Processing

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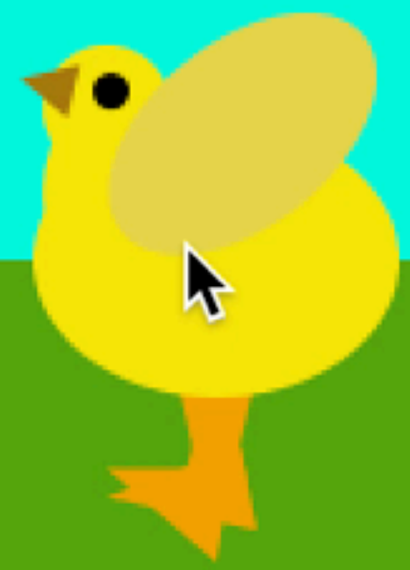
What is Processing?

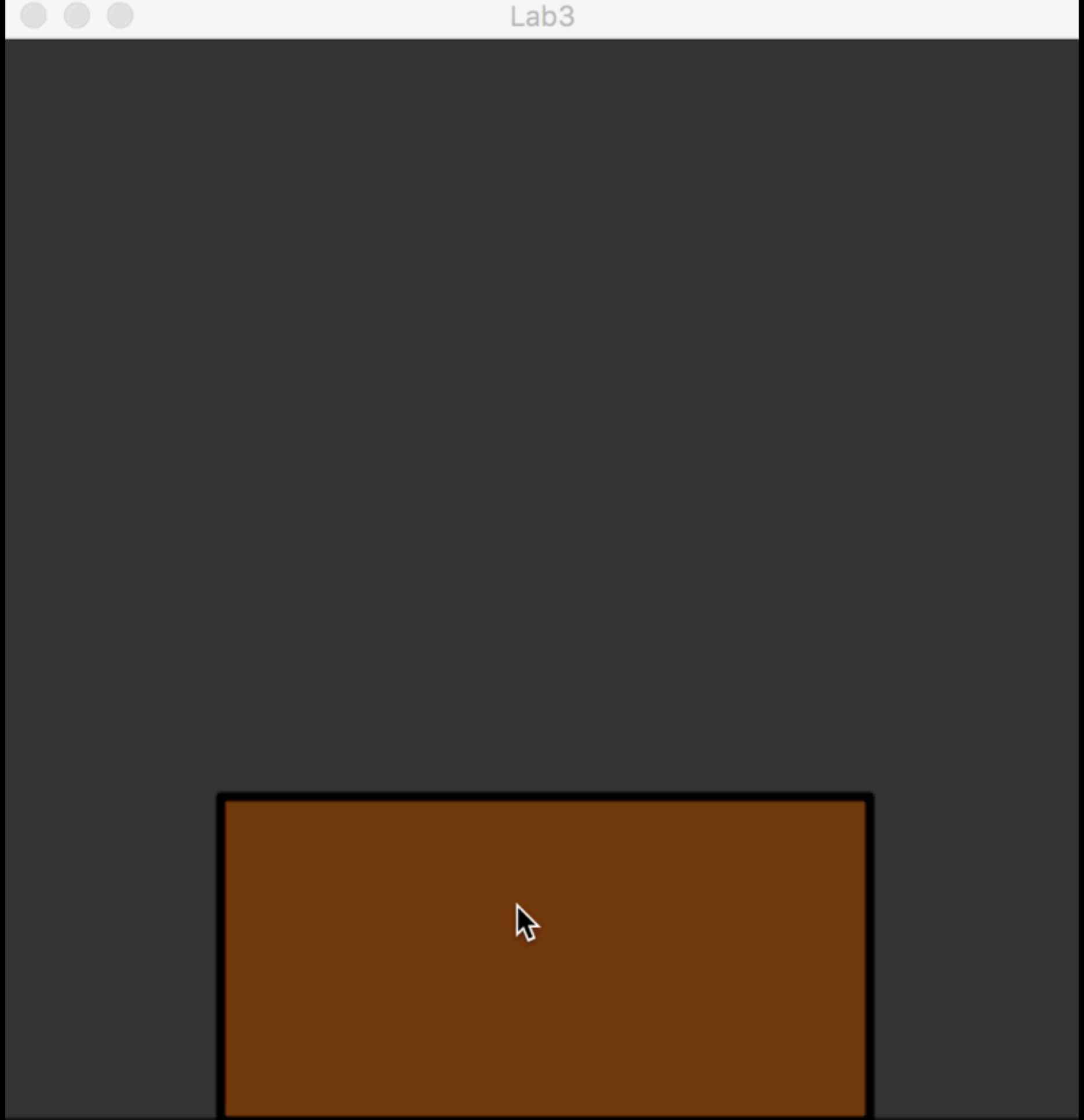
- Code within the context of visual arts
- Compatible with most platforms
- Easy to learn
- Used as a teaching tool
- Java, JavaScript, Python, Android
- 2D and 3D art with user interaction and animation

Confused?

- Ask me.
    - ethan.a.look@vanderbilt.edu
- Check out Processing documentation
    - https://processing.org/reference/
- Check out this session content
    - https://github.com/ethanlook/VandyHacks-Hacker-Night-2016-11-3

Duck




Lab3

Scale

Rocket_Game

MEGA ROCKET

CLASSIC MODE

Due to heavy asteroid traffic, the alien population has asked you to do some damage on the largest rock that blocks the most used intergalactic highway. Don't catch the UFO's in the crossfire while launching missiles from below the green fire zone. Use your mouse. Do some damage.

GO!

MENU

Program Structure

```
// The statements in the
// setup() function
// execute once when the
// program begins

void setup() {
  // Size must be the
  // first statement
  size(640, 360);

  // Set line drawing
  // color to white
  stroke(255);

  // Set the frame rate to
  // 30 frames per second
  frameRate(30);
}
```

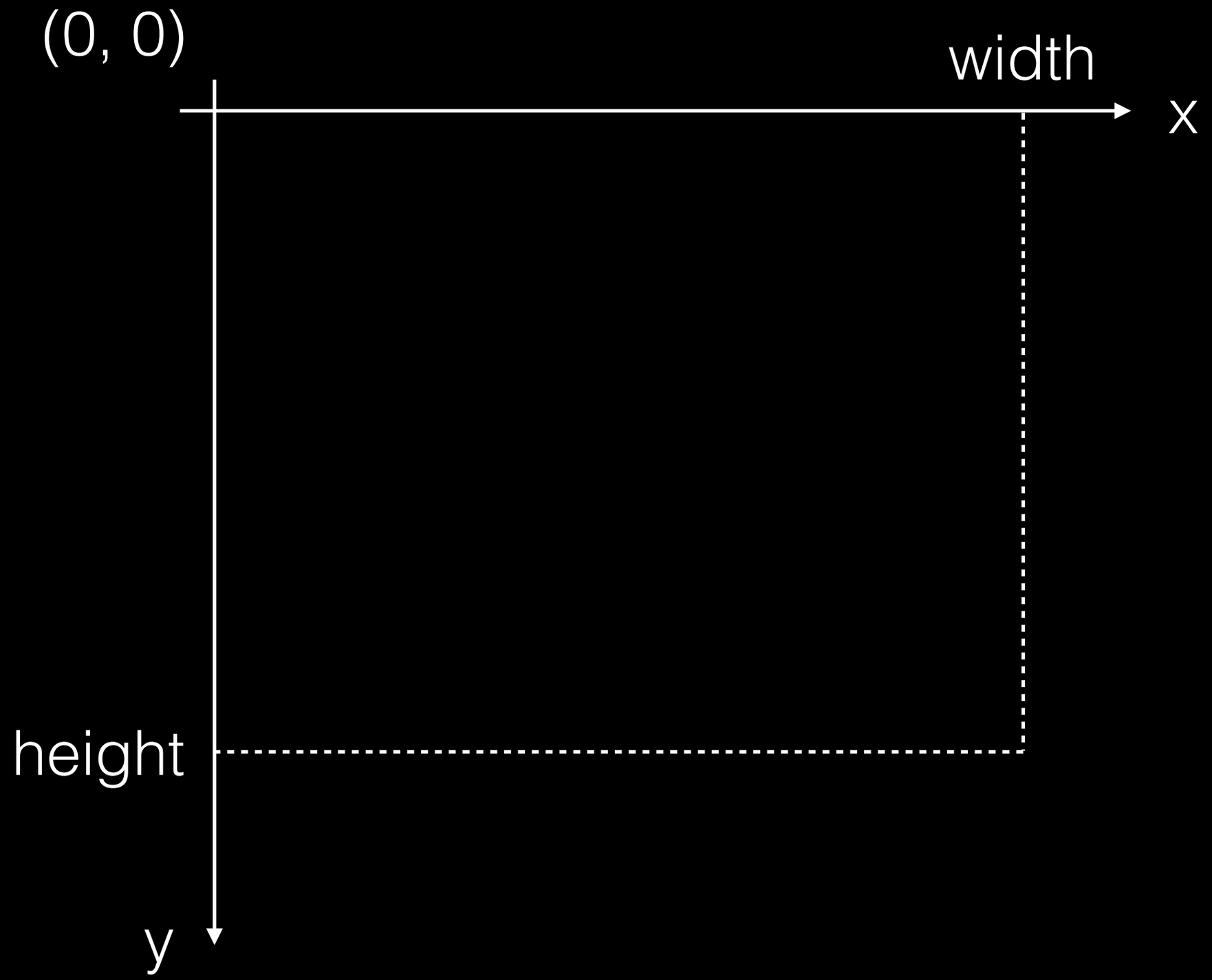
```
// The statements in draw()
// are executed until the
// program is stopped. Each
// statement is executed in
// sequence and after the
// last line is read, the first
// line is executed again.

void draw() {

  // Draw a red circle in
  // the middle of the
  // screen.

  fill(255, 0, 0);
  ellipse(width/2, height/2,
          100, 100);
}
```

The Processing Coordinate Space



Basic Drawing

```
// Can “paint-over” the
entire background. Values
between 0-255.
background(r, g, b);

// Can also set the
background color on a
grayscale from 0-255.
background(gray);


// Sets the fill color for
the scene. You can set it
as many times as you need.
fill(r, g, b);
fill(gray);
```

```
// Can also do no fill.
Makes the object “see-
through”.
noFill();

// Sets the stroke color
for the scene. Can also
do grayscale.
stroke(r, g, b);
stroke(gray);

// Can also do no
stroke.
noStroke();
```

Drawing Shapes

```
// Ellipse with center
(a, b), width c, height
d.
ellipse(a, b, c, d);

// Line with endpoints
(x1, y1) and (x2, y2).
line(x1, y1, x2, y2);

// Rectangle with upper-
left corner at (a, b),
width c, height d.
rect(a, b, c, d);
```

```
// An arc. Think of a
“pie slice” of an
ellipse. Center (a, b),
width c, height d. Start
at radian value start,
end at radian value end.
Goes clockwise.
arc(a, b, c, d, start,
stop);

// A triangle with
vertices (x1, y1), (x2,
y2), (x3, y3).
triangle(x1, y1, x2, y2,
x3, y3);
```

An Example of Drawing

A House

Now, Draw a Smiley Face

5-10 minutes
Ask me any questions

Using Global Variables

- Can use global variables to make changes over time.
- Has an effect like animation.
- From previous example, we can make the house move.
- Need to repaint the background each time!

```
int x, y;

void setup() {
  size(600, 400);

  // x and y of the upper left of the house.
  x = 0;
  y = height/2 - 75;
}

void draw() {
  // Set the background color.
  background(0, 150, 200);

  // Draw the grass
  fill(0, 255, 0);
  noStroke();
  rect(0, height/2, width, height/2);

  // Draw the house
  fill(204, 102, 153);
  rect(x, y, 200, 75);

  // Draw the roof
  fill(102, 51, 0);
  stroke(0);
  strokeWeight(2);
  triangle(x - 10, y, x + 100, y - 50, x + 210, y);

  x = x + 2;
}
```

Make your Smiley Face Go Back and Forth

5-10 minutes
Ask me any questions

Using Click Events

- At any time, can use the mouse location with **`mouseX`** and **`mouseY`**.
- Can capture mouse click events with **`mouseClicked()`**
- When used with **`ArrayLists`**, can do interesting things.

Using Click Events

```
ArrayList<Integer> houseXs = new
ArrayList<Integer>();
ArrayList<Integer> houseYs = new
ArrayList<Integer>();

void setup() {
  size(800, 600);
}

void draw() {
  // Set the background color.
  background(0, 150, 200);

  // Draw the grass
  fill(0, 255, 0);
  noStroke();
  rect(0, height/2, width, height/2);

  // Draw all of the houses.
  for (int i = 0;
       i < houseXs.size(); i++) {
    drawHouse(houseXs.get(i),
              houseYs.get(i));
  }
}
```

```
void mouseClicked() {
  houseXs.add(mouseX);
  houseYs.add(mouseY);
}

void drawHouse(float x, float y)
{
  // Draw the house
  noStroke();
  fill(204, 102, 153);
  rect(x, y, 200, 75);

  // Draw the roof
  fill(102, 51, 0);
  stroke(0);
  strokeWeight(2);
  triangle(x - 10, y,
           x + 100, y - 50,
           x + 210, y);
}
```

Make a Smiley Face Every Time You Click

5-10 minutes
Ask me any questions

Questions?

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