CS260: Object Oriented Programming

Objects - September 1, 2016

Overview

- Quiz next Thursday...
- Processing IDE
- Objects
- Classes
- UML Class Diagrams
  - Next Lecture

Quiz next Thursday...

1. Pascal Case
    a. When should you use Pascal Case?
        i. Class Names
    b. Give an example of Pascal Case.
        i. ThisIsPascalCase
2. Camel Case
    a. When should you use Camel Case?
        i. Variable Names, Function Names
    b. Give an example of a Camel Case.
        i. thisIsCamelCase

Quiz next Thursday...

3. All Capitals
    a. When should you use All Capitals?
        i. Constants
    b. Give an example of All Capitals.
        i. THIS_IS_A_CONSTANT
4. IDE
    a. What does IDE stand for?
        i. Integrated Development Environment
    b. Give the name of an IDE
        i. Processing IDE, Eclipse, Microsoft Visual Studio

Quiz next Thursday...

5. Classes
    a. What does a class declaration look like?

```
public class ClassNameHere {
        //this is where fields go
        ClassNameHere(){
                //this is where we set up the class
        }
        //this is where methods go
}
```

Processing IDE

- IDE - Integrated Development Environment
  - Syntax Checking
  - Code Completion
  - 1 Step Click to Compile & Run
  - Color Chooser
- Other IDE’s
  - Eclipse - Java
  - Visual Studio - Windows Stuff

Loading Images

- To Load Images in Processing:
  - PImage Object - Special Variable Type that holds Image data
  - loadImage() gets pointed to a file
  - Render the PImage Object with the image()
- Demo

Objects

- Why use objects?
  - Encapsulation
    - Organize Related Code
    - Divide Up Responsibilities
  - Modular Code
    - Reusable Code
    - Extendable - Inheritance
  - New Types
    - Point2D, Car, House, Submarine

What do Objects look like?

- Modelled after real-world objects
- 2 Main Parts
  - State
    - Fields - Internal Class Variables
  - Behavior
    - Methods - Internal Class Functions
- Example : Car
  - State
    - Number of Wheels
    - Color of Car
  - Behavior
    - Drive
    - Park

How do we make Objects?

- Classes are Object Blueprints
  a. What does a class declaration look like?
  b. Constructor - sets up object

```
public class ClassNameHere {
        //this is where fields go - state
        ClassNameHere(){
                //this is where we set up the class
        }
        //this is where methods go - behavior
}
```

Demo: Bubble

Bubble Class

- 2 Main Parts
  - State
    - Fields - Internal Class Variables
      - x, y, radius, color
  - Behavior
    - Methods - Internal Class Functions
      - floatUp - move the object by changing x, y location
      - drawBubble - draw the object according to x, y, radius, and color

Bubble Class

```
public class Bubble {
	int x, y;
	int radius;
	int col;
	Bubble(int startX, int startY, int rad, int c){
		x = startX;
		y = startY;
		radius = rad;
		col = c;
	}
	public void floatUp(){
		if(y < 0){
			y = height;
		}
		y--;
	}
	public void drawBubble(){
		noFill();
		stroke(col);
		ellipse(x, y, radius, radius);
	}
}
```

In Main

```
Bubble b;
Bubble q;

void setup() {
        b = new Bubble(width/2, height/2, 50, #FF0000);
        q = new Bubble(200, 200, 100, #00FF00);
}

void draw(){
        b.drawBubble();
        b.floatUp();
        q.drawBubble();
        q.floatUp();
}
```

On Your Own (...not homework...)

- Make an Array of at least 20 Bubbles
- Use a for-loop to initialize the objects (via Constructors) to random values

- What does an Array of Bubbles look like in Java?
- HINT: integer arrays Look like this in Java:
  - `int[ ] intArray = new int[ SIZE ];`

- ...Try ArrayLists if we have time...