# United International University (UIU)

## Dept. of Computer Science & Engineering (CSE)

**Mid-term Exam :: Fall 2020**

**Course Code: CSE 1115 Course Title: Object Oriented Programming**

Total Marks: **20** Time: **1hr**

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

**Question 1 (3 + 2)**

**a)** You're given two java classes **School** and **SchoolDemo**. Now answer the following questions:

I. Create the class Student so that the given code works without any error. You're **not allowed to modify** the given code. **[2]**

II. Complete the updateStudent(int id, float new_cgpa) and printStudentDetail(int id) method in School class such that the code produces the expected output. **[1]**

```
class School {
    Student[] students;
    School() {
        students = new Student[3];
    }
    void addStudent(int id, String name, float cgpa) {
        students[id] = new Student(name, cgpa);
    }
    void updateStudent(int id, float new_cgpa) {
        // Complete this method
    }
    void printStudentDetail(int id){
        // Complete this method
    }
}
```

```
public class SchoolDemo {
    public static void main(String[] args) {
        School school = new School();
        school.addStudent(0, "Alice", 3.5f);
        school.addStudent(1, "Bob", 3.7f);
        school.addStudent(2, "Trudy", 3.2f);
        school.printStudentDetail(0);
        school.updateStudent(0, 3.7f);
        school.printStudentDetail(0);
    }
}
```

**Expected Output:**
Alice 3.5
Alice 3.7

**b)** How many objects will be eligible for garbage collection after the execution of **line 14** in the following code? Explain your answer briefly. **[2]**

```
1 class Garbage {
2     int val;
3     Garbage(int a) {
4         val = a;
5     }
6     void update(Garbage a) {
7         this.val = a.val;
8     }
9 }
```

```
10 public class GC {
11     public static void main(String[] args) {
12         Garbage g1 = new Garbage(1);
13         new Garbage(2);
14         g1.update(new Garbage(3));
15         System.out.println(g1.val);
16     }
17 }
```

**Question 2 (3 + 4)**

**a)** Consider the following code:

```
1 package Mid1;
2
3 public class AM1 {
4     int i;
5     public AM1() {
6
7     }
8 }
```

```
package Mid2;

import Mid1.AM1;

public class AM2 extends AM1 {
    int k;
}
```

Now, answer the following questions with brief reasoning. The given code does not have any error.

I. Why is the class AM1 made public in line 3? Will it work if the public keyword is removed in line 3? **[1]**

II. Why is the parameter less constructor at line 5 made public? Will it work if the public keyword is removed in line 5? **[1]**

III. Will the "**i**" variable in AM1 class be accessible in AM2 class? If not, suggest two ways to make it accessible in AM2? **[1]**

**b)** Write a java code to perform the following tasks (you can answer all the questions in a single code):

I. Create a **double** array that contains **at least** 8 elements. The array should be **initialized** during **declaration**. **[1]**

II. Print the sum of the elements that are **less then 10.0** in the array that you created. Use **for-each** loop for the task. **[2]**

III. Write a print statement that prints the **size** of the array that you created using the array reference variable. **[1]**

**Question 3 (5 + 3)**

**a)** Consider the following code:

```
public class Flower {
    private int nPetals;
    private String color;

    public Flower(int nPetals, String color) {
        this.nPetals = nPetals;
        this.color = color;
    }

    public void printName(){
        System.out.println("Flower");
    }
}
```

Now, write a **child** class of the **Flower** class. The child class should have the following members:

I. A **private** instance variable called **flowerName**. **[1]**

II. A parameterized constructor that initializes all the instance variables (including the ones inherited from the Flower class). **[2]**

III. A getter and setter method for the **flowerName** instance variable. **[2]**

**b)** Consider the following function:

```
void printFlower(Flower a){
    a.printName();
}
```

I. What will be happen if an object of the **child class of Flower** that you created in Question 3.a, is passed to this (**printFlower**) function? **[1]**

II. Modify the **child class of Flower** from the question 3.a, so that when an object of the child class is passed to the **printFlower** function, it prints the **name** of the flower.
(Note: No need to rewrite the whole child class again, just write the updated part.) **[2]**