Quiz Preparation for Week 6

function and method: interchangable

variable and field: interchangable

instance and object: interchangable

Concepts

- Static function/variable (09/28)
- Inheritance (09/29)
  - overriding functions

- Polymorphism (09/30)
  - "is a" relationships
  - up/down casting

- Equality and Copy Constructor (10/01)
  - overriding equals()
  - designing copy constructor

Warm-ups problems

Static function/variable

1. What is a static function for a class? What's its difference from an instance function?
2. A static function can/cannot do _____?
3. What does keyword *final* do?

Inheritance

4. Bird is a type of animal. A chick is a bird. A penguin is a bird. Declare four classes to reflect their relationships.
5. What is the keyword for invoking parent class constructor?
6. Given the following class declarations, what variable(s) can Bird access from Animal?

```java
public class Animal {
  public int one;
  private int two;
  protected int three;
}
public class Bird extends Animal {
  // things
}
```

7. How do you override a function from the parent class?

Polymorphism

8. Identify the error in the following codes:

```java
public class Bird { }
```

```
public class Penguin extends Bird { }

void isPenguin(Penguin d) { /* do nothing */}

Bird b = new Bird();
isPenguin(b);
```

9. What is upcasting? Given the following codes, what can Penguin be upcast to?

```
public class Animal { }
public class Bird extends Animal { }
public class Penguin extends Bird { }
```

10. Assume we have the following codes, will there be an error? Why?

```
public class Penguin extends Bird {
  public void swim() {}
}

Bird b = new Penguin();
b.swim();
```

11. Assume we have the following codes, will there be an error? Why? *(Hint: this is about down casting)*

```
public class Penguin extends Bird {
  public void swim() { }
}

Bird b = new Penguin();
if (b instanceof Penguin) {
  Penguin thisB = (Penguin) b;
  thisB.swim();
}
```

Equality and Copy Constructor

12. What are some aspects you want to check for designing your equals() function?

13. How do you define a copy constructor?

Combining it all together!

Whew! That's a lot of materials above huh?