JAVA LAB PROGRAM

Submitted by,

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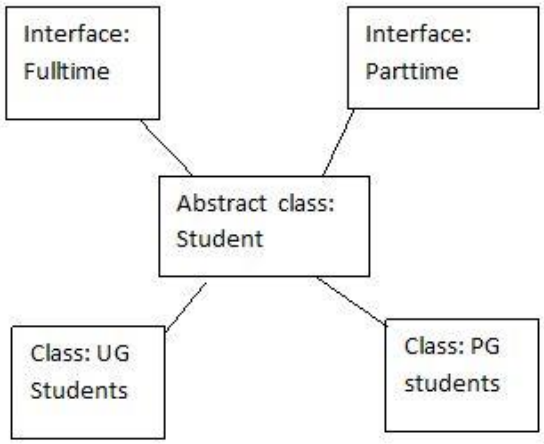
Abstract Class & Interface

Consider the hierarchy given below to implement the concept of abstract classes and interfaces. Write a Java program that computes the grades for the full-time and part-time students. Apply your own creativity and include suitable methods and variables for grade calculation. The program should strictly follow the hierarchy given in diagram below and should include the following features: Two interface named Fulltime and Parttime, an abstract class that implements the two interfaces and two subclasses: UG students and PG students that inherits the abstract class.



Program

```
import java.util.Scanner;
interface fullTime{
    int max = 100;
    String name = "";
    int reg = 0;
    int[] arr = new int[10];
    int marks = 0;
    int computefulltime(int arr[]);
}
interface partTime{
    int max = 50;
    String name = "";
    int reg = 0;
    int[] arr = new int[10];
    int computeparttime(int arr[]);
}
abstract class Student implements fullTime,partTime {
```

```
    @Override
    public int computefulltime(int arr[]){
        int marks = 0;
        for(int i = 0; i < arr.length; i++){
            marks += arr[i];
        }
        return marks/5;
    }
    @Override
    public int computeparttime(int arr[]){
        int marks = 0;
        for(int i = 0; i < arr.length; i++){
            marks += arr[i];
        }
        return marks/3;
    }
}
class Ug extends Student{
    public int computefulltime(int[] arr){
        int marks = 0;
        for(int i = 0; i < arr.length; i++){
            marks += arr[i];
        }
        return marks/5;
    }
    public int computeparttime(int[] arr){
        int marks = 0;
        for(int i = 0; i < arr.length; i++){
            marks += arr[i];
        }
        return marks/5;
    }
    void result(int res){
        int marks = res;
        if(marks >= 50 && marks <= 60){
            System.out.print("B");
        }
        else if(marks >= 61 && marks <= 70){
            System.out.print("B+");
        }
```

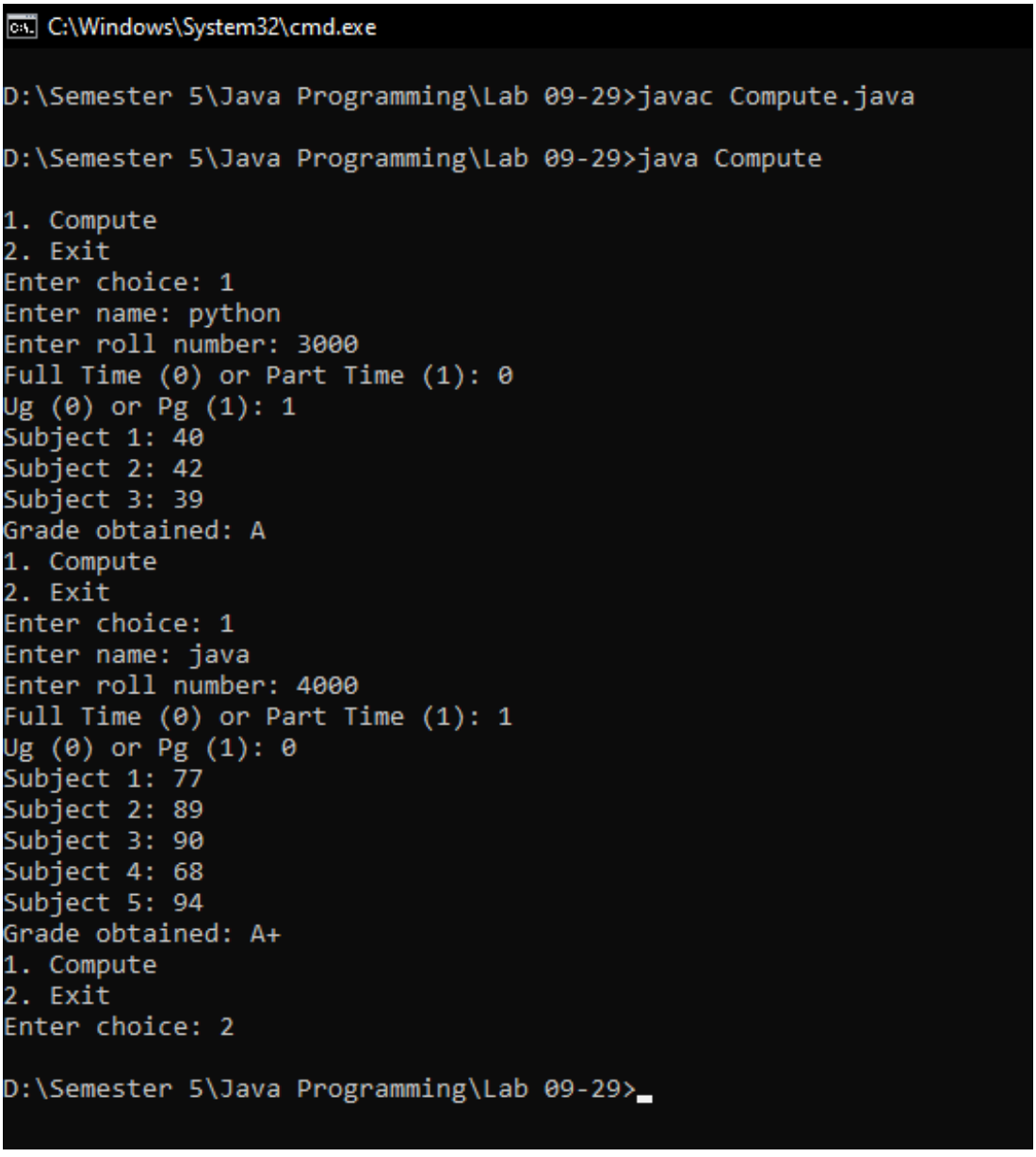
```
        else if(marks >= 71 && marks <= 80){
            System.out.print("A");
        }
        else if(marks >= 81 && marks <= 90){
            System.out.print("A+");
        }
        else if(marks >= 91){
            System.out.print("O");
        }
        else{
            System.out.print("Below average");
        }
    }

}
class Pg extends Student{
    public int computefulltime(int arr[]){
        int marks = 0;
        for(int i = 0; i < arr.length; i++){
            marks += arr[i];
        }
        return marks/3;
    }
    public int computeparttime(int arr[]){
        int marks = 0;
        for(int i = 0; i < arr.length; i++){
            marks += arr[i];
        }
        return marks/3;
    }
    void result(int res){
        int marks = res;
        if(marks >= 20 && marks <= 30){
            System.out.print("B");
        }
        else if(marks >= 31 && marks <= 40){
            System.out.print("A");
        }
        else if(marks >= 41 && marks <= 50){
            System.out.print("O");
```

```
        }
        else{
            System.out.print("Below average");
        }
    }
}
public class Compute{
    public static void main(String... arrgs){
        Scanner sc = new Scanner(System.in);
        int choice;
        while(true){
            System.out.print("\n1. Compute\n2.
Exit\nEnter choice: ");
            choice = sc.nextInt();
            if(choice == 1){
                System.out.print("Enter name: ");
                String name = sc.next();
                System.out.print("Enter roll number:
");
                int reg = sc.nextInt();
                System.out.print("Full Time (0) or
Part Time (1): ");
                int c = sc.nextInt();
                if(c == 0){
                    System.out.print("Ug (0) or Pg
(1): ");
                    int n = sc.nextInt();
                    if(n == 0){
                        int[] arr = new int[5];
                        for(int i = 0; i < 5; i++){
                        System.out.print("Subject " +
String.valueOf(i + 1) + ": ");
                            arr[i] = sc.nextInt();
                        }
                        Ug obj = new Ug();
                        int res =
obj.computefulltime(arr);
                        System.out.print("Grade
obtained: ");
                        obj.result(res);
```

```
                    }
                    else if(n == 1){
                        int[] arr = new int[3];
                        for(int i = 0; i < 3; i++){
                        System.out.print("Subject " +
String.valueOf(i + 1) + ": ");
                            arr[i] = sc.nextInt();
                        }
                        Pg obj = new Pg();
                        int res =
obj.computefulltime(arr);
                        System.out.print("Grade
obtained: ");
                        obj.result(res);
                    }
                }
                else if (c == 1){
                    System.out.print("Ug (0) or Pg
(1): ");
                    int n = sc.nextInt();
                    if(n == 0){
                        int[] arr = new int[5];
                        for(int i = 0; i < 5; i++){
                        System.out.print("Subject " +
String.valueOf(i + 1) + ": ");
                            arr[i] = sc.nextInt();
                        }
                        Ug obj = new Ug();
                        int res =
obj.computeparttime(arr);
                        System.out.print("Grade
obtained: ");
                        obj.result(res);
                    }
                    else if(n == 1){
                        int[] arr = new int[3];
                        for(int i = 0; i < 3; i++){
                        System.out.print("Subject " +
String.valueOf(i + 1) + ": ");
                            arr[i] = sc.nextInt();
```

```
                            }
                            Pg obj = new Pg();
                            int res =
obj.computeparttime(arr);
                            System.out.print("Grade
obtained: ");
                            obj.result(res);
                        }
                    }
                }
                else if(choice == 2){
                    break;
                }
            }
        }
}
```

Output


C:\Windows\System32\cmd.exe
D:\Semester 5\Java Programming\Lab 09-29>javac Compute.java
D:\Semester 5\Java Programming\Lab 09-29>java Compute
1. Compute
2. Exit
Enter choice: 1
Enter name: python
Enter roll number: 3000
Full Time (0) or Part Time (1): 0
Ug (0) or Pg (1): 1
Subject 1: 40
Subject 2: 42
Subject 3: 39
Grade obtained: A
1. Compute
2. Exit
Enter choice: 1
Enter name: java
Enter roll number: 4000
Full Time (0) or Part Time (1): 1
Ug (0) or Pg (1): 0
Subject 1: 77
Subject 2: 89
Subject 3: 90
Subject 4: 68
Subject 5: 94
Grade obtained: A+
1. Compute
2. Exit
Enter choice: 2
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