

From Pixels to Games

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Pixels

- The only manner of creating a Picture is to do so at the pixel level
- You can make a library of Photoshop-like functions by just setting the pixels of a Picture based on another Picture
- Everything on the computer is created by altering pixels (desktop, cell phone displays, etc)
- In real time, one can do this same thing for TV weather forecasting (bluescreen, greenscreen)
- Animations are made by showing slightly different Pictures in quick succession

Photoshop Examples

- Flip (horizontal or vertical)
- Rotate 90, -90
- Scale (larger or smaller)
- Blur or sharpen
- Copy/paste
- Brighten or lighten
- Colorize, color altering (eg, red-eye removal)

Other Uses

- Greenscreen, bluescreen
- Stereographs
- Animations
- Image Processing
- Football
- Visualizations

Making Photoshop Functions

```
def copy(pic1):  
    pic2 = makePicture(getWidth(pic1), getHeight(pic1))  
    for pixel in getPixels(pic1):  
        setPixel(pic2, getX(pixel), getY(pixel), getColor(pixel))  
    return pic2
```

Objects

- Why?
- Terms:
 - Object
 - Class
 - Instance
 - Property
 - Method

What if you wanted to control two or more robots?



How do we currently control a robot?

```
forward(1, .5)  
turnLeft(.7, 2)
```

How could we indicate which robot we want to move?

One possible way of controlling more than one robot:

```
robot1 = Robot("Garth")
```

```
robot2 = Robot("Miley")
```

```
forward(robot1, 1, .5)
```

```
turnLeft(robot2, .7, 1.2)
```

forward() would have to know about many different kinds of Robots



Introducing “Objects”

- Objects are “things” (often nouns) in computing
- They know how to do things (verbs) and have attributes (properties)
- We can refer to properties and tell objects to do things by using the DOT (period):
 - `garth.turnLeft(1, 2)`
 - `jane.turnLeft(1, 3)`
 - `robot1.name`
- Verbs are just functions, but we call them “methods”