Intro to Coding with Python– Graphics

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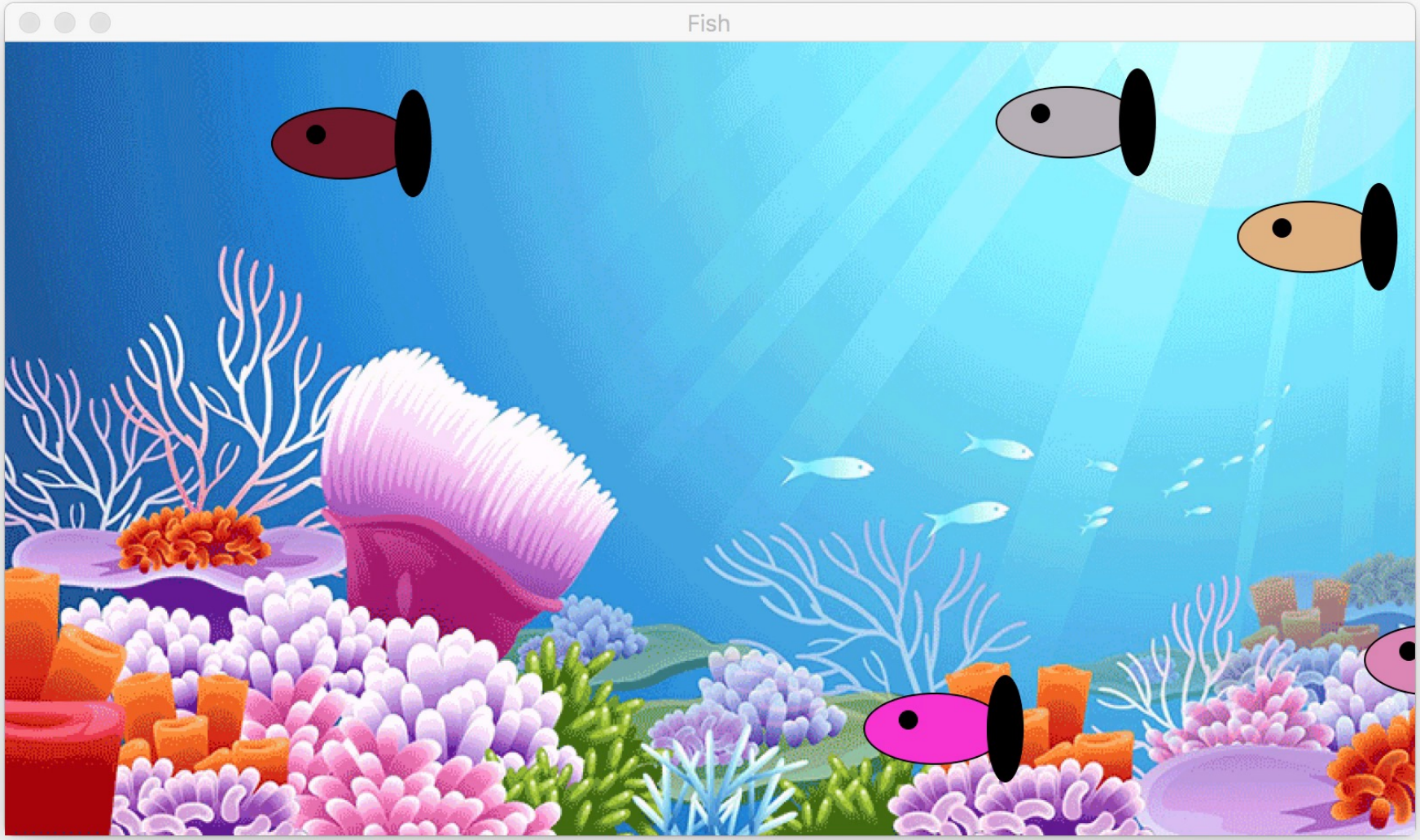
Slides based off slides courtesy of Jordan Crouser (https://jcrouser.github.io/)

Plan for Today

- Drawing pictures with **`graphics`**

Virtual Fish Tank



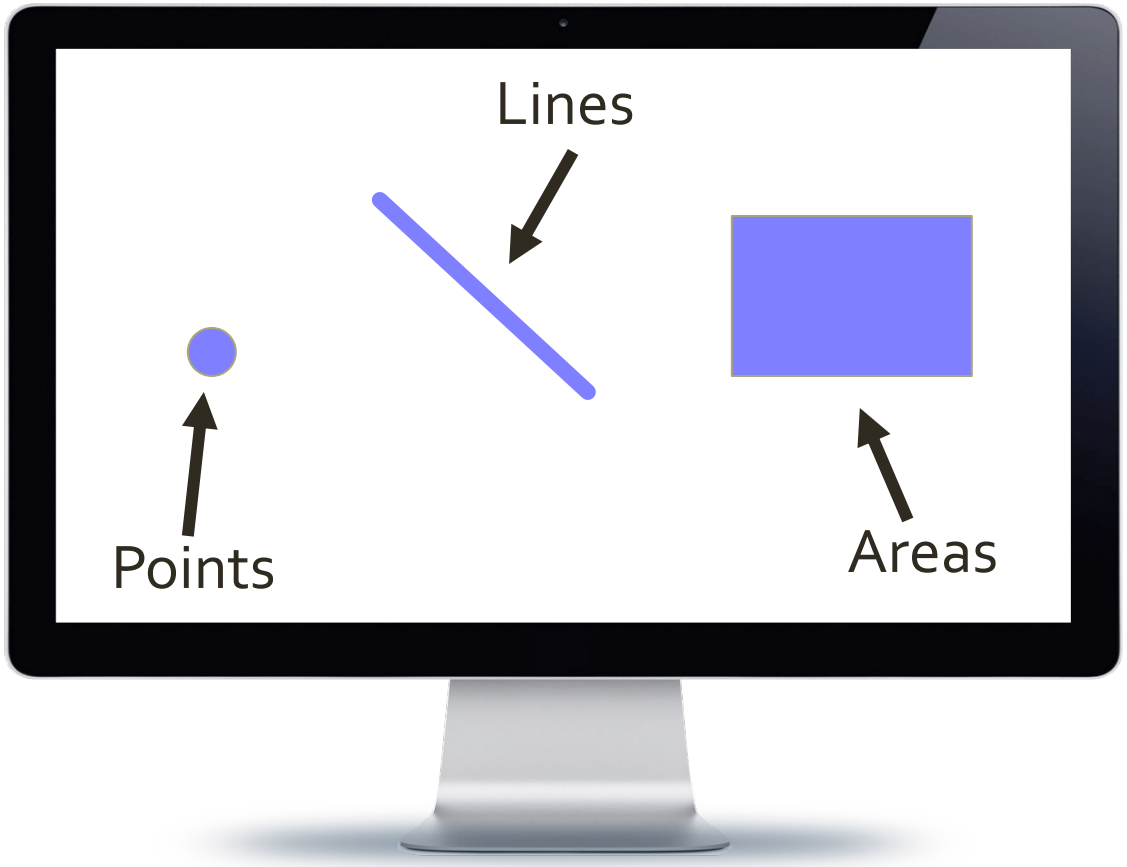
Discussion

How do you think they **built** that?

What **components** did they need?

1. Draw stuff

The images we draw are composed of marks: like ink



2. Make it move

…more about this Wednesday

3. Get input from the user and react

...more about this Friday

Hmm…

If these are the basic components of **every game**,

it's probably the case that **someone else**

has had to **build them before**…

The **`graphics`** module*

- Two kinds of objects:
  - stuff you draw (**`Graphics`** objects)
  - stuff you draw on (**`GraphWin`** objects)

- Basic formula for drawing graphics:
  - open a graphic window (a **`GraphWin`**)
  - construct some **`Point`**, **`Line`**, **`Circle`**, **`Oval`**, **`Rectangle`**, **`Polygon`**, and **`Text`** objects
  - draw them to the window
  - close the window when you're done
  - terminate the program

- written by John Zelle to go along with his book "Python Programming: An Introduction to Computer Science" (Franklin, Beedle & Associates)
  Available from: http://mcsp.wartburg.edu/zelle/python/

Our first **graphics** program

Untitled

```
from graphics import *

def main():
    win = GraphWin("CSC111 - Graphcs Demo", 600, 400)
    c = Circle(Point(50,50), 10)
    c.draw(win)
    win.getMouse()
    win.close()

if __name__ == "__main__":
    main()
```

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import the module

(this method means we don't have to type "**graphics.**" in front of every method)

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build a **GraphWin** object

width

height

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construct a **Circle** object
(centered at (50,50) with a radius of 10)

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draw the **Circle** to the **GraphWin**

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wait for the user to click
(so we can actually look at what we drew)

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close the **GraphWin**

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Our first **`graphics`** program

First "graphical primitives"

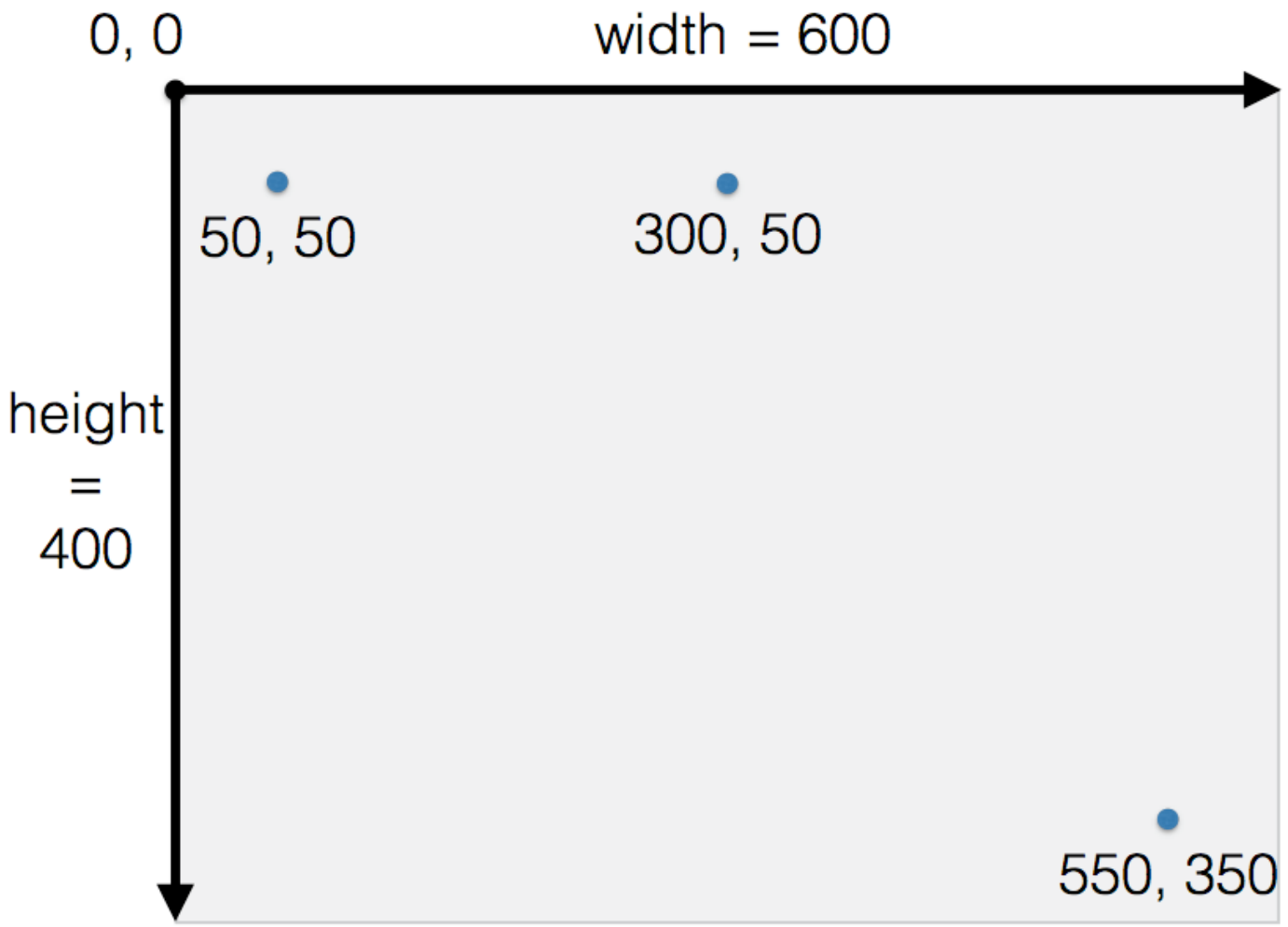
Points

- Used to anchor other objects (circles or rectangles)
- Defined by **x** and **y** coordinates

```
# create a point at location (50, 50)
p1 = Point(50,50)

# create a point at location (300, 50)
p2 = Point(300,50)
```

First "graphical primitives"



First "graphical primitives"

Circles

- Defined by a **center** and a **radius**
- The center is a **Point**

```
# create a circle centered at (50, 50)
# with radius 70
c1 = Circle( Point(50,50), 70 )
c1.draw( win )
```

First "graphical primitives"

Rectangles

- Defined by a **top-left,** and a **bottom-right point**

```
# create a rectangle with top-left corner
# at (5,5) and bottom-right at (50,50)

r3 = Rectangle( Point(5,5), Point( 50, 50) )
r3.draw( win )
```

Filling an object with color

```
# create a rectangle with top-left corner
# at (5,5) and bottom-right at (50,50)

r3 = Rectangle( Point(5,5), Point( 50, 50) )
r3.setFill( "red" )
r3.draw( win )
```

What if we want a more specific color?

```
# create a rectangle with top-left corner
# at (5,5) and bottom-right at (50,50)

r3 = Rectangle( Point(5,5), Point( 50, 50) )
color = color_rgb( 200, 100, 150 )
r3.setFill( color )
r3.draw( win )
```

Okay, let's make a fish!