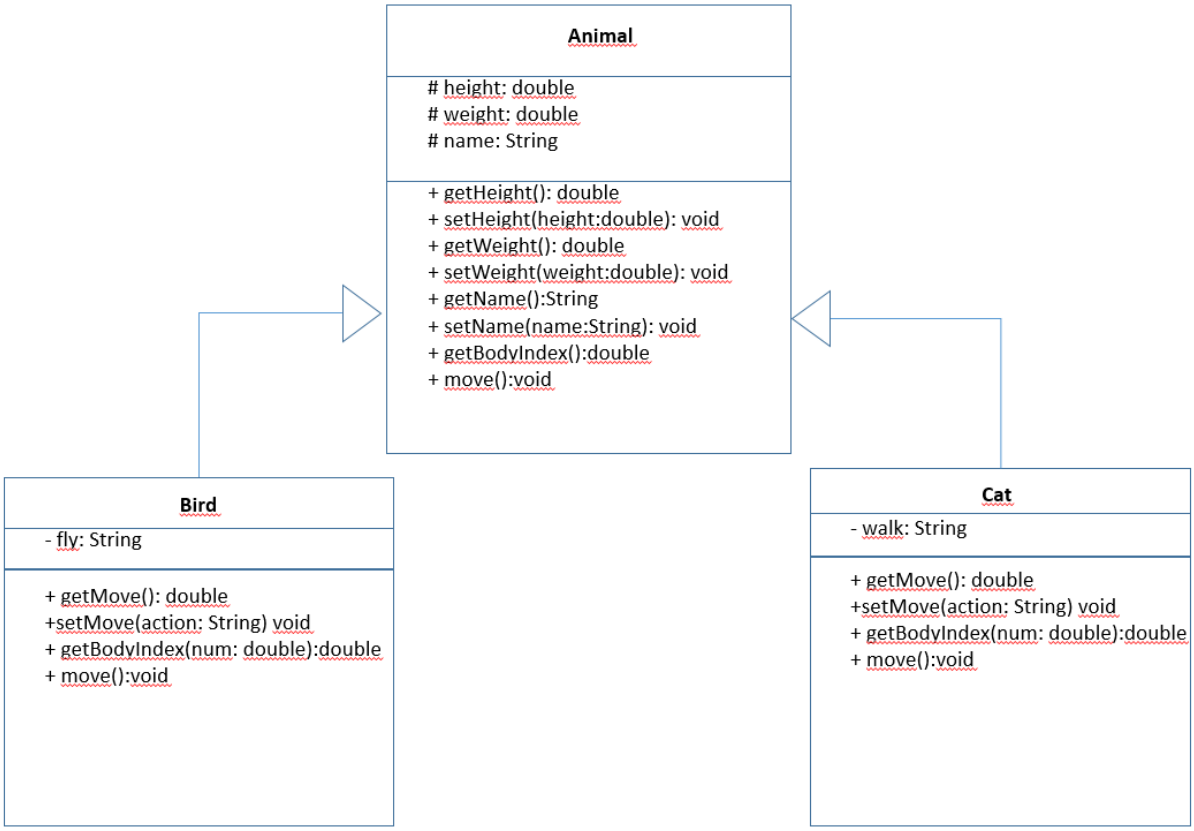
2021 – 2022 Spring, CMPE 114/211 Fundamentals of Programming II

Lab Assignment 7

Section … - Question 1

In this lab assignment, you are asked to write java code of given classes in the following class diagram.



Instructions:

- Create classes with defined attributes.
- Write the methods of classes according to the given signatures,
- You can get class name using the following code in java:
  - this.getClass().getSimpleName();
- The methods **move(), getBodyIndex()** give information when it is invoked. It prints out the class name and "…method is invoked ".
  - i.e. `move()` method has the following line:

```
System.out.println(this.getClass().getSimpleName() + " move method is invoked");
```

- The properties of the **super class** is as follows:
  - The access (visibility) modifiers are as given in the diagram.
  - getBodyIndex() methods calculates the body mass index of the animal.
    Body Index Formulation for animal: **weight/height**
  - move() method prints out:
    "Every "+ class name+ " has a movement type"
- Part of the code for this class given below.

Animal.java

```
6
7
8     public double getHeight() {
9         return height;
10    }
11    public void setHeight(double height) {
12        this.height = height;
13    }
14    public double getWeight() {
15        return weight;
16    }
17    public void setWeight(double weight) {
18        this.weight = weight;
19    }
20    public String getName() {
21        return name;
22    }
23    public void setName(String name) {
24        this.name = name;
25    }
26
27    public void move() {
28        System.out.println(this.getClass().getSimpleName()+" move method is invoked");
29        System.out.println("Every "+this.getClass().getSimpleName()+" has a movement type");
30    }
31
```

- In the **subclasses**:
- Get the type of move by setMove method. Take the move type as the parameter.
- Overload the getBodyIndex() method of super class with a double parameter,
  - The method calculates the body mass index of the animals
  - The method takes a double value as the parameter, *num*
  - The formulation for body mass index: **(weight/height)*num**
  - Print out the result.
- Override the move() method of super class.
  - The method calls the move method of the super class at the first line.
- Prints out the name of the class and the method:
  - `System.out.println(this.getClass().getSimpleName() + " move method is invoked");`

    Prints out the following line:
    - "The animal " + class name + fly(String variable) (for Bird class)
    - "The animal " + class name + walk(String variable) (for Cat class)

- The runnable class is as follows:
- The name of the class is **testInheritance.java**
- It creates one instance of each class.
  - Animal animal = new Animal();
  - Bird bird =new Bird();
  - Cat cat =new Cat();

- The height of animal is set to 100, the weight of animal is set to 70, the name of animal is set to “Lion”
- The height of cat is set to 125, the weight of cat is set to 40, the name of cat is set to “Boncuk”
- The height of bird is set to 60, the weight of bird is set to 20, the name of bird is set to “Mavis”
- Part of the code for this class given below.

```
public class testInheritance {

    public static void main(String[] args) {

        Animal animal = new Animal();
        Bird bird =new Bird();
        Cat cat =new Cat();

        animal.setHeight(100);
        bird.setHeight(60);
        cat.setHeight(125);


        animal.setWeight(70);
        bird.setWeight(40);
        cat.setWeight(20);

        animal.setName("Lion");
        bird.setName("Boncuk");
        cat.setName("Mavis");

        animal.getBodyIndex();



        animal.move();

    }

}
```

- To test your code, inside main method, invoke getBodyIndex() and move() methods of related classes to obtain the given output.

You can see the expected output below!!

Expected Output:

```
Animal getBodyIndex method is invoked
Body index: 0.7
Bird getBodyIndex method is invoked
Body index: 0.6666666666666666
Cat getBodyIndex method is invoked
Body index: 0.16
Animal move method is invoked
Every Animal has a movement type
Bird move method is invoked
Every Bird has a movement type
Bird move method is invoked
The animal Bird flies
Cat move method is invoked
Every Cat has a movement type
Cat move method is invoked
The animal Cat walks
```