Introduction to Software Engineering

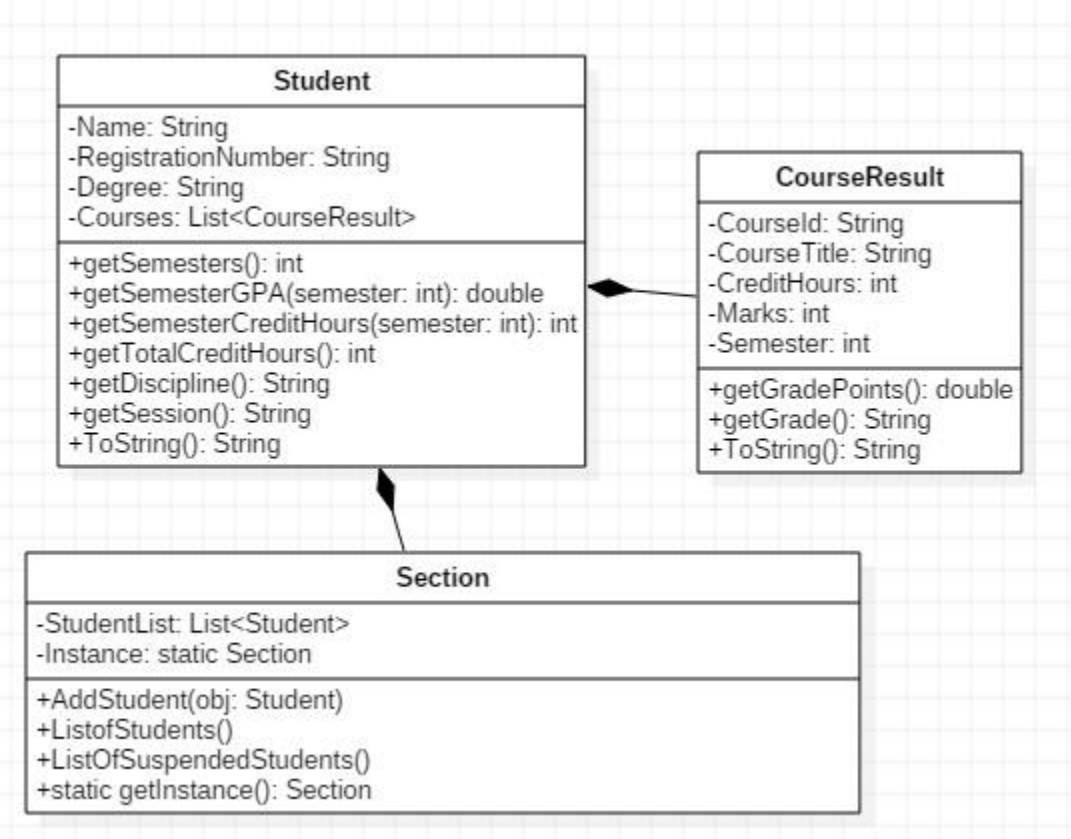
Fall 2018

Problem Set 2

Instructor: Samyan Qayyum Wahla
CLO: CLO2, CLO5

Assignment

Write a C# program in which you are required to implement the following design.



Constraints for each attribute are given below.

- **StudentName** //should be alphabetic, special characters and numbers are not allowed
- **RegistrationNumber** //Format should be like this: 2015-CS-888, any other format should be handled in setter function
- **Degree** //it should be MS, BS or BE
- **CourseID** // Format should be valid according to your course codes given in your LMS. For instance, software engineering lab has course ID of CS381L. Length of course code should be from 2 to 8 characters.
- **CourseTitle** // should be alphabetic. Length of course code should be from 10 to 35 characters.
- **CreditHours** // values from 1 to 3 are allowed
- **Marks //** values from 0 to 100 are allowed

- **Semester //** valid range is from 1 to 8

1. Your Program should define three constructors for class of **CourseResult**
   - a constructor with **no parameter**
   - a constructor with **parameters**
   - **copy** constructor
2. **Student** will have only one constructor without parameter
3. Define getter setter for each data member in classes
4. Apart from getter, setter and constructor, define the following functions in respective classes according to class diagram
   i. **getGrade()** – it should calculate grade based on marks using the following criteria.
      a. IF marks are less than 40 – Grade is F
      b. IF marks are between 40 and 50(exclusive) - Grade is D
      c. IF marks are between 50 and 55(exclusive) - Grade is C
      d. IF marks are between 55 and 60(exclusive) - Grade is C+
      e. IF marks are between 60 and 65(exclusive) - Grade is B-
      f. IF marks are between 65 and 70(exclusive) - Grade is B+
      g. IF marks are between 70 and 80(exclusive) - Grade is A-
      h. IF marks are above 80 - Grade is A

   ii. **getGradePoints()** – function should return grade points using the following criteria

Grade	CoursePoints
A	4.0
A-	3.7
B+	3.3
B-	3.0
C+	2.7
C	2.3
D	1.0
F	0

   iii. **getSemesters()** – it should return number of semesters based on course list
   iv. **getSemesterGPA(semester: int)** – calculate semester GPA according to following formula

$$SemesterGPA = \frac{\sum(SemesterCourseGradePoints * CreditHours)}{SemesterCreditHours}$$

   v. **getCGPA():** calculate GPA using the following formula

$$CGPA = \frac{\sum(CourseGradePoints * CreditHours)}{TotalCreditHours}$$

   vi. **getTotalCreditHours()** – it should return number of credit hours based on course list
   vii. **getSemesterCreditHours(semester: int)** – it should return number of credit hours for a given semester based on course list
   viii. **getSession()** – extract session from RegistrationNumber
   ix. **getDiscipline()**: extract discipline from RegistrationNumber

x. **toString()** – Purpose of this function is to write all attributes of a class in desired format and return as a string
xi. **ListOfSuspendedStudents():** this will return students with CGPA less than 2.0.

5. Section class will be singleton
6. Create GUI to support above class diagram. GUI will be your choice, better GUI will get more points
7. You don't need to write data in file or database.
8. Use DataGridView for Course List and Student List
9. ToString() of Student will show result in following format

Name: Samyan Qayyum Degree: BS CS
Registration Number: 2009-CS-01
Session: 2009

Semester 1:

ID	Name	CH	Marks	Grade
MTH134	Calculus	3	90	A
CS141	Computing Fundamentals	2	79	A-
PHY101	Physics	3	75	A-

SGPA: 3.8125

Semester 2:

ID	Name	CH	Marks	Grade
MTH111	Linear Algebra	1	80	A
CS141	Programming Fundamentals	3	65	B+

SGPA: 3.475

CGPA: 3.7