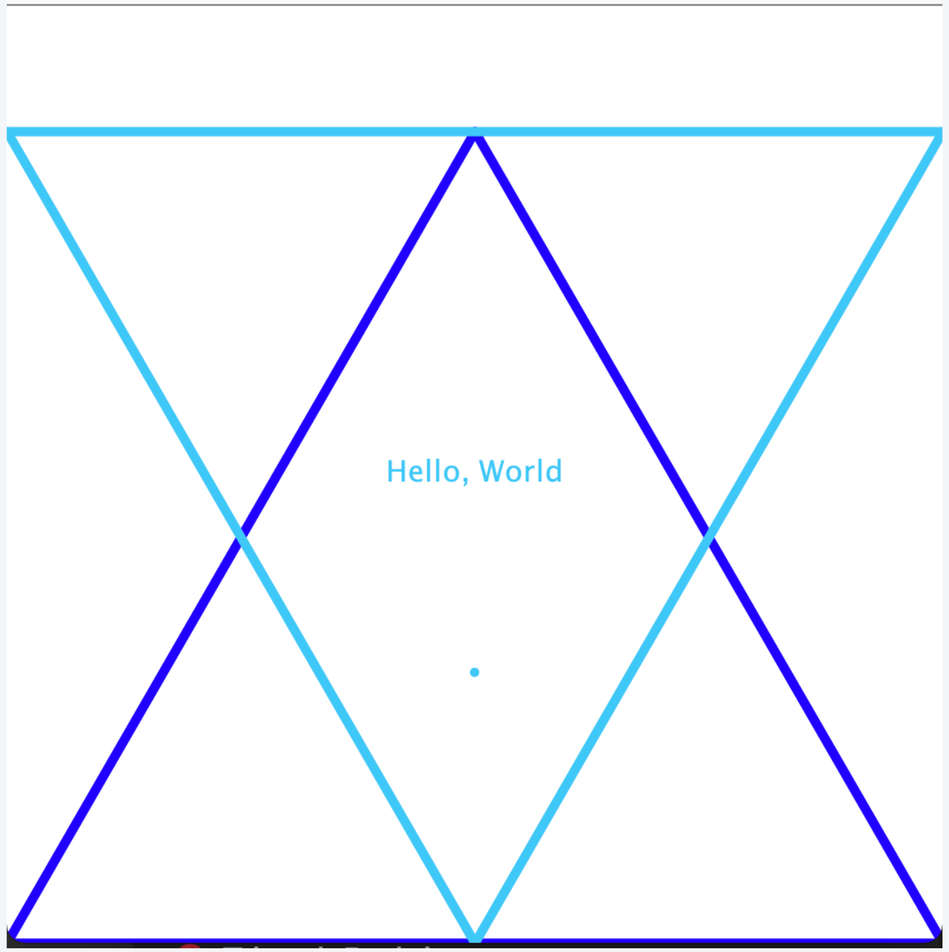
window for standard drawing

virtual terminal for editor



virtual terminal for OS commands

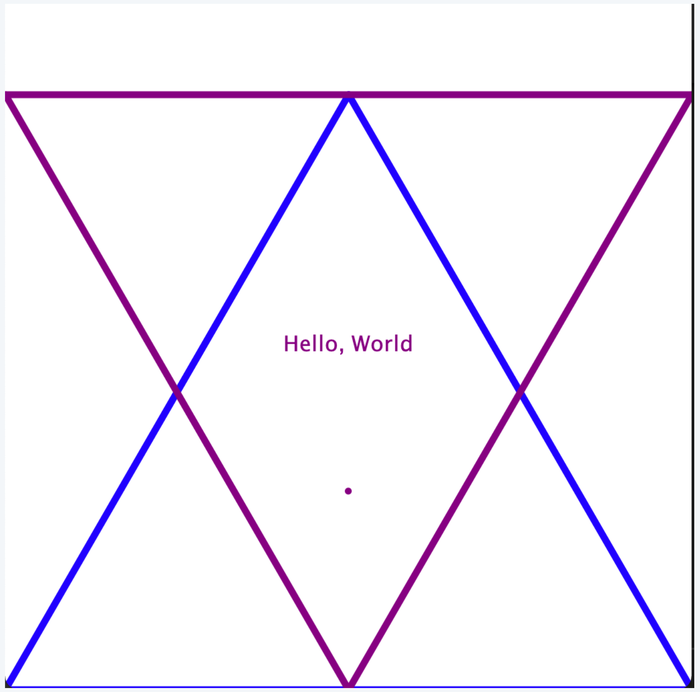
Can you FLIP it?



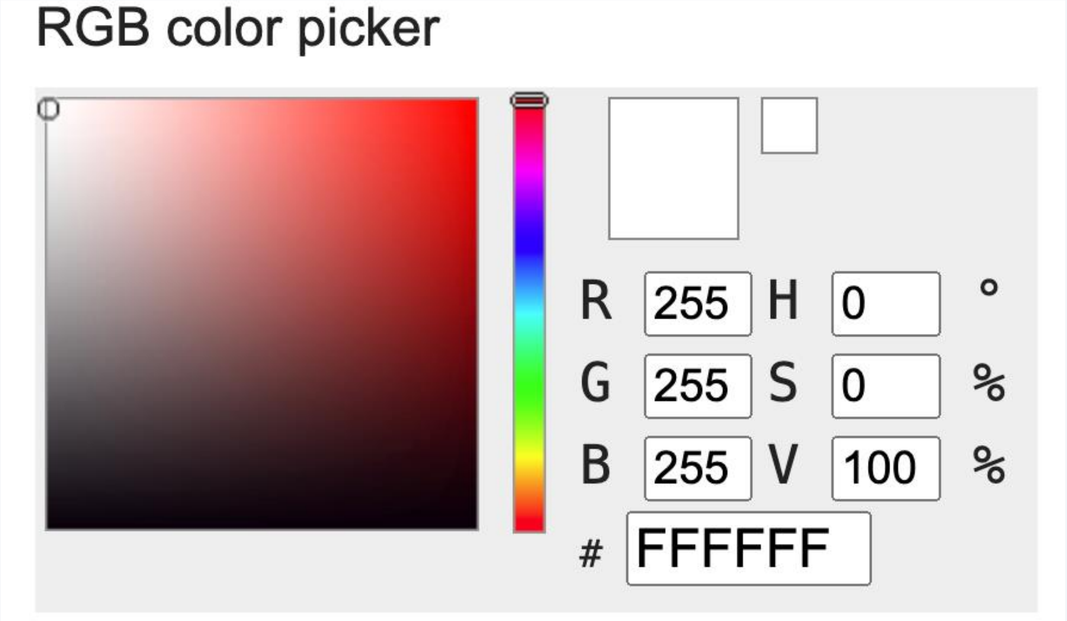
Line 7 of Triangle.java:
StdDraw.setPenColor.

Auto complete will list colors.

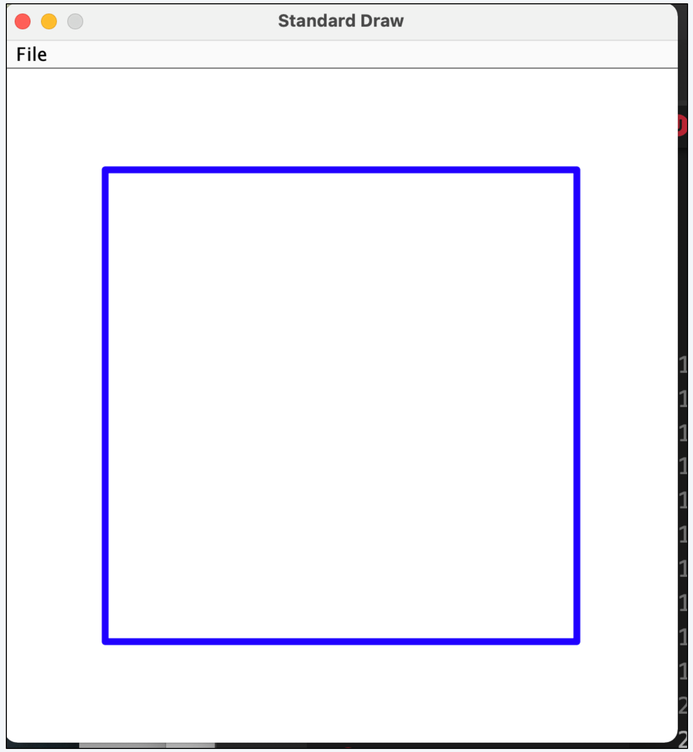
Can you FLIP it?

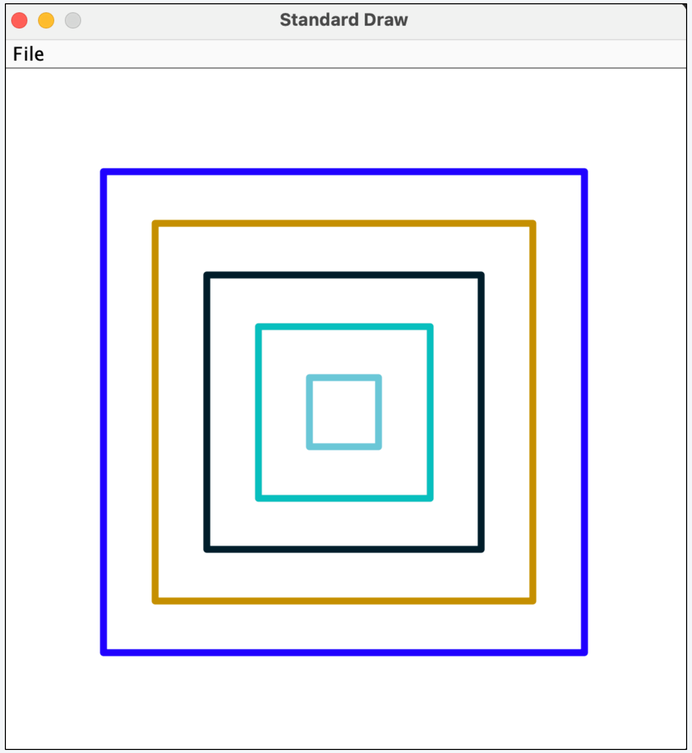


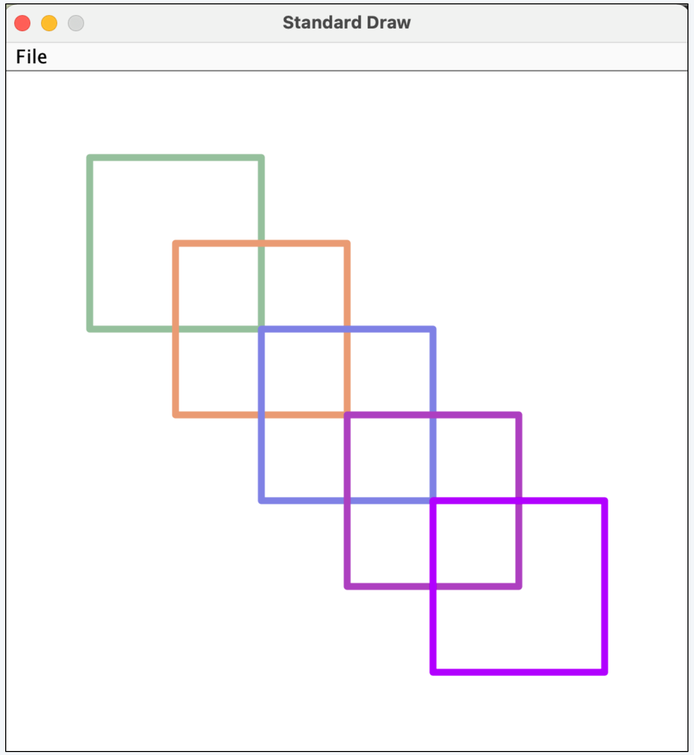
Line 943 of StdDraw OR
https://www.rapidtables.com/web/color/RGB_Color.html
StdDraw.setPenColor(122,12,125);



Can you code and display the SQUARES below?

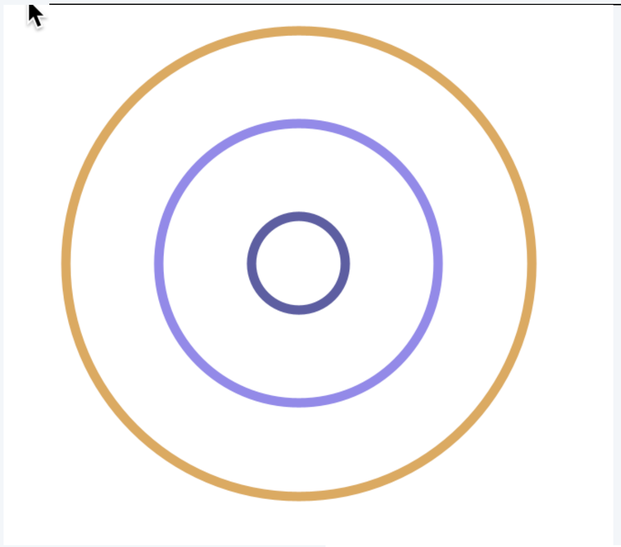


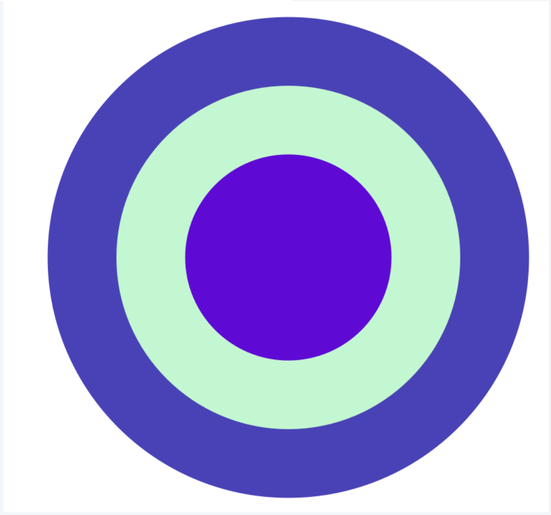





```
StdDraw.setScale(0,2); //canvas
double halfLength = 0.7;   //half the length of a side
StdDraw.square(1,1,halfLength); // x-coordinate of center, y-coordinate of center, halfLength
```

Circles





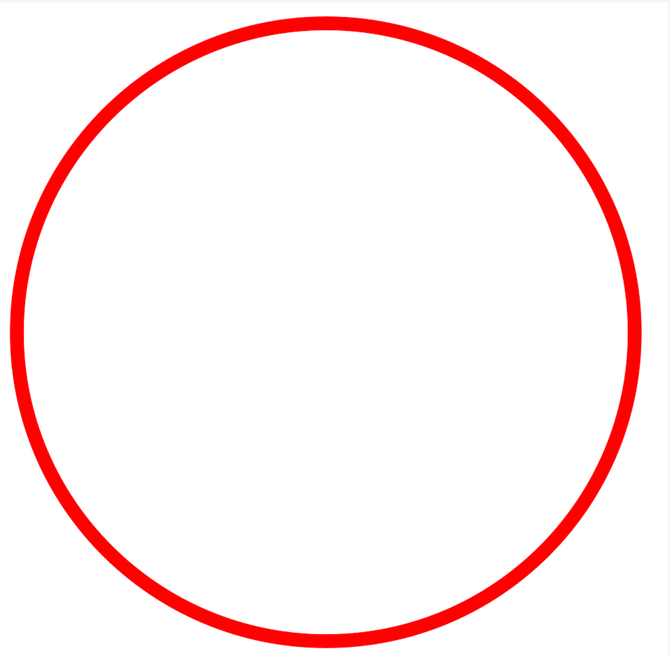
```java
public class Circle{
    public static void main(String[] args){
        StdDraw.setScale(0,2);
        StdDraw.setPenRadius(0.02);
        double radius = 0.7;
        for(int i = 0; i < 3; i++){
            int r = (int)(Math.random()* 255);
            int g = (int)(Math.random()* 255);
            int b = (int)(Math.random()* 255);
            StdDraw.setPenColor(r,g,b);
            StdDraw.circle(1,1,radius);
            radius = radius - 0.2;
        }
    }
}
```

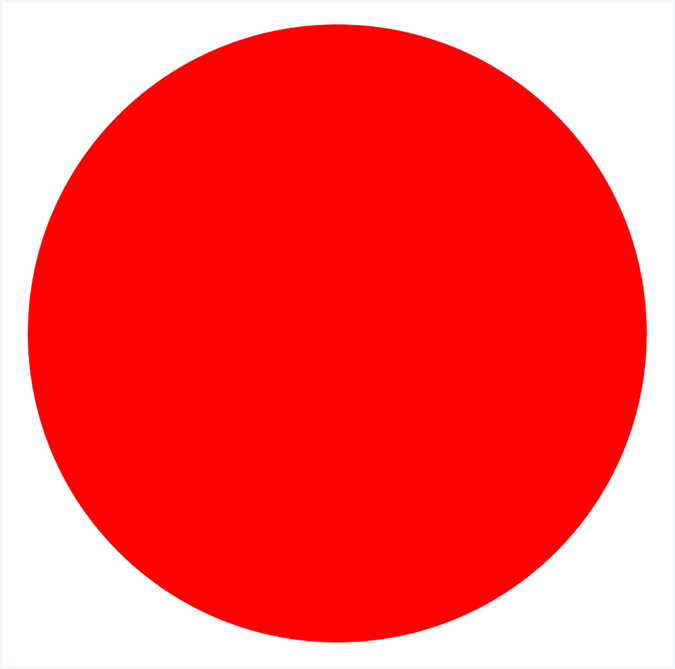
StdDraw.circle(1,1,r); //center-x, center-y, radius
StdDraw.**filledCircle**(1,1,r); //center-x, center-y, radius

Circles

```
StdDraw.setPenRadius(0.02);
StdDraw.setPenColor(StdDraw.RED);
StdDraw.setScale(0,2);
double r = 0.9;
StdDraw.circle(1,1,r);
//  StdDraw.filledCircle(1,1,radius);
```



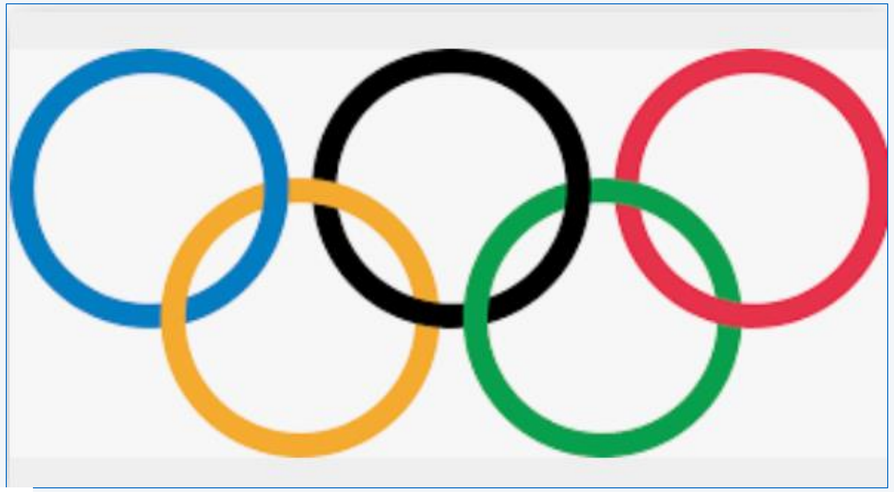






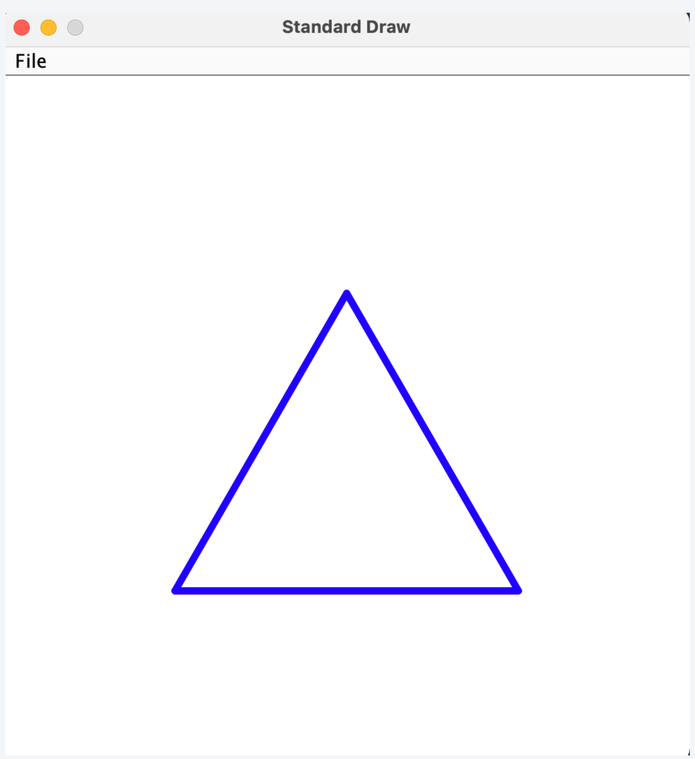
What about????

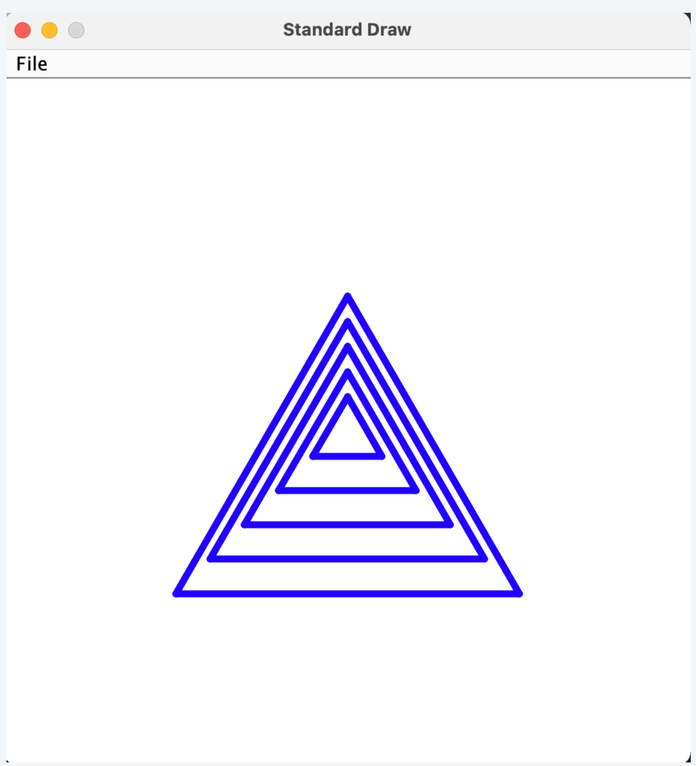


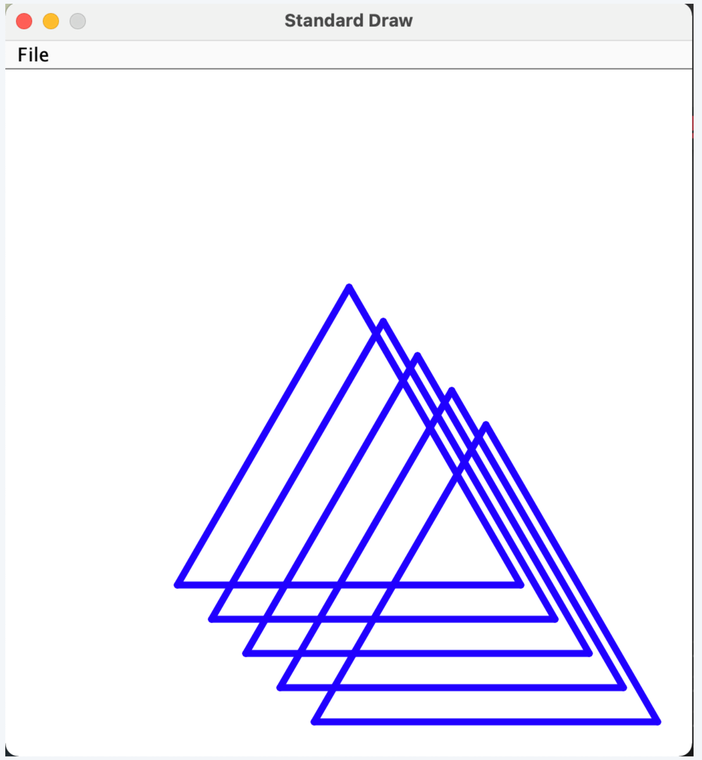




Can you modify your original TRIANGLE program to display the ones below?







StdDraw.setScale(-0.5, 1.5);



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