University of Vavuniya, Sri Lanka
Faculty of Technological Studies
Department of ICT
TICT1224(P) - Object Oriented Programming (Practical)
In-course Assessment Examination – 02

Duration: 01 Hour 45 mins 21st September 2023

You are requested to submit your answers in a folder named with your registration number(Eg: 2017ICTS##) only with the .java files.

Consider the following class diagram.

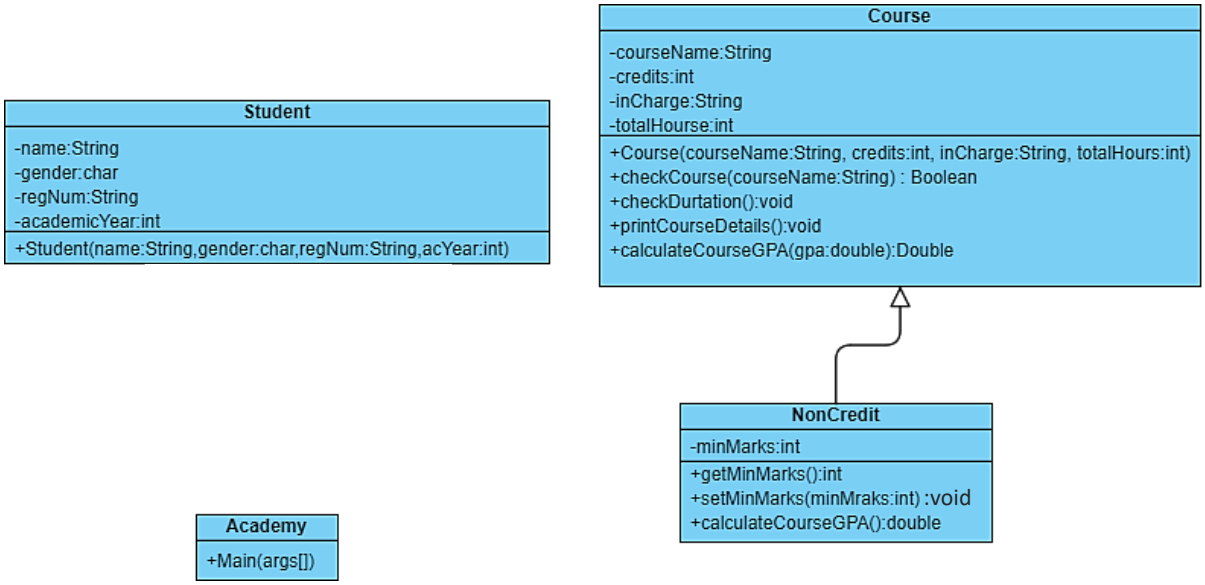

Figure 1:UML Class Diagram

You are required to map the above class diagram into a computer programming using Java programming language in order to automate a Student Management System of "The Techzie Acdemy". Please note that + indicates the public class members and - indicates the private class members.

Create 4 separate classes Student , Course , NonCredit and Academy.

Class Student:

(a) Inside the Student class create separate getters and setters to get and set the values of the instance variables name , gender, regNumber and academicYear to accomplish encapsulation.

(b) The academicYear should be read-only.

(c) Create a default constructor.

(d) Create another constructor to get only the Academic Year as the parameter and initialize the value within the constructor.

(e) Create another parameterized constructor with the parameters name , gender , registration number and academic year to initialize the instance variables.

(NOTE: The Gender should be marked as ‘M’ if the student is a Male and ‘F’ is the student is a Female)

Class Course:

(a) Create a deafualt constructor and a parameterized constructors with the parameter list *courseName, credits , in-charge* and *totalHours*.
(b) Initialize the instance variables inside the parameterized constructor.
(c) Create separate getters and setters to get and set the values of the instance variables *courseName , credits , in-charge* and *totalHours* to accomplish encapsulation.

Create the following methods inside the Course class.

- *checkCourse* – The method should check whether the Course is available or not when the user gives the full name or a portion of a Course name. The method should return “true” if the course is available and “false” if the course is not available.
- *checkDuration* – The method should print a message “The duration exceeds the limit” if the *totalHours* of the Course is greater than 15, otherwise print “Duration is limited”
- *printCourseDetails* – The method should print all the details of the course including *coursename, credits , in-charge* and *totalHours*.
- *calculateCourseGPA* - This method should calculate the GPA of a particular course based on the credits of the subject and the GPA got through the parameter. The course GPA is calculated based on the equation below.

$$CourseGPA = Marks \; x \; GPA$$

Class NonCredit:

(a) The class *NonCredit* should be derived from the super class *Course.*
(b) Declare a variable *minMarks* and set it to 0.
(c) Create getter and setter to get and set the values of the variable *minMarks.*
(d) Overload the method *caclulateCourseGPA()* inside the class *NonCredit* to print a Message “Non credit Subject” and return 0.

Class Academy:

(a) The class *Academy* should have the main method.
(b) Create a student instance “*st01*” with the following details. Use the setters and getters to set and print the values of the student.
Name: Jhon
Gender : Male
Registration Number: 2017/ICT/009

(c) Set the academic year of that student as *2017* using the constructor.

(d) Create the following courses.

	Course	Credits	In-charge	Duration
1	OOP Concepts	2	Mrs.A.Harish	30
2	Database Design	2	Mrs.A.D.Bandara	15

HINT: You can use array of objects to get the corresponding output.

(e) Get the name of the course to search as a user input, and check whether the course is available or not. Print the message "The course is available" if the course is available and "The course is unavailable" if it's not available.

(f) Print the details of course 1.

(g) Create a non-credit subject *"nc01"* and set the minimum marks to 30.

(h) Call the *"calculateCourseGPA"* method for *nc01*.

The expected output is given below.

```
-------------The Techzie Academy------------
Name: Jhon
Gender: M
Registration Number: 2017/ICT/009
Accademic Year : 2017
-------------------------------------------
Enter the course you want to find: OOP
The Course is Available
-------------------------------------------
*****
Course Name: OOP Concepts
Credits: 2
Incharge: Mrs.A.Harish
Total Hours: 30
*****
The duration exceeds the limit
-------------------------------------------
Non credit subject
```

[100%]