Montgomery College, CMSC 203
Worksheet 1
Module 17

Objectives
- Interfaces
- Polymorphism with interfaces

Concept Questions

1) In Java, a(n) _____ is a collection of constants and abstract methods.
   a) polymorphic reference
   b) abstract class
   c) implementation
   d) interface
   e) iterator

2) Write a header for an interface called "Animal"

3) The fields in the interfaces are treated as:
   a) final
   b) static
   c) both a and b
   d) interfaces cannot contain fields

4) (True/False) An instance of an interface CAN be created just like an instance of a class.

5) A class can be derived from (one/multiple) superclass(es) and it can implement (one/multiple) interface(s).

6) A polymorphic reference is one that can refer to _____ type(s) of object(s).
   a) exactly one
   b) zero
   c) multiple
   d) abstract
   e) static

7) In Java, polymorphic references can be created through the use of _____ and _____.
   a) inheritance, interfaces
   b) inheritance, abstract classes
   c) interfaces, abstract classes
   d) interfaces, iterators
   e) none of the above

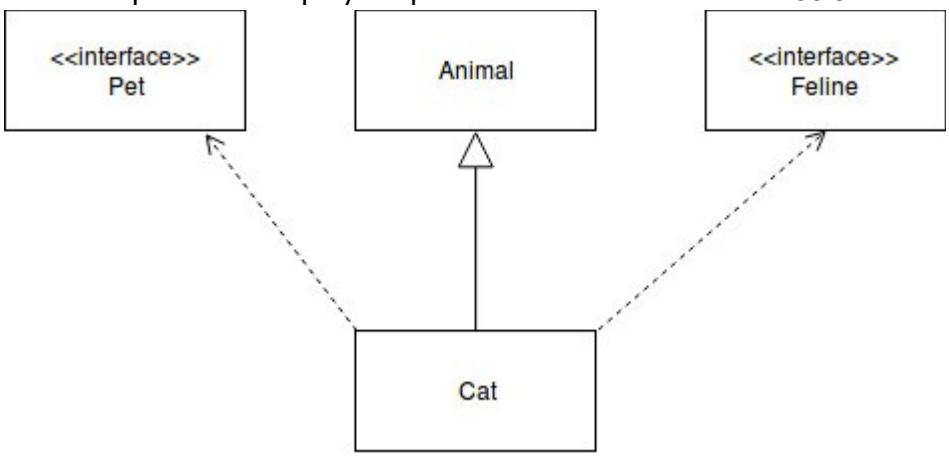
8) Suppose `Animal` is an interface that specifies a single method – `speak`. Now suppose the Dog class implements the `Animal` interface. In addition to the speak method, the Dog class also has a method called `wagTail`. Now consider the following code.

```
Animal a = new Dog();
a.wagTail();
```

Which of the following is true about this code?

a) It will result in a compile-time error.
b) It will result in a run-time error.
c) It will call the speak method defined in the Animal interface.
d) It will call the `wag`Tail method defined in the Dog class.
e) none of the above are true.

9) Write a header that represents the polymorphic architecture of the class `Cat`:



10) It is possible to define a method in the interface by using a:

a) static method
b) final static method
c) default method
d) you cannot define methods in the interface

11) Methods in an interface have public visibility by default. (True/False)

12) All the methods in the Interface are abstract by default (True/False)

13) What is the wrong with the following code?(assume each class is defined in its own java file).

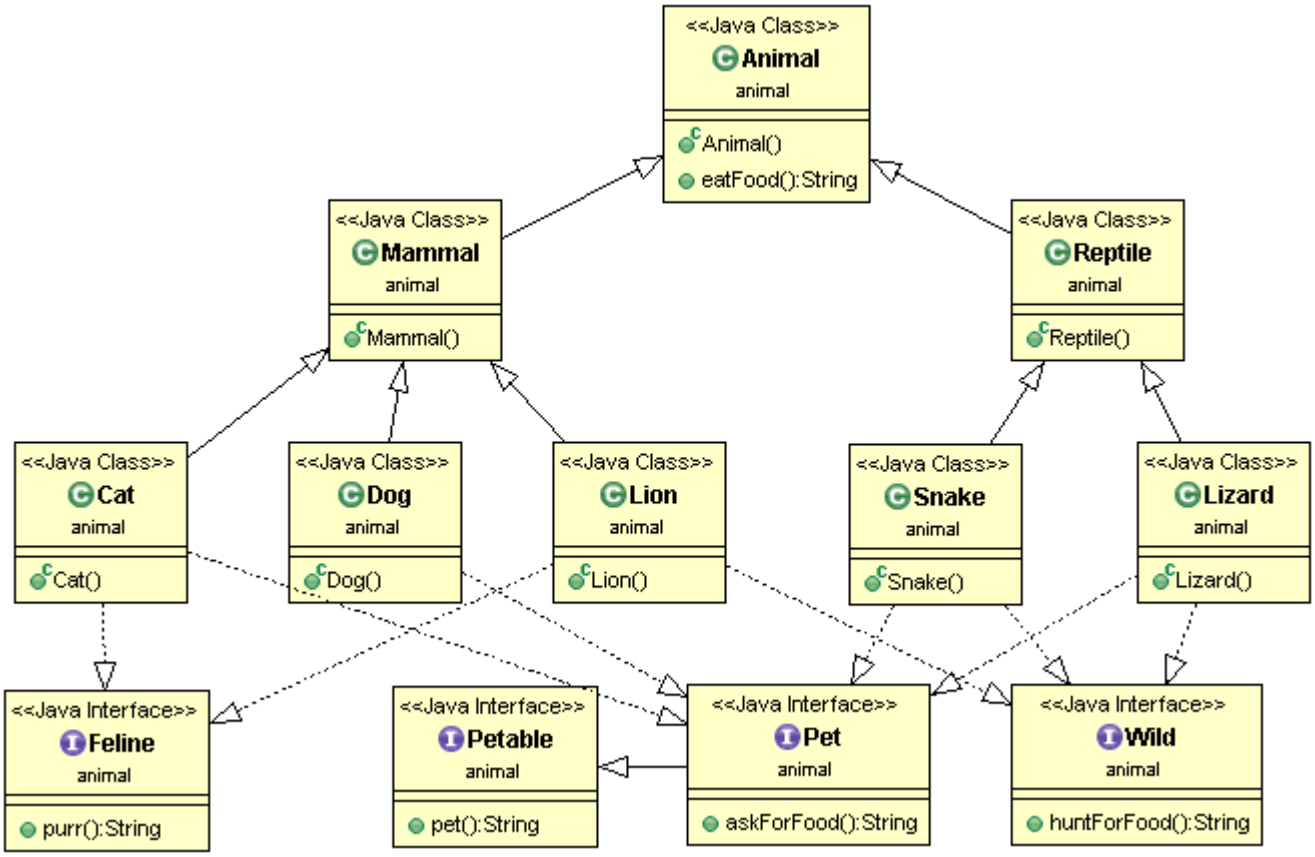
```
1. public interface MobileDevice
2. {
3.   String MNUFACTURE;
```

```
4.     public String turnOn();
5.     public String takePicture() { return "Ready to take picture"; }
6.     public String record(int start, int end);
7.     public String pause();
8. }
```

```
1. public class Iphone implements MobileDevice {
2.   public String turnOn () { return "Iphone is turned on"; }
3.   public String takePicture () { return "picture taken by iphone"; }
4.   public String pause(){ return "pause recording"; }
5. }
```

Programming Question:

1. Convert the following UML diagram design into classes and interfaces



2. Implement the methods seen in the UML diagram. All the methods simply return a string of the activity. For example, askForFood() method implementation in the Cat subclass will simply return a string "Cat is asking for food". Another example is a pet() method in the Petable interface will return "Being petted".