ICS 104 – T221 - Lab Project

University Registrar System

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A. Description

The information of available courses in a university are stored in "**coursesInfo.txt**" file, such that each line represents a record that corresponds to a unique course/section. Each record contains the following information:

- Course Number (5 digits)
- Course Code
- Section Number
- Course Name
- Instructor's Name
- Section Size
- number of registered students

In each record: The above items are separated by commas.

The information of registered students is stored in "**registeredStudents.txt**" file. Each line in this file represents a record that contains the course number of the course and the ID and the name of the student who registered this course. This information is separated by a comma.

You are required to develop a menu-driven program that display the following menu and keep displaying it until the user chooses the exit option.

```
University Registrar System
==============================
1. Print courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================
Enter your choice:
```

Below are the details for each possible choice:

1. Print courses info

The following information should be displayed for all courses in the university:

course number (CRN), course code, section number, course name, instructor's name, section size, number of available seats (i.e., section size – registered students)

2. Search a course

The user can choose to search for a course by entering either its name (or part of it), by entering its course code, or by entering the course number of the course. You should display all information of all matched courses, otherwise an appropriate message is displayed to indicate that there are no matched courses. Searching should be case insensitive; user can search using lowercase or uppercase letters.

3. Add a new course

To add a new course, the user should enter required information except the number of registered students. The course number should be unique for each course in the university. The entered information should be validated as follows: course number should be 5 digits and it should not be equal to any other used serial number, course code is not empty, section number is a positive integer value, course name is not empty, instructor's name is not empty, and section size is valid positive integer number. After the user enters complete valid information for a new course, a new record should be added to the "coursesInfo.txt" file (in this case, the number of registered students will be equal to 0), and a message is displayed to indicate that the new course has been added successfully. Otherwise, appropriate wrong messages should be displayed about all invalid inputs.

4. Remove a course

To remove a course, a user should enter a valid existing course number. Then, all information of the course is displayed, and the user should be asked whether he is sure about removing the course. If the user confirms removing the course, the corresponding record should be deleted from (coursesInfo.txt) file. A message is displayed to indicate that the course has been removed successfully. Note that a course can be removed if and only if it has no registered students. Appropriate error messages should be displayed if the user entered invalid/non-existing course number, or if the course has some registered students.

5. Update a course

To update a course, the user should enter the course number. If a matched record is found in the "coursesInfo.txt" file, then ask the user what he/she wishes to update (i.e., course's name, instructor's name, section size). Read the updated information from the user and update the corresponding record in "coursesInfo.txt" file. A message is displayed to indicate that the course has been updated successfully. If no match is found, an appropriate error message is displayed

6. Register a student in a course

To register a student in a course, the user should enter the course number of the course and student's ID and name, then a new record is added to the file "registeredStudents.txt". The corresponding record in "coursesInfo.txt" file should be modified such that the number of registered students in the course is incremented

by 1. A message is displayed to indicate that the student has been registered in that course successfully. Note that a student cannot register the course under the following conditions: user entered invalid/non-existing course number or if there are no available seats in that course (i.e., students registered in this course equals to the section size).

7. Drop a student from a course

To drop a student from a course, the user should enter the course number and student's ID. If this student is registered in this course (i.e., there is a record in "registeredStudents.txt" with this course and this student), a message should be showed to the user asking for confirmation dropping this student from this course. If the user confirms this option, the record in the "registeredStudents.txt" file should be deleted and the record of the course in the "coursesInfo.txt" should be updated (i.e., number of registered students should be decremented by 1). Then, a message should be displayed to the user once the students has been dropped from this course. Appropriate error messages should be displayed if the user entered invalid/non-existing course number, or the student is not registered in that course.

If user entered an invalid menu option, the program should display an appropriate error message.

B. Deliverables:

Each team should submit the following:

1. Working code written in a **Jupyter notebook file**, the file should include the names, ids, section numbers of team members at the beginning.

2. A **report** as a separate word/pdf file that includes the following:
   - Description of how the team solved the problem
   - Contribution of each team member
   - Description of the different functions with their tasks
   - Screen shots of the running code.

C. Project Demo/presentation

Each team is required to present his project:

- The project demos will be scheduled in week 15 (Dec. 11 to Dec. 15).
- Students fail to appear for project demo/presentation will get ZERO in the lab project.
- During the demo, each member is expected to run the program and perform some of the functionalities.
- Team members should be ready for any question about their code.
- A slot of 15 minutes will be allocated to each team for their presentation and questions

D. Grading Policy

The project weights 100 points:

Item	Points
Report	5
Including meaningful comments in the code for all implemented functions	5

Adopting good programming practices: • Use meaningful variable names • Modularity: Your program must contain as many functions as needed. You need to divide your problem into small tasks and each task is handled by a separate function. • Global variables are not allowed	10
Code, presentation, and discussion	80

E. Guidelines

- The project should be conducted by a team consists of TWO students
- The deadline for submitting the lab project is **Saturday December 10** before midnight.
    - Submitting Sunday before midnight will lead to 5% penalty
    - Submitting Monday before midnight 15% penalty
    - Later submissions will not be accepted
- Submission is through blackboard only; each team needs to submit a zipped file that contains the Jupyter notebook file and the word/pdf file.
- You are limited to the material covered in the course lectures and labs in your code. Using uncovered material/libraries is not allowed.
- Only one member needs to submit the project. In case of multiple submissions, the latest submission will be considered.
- Team members should contribute equally to the project (as much as possible). If a member contributes significantly less than the other member, his work will not be graded out 100, rather it will be graded proportionally to his contribution amount.

APPENDIX A: Sample Runs

1. Print courses info

coursesInfo.txt

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
```

```
University Registrar System
==============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:1
CRN     Code    Sec No. Name                                            Instructor      Size    Available
13068   ICS104  55      Introduction to Programming in Python and C     Saleh AlSaleh   30      30
13080   ICS104  68      Introduction to Programming in Python and C     Saleh AlSaleh   30      30
14292   ICS104  69      Introduction to Programming in Python and C     Saleh AlSaleh   30      30
14293   ICS104  70      Introduction to Programming in Python and C     Saleh AlSaleh   30      30
```

2. Search for a course

coursesInfo.txt

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
```

RUN1:

```
University Registrar System
============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:2

    1. By Course Number
    2. By Course Code
    3. By Course Name
Enter your choice: 1
Enter course CRN: 13068
Found a matching course
CRN     Code    Sec No. Name                                                    Instructor      Size    Available
13068   ICS104  55      Introduction to Programming in Python and C             Saleh AlSaleh   30      30
```

RUN2:

```
University Registrar System
============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:2

    1. By Course Number
    2. By Course Code
    3. By Course Name
Enter your choice: 2
Enter Course Code: ICS104
CRN     Code    Sec No. Name                                                    Instructor      Size    Available
13068   ICS104  55      Introduction to Programming in Python and C             Saleh AlSaleh   30      30
13080   ICS104  68      Introduction to Programming in Python and C             Saleh AlSaleh   30      30
14292   ICS104  69      Introduction to Programming in Python and C             Saleh AlSaleh   30      30
14293   ICS104  70      Introduction to Programming in Python and C             Saleh AlSaleh   30      30
```

RUN3:

```
University Registrar System
==============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:2

    1. By Course Number
    2. By Course Code
    3. By Course Name
Enter your choice: 3
Enter course name or part of it: python
CRN     Code    Sec No. Name                                                    Instructor      Size    Available
13068   ICS104  55      Introduction to Programming in Python and C             Saleh AlSaleh   30      30
13080   ICS104  68      Introduction to Programming in Python and C             Saleh AlSaleh   30      30
14292   ICS104  69      Introduction to Programming in Python and C             Saleh AlSaleh   30      30
14293   ICS104  70      Introduction to Programming in Python and C             Saleh AlSaleh   30      30
```

RUN4:

```
University Registrar System
==============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:2

    1. By Course Number
    2. By Course Code
    3. By Course Name
Enter your choice: 2
Enter Course Code: COE301
Course does not exist
```

3. Add new course

coursesInfo.txt

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
```

RUN1

```
University Registrar System
==============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:3
Enter course CRN: 11433
Enter course code: COE301
Enter Section Number: 51
Enter course name: Computer Organization
Enter Instructor name: Hazem Selmi
Enter Section Size: 25
Course has been added successfully !!!
```

Note: New record should be added in *coursesInfo.txt* as follows:

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
11433,COE301,51,Computer Organization,Hazem Selmi,25,0
```

RUN2

```
University Registrar System
==============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:3
Enter course CRN: 11433
Serial Number already exists
Enter course CRN: 11917
Enter course code:
course code cannot be empty
Enter course code: COE301
Enter Section Number:
Section Number must be positive and non-empty
Enter Section Number: 52
Enter course name:
course name cannot be empty
Enter course name: Computer Organization
Enter Instructor name:
instructor name cannot be empty
Enter Instructor name: C KAMAL
Enter Section Size:
Section Size must be positive and non-empty
Enter Section Size: 23
Course has been added successfully !!!
```

Note: New record should be added in *coursesInfo.txt* as follows:

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
11433,COE301,51,Computer Organization,Hazem Selmi,25,0
11917,COE301,52,Computer Organization,C KAMAL,23,0
```

4. Remove a course

coursesInfo.txt

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
11433,COE301,51,Computer Organization,Hazem Selmi,25,0
11917,COE301,52,Computer Organization,C KAMAL,23,0
```

RUN1

```
University Registrar System
================================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
================================

Enter your choice:4
Enter course CRN: 12345
Course does not exist
```

RUN2

```
University Registrar System
============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
============================

Enter your choice:4
Enter course CRN: 11917
CRN     Code    Sec No. Name                                    Instructor      Size    Available
11917   COE301  52      Computer Organization                   C KAMAL         23      23
Are you sure you want to remove this course ? [Y/N]y
Course has been removed successfully :)
```

Note: COE301-52(CRN: 11917) record should be deleted from coursesInfo.txt as follows:

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
11433,COE301,51,Computer Organization,Hazem Selmi,25,0
```

5. Update a course

coursesInfo.txt

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
11433,COE301,51,Computer Organization,Hazem Selmi,25,0
```

RUN1:

```
University Registrar System
==============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:5
Enter course CRN: 99999
Course does not exist
```

RUN2

```
University Registrar System
==============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:5
Enter course CRN: 11433

            1. Course Name
            2. Instructor's Name
            3. Section Size
What would you like to update ?3
Enter Section Size: 24
Course has been updated successfully
```

Note: COE301-51 (CRN: 11433) record should be updated from coursesInfo.txt as follows:

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
11433,COE301,51,Computer Organization,Hazem Selmi,24,0
```

6. Register a student in a course

coursesInfo.txt

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
11433,COE301,51,Computer Organization,Hazem Selmi,24,0
```

RUN1

```
University Registrar System
================================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
================================

Enter your choice:6
Enter course CRN: 88888
Course does not exist
```

RUN2

```
University Registrar System
================================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
================================

Enter your choice:6
Enter course CRN: 13068
Enter Student's ID: 201956540
Enter Student's Name: Ahmed Khalid
Student 201956540, Ahmed Khalid has been registered in Introduction to Programming in Python and C course Successfully
```

Note: ICS104-55 (CRN: 13068) record should be updated from coursesInfo.txt as follows:

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,1
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
11433,COE301,51,Computer Organization,Hazem Selmi,24,0
```

A new record should be added in the registeredStudents.txt as follows:

```
13068,201956540,Ahmed Khalid
```

RUN3

```
University Registrar System
==============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:6
Enter course CRN: 13068
Enter Student's ID: 201956540
Enter Student's Name: Ahmed Khalid
Student 201956540 is already registered in this course
```

No new record should be added to registeredStudent.txt

7. Drop a student from a course

coursesInfo.txt

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,1
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
11433,COE301,51,Computer Organization,Hazem Selmi,24,0
```

registeredStudents.txt

```
13068,201956540,Ahmed Khalid
```

RUN1:

```
University Registrar System
==============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
==============================

Enter your choice:7
Enter course CRN: 89898
Enter Student's ID: 20195630
Course does not exist or student is not registered in that course
```

RUN2:

```
University Registrar System
============================
1. Print Courses info
2. Search for a course
3. Add new course
4. Remove a course
5. Update a course
6. Register a student in a course
7. Drop a student from a course
8. Exit
============================

Enter your choice:7
Enter course CRN: 13068
Enter Student's ID: 201956540
Are you sure you want to drop this student from this course ? [Y/N]y
Student 201956540, Ahmed Khalid
 has been dropped from Introduction to Programming in Python and C course Successfully
```

The new coursesFile.txt and registeredStudents.txt should be as follows:

coursesInfo.txt

```
13068,ICS104,55,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
13080,ICS104,68,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14292,ICS104,69,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
14293,ICS104,70,Introduction to Programming in Python and C,Saleh AlSaleh,30,0
11433,COE301,51,Computer Organization,Hazem Selmi,24,0
```

registeredStudents.txt