Programming Principles 02

**Tutorial 06: Classes and Objects**

**Case Study**

For the current academic year, a batch of 210 students has been enrolled for Programming Principles 01 module. The total module mark is derived from marks obtained for 09 components specified below.

* Project 01 with In-class test (30%)
  + Which is made up of three sub components
    - Project 01 – 20%
    - In-class Test 01 (ICT01) – 70%
    - Active Participation – 10%
* Coding Assignment with In-class test (35%)
  + Which is made up of three sub components
    - Coding Assignment – 50%
    - In-class Test 02 (ICT02) – 40%
    - Active Participation – 10%
* Project 02 with In-class test (35%)
  + Which is made up of three sub components
    - In-class Test 03 (ICT03) – 60%
    - Project 02 – 30%
    - Active Participation – 10%

Each of the above assignment components is marked out of 100 and their contribution percentages for the total module mark are as follows.

* Project 01 with In-class test – 30%
* Coding Assignment with In-class test – 35%
* Project 02 with In-class test – 35%

Active participation is calculated using the percentage of attendance as follows:

* Active participation 01 comprises of attendance for lecture and tutorial between week 01 to 05
* Active participation 02 comprises of attendance for lecture and tutorial between week 06 to 09
* Active participation 03 comprises of attendance for lecture and tutorial between week 10 to 12

If student has mitigated for any of the sub component other than active participation the whole component should be marked absent (only if mitigation has been accepted otherwise the marks goes as ZERO)

The students’ final grades are decided as follows.

Range Grading

100 to 80 Higher Distinction

79 to 70 Distinction

69 to 60 Credit

59 to 50 Pass

Below 50 Fail

The grading procedure also considers the following facts.

1. Project 01 with In-class test (30%) and Coding Assignment with In-class test (35%) together is known as qualifying set 01. The average mark of the qualifying set must be above 40 irrespective of what is individually Project 01 with In-class test or Coding Assignment with In-class test marks.
2. For a student to obtain a minimum pass for the module, s/he has to obtain 40 marks for the qualifying set 01 and Project 02 with In-class test and also a total mark of above 50 for the module.
3. Only those who successfully meet the criteria (b) will be awarded an appropriate grading.
4. A student will have to obtain a total module mark of 50 in order to avoid re-taking the module. (Failing to obtain at least 50 will result in a re-take.)
5. If the student has obtained a total module mark above 50, but has failed to achieve a minimum of 40 for qualifying set 01 or Project 02 with In-class test, s/he has to re-sit the individual components for which he has scored below 40.

**You are required to,**

1. Write a Java program (**Command Line Interface Application**) with functional decomposition, using necessary validations for inputs and appropriate good coding practices for the following expectations of the customer:
2. Accept the students’ details (Application should be capable of any given number) and store them in an appropriate form (choose the most suitable data structure to store the input captured through keyboard). **Hint:-** see the usage of ArrayList.
3. Create appropriate user-defined data types and the details of the students should include but need not to be limited to:

* First Name
* Last Name
* Registration No.
* Marks obtained for each sub component

1. Find the average for each component separately and store the same in appropriate variable.
2. Find the number of students who have obtained marks below 40 for each component separately and display the same with suitable title
3. Find the overall marks of the module for each student and display the same.
4. Find the overall class average.
5. Find the list of students whose total module marks fall below the class average and display their details with suitable headings.
6. Find the highest scorer for each component and overall module separately and display those students’ details with suitable headings.