Quiz 14: Recursion and objects SOLUTION

CSCI 110 Section 1

Wednesday, September 28, 2016

1) What's printed when you call warmup(10)? [no points, warmup]

```
void warmup(int x) {
    if (x < 0) {
        System.out.println("finally");
        return;
    }
    if (x % 2 == 0) {
        System.out.println("even");
    } else {
        System.out.println("odd");
    }
    warmup(x - 3);
}
```

even
odd
even
odd
finally

Say you have the following function:

```
void someFunction(double d) {
    if (d < 2) {
        System.out.println("whew");
        return;
    }
    System.out.println(d);
    someFunction(d - 0.5);
}
```

2) Please convert each line of code to English. [30 points]

- **Defines a function called someFunction; the return type is void and there's one parameter, a double**
- **Tests if d is less than 2**
    - **If d was less than 2, prints "whew"**
    - **Returns from the function**
- **Prints out d**
- **Calls itself with the value of d minus 0.5**

3) What's printed when you call someFunction(4)? [30 points]

4
3.5
3
2.5
2
whew

Consider the following class.

```
class Roadrunner {
    private int speed;

    public Roadrunner(int speed) {
        this.speed = speed;
    }

    public void setSpeed(int newSpeed) {
        speed = newSpeed;
    }

    public int getSpeed() {
        return speed;
    }
}
```

and a separate function fn:

```
void fn(Roadrunner r) {
    r = new Roadrunner(50);
    r.setSpeed(20);
}
```

4) What gets printed when the following code is run? Why? [40 points]

```
Roadrunner runner = new Roadrunner(100);
fn(runner);
System.out.println(runner.getSpeed());
```

100

We pass ‘runner’ as a parameter when we call the function fn, which causes the parameter ‘r’ to get initialized to the same value. ‘runner’ and ‘r’ initially refer to the same Roadrunner. But then we construct a new, different Roadrunner and assign it to ‘r’. We change the speed of this new Roadrunner to 20. The speed of the Roadrunner named ‘runner’ is unaffected.