



United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

CSE 1116: Object Oriented Programming Laboratory - Mid Examination (L)

Marks: 20

Answer all the parts of the question

You are required to design and implement a **Student Management System** in Java.

1. Create a class **Student**

○ **Attributes:**

- **name (String):** Name of the student.
- **rollNumber (int):** Unique roll number of the student.
- **marks1, marks2, marks3 (int):** Marks in three subjects.
- **cgpa (double):** The CGPA of the student, calculated as the average marks divided by 30.
- All these attributes must not be directly accessible and changed from outside. Take necessary steps.
- Write the necessary constructors to initialize the fields.
- **calculateCGPA():** Calculates and updates the CGPA based on the marks.
- **getDetails():** Prints the student's name, roll number, marks, and CGPA.

2. Create a class **GraduateStudent** that inherits the class **Student**.

○ **Attributes:**

- **researchTopic (String):** Research topic of the graduate student.
- Write a constructor that only takes **researchTopic** as a parameter. Take necessary measures to initialize the **name, rollNumber, marks1, marks2, marks3** and **cgpa** of the student.
- Override **getDetails()** to print the student details including the **researchTopic**.

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| | <p>3. Create a class StudentOperations: This class contains the following methods:</p> <ul style="list-style-type: none">○ calculateAverage(Student student): A method that calculates and returns the average marks of a single student.○ calculateAverage(Student student1, Student student2): A method that calculates and returns the average marks of two students. For example, add all marks of two students and divide by 6. <p>4. In the Main class, perform the following:</p> <ul style="list-style-type: none">○ Create at least 5 students (3 Student and 2 GraduateStudent objects).○ Add the students to an array.○ Print the student details using a foreach loop.○ Call all the methods from the Main class. | |
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