

Section 2: Drawing

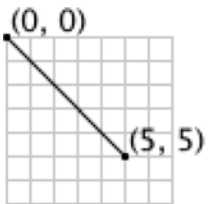
Introduction: Drawing in Processing is achieved by issuing shape commands. The shapes will be drawn on the coordinate system of your drawing canvas, which starts from the upper-left corner. You won't be able to see anything that you draw outside of your canvas. Shapes will assume the last specified properties.

Shapes:

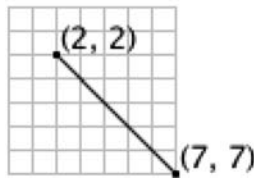
Command: `line` (startX, startY, endX, endY);

Description: Draws a line from (startX, startY) to (endX, endY). Only uses stroke (no fill).

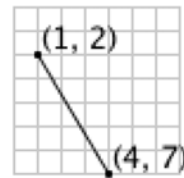
`line` (0, 0, 5, 5);



`line` (2, 2, 7, 7);



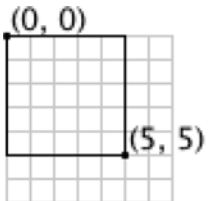
`line` (4, 7, 1, 2);



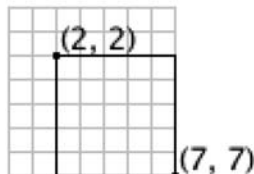
Command: `rect` (startX, startY, width, height);

Description: Draws a rectangle of size width×height with upper-left corner at point (startX, startY).

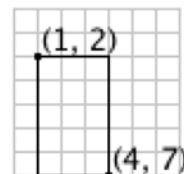
`rect` (0, 0, 5, 5);



`rect` (2, 2, 5, 5);



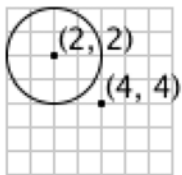
`rect` (1, 2, 3, 5);



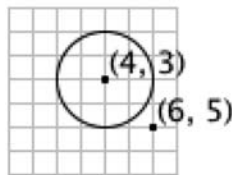
Command: `ellipse` (centerX, centerY, width, height);

Description: Draws an ellipse of specified width and height centered at point (centerX, centerY).

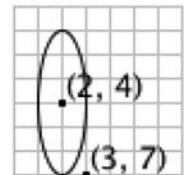
`ellipse` (2, 2, 4, 4);



`ellipse` (4, 3, 4, 4);



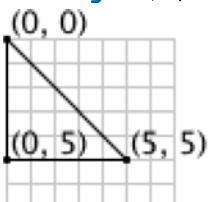
`ellipse` (2, 4, 2, 6);



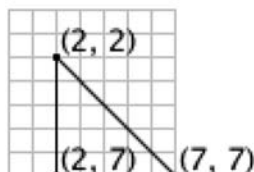
Command: `triangle` (x1, y1, x2, y2, x3, y3);

Description: Draws a triangle between points (x1, y1), (x2, y2), and (x3, y3).

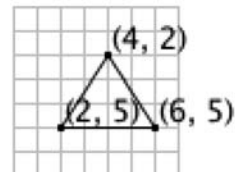
`triangle` (0,0, 0,5, 5,5);



`triangle` (2,2, 7,7, 2,7);



`triangle` (4,2, 6,5, 2,5);



Color: Colors are represented by a triplet (i.e. 3 numbers) that specifies the amount of red, green, and blue – always in that order – to mix together. Each number ranges from 0 to 255, inclusive. Colors can be applied to your drawing canvas background as well as the fill and stroke of shapes.

In a computer, colors mix like light (i.e. additive color). You can find color triplets by going to [Tools → Color Selector...] in the Processing menu and then copying the values in the R, G, and B fields.

black: 0, 0, 0	white: 255, 255, 255	dark-ish grey: 100, 100, 100
yellow: 255, 255, 0	cyan: 0, 255, 255	magenta: 255, 0, 255
purple: 128, 0, 128	brown: 150, 75, 0	orange: 255, 165, 0

Command: `background(red, green, blue);`

Description: Covers the entire drawing canvas with the specified color.

Command: `fill(red, green, blue);`

Description: Changes the fill (inside) color for all future shapes.

Command: `stroke(red, green, blue);`

Description: Changes the stroke (outline) color for all future shapes.

Opacity: Shapes can be made to be see-through! The `fill()` and `stroke()` commands can take an optional 4th parameter from 0 to 255 to specify opacity/transparency. 255 means fully opaque (i.e. not transparent at all) and 0 means fully transparent (i.e. invisible).

Other Drawing Commands: These may come in handy. More can be found in the Processing Reference.

Command: `size(width, height);`

Description: Sets the size of your drawing canvas. Can only be used once (i.e. no resizing).

Command: `noFill();`

Description: All future shapes will be drawn with an empty inside. Overridden by future calls to `fill()`.

Command: `noStroke();`

Description: All future shapes will be drawn without an outline. Overridden by future calls to `stroke()`.

Command: `strokeWeight(weight);`

Description: All future outlines will be drawn with the specified thickness.

Command: `smooth();`

Description: All future shapes will be drawn smoothly. This may slow down Processing's drawing speed.

Exercises:

1) The following Processing program contains several errors. Find and fix them all.

Erroneous code:

```
size 300, 300;  
rect(100 200 40 50);  
lines(100, 200, 140, 250)
```

Fixed code:

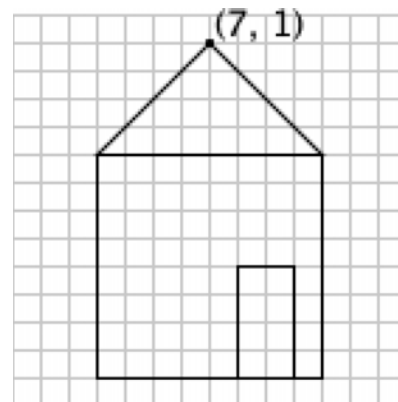
2) Write code below that creates a drawing canvas of size 200×150 and then draws an 'X' across the diagonals of the canvas.

3) Draw out the result of running the Processing code on the left in the grid on the right.

```
ellipse(7, 7, 9, 12);  
ellipse(5, 5, 4, 4);  
ellipse(9, 5, 4, 4);  
ellipse(5, 5, 1, 1);  
ellipse(9, 5, 1, 1);  
triangle(6,7, 8,7, 7,9);
```



4) Write the Processing code that would draw the house shown below. You may find it helpful to start by labeling important coordinates.



5) On the course website, navigate to the Tajjitu lab page and complete that lab assignment to get checked off. [partners]