INTRODUCTION TO PROGRAMMING

UH : Pacific New Media : 2013 : 06 : 15

"Everybody in this country should learn how to program a computer... because it teaches you how to think."

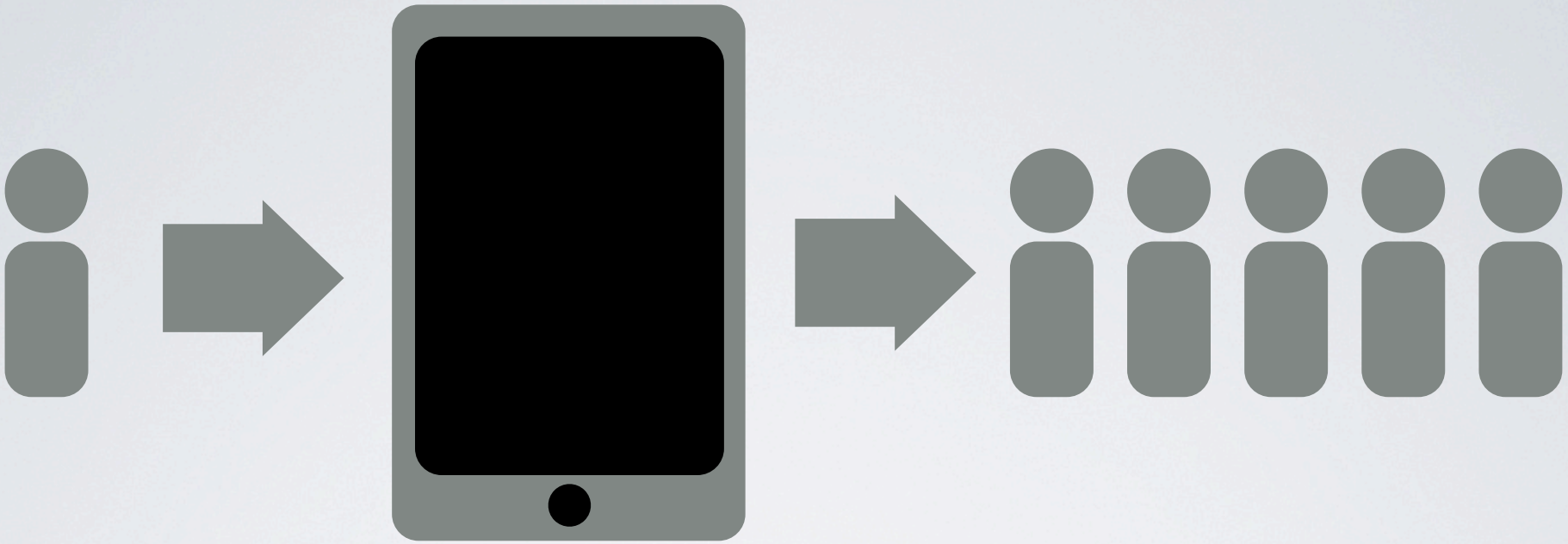
-Steve Jobs

...do we direct technology, or do we let ourselves be directed by it and those who have mastered it?

"Choose the former," writes Rushkoff, "and you gain access to the control panel of civilization.

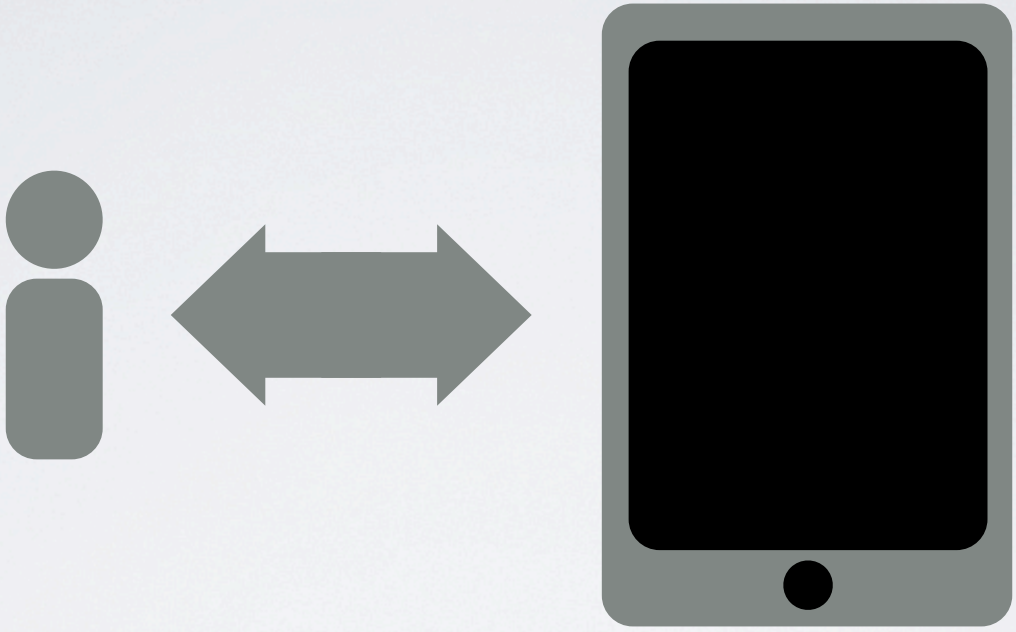
Choose the latter, and it could be the last real choice you get to make."

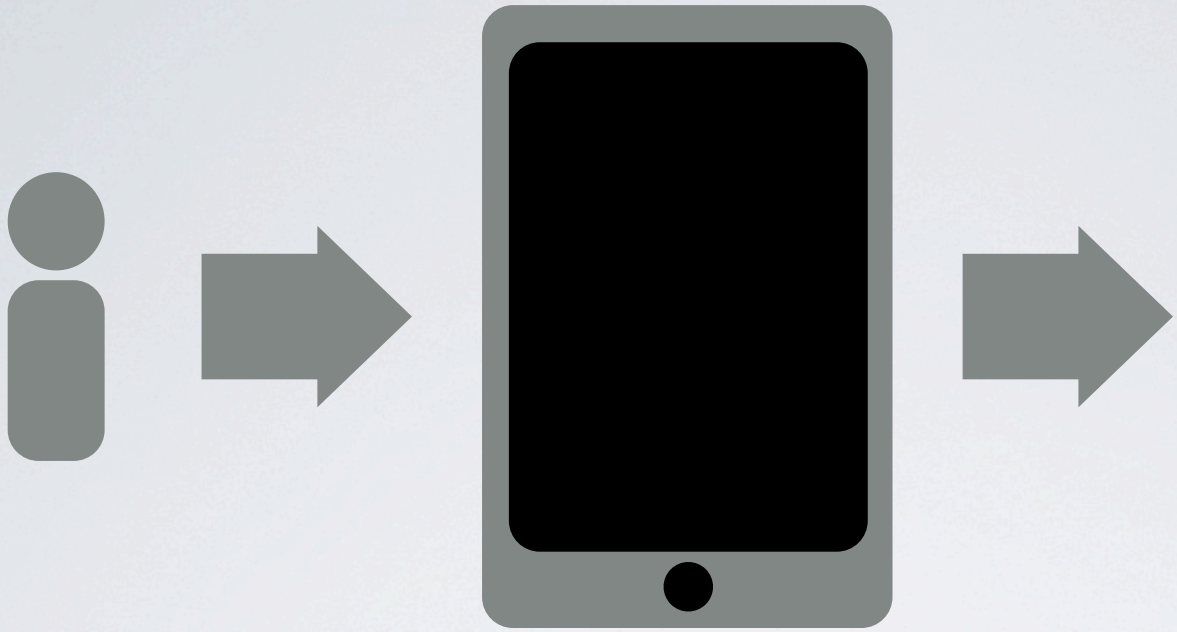
http://www.rushkoff.com/program-or-be-programmed/



"Any customer can have a car painted any
colour that he wants
so long as it is black."

- Henry Ford





Drawings

Websites

Mobile Apps

Tasks

3D Printing

Art Projects

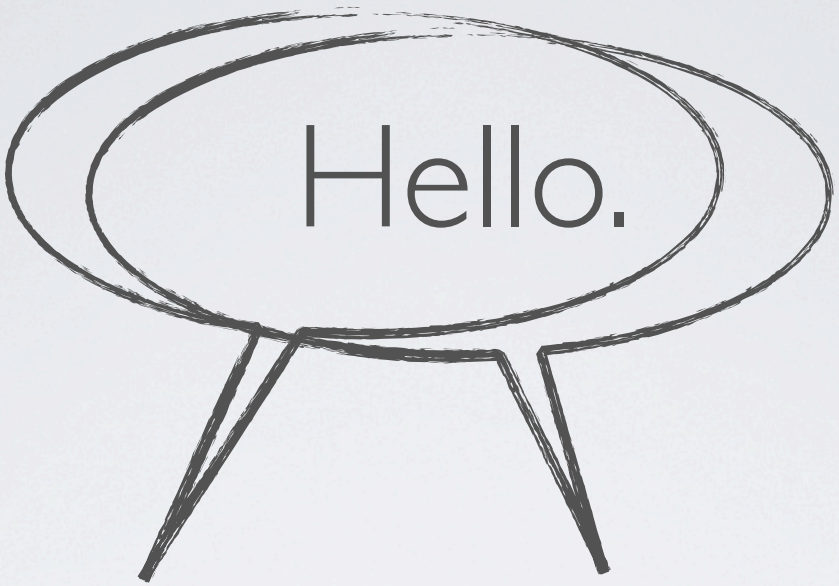
Physical Computing

Books

Digital Natives - Matthew Plummer-Fernandez

My little piece of Privacy - Niklas Roy

Feltron Annual Report - Nicholas Felton



Kevin McCarthy

Real Geeks
me@kevinmccarthy.org

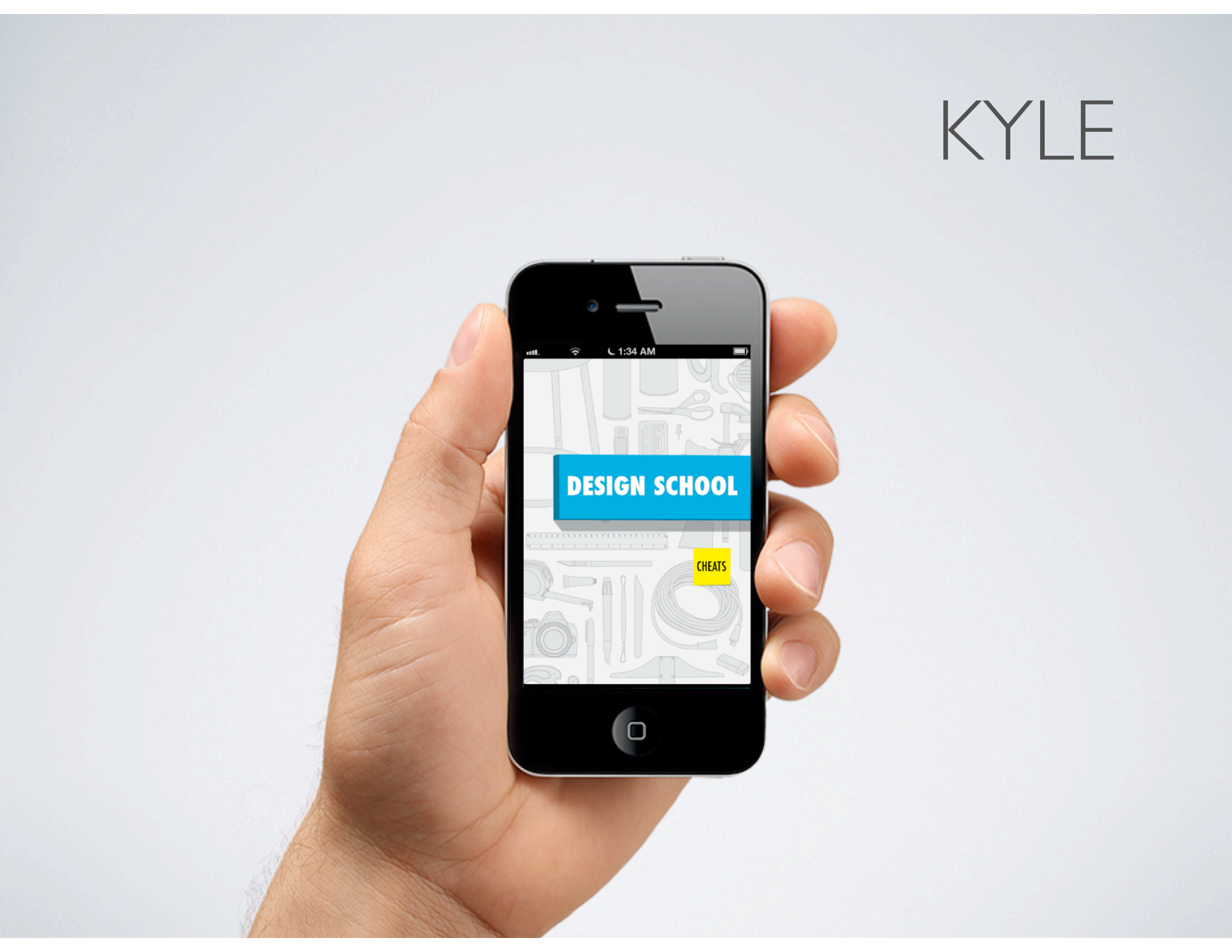
Kyle Oba

Pas de Chocolat
koba@pasdechocolat.com

@mudphone
facebook.com/WhatNoChoco


KEVIN

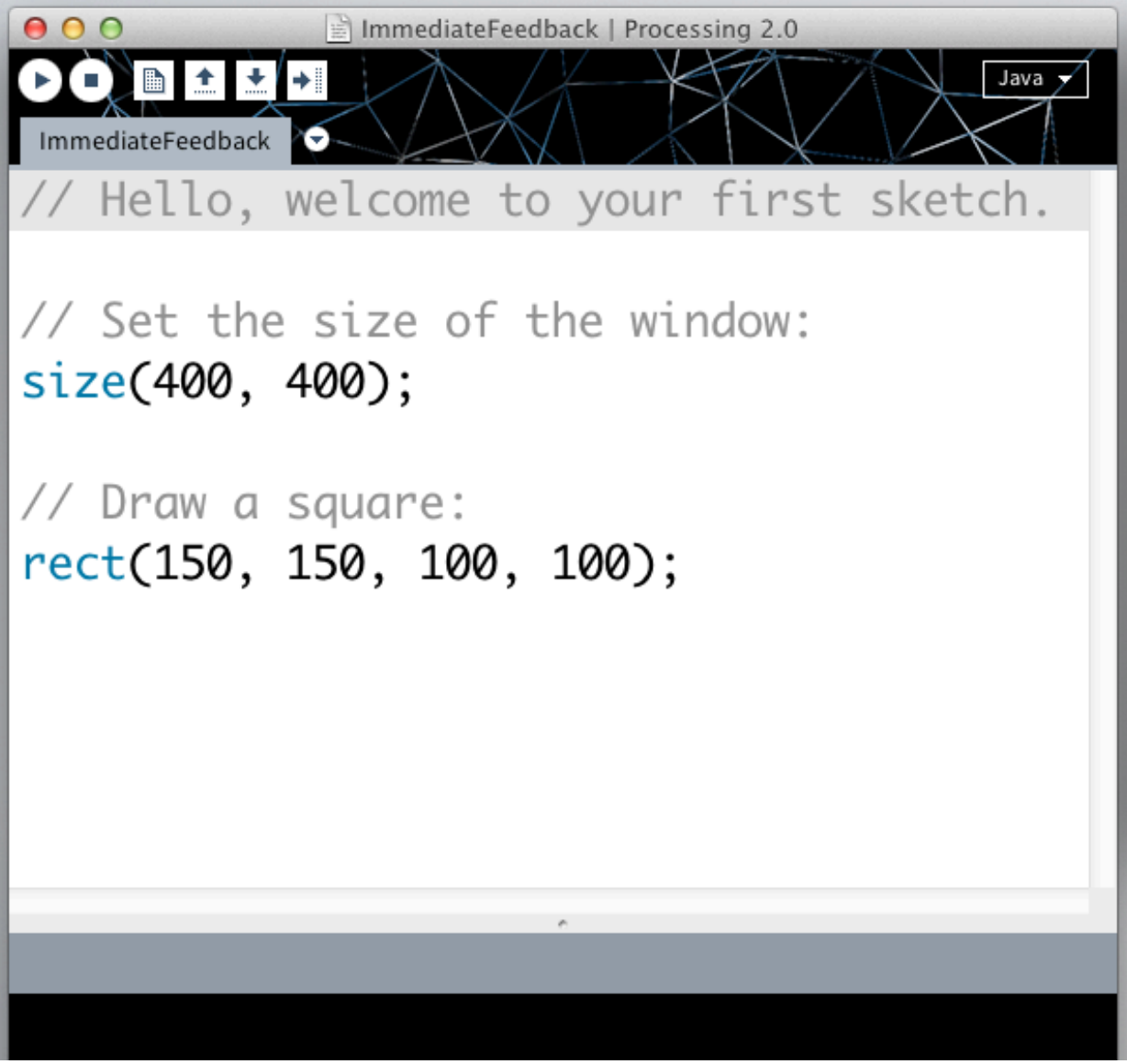
KYLE

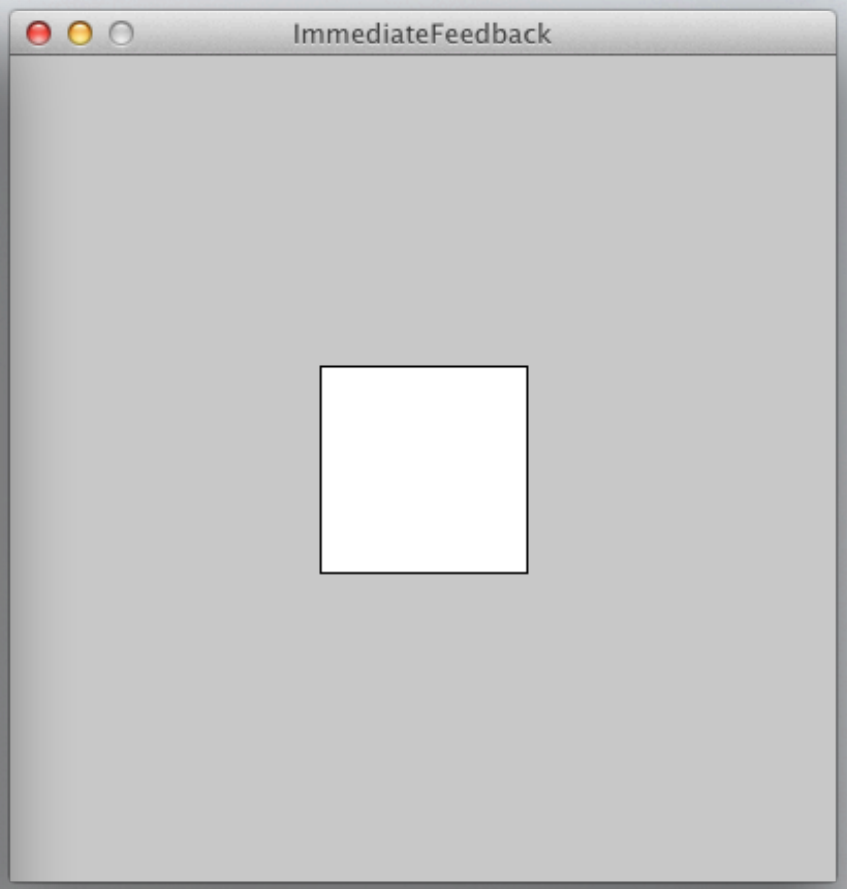


- Immediate Feedback
- What is programming?
- Thinking and programming
- Processing (the tool)
- Programming details: Color, Variables, Animation, Interactivity
- What's next?

- Immediate Feedback
- What is programming?
- Thinking and programming
- Processing (the tool)
- Programming details: Color, Variables, Animation, Interactivity
- What's next?

LAB: IMMEDIATE FEEDBACK





LAB: IMMEDIATE FEEDBACK

Run me:

LABS > ImmediateFeedback > ImmediateFeedback.pde

COFFEE BREAK

15 minutes.

WHAT IS PROGRAMMING?

Amelia Bedelia got the cereal.

She put some in a cup.

And she fixed Mrs. Rogers

some cereal with her coffee.

She took it into the dining room.

"Amelia Bedelia!" said Mrs. Rogers.

"What is that mess?"

"It's your cereal with coffee,"

said Amelia Bedelia.

HUMAN VS COMPUTER

- 1. Get me some cereal with coffee

- 1. Use feet to move to kitchen. Kitchen is at position x, y, z.
- 2. Open cupboard. Cupboard is at position x, y, z, and retrieve cereal bowl, which looks like this
- etc etc

DEMO: PAPER LAB 1

Graph paper!

PAPER LAB 1

Graph paper!

SIMPLE INSTRUCTIONS

- write instructions to draw a thing (example: primitive car, house)
- try to be as explicit as possible
- executes from top to bottom
- programmer, pass to computer, and vice versa
- do this twice
- GOAL: all computers product similar result

SIMPLE INSTRUCTIONS

- write instructions to draw a thing (example: primitive car, house)
- try to be as explicit as possible
- executes from top to bottom
- programmer, pass to computer, and vice versa
- do this twice
- GOAL: all computers product similar result

SIMPLE INSTRUCTIONS

1. Take out a piece of blank paper and write your name and "INSTRUCTIONS" at the top.

2. Write step by step instructions to draw your simple picture. Try to put each step on a separate line.

3. When complete pass it to your "computer."

4. Receive instructions from your "programmer."

5. Execute instructions on a separate, blank sheet of graph paper.

SIMPLE INSTRUCTIONS

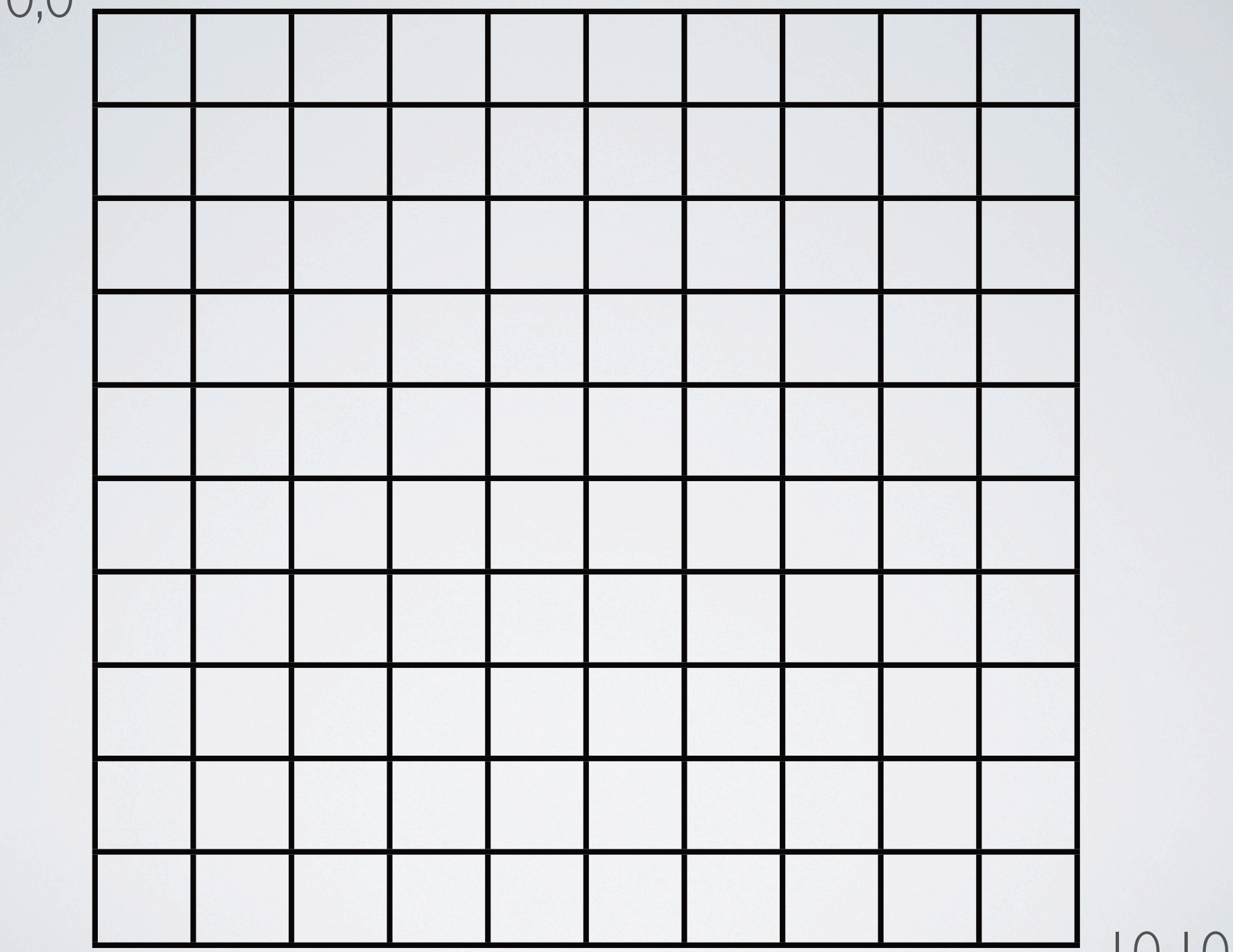
1. Take out a piece of blank paper and write your name and "INSTRUCTIONS" at the top.

2. Write step by step instructions to draw your simple picture. Try to put each step on a separate line.

3. When complete pass it to your "computer."

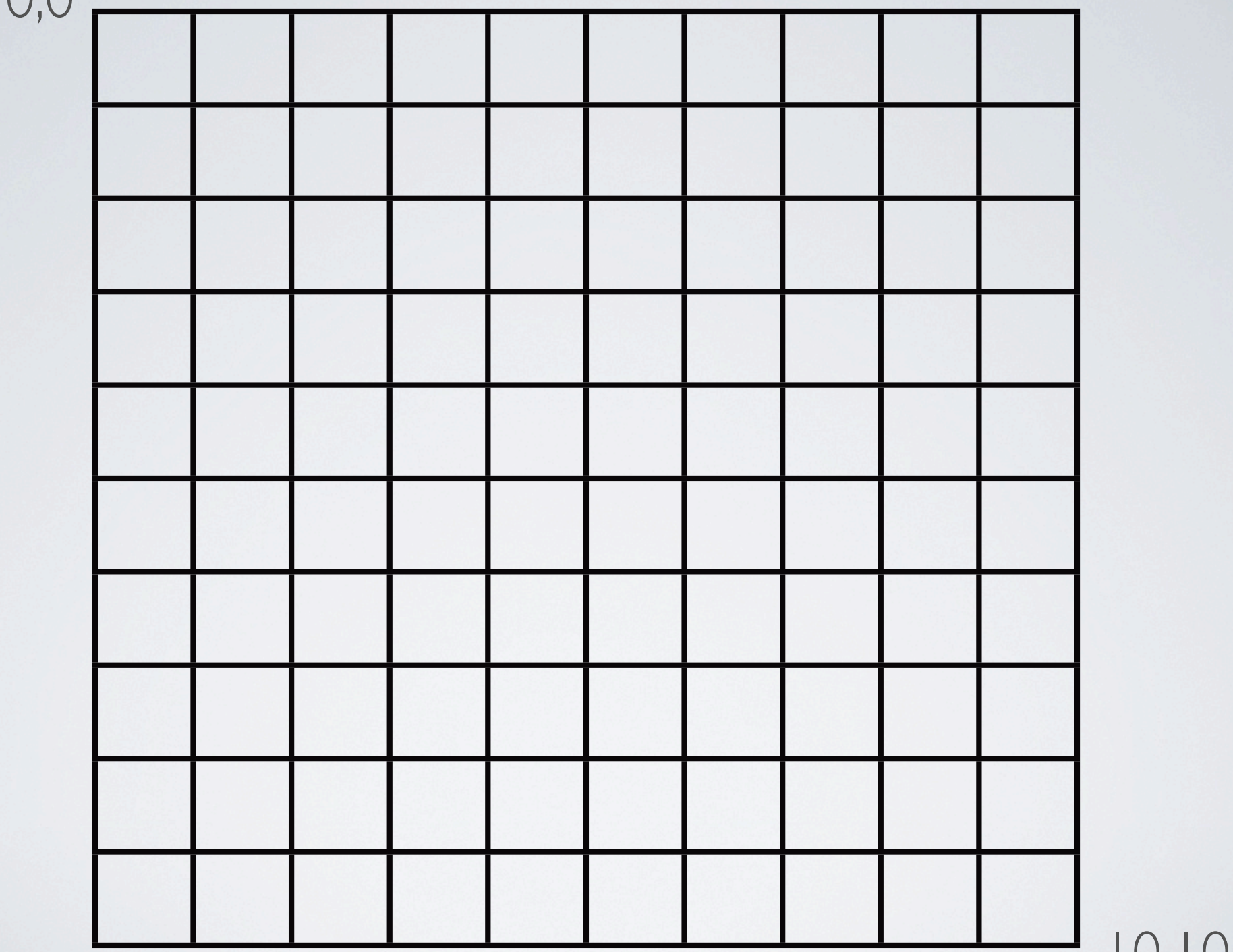
4. Receive instructions from your "programmer."

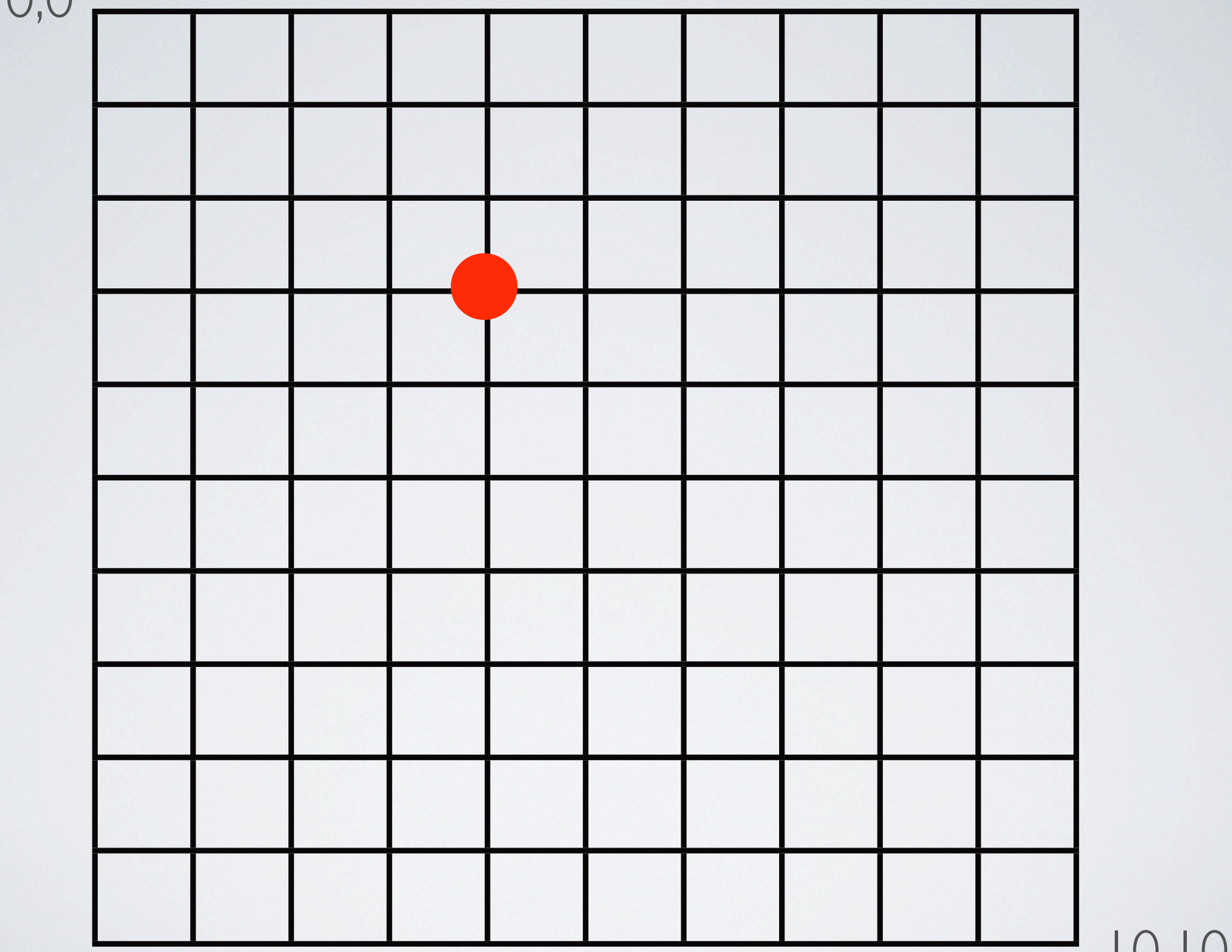
5. Execute instructions on a separate, blank sheet of graph paper.


0,0
10,10

DRAW A DOT AT 4,3

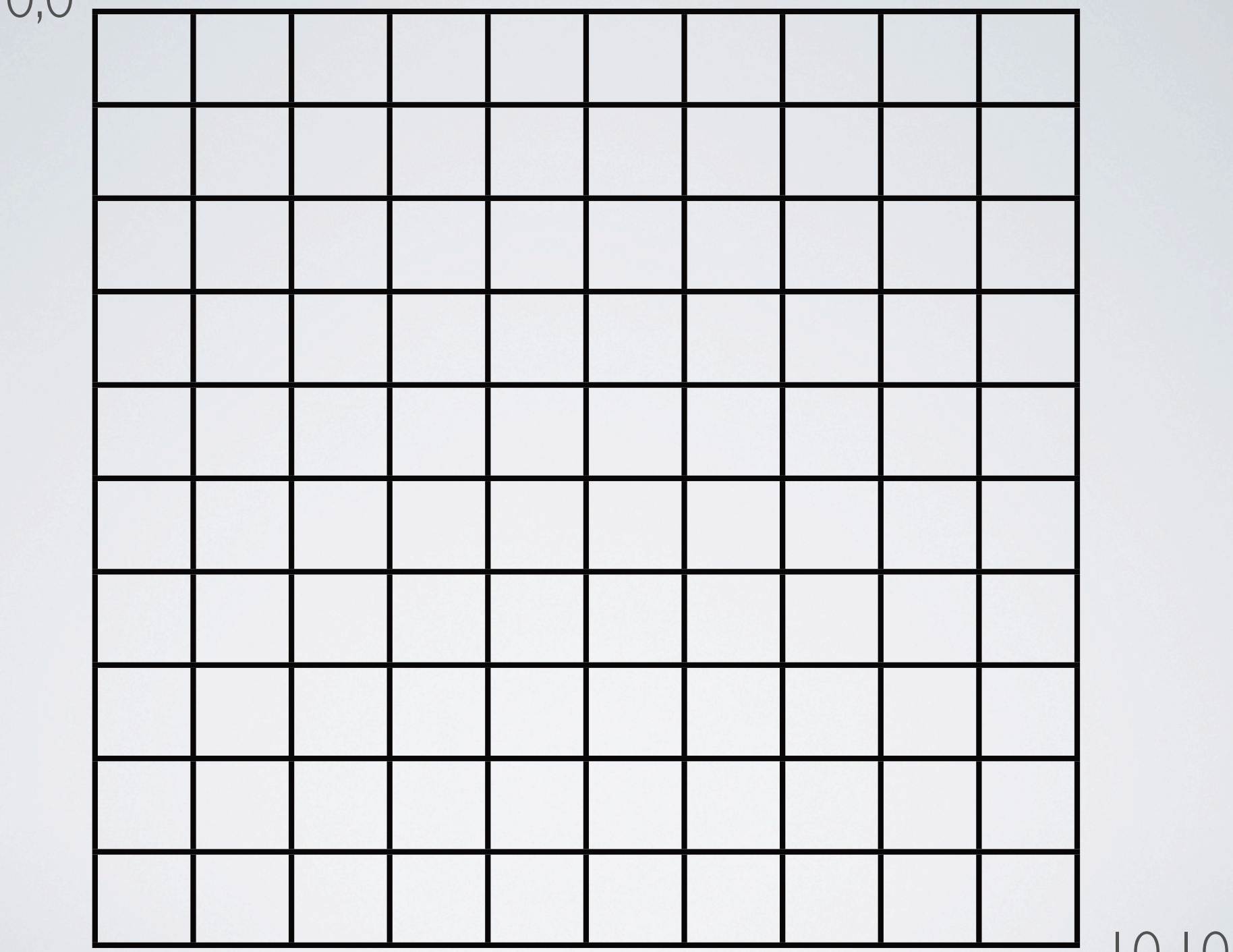
```
point(4,3);
```

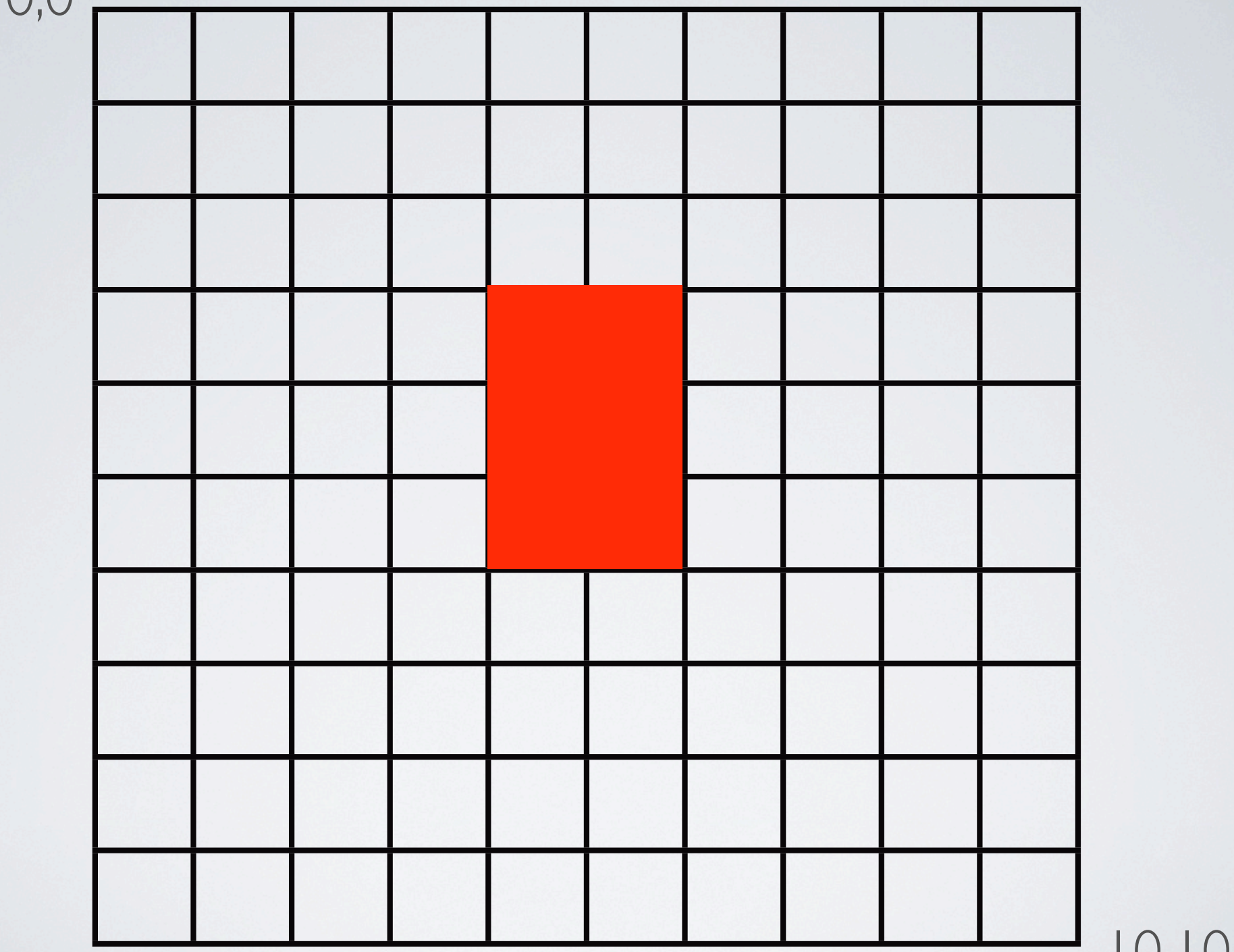

0,0
10,10


0,0
10,10

DRAW A BOX WITH ONE CORNER AT 4,3 AND ANOTHER CORNER AT 6,6

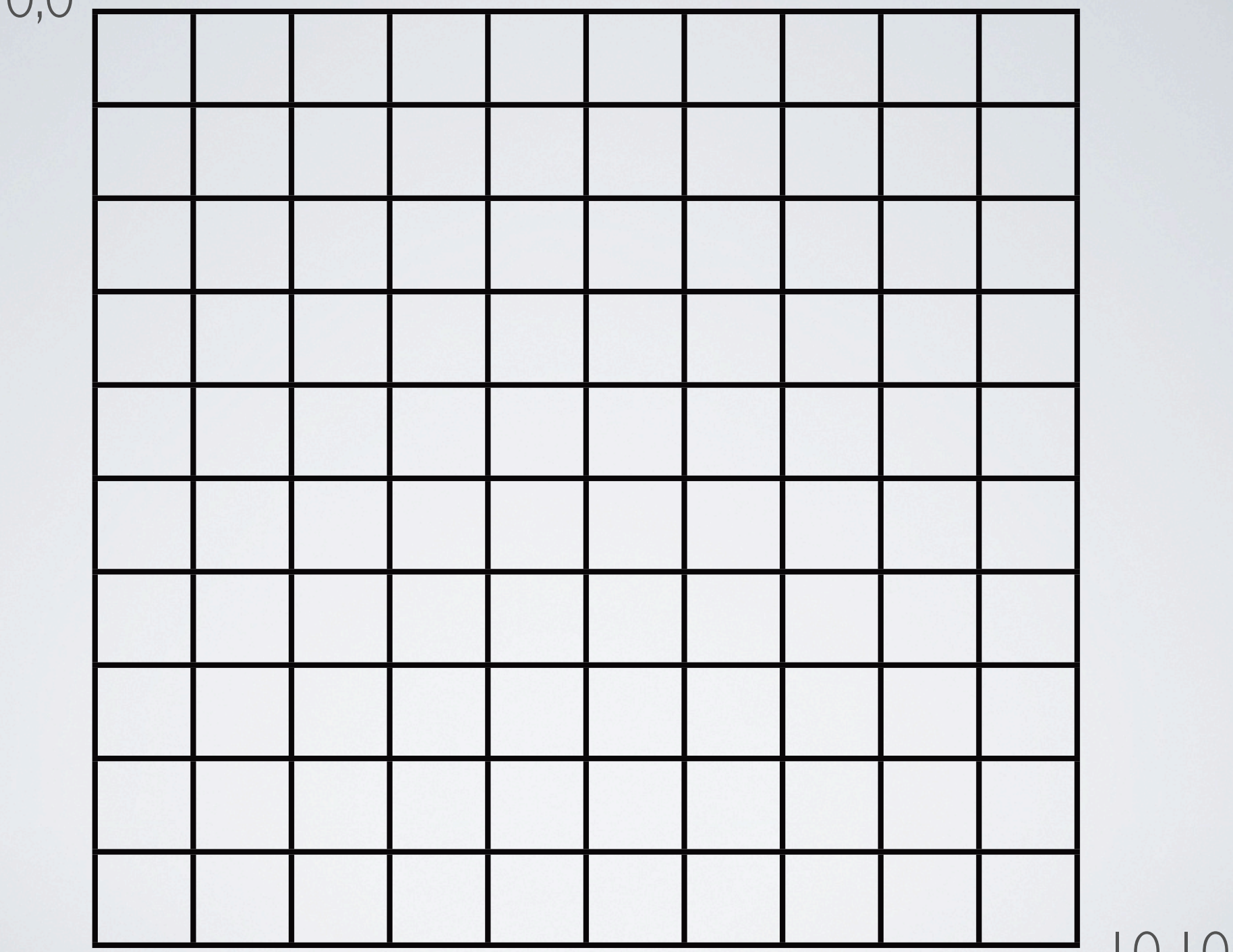
```
rect(4,3,6,6);
```

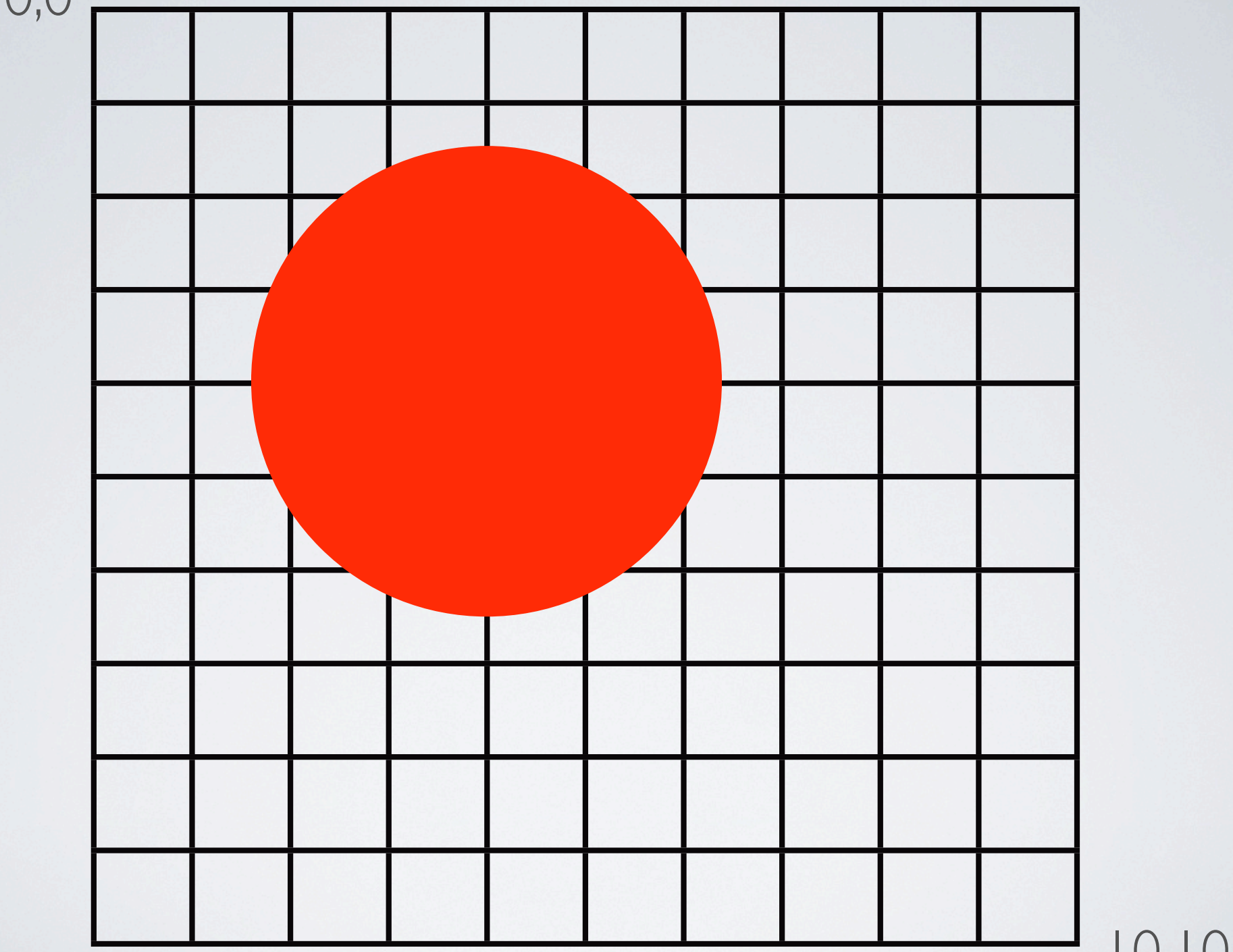

0,0
10,10


0,0
10,10

DRAW A CIRCLE 5 TALL AND 5 WIDE WITH ITS CENTER AT 4, 4

```
ellipse(5,5,4,4);
```


0,0
10,10


0,0
10,10

DEMO: PAPER LAB 2

Manipulatives!

PAPER LAB 2

Manipulatives!

THE SAME THING, BUT...

- strict instructions with physical paper instructions
- executes from top to bottom
- choose from ellipse, line, & rect
- with semicolons already attached
- SAME GOAL: all computers product similar result

THE SAME THING, BUT...

- strict instructions with physical paper instructions
- executes from top to bottom
- choose from ellipse, line, & rect
- with semicolons already attached
- SAME GOAL: all computers product similar result

WITH MANIPULATIVES

1. Take out a piece of blank paper and write your name and "INSTRUCTIONS" at the top.

2. Arrange the given instruction cards on your sheet. Use the given instructions to draw your simple picture.

3. When complete pass it to your "computer."

4. Receive instructions from your "programmer."

5. Execute instructions on a separate, blank sheet of graph paper.

WITH MANIPULATIVES

1. Take out a piece of blank paper and write your name and "INSTRUCTIONS" at the top.

2. Arrange the given instruction cards on your sheet. Use the given instructions to draw your simple picture.

3. When complete pass it to your "computer."

4. Receive instructions from your "programmer."

5. Execute instructions on a separate, blank sheet of graph paper.

COFFEE BREAK

15 minutes.

FIRST PROCESSING LAB

Manipulatives!

CHECKPOINT

Is your Processing sketch running?

CHECKPOINT: EXTRA CREDIT

Help > Reference > 2D Primitives
arc(), quad(), triangle()

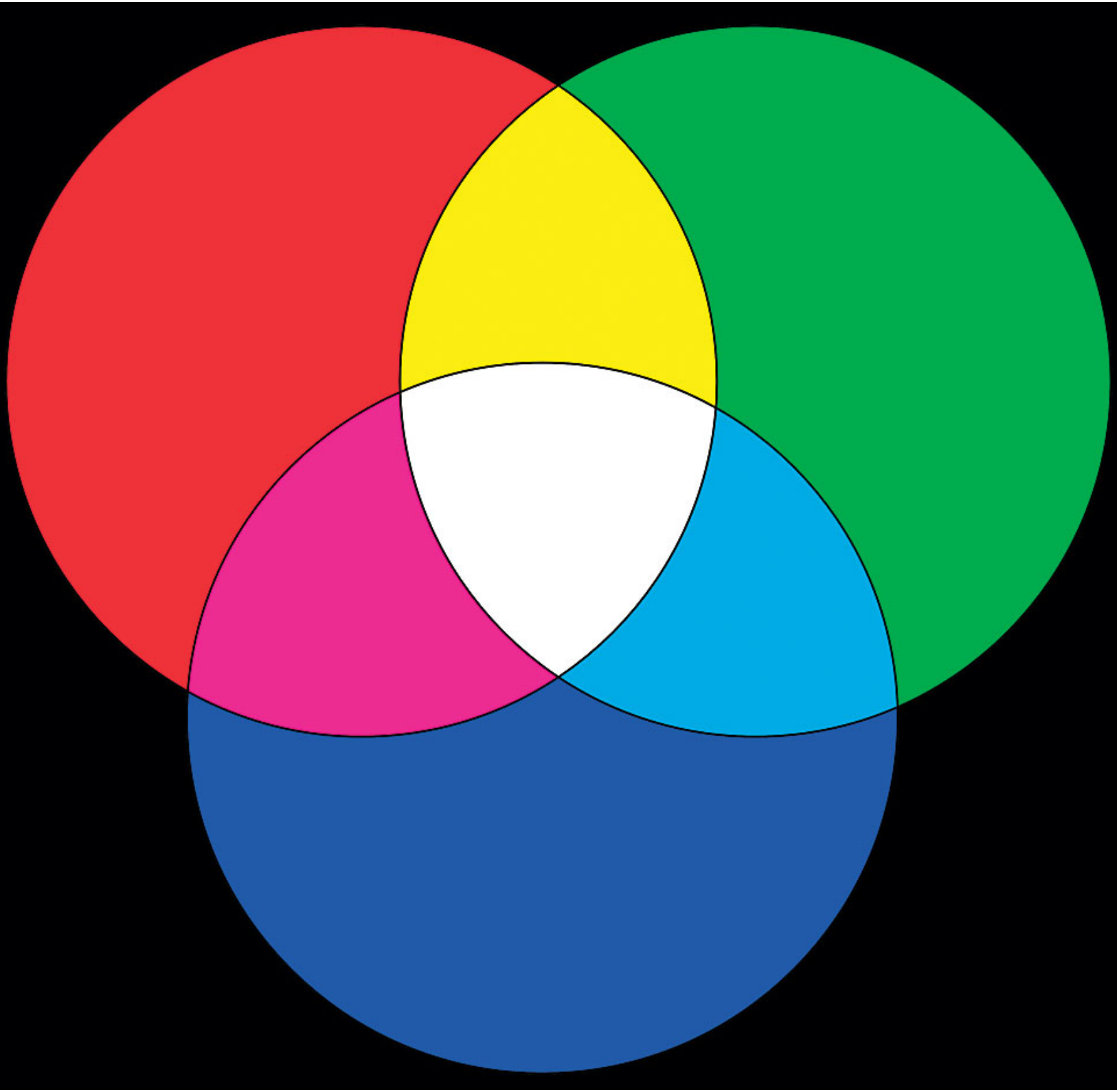
LUNCH BREAK

60 minutes.

Casey Reas & Ben Fry

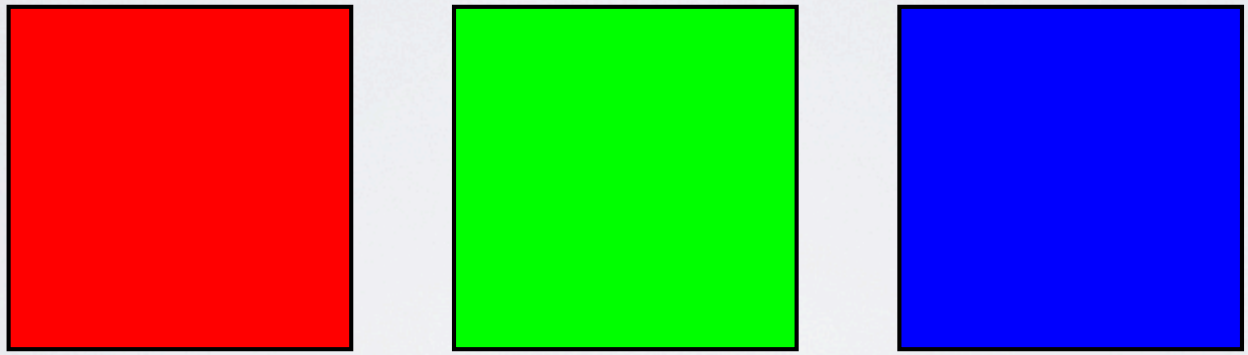
Processing is software for making images, animations, and interactions.

COLOR



color(255,0,0)

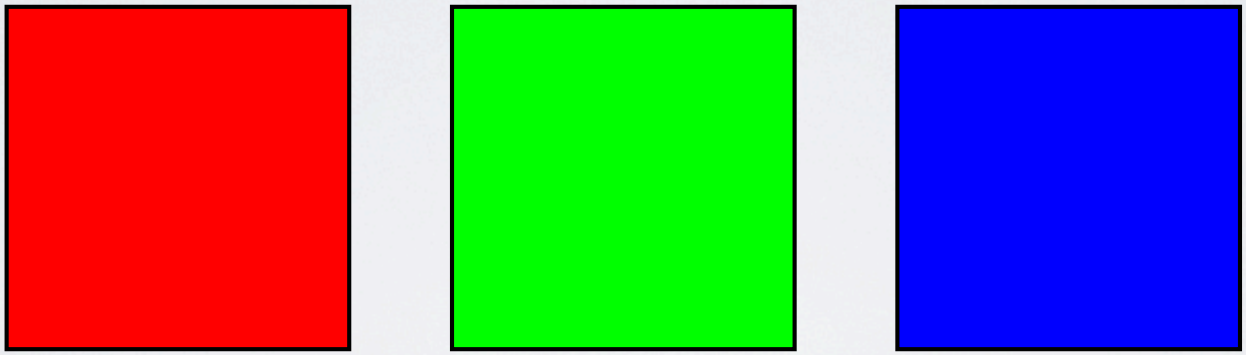
color(0,0,255)



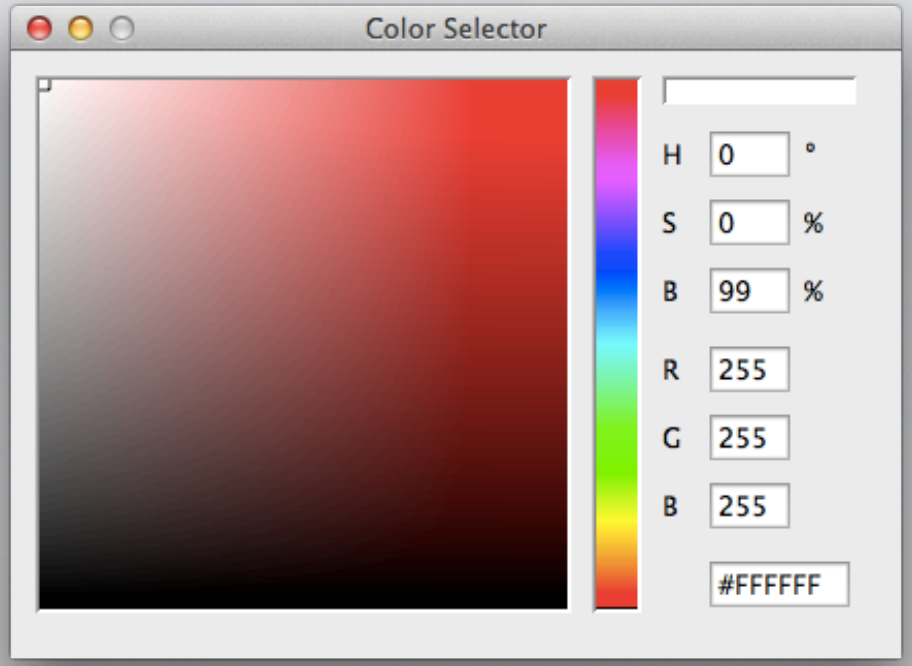
color(0,255,0)

#FF0000

#0000FF



#00FF00



Tools > Color Selector

DEMO: COLOR PICKER

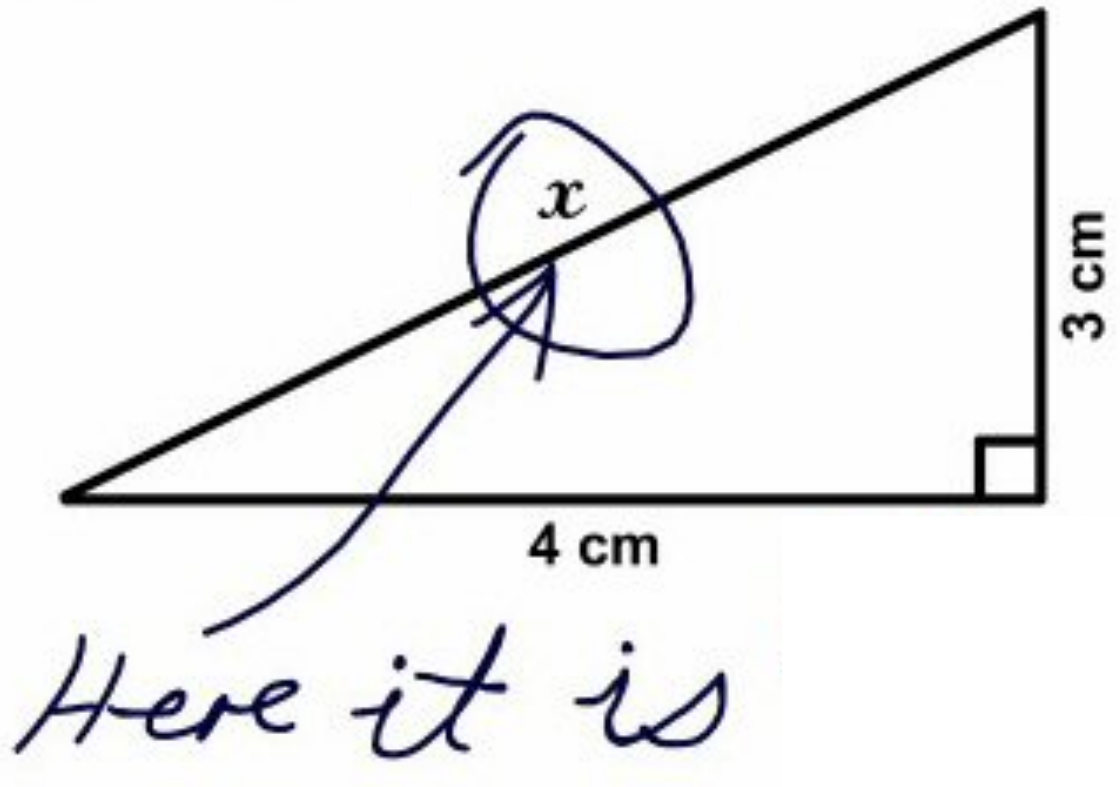
DEMO: STROKE + FILL

LAB: COLOR

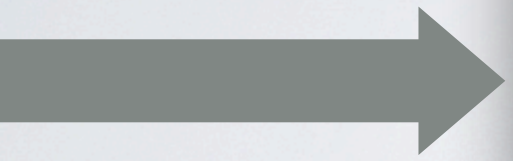
add color to your program from manipulatives
(first processing lab)

VARIABLES

3. Find x.



VARIABLES



MoveCircle | Processing 2.0

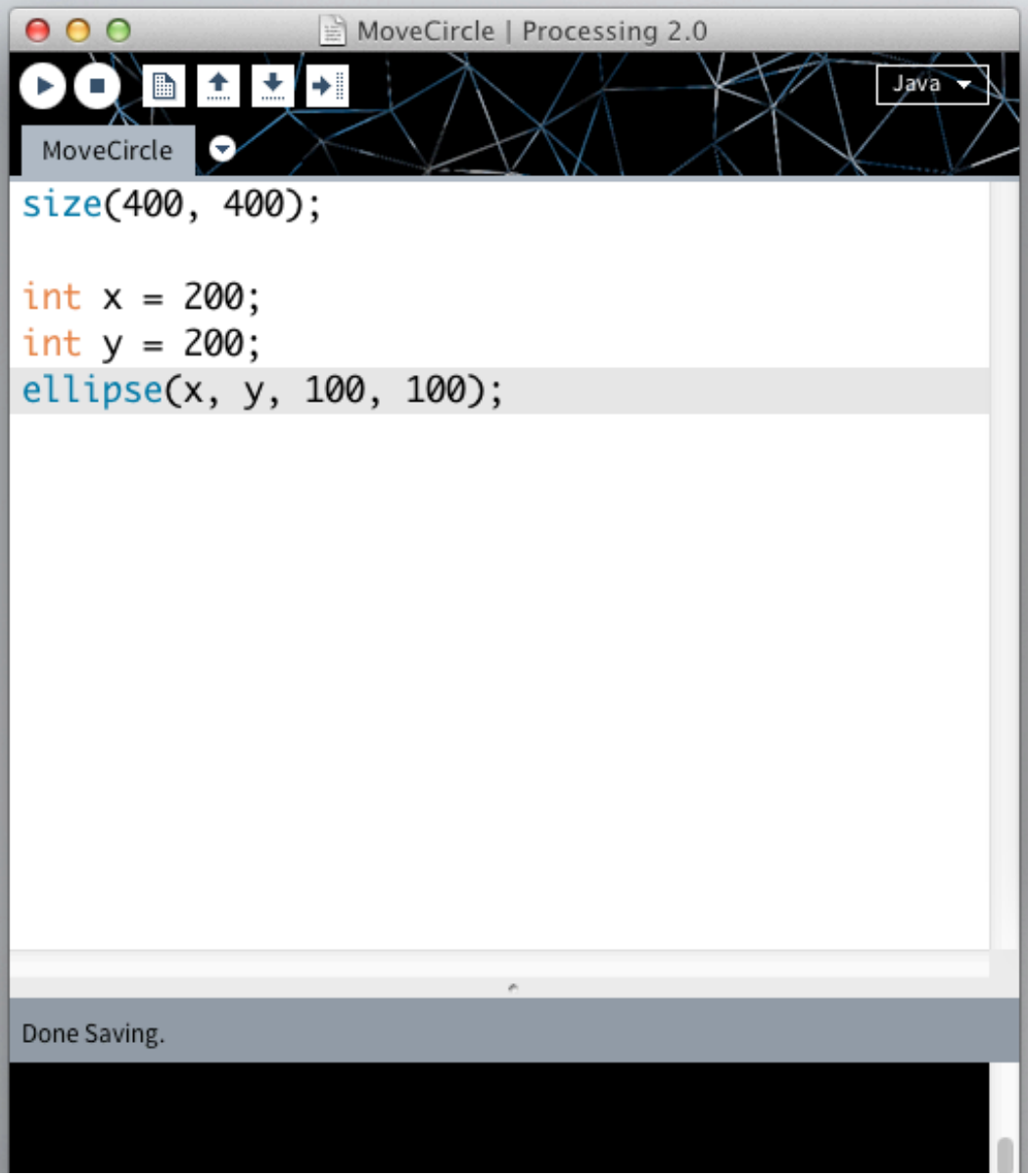
Java

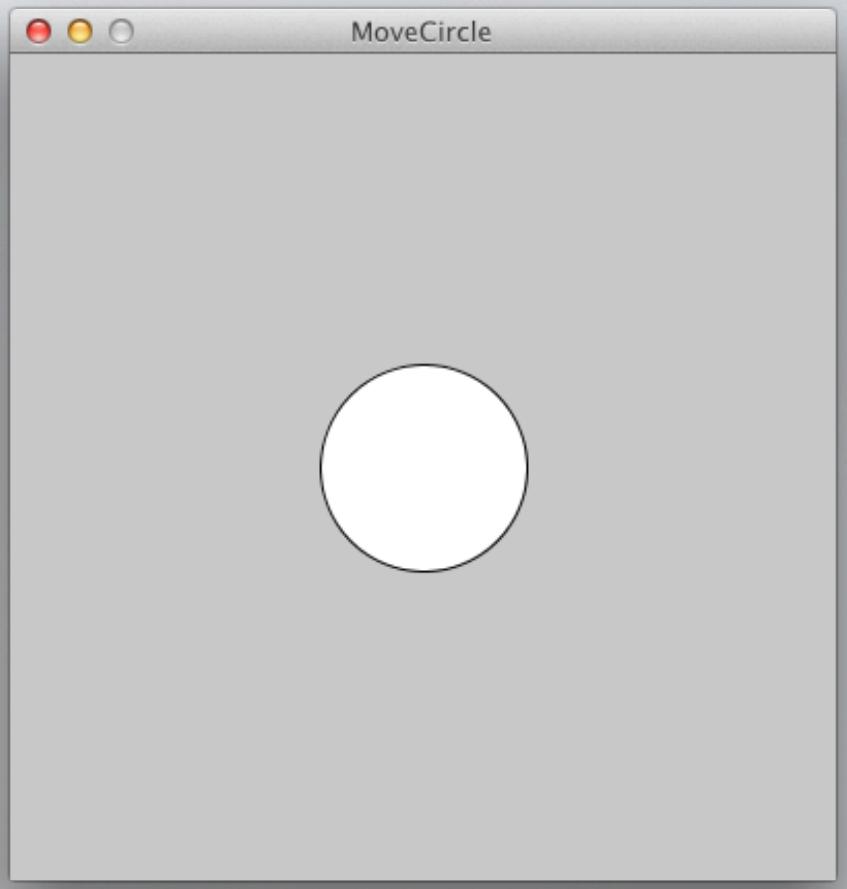
MoveCircle

```
size(400, 400);

int x = 200;
int y = 200;
ellipse(x, y, 100, 100);
```

MOVE THE CIRCLE



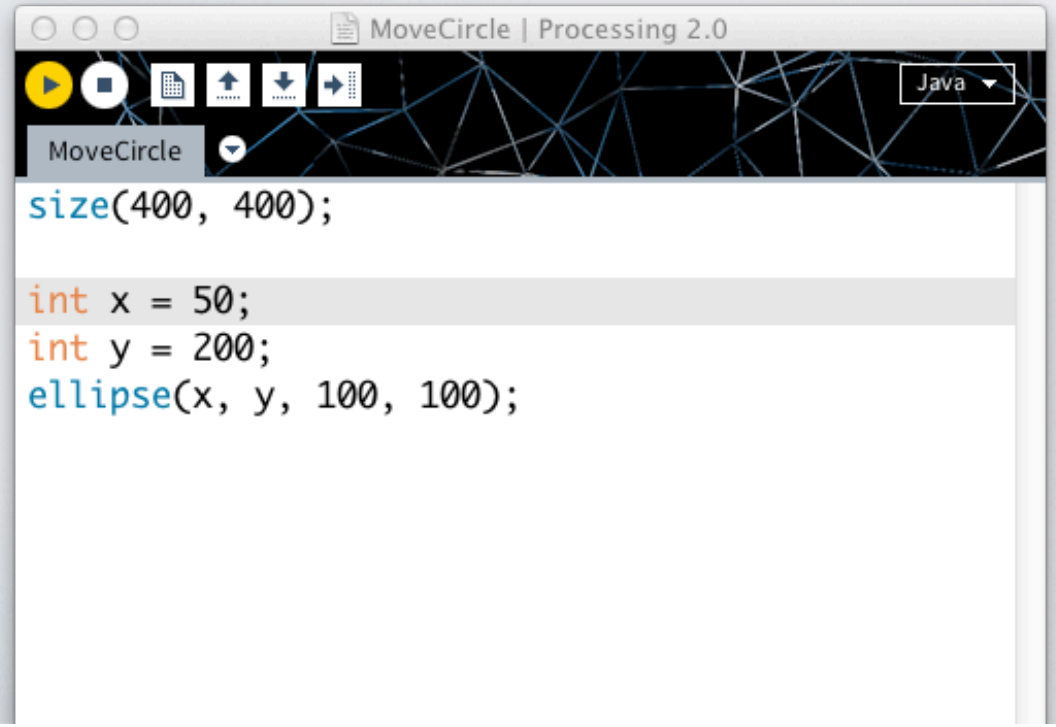


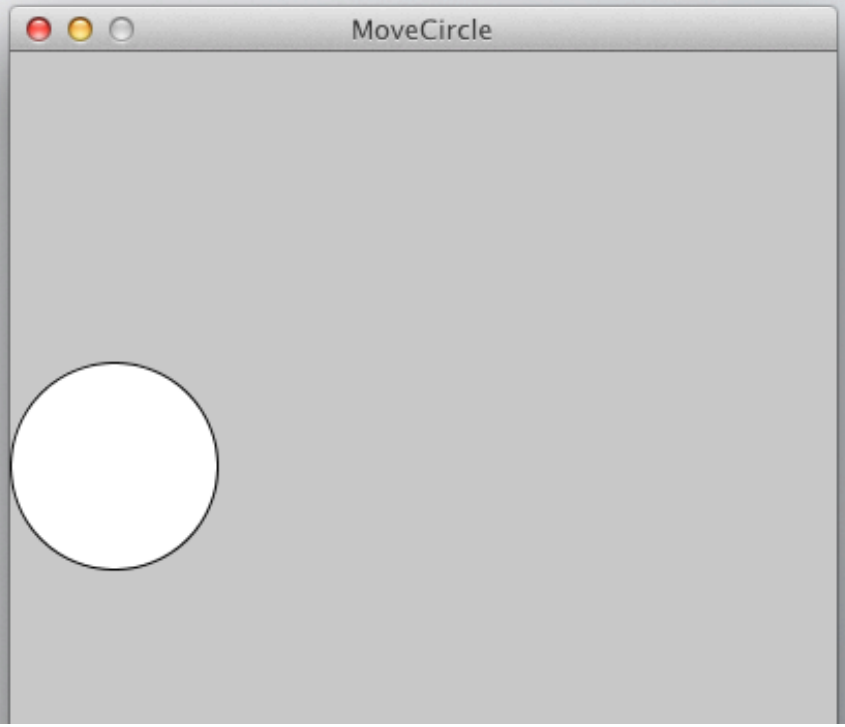
MOVE THE CIRCLE

Open the sketch:

Examples > MoveCircle > MoveCircle.pde

Change the value for x, keeping it between 0 and 400.

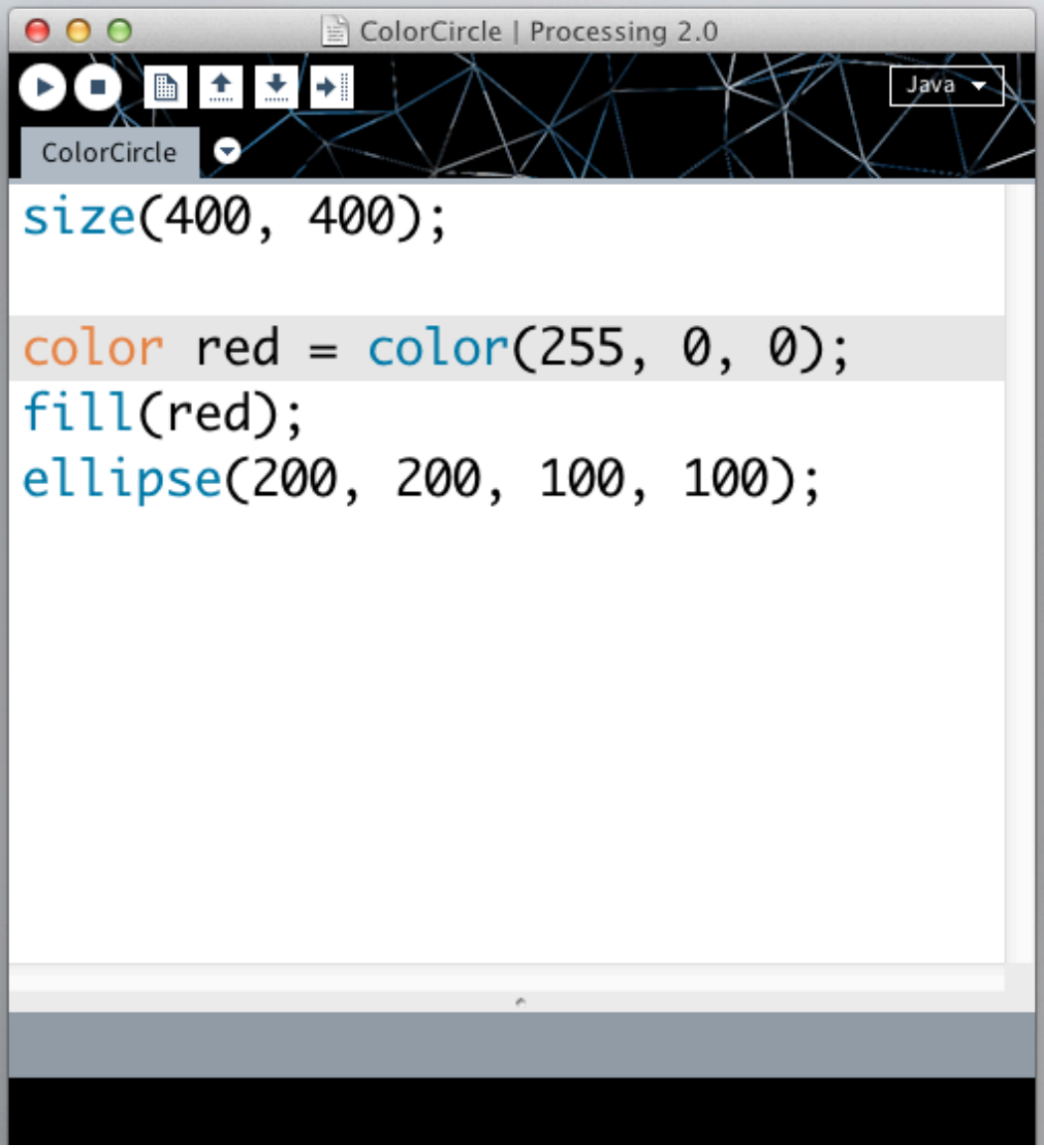


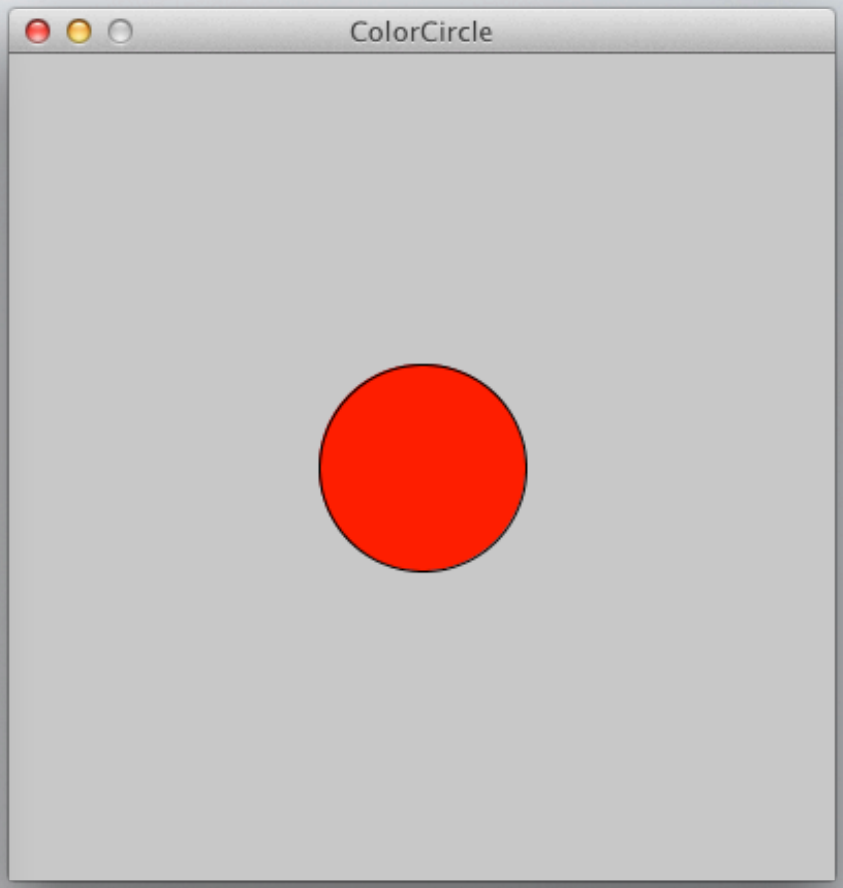


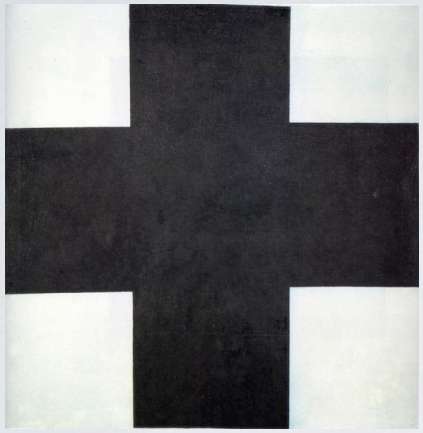
VARIABLES

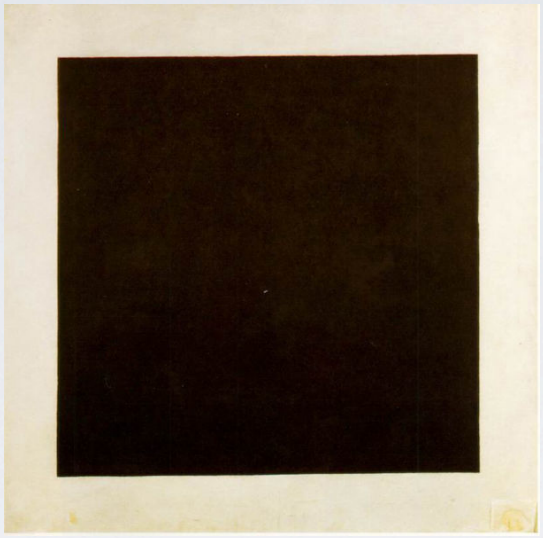
Draw shapes with color.

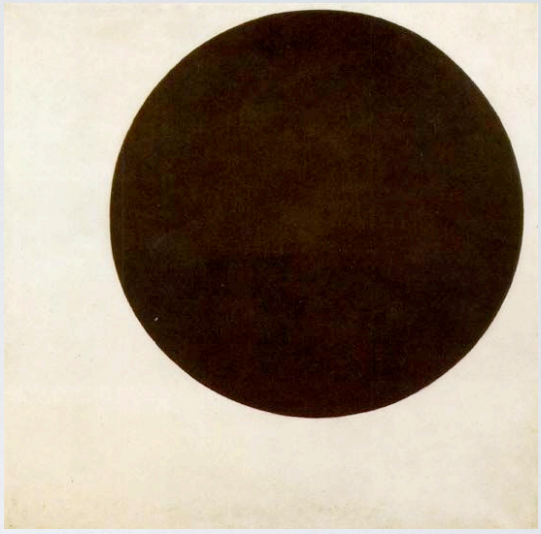
VARIABLES & COLOR







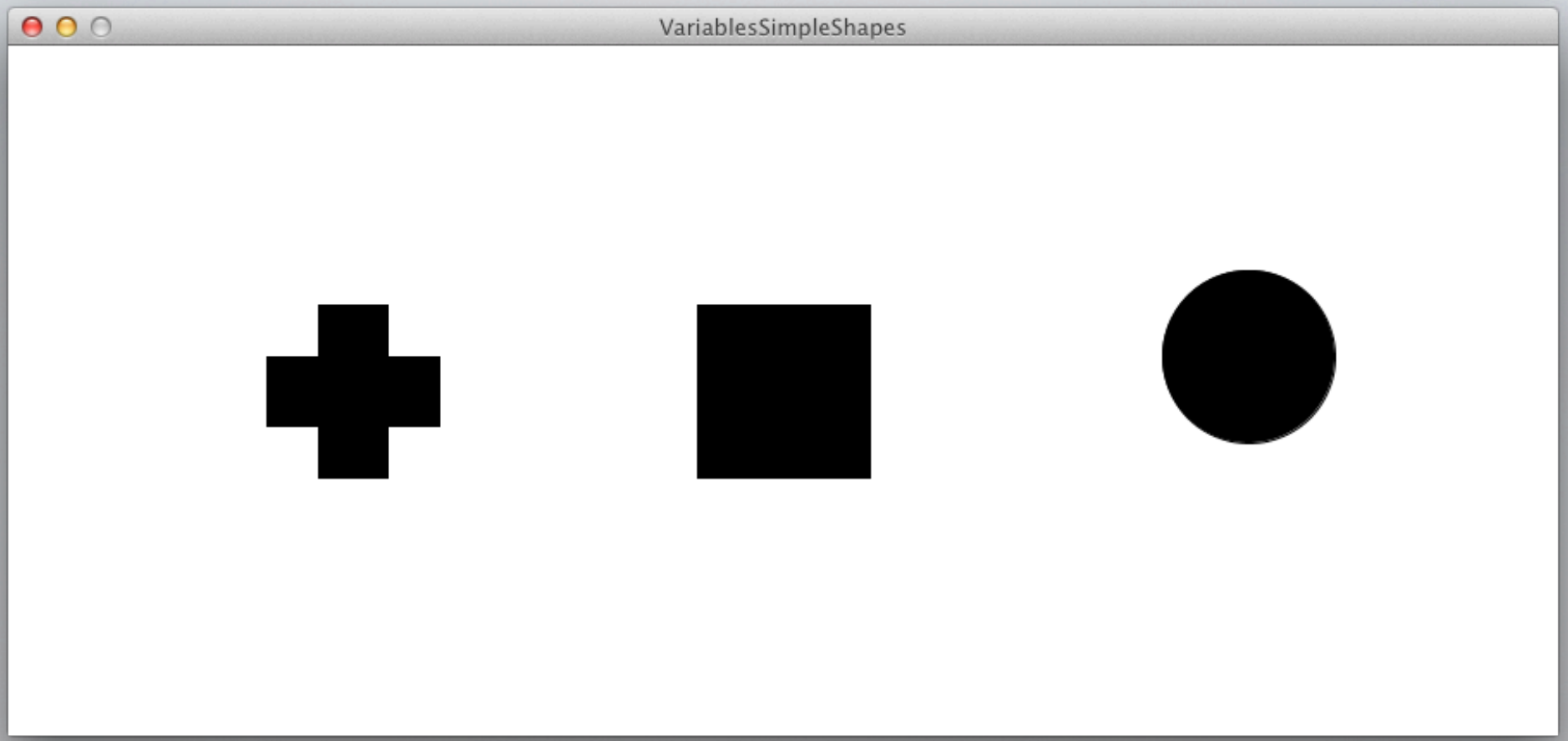


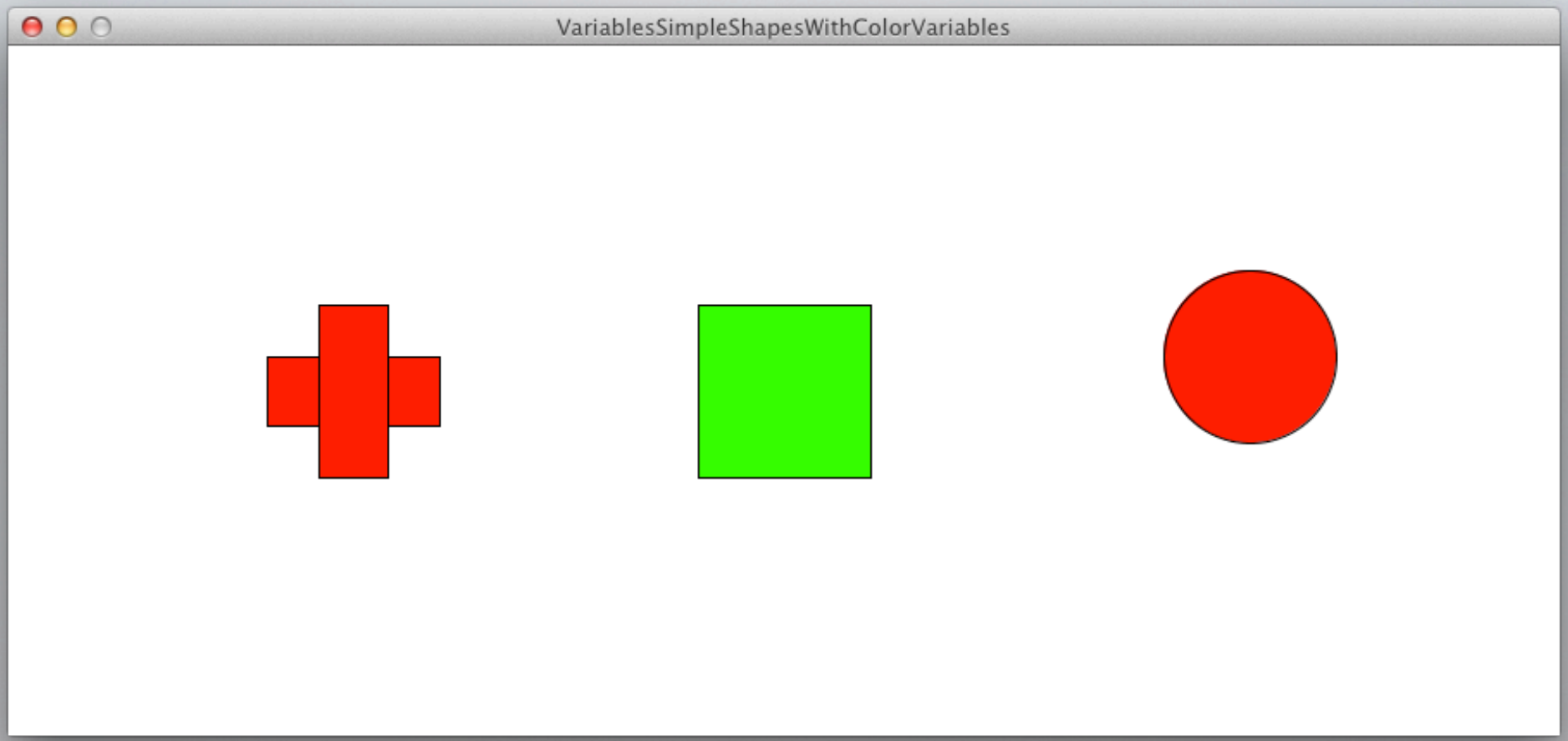


Kazimir Malevich (1879-1935)

Russian painter and art theoretician. He was a pioneer of geometric abstract art and the originator of the avant-garde, Suprematist movement.

http://commons.wikimedia.org/wiki/File:Black_Cross.jpg
http://commons.wikimedia.org/wiki/File:Black_square_lg.jpg
http://commons.wikimedia.org/wiki/File:Black_circle.jpg


VariablesSimpleShapes


VariablesSimpleShapesWithColorVariables

LAB: VARIABLES

Variables - Simple Shapes

PNMProcessingWorkshop_Summer2013 > LABS > VariablesSimpleShapes

COFFEE BREAK

15 minutes.

CHECKPOINT

interactivity and animation?

ANIMATION IN MOVIES

The motion picture.

Movies	24 fps
TV	30fps
The Hobbit	48 fps
Processing	60 fps (or whatever you want)

`setup();` Set size of sketch, create new variables, etc

`setup();` Set size of sketch, create new variables, etc

`draw();` Draw frame of your program

`setup();` Set size of sketch, create new variables, etc

`draw();` Draw frame of your program

`draw();` Draw frame of your program

setup(); Set size of sketch, create new variables, etc

draw(); Draw frame of your program

draw(); Draw frame of your program

draw(); Draw frame of your program

setup(); Set size of sketch, create new variables, etc

draw(); Draw frame of your program

draw(); Draw frame of your program

draw(); Draw frame of your program

draw(); Draw frame of your program

draw(); Draw frame of your program

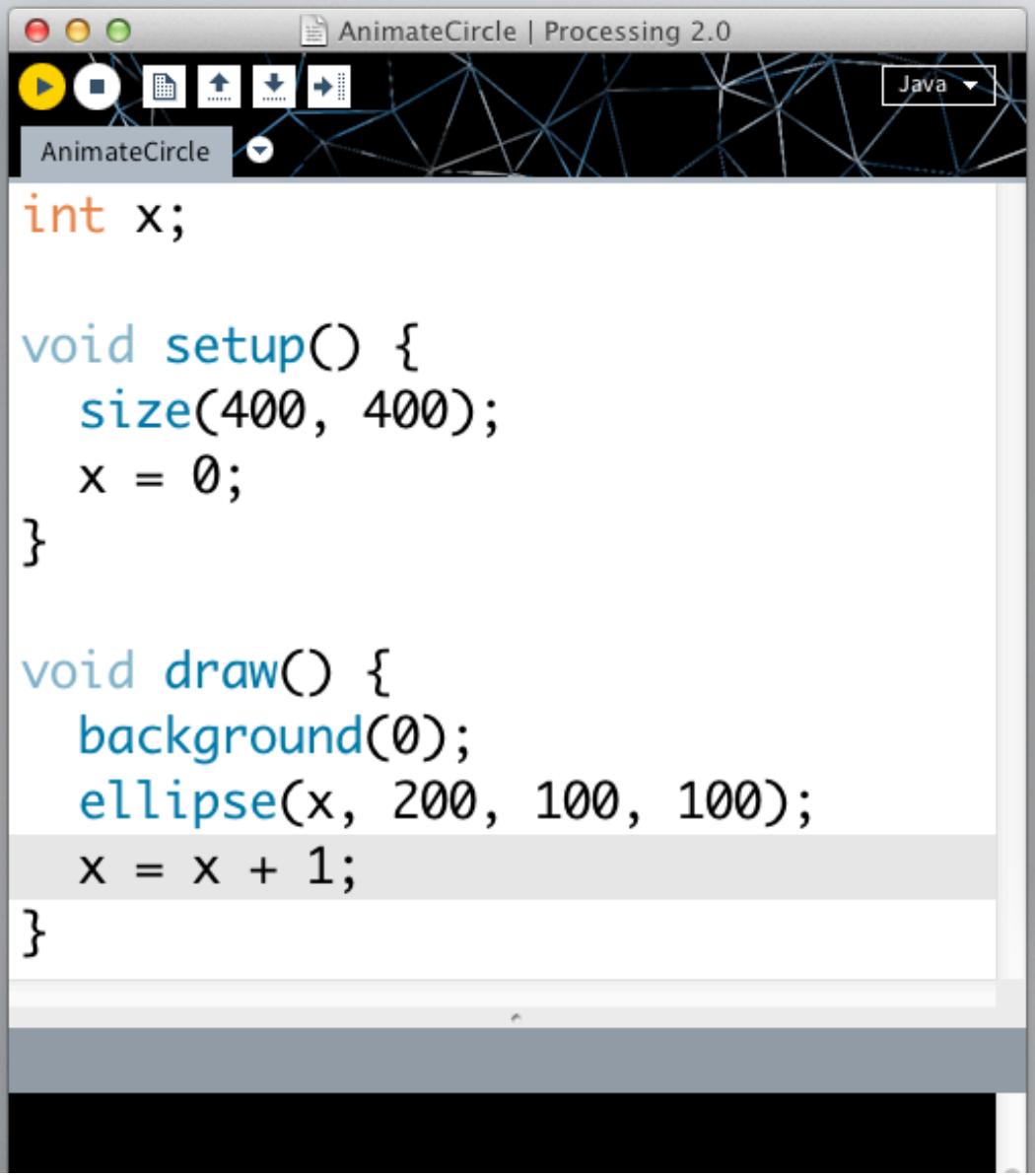
draw(); Draw frame of your program

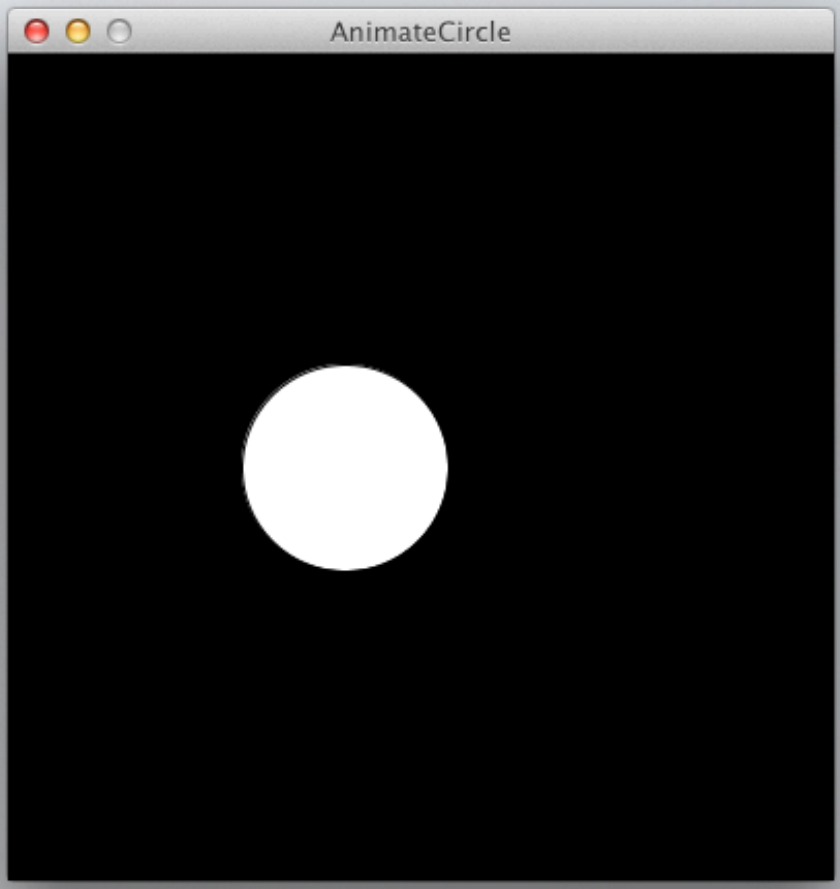
draw(); Draw frame of your program

draw(); Draw frame of your program

ANIMATION IN PROCESSING

ANIMATE


AnimateCircle | Processing 2.0
Java
AnimateCircle
int x;
void setup() {
size(400, 400);
x = 0;
}
void draw() {
background(0);
ellipse(x, 200, 100, 100);
x = x + 1;
}


AnimateCircle

CHECKPOINT

interactivity and animation?

INTERACTIVITY

Using mouseX and mouseY - ties into variables

LAB: INTERACTIVITY

```
ellipse(mouseX, mouseY, 100, 100);
```

PNMProcessingWorkshop_Summer2013 > LABS > MoveCircle

ANIMATING WITH VELOCITY

IF STATEMENT

IF STATEMENT

BasicIfColorChange | Processing 2.0

Java

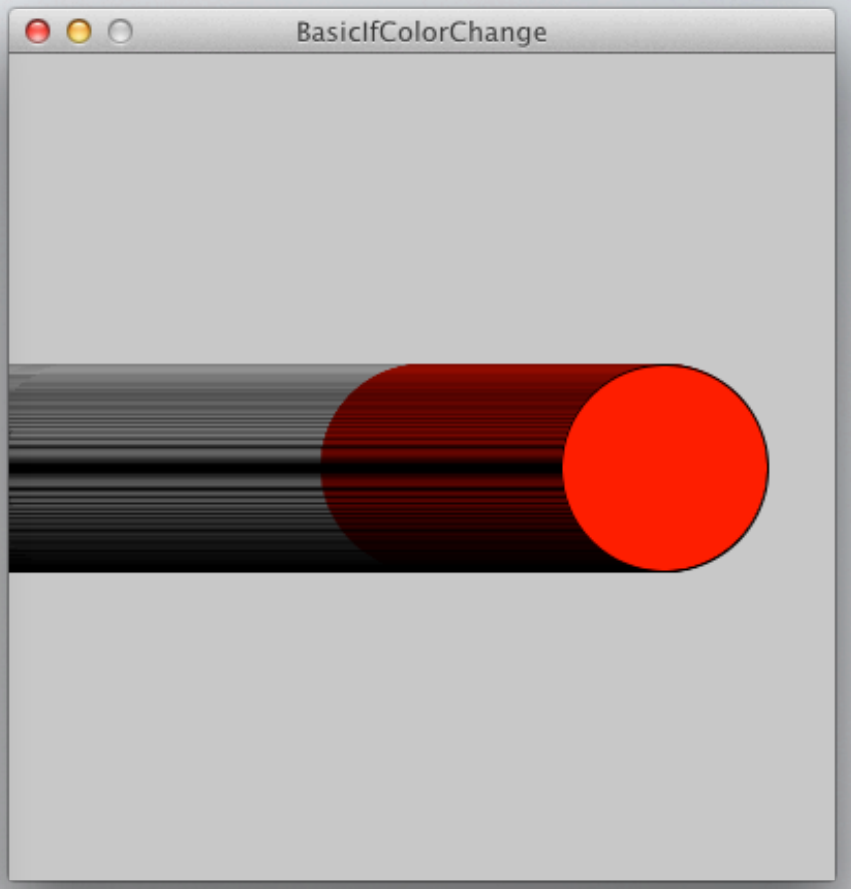
BasicIfColorChange

```
int x;

void setup() {
  size(400, 400);
  x = 0;
}

void draw() {
  if (x > 200) {
    fill(255, 0, 0);
  }

  ellipse(x, 200, 100, 100);
  x = x + 1;
}
```



LAB: BOUNCING ANIMATION

PNMProcessingWorkshop_Summer2013 > LABS > BouncingAnimation

WHAT'S NEXT?

https://github.com/PasDeChocolat/PNMProcessingWorkshop_Summer2013/wiki/Resources


Out Of Office


http://meetup.com/dynamic/

Kevin McCarthy

Real Geeks
me@kevinmccarthy.org

Kyle Oba

Pas de Chocolat
koba@pasdechocolat.com

@mudphone
facebook.com/WhatNoChoco

TEMPLATES FOR MANIPULATIVES

```
size(____, ____);
     width  height
```

```
size(____, ____);
     width  height
```

```
rect(____, ____, ____, ____);
     x      y      width  height
```

```
line(____, ____, ____, ____);
     start-x start-y end-x  end-y
```

```
rect(____, ____, ____, ____);
     x      y      width  height
```

```
line(____, ____, ____, ____);
     start-x start-y end-x  end-y
```

```
rect(____, ____, ____, ____);
     x      y      width  height
```

```
line(____, ____, ____, ____);
     start-x start-y end-x  end-y
```

```
rect(____, ____, ____, ____);
     x      y      width  height
```

```
line(____, ____, ____, ____);
     start-x start-y end-x  end-y
```

```
rect(____, ____, ____, ____);
     x      y      width  height
```

```
rect(____, ____, ____, ____);
     x      y      width  height
```

```
ellipse(____, ____, ____, ____);
        x      y      width  height
```

```
rect(____, ____, ____, ____);
     x      y      width  height
```

```
ellipse(____, ____, ____, ____);
        x      y      width  height
```

```
ellipse(____, ____, ____, ____);
        x      y      width  height
```

```
ellipse(____, ____, ____, ____);
        x      y      width  height
```

```
ellipse(____, ____, ____, ____);
        x      y      width  height
```

UH Pacific New Media : Introduction to Programming : June 15, 2013

Kevin McCarthy - me@kevinmccarthy.org
Kyle Oba - @mudphone - koba@pasdechocolat.com

- https://github.com/PasDeChocolat/PNMProcessingWorkshop_Summer2013/wiki/Workshop-Outline
- https://raw.github.com/PasDeChocolat/PNMProcessingWorkshop_Summer2013/master/Intro_to_Programming.pdf
- https://github.com/PasDeChocolat/PNMProcessingWorkshop_Summer2013/tree/master/LABS
- https://github.com/PasDeChocolat/PNMProcessingWorkshop_Summer2013/tree/master/LABS/SOLUTIONS
- https://github.com/PasDeChocolat/PNMProcessingWorkshop_Summer2013/tree/master/EXAMPLES
- https://github.com/PasDeChocolat/PNMProcessingWorkshop_Summer2013/wiki/Resources