BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination: Final
Duration: 85 Minutes
No. of Questions: 3

CSE 111: Programming Language II

Semester: Fall 2024
Full Marks: 30
No. of Pages: 3

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A

✓ Use the back **part** of the answer script for rough work. **No washroom breaks.**
✓ At the end of the exam, put the question **paper** inside the answer script and **return both.**

Question - 1: CO4 [8 Points]

Given the classes below, your task is to design 1 child class: **RainReport** with necessary attributes and methods, such that the given output is generated.

Based on the weather attributes Rainfall amount will be adjusted
- Thunderstorm increases rainfall by 25%
- Greater than 20km/h wind reduces Rainfall by 10%
- Greater than 70% humidity increases Rainfall by 20%

After adjusting the new rainfall amount following statements should be printed:
- Rainfall Amount greater than 50 should print "Due to heavy rainfall, this area can face a flood situation."
- Rainfall Amount greater than 30 should print "The area will face Moderate rainfall."
- Other cases should print "The area will face Light rainfall."

```
public class WeatherReport{
  public double temp;
  public double humidity;
  public double windSpd;
  public WeatherReport(double temperature, double humidity, double windSpeed) {
    this.temp = temperature;
    this.humidity = humidity;
    this.windSpd = windSpeed;
  }
  public void displayReport() {
    System.out.println("Weather Report:");
    System.out.println("Temperature: " + temp + " Celsius");
    System.out.println("Humidity: " + humidity + "%");
    System.out.println("Wind Speed: " + windSpd + " km/h");
  }
  public void compareWith(RainReport other) {
    System.out.println("Comparing Weather Reports:");
    System.out.println("Temperature Difference: "+Math.abs(this.temp-other.temp)+" Celsius");
    System.out.println("Humidity Difference: "+Math.abs(this.humidity-other.humidity) + "%");
    System.out.println("WindSpeed Difference: "+Math.abs(this.windSpd-other.windSpd)+" km/h");
  }
}
```

Driver Code	Output

public class Tester {
  public static void main(String[] args) {
  WeatherReport gp = new WeatherReport(25.5, 65, 15);
  System.out.println("---------1--------");
  gp.displayReport();
  System.out.println("---------2--------");
  RainReport rp1 = new RainReport(22.3, 80, 10, 60.5, true);
  RainReport rp2 = new RainReport(18.0, 54, 67, 15.0, false);
  RainReport rp3 = new RainReport(20.0, 70, 26, 30.0, true);
  rp1.displayReport();
  System.out.println("---------3--------");
  rp1.rainFallStatus();
  System.out.println("---------4--------");
  rp2.rainFallStatus();
  System.out.println("---------5---------");
  rp3.rainFallStatus();
  System.out.println("---------6---------");
  gp.compareWith(rp1);
  System.out.println("---------7---------");
  rp1.compareWith(rp2);
  }
}
	---------1---------
	Weather Report:
	Temperature: 25.5 Celsius
	Humidity: 65.0%
	Wind Speed: 15.0 km/h
	---------2---------
	Weather Report:
	Temperature: 22.3 Celsius
	Humidity: 80.0%
	Wind Speed: 10.0 km/h
	Original Rainfall Amount: 60.5 mm
	Adjusted Rainfall Amount: 90.75 mm
	Thunderstorm: Yes
	---------3---------
	Due to heavy rainfall, this area can face a flood situation.
	---------4---------
	The area will face Light rainfall.
	---------5---------
	The area will face Moderate rainfall.
	---------6---------
	Comparing Weather Reports:
	Temperature Difference: 3.1999999999999993 Celsius
	Humidity Difference: 15.0%
	Wind Speed Difference: 5.0 km/h
	---------7---------
	Comparing Weather Reports:
	Temperature Difference: 4.300000000000001 Celsius
	Humidity Difference: 26.0%
	Wind Speed Difference: 57.0 km/h
	Comparing Rain Reports:
	Actual Rainfall Difference: 45.5 mm
	Adjusted Rainfall Difference: 77.25 mm

Question - 2: CO3 [12 Points]

Design the **Event** and **Organizer** classes in such a way that the following code provides the expected output. Hint:

1. Make the name instance variable of the Event class **private**
2. For simplicity assume that the Event class can create maximum 5 event objects and an Organizer can organize maximum 4 events.

Driver Code	Output

public class Tester{
public static void main(String args []){
Event.allEventInfo();
System.out.println("1--------------");
Event ev1 = new Event("HP Day", "7/12/24");
Event ev2 = new Event("TechConnect", "10/12/24");
System.out.println(ev1.details());
System.out.println("2--------------");
Organizer uni = new Organizer();
Organizer bracu = new Organizer("BRACU");
Organizer buet = new Organizer("BUET");
System.out.println("3--------------");
Event.allEventInfo();
System.out.println("4--------------");
bracu.organizeEvent(ev1);
bracu.organizeEvent(ev2);
System.out.println("5--------------");
Event ev3 = new Event("From Earth to Orbit", "15/12/24");
Event ev4 = new Event("NSysS 2024", "21/12/24");
System.out.println("6--------------");
buet.organizeEvent(ev4);
bracu.organizeEvent(ev3);
System.out.println("7--------------");
bracu.searchEventByDate("21/12/24");
System.out.println("8--------------");
bracu.searchEventByDate("15/12/24");
System.out.println("9--------------");
Event.allEventInfo();
}
}
	Total Events: 0
	Event Details:
	1--------------
	Name: HP Day
	Date: 7/12/24
	2--------------
	Please provide the organizer's name
	3--------------
	Total Events: 2
	Event Details:
	Event 1:
	Name: HP Day
	Date: 7/12/24
	Event 2:
	Name: TechConnect
	Date: 10/12/24
	4--------------
	BRACU successfully organized HP Day
	BRACU successfully organized TechConnect
	5--------------
	6--------------
	BUET successfully organized NSysS 2024
	BRACU successfully organized From Earth to Orbit
	7--------------
	No event is scheduled for 21/12/24
	8--------------
	From Earth to Orbit
	9--------------
	Total Events: 4
	Event Details:
	Event 1:
	Name: HP Day
	Date: 7/12/24
	Event 2:
	Name: TechConnect
	Date: 10/12/24
	Event 3:
	Name: From Earth to Orbit
	Date: 15/12/24
	Event 4:
	Name: NSysS 2024
	Date: 21/12/24

Question - 3: CO2 [9+1 Points]

```
1  public class A{
2   public static int temp = 4;
3   public int x = 1, sum = 5, y = 3;
4   public A(){
5     y = temp - 2;
6     sum = (temp--) + 3;
7   }
8   public void methodB(int a, int b){
9     int y = 0;
10    y = y + this.y + a;
11    x = y + this.x + temp;
12    methodA(temp, b);
13    sum = x + y + this.sum;
14    System.out.println(x + " " + y+ " " +sum);
15  }
16  public void methodA(int temp, int b){
17    int x = 1;
18    y = y + b + (this.temp++);
19    x = x + 2 + b;
20    sum = sum + this.x + y;
21    System.out.println(x + " " + y+ " " +sum);
22  }
23 }
24 public class B extends A{
25  public static int x = 7;
26  public B(){
27    temp = temp + 3 ;
28    super.temp -= 2;
29  }
30  public B(B b){
31    sum = b.sum;
32    y = b.x;
33  }
34  public void methodA(int m, int n){
35    y = y + this.y + m;
36    x = this.y + super.x + temp;
37    sum = x + y + super.sum + n;
38    System.out.println(x + " " + y+ " " +sum);
39  }
40 }
```

Illustrate the output of the following statements.
[Your outputs won't be accepted without the workings]

```
B b1 = new B();
B b2 = new B(b1);
b1.methodB(1, 3);
b2.methodA(5, 2);
```

Output:

Out1	Out2	Out3
17	7	34
7	3	44
23	19	51