**Problem 2 : Students Marks System (student\_marks\_system.c / cpp )  
  
Intro** : The problem will have 3 Levels ,and you will be graded on basis of number of features your program will support ,But for submission at least Level 1 tasks are needed to be done. Maintain good design ,and keep modularity in mind while writing code .Dont jump on to the task immediately ,Read the Guidelines provided and then start solving .

**GuideLines :**

1. Maintain Code –Readability, Try to separate your Code to as many functions as possible ,with good meaningful names .
2. DO NOT Share your code with your friends ,or else you too will be disqualified .
3. Do think about what data structure ,or collection of data structures you are going to use to solve the below problem
4. Do write a basic Command line UI which helps in running the below tasks ,Like A Menu which shows Add Student ,Print Leaderboard , Fetch Student Marks etc .

**Problem :**You are given a Text file which consists of Students and His marks in various subjects .The data will be in the following format .

6  
C,Java,NodeJS,Maths,Physics,Chemistry  
Abhijith  
95,94,100,26,43,57  
Jack  
100,100,100,99,99,100  
Bob  
50,40,30,50,80,90  
.  
.

The First line will specify the number of subjects each student has taken the exam for.  
The next line will specify the subject names in a comma separated fashion.  
The next lines will be occurring in pairs of 2 , where first line will specify a name ,and the next line will be a comma separated list of Integers which specify each student marks in subject 1 ,subject 2..and so on. [The Ordering will be matched with the subject names specified ]

**Sample Input File is provided ,But Do create your own Input Files .**

**Level 1 Tasks :**

1. Show List of All students and his marks in a good represented way
2. Add the support for fetching all subject marks for particular student
3. Add support for fetching a particular subject marks for a student
4. Add support for fetching Maximum marks a student got in all subjects
5. Add support for fetching the Average marks a student got .
6. Add support for fetching marks of all students , when a particular subject is given .
7. Add the support for addition of a student and his subject marks.
8. Add Basic Error Handling ,Like when two names occur line by line without subject marks in between ,Don’t consider that student .[Do think of any more cases that require Error Handling ]

**Level 2 Tasks :**

1. Add support for Changing a students name
2. Add support for changing a student marks for particular Subject / All subjects.
3. Add support for deletion of a particular student and all his marks .
4. Display List of Students whose Data is missing ,and provide an option to Enter the subject marks again .
5. Print the All students ,in a Leaderboard format , with Highest marks of all subjects being at First .
6. Add Support for the above leaderboard to print the marks according to the below specified queries .  
   **SubjectName > K** . (should print the students data who got above K marks in the particular subject , It can be < or = too)  
   **Total > K** ( Only print if total marks are greater than K ,It can be < or = too )

**Level 3 Tasks : (ONLY ATTEMPT THIS ,if you have TIME and completed All other tasks,The below would be a glimpse of what tasks you are going to do at Summer would be. )**

1. If you had an option to Re-Design the Format of the Text file/Structure provided ,What would be the format you would be using ,so that It will be more efficient in solving the above Tasks .Write it in the Report Doc you are going to write ,along with why It would suit your data structure well .
2. Add support for **AND**,**OR** operators for the above queries ,   
   **C > 80 and Physics > 60 .** (Should print all students who got above 80 marks in C and above 60 in physics )
3. Add support for querying on Students Name too , Like **Name = ‘’Abhijith”.**
4. Now if each student will have 3 more attributes defining him , College , Branch and Section ,How well your data structure will hold and support the Query functionality for the new attributes .

**It is a very scalable problem ,and we left some internal details[Like what is an error case ,Is Bob and bob same ?Maths and maths ? so that we want you to think on it .**  
So do find the unknowns given in the above Tasks and mention in the Doc any other extra features you have implemented .

**How to Write the Report Doc :  
Heading : Students Marks System   
First Line should be your Name ,Year ,College Name .**There will be no other formatting rules etc ,So don’t think much on how to format the document, Font size etc .If its understandable ,It will be okay .Make sure it is not exceeding 2pages (Only Extend if it is necessary and what all you wrote is very important ) All we look into the document is

* What Data structure/structures you have used ,Why you think that data structure works efficiently for the above problem
* Mention any Top 2-3 Tasks you did and How did you Solve it .
* How are you handling File Operations ? Are you manipulating the data In-Memory vs On File ,Do state what you think is best and why ?
* Any other things which would support your Implementation as a good one .