Computer Science I (Java) – CSC 130 – Duke Hutchings

Notes (Day 5)

- Methods that return data
- Classes and Objects Java

Methods that Return Data

Remember this?

```
public void drawFace(int x, int y, int size) {
  ellipse(x, y, size, size);
  // etc.
}
```

We now add a wrinkle: methods that not only do work,
but also **return** a result from the work

Methods that Return Data

Now we add a data type and return statement (output data)

```
public int loanCost(double monPmt, int numPmts, int amt) {
  int totPaid = (int)(monPmt * numPmts);
  int totCost = totPaid - amt;
  return totCost;
}
```

// The method type was **void** but now it's **int**

// The last line **returns** a value of the **int** type

Using Methods that Return Data

We call the function by sending **arguments** that match the type

We **assign** the result to a variable of matching type

```
int myCost = 0;
myCost = loanCost(249.87, 60, 13500);

public int loanCost(double monPmt, int numPmts, int amt) {
  int totPaid = (int)(monPmt * numPmts);
  int totCost = totPaid - amt;
  return totCost;
}
```

Worksheet Time!

Let's do some practice on the worksheet

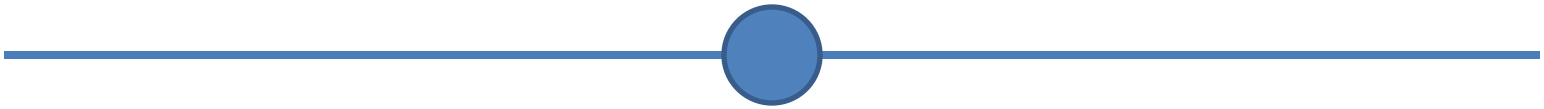
We'll also see how to do some code testing in Java

Java Objects

Motivation

What if you need a method that returns more than 1 value?

Example: finding the midpoint between two points



Objects

allow storage of many variables in one place

also define actions that can be taken on the variables

The Point Object

Models an ***x*** and a ***y*** coordinate

Has `int` methods `getX()` and `getY()`

Has `void` methods `setX(int x)` and `setY(int y)`

Has `void` method `resetX(int x, int y)`

Basically, the Point object stores two values that can be retrieved independently, set independently, or set simultaneously.

Relationship to Variables: Declaration

```
/* OBJECTS */

// defining an object
Point p;


// defining with a value
Point p = new Point(2, 4);
```

```
/* VARIABLES */

// defining a variable
int startX;
int startY;

// defining with a value
int startX = 2;
int startY = 4;
```

Relationship to Variables: Using and Assigning values

```
/* OBJECTS */

// setting data value
p.setX(5);

// setting data value
p.reset(9, 7);


// getting data
int s = p.getX() + p.getY();

// getting data
int a = p.getX();
```

```
/* VARIABLES */

// defining a new variable
startX = 5;

// defining with a value
startX = 7;
startY = 9;

// getting data
int s = startX + startY;
```

The Point Object

Also has `int` method `length(Point p)`

That's right... a method of an object can take an object of the same type as a parameter.

Relationship to Variables: Using and Assigning values

```
Point p = new Point(10, 20);
Point q = new Point(14, 23);

int dist = p.length(q);

// dist will have the value 5
// at this point in the code

dist = q.length(p);

// since length doe not have a direction
// this call results in an identical value
```

Java Objects Note

Objects can model pretty much **anything**

- a moving object (animation, video, etc.)
- a person (such as a Facebook profile)
- a student (like on OnTrack, Moodle, etc.)
- a message (email, facebook, twitter, etc.)
- an event (such as a crime or a student org. meeting)
- a location (such as a restaurant, park, room in a building)
- etc. etc. etc.

Demo Time!

Feel free to follow along using the download listed on the Web page (go to next slide first though...)

Coming up: Practicing using Variables, Methods, and Objects (PW2)