CO222: Programming Methodology
Lab: 10

Deadline: Apr 5th 2016 @ 11.55PM

An array is a continuous chunk of memory that can contain a predefined amount of data. All the data in an array should have the same type and they should be of same size.

https://en.wikipedia.org/wiki/Array_data_structure

Q1

Write a program that can be used to handle a student registration system.

1. The system should keep following data of each student,
   a. Registration Number
   b. Batch
   c. First Name
   d. Last Name
   e. GPA
2. There should be options to
   a. Add new students.
   b. Delete students.
   c. Show the information of a student when his/her registration number is given.
   d. Show information of all the students.
3. Its okay to make the student registration system volatile. (The data is lost when the program is stopped. No need to write student data to a file or a database.)
4. Internally the program should use an array to store student data.
5. The UI can be command line based. (See the sample UI given.)

Figure 1 : Main UI

Figure 2 : Adding a new record.

```
---------------------------------------------
A VOLATILE STUDENT RECORD MAINTENANCE SYSTEM
---------------------------------------------
0. Quit
1. Insert a Student Record
2. Print a Student Record
3. Print all Student Records
4. Delete a Student Record
2
Enter the Registration Number: 555
The student ppp qqq (E/11/555) has a cumulative GPA of 3.20


---------------------------------------------
A VOLATILE STUDENT RECORD MAINTENANCE SYSTEM
---------------------------------------------
0. Quit
1. Insert a Student Record
2. Print a Student Record
3. Print all Student Records
4. Delete a Student Record
3
The student aaa bbb (E/11/123) has a cumulative GPA of 3.10
The student ppp qqq (E/11/555) has a cumulative GPA of 3.20
```

Figure 3 : Displaying results.

```
---------------------------------------------
A VOLATILE STUDENT RECORD MAINTENANCE SYSTEM
---------------------------------------------
0. Quit
1. Insert a Student Record
2. Print a Student Record
3. Print all Student Records
4. Delete a Student Record
4
Enter the Registration Number: 555
```

Figure 4 : Deleting a record

Instructions

- The code should be in a file named code.c
- Start by creating the UI.
- Next create the structure to store a student record, and the array.
  - An structure similar to following can be used,

    ```
    typedef struct _ {
          int batch;
          int regNo;
          char firstName[20];
          char lastName[20];
          float cGPA;
    }student_t;
    ```

- Create separate functions for each operation (Add, delete, print) and add them to UI.
- Write answers on the discussion part in a text file named discussion.txt
- Put both code.c and discussion.txt files to a zip file named E13###_co222_lab10.zip
  - use zip -r E13###_co222_lab10.zip *
  - Replace ### with your registration number.
- Submit E13###_co222_lab10.zip to feels.

Discussion
1. How much memory (in bytes) is allocated for your array? Show your calculation.
2. At what stage of your program this memory allocation is happened and when the memory is freed?
3. Explain how deleting values is implemented. Is there any additional processing we should do to keep the data structure consistent? Explain.
4. Can we add unlimited amount of student data to this program? If no what is the limitation?
5. Suggest a way that can be used to resize an array while the program is running.