

CSC 215

Procedural Programming with C

Lab #8

Structures

Lab Section

- Write a program that does the following:
 - Define a constant variable MAX and make it equal to 3.
 - Define a structure called **Course** with the following data member:
 - Code: a string of maximum 10 characters.
 - Hours: an integer number.
 - Grade: a float number.
 - Define a structure called **Student** with the following data member:
 - Name: a string of maximum 40 characters.
 - Courses: an array of the structure Course with the size of 10.
 - NumberOfCourses: an integer number.
 - Department: a string of maximum 40 characters.
 - Declare an array of MAX Student.
 - Show the following menu:
 1. Add a New Student.
 2. Display student with max GPA.
 3. Display all Students.
 4. Exit.
 - When the user chooses 1, use **addStudent** to read a student info. Make sure that you didn't add more than MAX students. The show the menu again.
 - When the user chooses 2, use **calculateGPA** to find the student with the maximum GPA. Then display that student info using **displayStudent**. Make sure that there are at least one student. The show the menu again.
 - When the user chooses 3, use **displayAllStudents**. Make sure that there are at least one student. The show the menu again.
 - When the user chooses 4, print "Goodbye" then close the program.
 - When the user chooses anything else, show the user an error. The show the menu again.
- Write the following functions:
 - Write the function **addStudent** that takes a pointer to Student. The functions should read the name, department, and number of courses the student took. Then read these courses' code, hours, and grade.
 - `void addStudent(struct Student *Stu)`

- Write the function ***calculateGPA*** that takes a Student. The functions should calculate the student GPA by summing all of his courses hours multiplied by grades. Then dividing them by the total hours.
 - `float calculateGPA(struct Student *Stu)`
 - Write the function ***displayStudent*** that takes a Student. The function should print the student name, department, and GPA. The print all of his courses and their info. Use the following when printing the grade:
 - If grade = 5, print "A+"
 - If grade = 4.75, print "A"
 - If grade = 4.5, print "B+"
 - If grade = 4, print "B"
 - If grade = 3.5, print "C+"
 - If grade = 3, print "C"
 - If grade = 2.5, print "D+"
 - If grade = 2, print "D"
 - If grade = 1, print "F"
 - `void displayStudent(struct Student Stu)`
 - Write the function ***displayAllStudents*** that takes an array of Students and an integer. The function should use displayStudent to print all the students.
 - `void displayAllStudents(struct Student AllStu[], int size)`
- Show your program to the instructor. Then upload it to LMS under Lab8 Homework.

SUBMIT POLICY: -

- Use the follow naming convention: Lab08_ID_FirstName_LastName.c
 - **Example:** Lab08_123456789_Marwan_Almaymoni.c
- Use a comment to write your name and ID at the beginning of the code.
- The Deadline is: 20/04/2015 right before the Lab starts.
- Late submissions will not be accepted.
- Email submissions will not be accepted.
- **-1 Point** for not following the naming convention.
- **-1 Point** for not writing your name and ID in the code inside a comment.
- **-8 Points** if the submitted program didn't work due to syntax errors.
- **-10 Points** for cheating and helping others cheat.

Example runs:

```
$ ./lab8
*****
* 1- Add a New Student.          *
* 2- Display student with max GPA.*
* 3- Display all Students.       *
* 4- Exit.                       *
*****
> 2
*****
No students added.
*****
* 1- Add a New Student.          *
* 2- Display student with max GPA.*
* 3- Display all Students.       *
* 4- Exit.                       *
*****
> 1
*****
Enter the student's name: Marwan
Enter the student's department: CSC
How many courses did the student take? 4
=====
Enter course 1 code: CSC111
Enter course 1 hours: 4
Enter course 1 grade (Out of 5): 3
=====
Enter course 2 code: CSC113
Enter course 2 hours: 4
Enter course 2 grade (Out of 5): 4.75
=====
Enter course 3 code: CSC212
Enter course 3 hours: 3
Enter course 3 grade (Out of 5): 4
=====
Enter course 4 code: CSC215
Enter course 4 hours: 3
Enter course 4 grade (Out of 5): 5
=====
Done.
*****
* 1- Add a New Student.          *
* 2- Display student with max GPA.*
* 3- Display all Students.       *
* 4- Exit.                       *
*****
> 1
*****
Enter the student's name: Ali
Enter the student's department: IS
How many courses did the student take? 3
=====
Enter course 1 code: IS360
Enter course 1 hours: 3
Enter course 1 grade (Out of 5): 4.5
=====
Enter course 2 code: IS499
Enter course 2 hours: 1
Enter course 2 grade (Out of 5): 3.5
```

```

=====
Enter course 3 code: IS420
Enter course 3 hours: 3
Enter course 3 grade (Out of 5): 2.5
=====
Done.
*****
* 1- Add a New Student.          *
* 2- Display student with max GPA.*
* 3- Display all Students.      *
* 4- Exit.                      *
*****
> 2
*****
The student with the maximum GPA is:-
Name: Marwan. Department: CSC. GPA = 4.14
CSC111, 4 hours, C
CSC113, 4 hours, A
CSC212, 3 hours, B
CSC215, 3 hours, A+
*****
* 1- Add a New Student.          *
* 2- Display student with max GPA.*
* 3- Display all Students.      *
* 4- Exit.                      *
*****
> 3
*****
Name: Marwan. Department: CSC. GPA = 4.14
CSC111, 4 hours, C
CSC113, 4 hours, A
CSC212, 3 hours, B
CSC215, 3 hours, A+
=====
Name: Ali. Department: IS. GPA = 3.50
IS360, 3 hours, B+
IS499, 1 hours, C+
IS420, 3 hours, D+
=====
*****
* 1- Add a New Student.          *
* 2- Display student with max GPA.*
* 3- Display all Students.      *
* 4- Exit.                      *
*****
> 4
*****
Goodbye!

```