



# United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

Midterm Exam, Trimester: Spring 2024

Course Code: CSE-1115, Course Title: Object Oriented Programming

Total Marks: 30, Duration: 1 Hour 30 Minutes

*Any examinee found adopting unfair means will be expelled from the trimester / program as per UIU disciplinary rules.*

## QUESTION 1

[3+2+2.5 MARKS]

Consider the following codes:

```
class Point2D
{
    int x, y;
    public Point2D(int x, int y){
        this.x = x;
        this.y = y;
        System.out.println("Point2D constructor");
    }
    public String Display(){
        //write codes here
    }
}
class Point3D extends Point2D{
    int z;
    //write codes here
}
```

```
public class Test{
    public static void main(String args[]){
        Point2D p2D = new Point2D(1, 2);
        System.out.println(p2D.Display());
        Point3D p3D = new Point3D(5, 4, 3);
        System.out.println(p3D.Display());
    }
}
```

Now:

- I. Complete the “Display” method of the Point2D class that prints all the instance variables,
- II. Add a constructor in the Point3D class that uses the base class constructor,
- III. Add another method “Display” in the Point3D class. You have to use the parent’s “Display” method here, so that the **output** looks like this:

```
Point2D constructor
x= 1, y = 2
Point2D constructor
Point3D constructor
x = 5, y = 4, z = 3
```

**QUESTION 2**

[3+2+1.5+1 MARKS]

Modify the following program by including/excluding the some codes without changing the highlighted parts.

<pre> public class Myparent {     private int p;     public final int myfunction(){         return p*p;     }     public void set_p(int Q){p = Q;}     // Write your code here } public class Mychild extends Myparent{     public Mychild(int K){ super(K); }      public final int myfunction(){         return p*p+1;     }     // write your code of myroot() that finds the square     // root of p in class Myparent     // write other necessary codes here } </pre>	<pre> public class Mytest {     public static void main(String[] args) {         Myparent c1, c2;         c1 = new Mychild(2);         c2 = new Mychild();         c2.set_p(2);         int x = c2. myfunction ();         double y = ((Mychild) c1).myroot(); // find square         root of p in class Myparent         System.out.println("x = " + x + ", y = " + y);     } } </pre>
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**QUESTION 3**

[7.5 MARKS]

Write the output of the following program:

<pre> class Person{     int id;     String name;     static int s = 10;     {         System.out.println("3");     }     public Person(){         this.id = 1;         this.name = "M";         System.out.println("1");         s++;     } } </pre>	<pre> public Person(int id, String name){     this();     this.id = id;     this.name = name;     System.out.println("2");     s++; }  public static void main(String args[]){     Person p = new Person(1, "N");     Person p1 = new Person();     System.out.println(p1.s);     p.s = 11;     System.out.println(Person.s); } } </pre>
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**QUESTION 4**

[7.5 MARKS]

Suppose that you visit a village market where fresh vegetables and fishes are sold. The sellers sell their items with a profit of  $z\%$  of their production cost  $c$ . Typical items are given by the following Table:

Food Items	Type $t$	production cost $c$ per Kg	profit of $z\%$
vegetable	Spinach	20	15
vegetable	Cauliflower	25	18
fish	Carp	300	15
fish	medium	250	20
fish	small	200	25

The class `FoodItem` that includes type  $t$ , production cost  $c$  and profit  $z$  as public variables and a method `findprice()` is given as follows:

```
public class FoodItem {
    public double c, z;
    public String t;
    public double getprice(double amount){
        return c*amount*(1+z/100);
    }
}
```

Next, two derived classes `Vegetable` and `Fish` are given as follows.

```
public class Vegetable extends FoodItem{
    public void setparameter(){
        if(t == "Spinach"){ c = 20; z = 15; }
        else if(t == "Cauliflower"){c = 25; z = 18;}
    }
    public Vegetable(String t){
        this.t = t;
    }
}

public class Fish extends FoodItem{
    public void setparameter(){
        if(t == "Carp"){ c = 20; z = 15; }
        else if(t == "medium"){c = 25; z = 20;}
        else if(t == "small"){c = 200; z = 25;}
    }
    public Fish(String t){
        this.t = t;
    }
}
```

Now as a programmer, test the above classes in the main method in a new class `MyTest` by finding your total purchase price if you buy 3Kg fish of type *small* and 2 Kg vegetable of type *Cauliflower*. [Make 2 objects of `FoodItems` and use the child class references to a `FoodItems` class object. Then call appropriate methods e.g., `setparameter`, `getprice`.]