CSC 110 2.0 Object Oriented Programming

Tutorial 08

Instructions:

- All questions must be attempted and answers submitted in a handwritten document, **on or before, 12.00pm noon on Monday, 9th September 2019, to the Department Office**.
- You must indicate your **Index Number and the Tutorial Class** to which you belong to **(LCS1/ LCS2/ NFC3.1)** clearly on the front page of your submission.
- Recommended Time Duration: **1 hour**

A. Understanding Code Segments [15 Marks]

For each of the code segments below, write the output of the main method in the respective Driver Class.

1. [3 marks]

```
class Test {
    protected int x, y;
}

class Main {
    public static void main(String args[]) {
        Test t = new Test();
        System.out.println(t.x + " " + t.y);
    }
}
```

2. [3 marks]

```
public class A extends B
{
    public static String sing()
    {
        return "fa";
    }
    public static void main(String[] args)
    {
        A a = new A();
        B b = new A();
    System.out.println(a.sing() + " " + b.sing());
    }
}
class B
{
    public static String sing()
    {
        return "la";
    }
}
```

3. [5 marks]

```
abstract class Vibrate
{
    static String s = "-";
    Vibrate()
    {
        s += "v";
    }
}
public class Echo extends Vibrate
{
    Echo()
    {
        this(7);
        s += "e";
    }
    Echo(int x)
    {
        s += "e2";
    }
    public static void main(String[] args)
    {
        System.out.print("made " + s + " ");
    }
    static
    {
        Echo e = new Echo();
        System.out.print("block " + s + " ");
    }
}
```

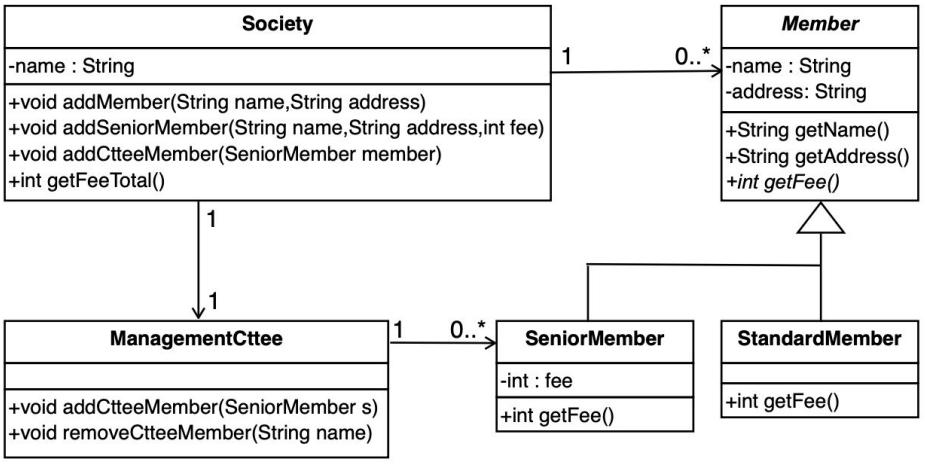
4. [4 marks]

```
interface Animal {
        public void eat();
        public void sound();
}

interface Bird {
        int numberOfLegs = 2;
        String outerCovering = "feather";

        public void fly();
}
class Eagle implements Animal, Bird {
        public void eat() {
                System.out.println("Eats reptiles and amphibians.");
        }
        public void sound() {
                System.out.println("Has a high-pitched whistling sound.");
        }
        public void fly() {
                System.out.println("Flies up to 10,000 feet.");
```

```
        }
}

class TestEagle {
        public static void main(String[] args) {
                Eagle myEagle = new Eagle();

                myEagle.eat();
                myEagle.sound();
                myEagle.fly();

                System.out.println("Number of legs: " + Bird.numberOfLegs);
                System.out.println("Outer covering: " + Bird.outerCovering);
        }
}
```

B. Coding in Java [20 Marks]

Consider this UML class diagram showing part of a program to manage the membership information for a professional society:



(a) Write Java source code of class `ManagementCttee` assuming it has this constructor: `public ManagementCttee()`. [4 marks]

(b) Class `Member` is an abstract class. Explain the role of an abstract class. [2 marks]

(c) Write a Java source code of class `Member` assuming it has this constructor: `public Member(String name, String address)` and that the method `getFee()` is abstract. [4 marks]

(d) Write a Java source code of class `StandardMember` assuming it has this constructor: `public StandardMember(String name, String address)` and the standard membership fee is fixed at LKR 1500. [3 marks]

(e) Write a Java source code of class `SeniorMember` assuming it has this constructor: `public SeniorMember(String name, String address, int fee)` where the membership fee is set when a SeniorMember object is created. [3 marks]

(f) Write a Java source code of class `Society` assuming it has this constructor: `public Society(String societyName)`. [4 marks]

C. Solving Problems: the Object-Oriented way [15 Marks]

Read the given passage and design a solution to the said problem using Object Oriented Programing Concepts.

Consider a veterinary hospital that treats cats and dogs. The hospital maintains a list of owners and vets; both must contain a name. The owners also store an address; the vets store the license. An owner may have several pets; for each pet the system should store the pet birth date, the pet name, the pet ID and the pet owner. Whenever a pet arrives to the hospital it is seen by a vet; in this appointment the pet may receive a treatment. A treatment should identify the disease diagnosed, the medicine to apply and the date of treatment.

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