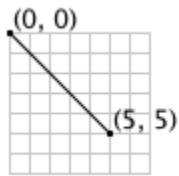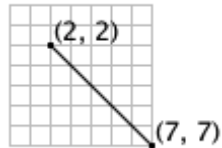# Drawing in Processing

```
line(startX, startY, endX, endY)
```
Draws a line from (startX, startY) to (endX, endY).
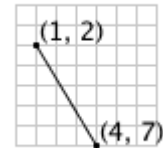
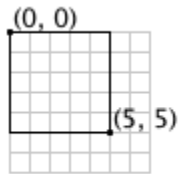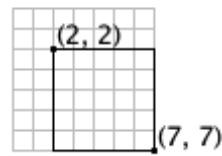| `line(0, 0, 5, 5);`	`line(2, 2, 7, 7);`	`line(4, 7, 1, 2);`


```
rect(startX, startY, width, height)
```
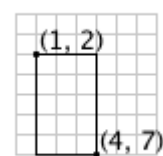Draws a width x height rectangle with upper left corner at point (startX, startY).
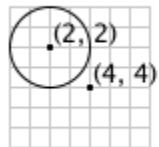
`rect(0, 0, 5, 5);`	`rect(2, 2, 5, 5);`	`rect(1, 2, 3, 5);`


```
ellipse(centerX, centerY, width, height)
```
Draws an ellipse of the given width and height centered at point (centerX, centerY).

`ellipse(2, 2, 4, 4);`	`ellipse(4, 3, 4, 4);`	`ellipse(2, 4, 2, 6);`
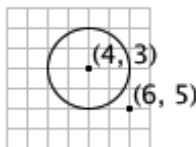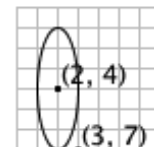

```
triangle(x1, y1, x2, y2, x3, y3)
```
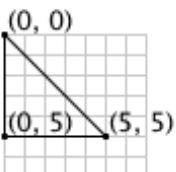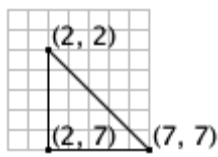Draws a triangle between points (x1, y1), (x2, y2) and (x3, y3).

`triangle(0, 0, 0, 5,` `5, 5);`	`triangle(2, 2, 7, 7,` `2, 7);`	`triangle(4, 2, 6, 5,` `2, 5);`
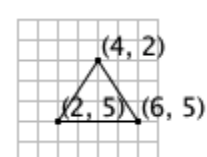
Color

Colors are represented by 3 numbers that specify the amount of red, green and blue to mix together. These numbers range from 0 - 255.

In Processing, colors mix like light. For example, 255 of red, 255 of green and 255 of blue makes white. Here are more examples:

```
255, 255,   0 - yellow
255,   0, 255 - magenta
 88,   0,  88 - dark purple
  0,   0,   0 - black
```

`background(red, green, blue)`
Changes the background color.

`fill(red, green, blue)`
Changes the current fill color. All future filled shapes will be of this color.

`stroke(red, green, blue)`
Changes the current outline color. All future outlined shapes will be of this color.

Transparency

The `fill` and `stroke` commands can also take in a 4th parameter between 0-255 to represent transparency. 255 means fully opaque (not transparent at all) and 0 is fully transparent (invisible!).

More Drawing Commands

`noStroke()`
All future shapes will be drawn without an outline.

`strokeWeight(weight)`
All future outlines will be drawn with the specified thickness.

`noFill()`
All future shapes will be drawn without being filled out.

`smooth()`
All future shapes will be drawn smoothly (may slow down drawing speed).

Processing Drawing Challenges

1. The following Processing program contains several errors. Can you find and fix them all?

```
size 300, 300;

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

2. In Processing, write code to create a window of size 200 x 150 and draw an 'X' across the entire screen.

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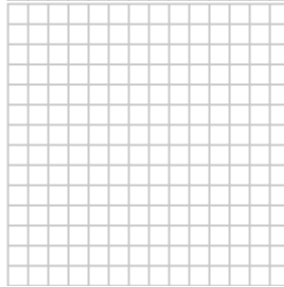
4. Write the Processing code that would draw the house shown below. You may find it helpful to start by labeling important coordinates.

(7, 1)

_____

_____

_____

_____
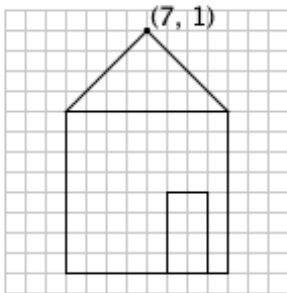
After writing the code on paper, type it into Processing to check your work. Notice that it is very small! How would you scale it up to look larger?