United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

Mid Exam :: Spring 2022

Course Code: CSE 1115 Course Title: Object Oriented Programming

Total Marks: **30** Time: **1hr 45 mins**

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

Question 1 [1.5 * 4 = 6]

a) Create a class named **Marks**. Marks class contains four instance variables:
i) id (String) ii) quizMark (double) iii) midMark (double) iv) finalMark (double)

b) Write a parameterized constructor for Marks class which initializes all the instance variables using **this** keyword.

c) Write a method **passedOrNot** which calculates the total mark of a student by adding quiz, mid and final marks. Then, if the student's total mark is greater or equal to **55**, print "**passed**" in the console. Otherwise print "**failed**" in the console. Method **passedOrNot** should not have any parameters.

d) Create a class called **Run** and write the **main** method inside the class. Create Marks objects in the main method with appropriate parameters. Call the **passedOrNot** method using the objects you created.

Question 2 [1 + 1.5 + 1 + 1.5 + 1 = 6]

Complete the following code using the following instructions:
a. Write necessary public getter/setter methods for the private variable **b**.
b. Write a constructor with three parameters. First two parameters must be passed to the super class constructor. The third parameter should initialize instance variable **c**.
c. Override the show() method. Inside the show() method print the summation of variable a, b and c.
d. Write a constructor that will take an object as its parameter. The object must be passed to the super class constructor.
e. Override the show() method. Inside the show() method print the summation of variable a, and b.

```
class Base {
   public int a;
   private double b;
    Base(int a, double b) {
        this.a = a;          this.b = b;
    }
    Base(Base ob){
       a=ob.a;          b=ob.b;
    }
    // Code for a
    void show() {
        System.out.println("Sum of variables" +
        "In the Base class " + a+b);
    }
}
```

```
class Override extends Base {
    int c;

    // Code for b

    // Code for c
}
```

```
class MethodOverride {
    public static void main(String[] args) {
        Override obj = new Override(10, 20.5,12);
        obj.show();
        Override2 obj2 = new Override2(6, 10);
        obj2.show();
        Override2 obj3 = new Override2(obj2);
        obj3.show();
    }
}
```

```
class Override2 extends Base {
     Override2(int a, double b) {
        super(a,b);
    }

    // Code for d

    // Code for e

}
```

Question 3 [3 + 3 = 6]

a. Write the output of the following code:

```
class PClass{
    void mFnc(){
        System.out.println("Hello from P Class!");
    }

    void mFnc(double d1){
        System.out.println("Double value: " + d1);
    }
}
```

```
class CClass extends PClass{
    void mFnc(){
        System.out.println("Hello from C Class!");
        super.mFnc(11.22);
    }

    void mFnc(int a2, double d2){
        mFnc(d2);
        System.out.println("Integer value: " + a2);
    }
}
```

```
class Main{
    public static void main(String[] args) {
        PClass pObj = new PClass();
        CClass cObj = new CClass();

        pObj.mFnc();
        cObj.mFnc();
        cObj.mFnc(10, 2.99);
        cObj.mFnc(3.145);
    }
}
```

b. The following code contains some errors. Fix the errors by adding new lines or by updating existing lines of code. You cannot remove any line of code. In the answer script, only write the lines that were added / updated. The correct code should produce the given output.

```
class Book{
    void description(){
        System.out.println("Books are awesome!");
    }
}

class PaperBackBook extends Book{
    void putPageMarker(int pageNo){
        System.out.println("Page marker was " +
                "put on page no: " + pageNo);
    }
}
```

```
class Test{
    public static void main(String[] args) {
        Book book1, book2;
        book1 = new Book();
        book2 = new PaperBackBook();

        book1.description();
        book2.description();
        book2.putPageMarker();
    }
}
```

Output:

```
Books are awesome!
Paperback books are good for your eyes!
Page marker was put on page no: 50
```

Question 4 [3 + 3 = 6]

Class Geometric Shape is given as follows:

```
abstract class GeometricShape {
   double PI = 3.14;
   abstract double volume();
}
```

Now answer the following question:

a) Write a class named "Sphere" inheriting the "GeometricShape" class.

i. Add **one additional field** named "radius" that holds the radius of this sphere

ii. Add a **constructor** with the following signature that takes the radius parameter and sets that: (radius: *double*)

iii. Now **override** the method "volume" that should return the volume of this sphere given by the formula:

$$(4/3) * \pi * radius^3$$

b) Write a class named "Cylinder" inheriting the "GeometricShape" class.

i. Add **two additional fields** named "radius" and "height" that holds the radius and height from base of this cylinder

ii. Add a **constructor** with the following signature that takes the radius and height parameters and sets them properly: (radius: *double*, height: *double*)

iii. Now **override** the method "volume" that should return the volume of this cylinder given by the formula:

$$\pi * radius^2 * height$$

Question 5 [2 + 4 = 6]

a. Complete the following code using the following instructions:

i. Create an object of class A from pack1 in class B

ii. Set the access specifier of x in A properly to make it accessible in this package

```
package pack1;

public class A {
    int x;
}
```

```
package pack2;

public class B {
    public static void main(String[] args) {
        // * a, b
    }
}
```

b. Consider the following code and answer the following questions:

i. What values will be printed in Line Number **31 and 33**?

ii. Mention the line numbers in the main method which will cause to mark some objects to be collected by the Garbage Collector

```
1 class Point {
2     int x, y;
3 }
4
5 class Functions {
6     void swapPoints1(Point a, Point b) {
7         Point t = a;
8         a = b;
9         b = t;
10    }
11    void swapPoints2(Point a, Point b) {
12        int x = a.x;
13        int y = a.y;
14        a.x = b.x;
15        a.y = b.y;
16        b.x = x;
17        b.y = y;
18    }
19 }
20
```

```
21 class Main{
22     public static void main(String[] args) {
23         Functions fnc = new Functions();
24         Point p1 = new Point();
25         p1.x = 10;
26         p1.y = 15;
27         Point p2 = new Point();
28         p2.x = 20;
29         p2.y = 25;
30         fnc.swapPoints1(p1, p2);
31         System.out.println(p1.x + ", " + p1.y);
32         fnc.swapPoints2(p1, p2);
33         System.out.println(p1.x + ", " + p1.y);
34         new Point();
35         Point p3 = p2;
36         p2 = new Point();
37         p3 = p1;
38         p1 = p2;
39     }
40 }
```