Lecture 4: 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.

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**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).

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**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.