CS1303: Introduction to Programming
Assignment 11: Structures

Submission Deadline:
Saturday, 16'th November 2019,10:00 PM

Please Note: You are free to take any design decision you think is appropriate for solving any problem in the assignment. The assumptions should be **reasonable** and clearly stated in the "**design.txt**" file that you are supposed to upload. Please refrain from commenting on Google classroom asking for clarifications on such issues. Do not expect any reply to questions asking if it is okay to use scanf/gets, and other similar kind of trivial enquiry. Other reasonable doubts can be clarified at the **lab session** or mailed directly to your allocated TA, so that your query is resolved at the earliest.

Problem Statement:

Assume that an automobile company has serial number for engine parts starting from AA0 to FF9. The other characteristics of engine parts are: Date of manufacture, material and weight. Create a structure with an appropriate name to store information about each engine part. Using this information, write functions to retrieve the following:

1) List of all the serial numbers of engine parts where weight is more than 5kg.
2) The year of manufacture of engine parts having serial numbers between AA2 and BB7 (both inclusive).
3) List of all the details of engine parts where the year of manufacture is within 3 years of 15th Nov 2019.

Important Notes:

1) Your functions **should** take **pointers to structure objects** as arguments, instead of structure objects. The reasoning is that structure objects are large and it is inefficient to create copies of large objects during function calls. You could also add checks for pointers being NULL before using those pointers.
2) The serial number is of the form XY, where X = AA, BB, ... ,FF and Y = 0,1, … ,9. Assume that the input of serial numbers given by the user is in the correct format. The ordering can be enumerated as: AA0, AA1, .. AA9, BB0, …, FF9.
3) 1<= weight of each engine part <= 10 (in kg). This has to be verified while taking the input. This is an integer.

4) The date of manufacture is in dd-mm-yyyy format. You are free to choose the data type and the manner on how you store the data. Be careful of leap year when calculating date difference. You cannot use library functions to find date difference.
5) Assume that the date of manufacture is never before 1st Jan 2000.
6) The number of instances of engine parts is not more than 5.
7) The material field of the structure can be either Iron or Steel.

Test Cases:

Case 1

Input:

Enter the number of parts: 2
Enter serial number of part 1 : CC4
Enter Date of manufacture of part 1 : 23-05-2015
Enter material of part 1 : Steel
Enter weight of part 1 : 6

Enter serial number of part 2 : BB1
Enter Date of manufacture of part 2 : 03-12-2018
Enter material of part 2 : Steel
Enter weight of part 2 : 2

Output:

Serial numbers where weight is more than 5kg : CC4

Year of manufacture of engine parts having serial number between AA2 and BB7 : 2018

Details of engine parts where year of manufacture is within 3 years of 15th Nov 2019 :
Serial number : BB1
Date of manufacture : 03-12-2018
Material : Steel
Weight : 2

Case 2

Input:

Enter the number of parts: 3
Enter serial number of part 1 : FF2
Enter Date of manufacture of part 1 : 09-04-2017
Enter material of part 1 : Iron
Enter weight of part 1 : 3

Enter serial number of part 2 : EE9
Enter Date of manufacture of part 2 : 03-10-2018
Enter material of part 2 : Steel

Enter weight of part 2 : 4

Enter serial number of part 3 : BB4
Enter Date of manufacture of part 3 : 06-09-2005
Enter material of part 3 : Steel
Enter weight of part 3 : 1

Output:
Serial numbers where weight is more than 5kg : No entries found!!

Year of manufacture of engine parts having serial number between AA2 and BB7 : 2018

Details of engine parts where year of manufacture is within 3 years of 15th Nov 2019 :
Serial number : FF2
Date of manufacture : 09-04-2017
Material : Iron
Weight : 3

Serial number : EE9
Date of manufacture : 03-10-2018
Material : Steel
Weight : 4

Submission Details:
Please submit the following information:

- **Source Code:** Your source program. The name of your file should be in this format: **Structures-roll no.c** where you replace "roll no" with your roll number.

- **Readme.txt:** In this file, you should explain how to compile and run your program. The name of your file should be in this format: **Structures-Readme-roll no.txt** where you replace "roll no" with your roll number.

- **Design.txt:** In this file, you explain the design of your program (control flow of your program). Your objective should be such that the TA reading this file should easily understand the working of your program. Please add details about how you have handled corner cases - i.e. for what inputs you have printed "Error". The name of your file should be in this format: **Structures-Design-roll no.txt** where you replace "roll no" with your roll number.

Zip all these files and name it as **Structures-roll no.zip**. **Please follow the naming convention strictly. Otherwise, your program will not be evaluated.** Then, submit it on google classroom for this assignment by the above-mentioned deadline.

Plagiarism policy: If we find a case of plagiarism in your assignment (i.e. copying of code from each other, in part or whole), you will be awarded **zero marks**. **Note** that we will not distinguish between a person who has copied, or has allowed his/her code to be copied; both will be equally awarded **zero** marks for the submission. Follow the link below for more information about plagiarism policy: **https://cse.iith.ac.in/academics/plagiarism-policy.html**

Evaluation Policy:
The TAs will use the following evaluation policy:

- Design: 30%
- Execution: 60%
- Indentation and Documentation (with comments): 10%

Late Submission Penalty:
For each day after the deadline, your submission will be penalized by 10 marks.