Java 4.1: Inheritance and Interfaces

For problems 1 & 2, upload a **pdf** of your answers to your Java 4.1 GitHub repository.

Syntax

The syntax for extending a superclass in a subclass is

```
class SubClassName extends SuperClassName
```

The syntax for implementing an interface in a class is

```
class ClassName implements InterfaceName
```

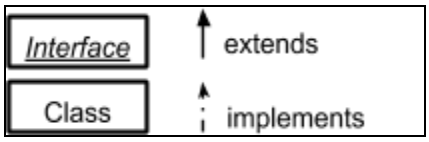
Remember to include `@Override` when you override a method.

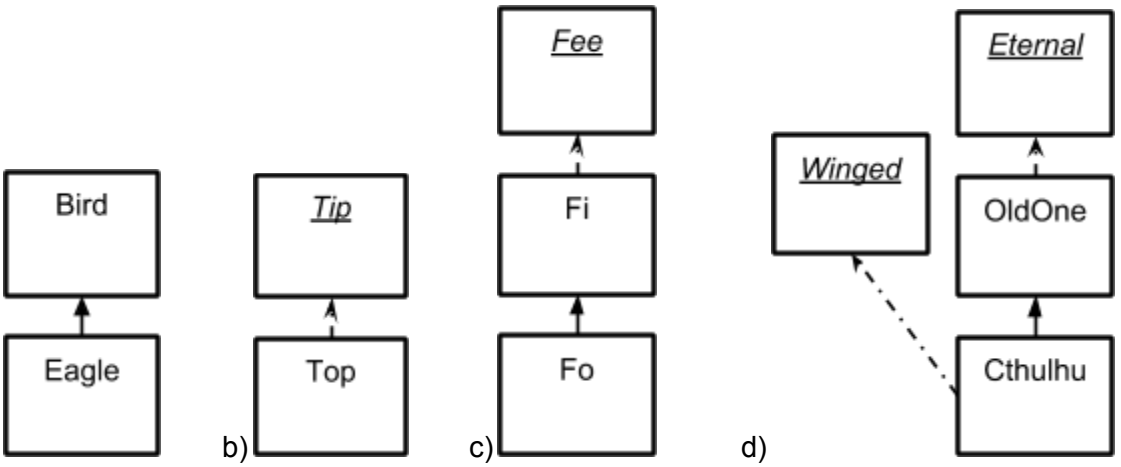
Questions

1. Explain what is wrong with the interface below, and modify it so that it will compile.

```
public interface DoesNotCompile {
    void aMethod(int newInt){
        System.out.println("I am broken!");
    }
}
```

2. Turn the class diagrams below into valid Java declarations. The first is shown as an example.





a:
```
public class Bird { }
public class Eagle extends Bird { }
```

3. Designing subclasses and interfaces

    a. Create a subclass of `TwoDShape` (the code is already in the Java 4.1 repository) called `Circle`. Include:

        i. A constant PI that stores the value of pi to at least 3 significant figures.

        ii. An instance variable to store the radius.

        iii. A method called `calcArea()` that overrides the method in TwoDShape and that returns the area of the circle. Remember your `@Override` keyword.

        iv. A constructor that takes the radius as a parameter and uses `super()` to set the total height and width of the shape. See `Rectangle` for an example class.

    b. Create an interface called `Named` that has two methods, one to set and one to return a name (what type should a name have?). Call those methods `setName` and `getName`.

    c. Create a new class called `NamedCircle` that is a subclass of `Circle` and uses the `Named` interface. Make sure you include all the required instance variables and methods.

    d. Create a class called `TestShape` that has a main method in which you 1) create an ArrayList of `TwoDShape` objects, 2) add one each of `Circle` and `Rectangle` objects with sizes of your choice, and 3) print out the area for both using an enhanced for loop.