Project Statement
Introduction to Computing Lab 1B1

Note: Datatype String is not allowed.

Write a C++ code to implement a small part of "**Library Management System (LMS)**". Given a file named **books.txt** having the following data:

LIBRARY BOOKS

Book Name	Book Number	Department	Availability	Issue Details Issued to:
Digital Logic Design	155	Electrical	Unavailable	161432
Electronic Circuit Design	156	Electrical	Unavailable	115119
Data Structures using C++	157	Computer Science	Available	-
Signals and systems	158	Electrical	Unavailable	172108
Digital signals processing	159	Electrical	Available	-

- Assume maximum number of books can be 10. Assume index **i** of all arrays contains data of same Book.
- Read data from file into corresponding arrays.
- Print the content of all arrays on console in the same format as shown in the input file.

Decide the prototype yourself. Remember that **variables must be declared** in **main** only. Write the main and test your program.

Following is the sample of how your system should work:

- Welcome to **"Library Management System"**.
- Press the assigned number to perform the desired operation.
- Your program should display the updated books list on the console after the execution of add, delete and edit operation.
- Your program should keep displaying the menu after each function call unless user wants to exit.
- Press 'E' to exit.

These are the **functions used** in this project:

InputstudentsDetail(..): This function should prompt the user to enter his/her Student ID.
mainmenu(…) – This function is used to display the main menu of this project.

Library Management System

Press1: To see all the (available/unavailable) books
Press 2: To return to the main menu
Press 3: To add new books
Press 4: To delete books from the available books
Press 5: To edit the details of a book
Press 6: To search a book from the Library management system
Press 7: To check the book issue record

1. **availableooks(…)** : This function should display all the books and their related information.

2. **returnfunc(…)** : With this function, the user will return back to the main menu.

3. **addbooks(…)** : This function adds a new book(s) in a file. For that, you need to mention the book name, department and book number.

For example, to add a new book of the following details:
Book Name: Microelectronic Circuit
Department: Electrical
Book Number: 160
The updated book list will look like as given below:

Library Management System

Book Name	Book Number	Department	Availability	Issue Details Issued to:
Digital Logic Design	155	Electrical	Unavailable	161432
Electronic Circuit Design	156	Electrical	Unavailable	115119
Data Structures using C++	157	Computer Science	Available	-
Signals and systems	158	Electrical	Unavailable	172108
Digital signals processing	159	Electrical	Available	-
Microelectronic Circuit	160	Electrical	Available	-

4. **deletebooks(…):** This function is used to delete a book from the library management system. For example, to delete a book of the following details:
Book Name: Electronic Circuit Design

Department: Electrical
Book Number: 156
The updated book list will look like as given below:

Library Management System

Book Name	Book Number	Department	Availability	Issue Details Issued to:
Digital Logic Design	155	Electrical	Unavailable	161432
Data Structures using C++	157	Computer Science	Available	-
Signals and systems	158	Electrical	Unavailable	172108
Digital signals processing	159	Electrical	Available	-
Microelectronic Circuit	160	Electrical	Available	-

5. **editbooks(…):** This function is used to edit the information of a book in the system. For Example, if the user has returned the book the system should update its availability status to available and remove the user Student ID from the Issue details.

6. **searchbooks(…):** This function is used to search book in the system. This function should prompt the user to enter the book number and display whether the book is available or unavailable?

7. **issuerecord(…)** – With this function, you can check record of the students to whom the book has been issued.

NOTE: ***You are required to make function for each functionality or where required. Your code should also include the loops and arrays. Marks will be awarded on the proper use of functions, control structures, Loops and arrays. Make your project as much generic as possible.***

Project Deliverables:

1. Identify possible solutions which can be used to design this system. Provide at least two different solutions to design the required system. **[SLO-5.1]**

2. Compare the possible solutions identified earlier in SLO 5.1 and select one among the possible solutions and justify your selection. **[SLO 5.2]**

3. Apply the selected and developed techniques in the design of system. **[SLO-5.3]**

4. Verify your design for different inputs and suggest solutions that might lead to improve the quality of such system . **[SLO-5.4, 11.4]**

5. Discuss the limitations and suggest extension of the developed solution. **[SLO-5.5]**

6. Prepare a management plan to implement the project successfully and provide a flow chart of your program. Clearly mention input arguments and return type of each function. Identify and mention algorithm/technique to be used in the functions.
   [SLO 11.1]

7. Prepare a schedule which will show the time duration required to implement the different functions of the assigned project. **[SLO 11.2]**

8. Prepare a short description about which tasks are performed by the group members and depict the team relationship while implementing the project. **[SLO 11.5 & 9.1]**

9. Prepare a detailed report (A report highlighting the technical as well as non-technical details which you think to be important) on the completion of project which will summarize all the relative information related to different tasks of the project. **[SLO-11.6]**

VERY IMPORTANT

Academic integrity is expected of all the students. Plagiarism or cheating in any assessment will result in negative marking or an **F** grade in the course, and possibly more severe penalties.

SUBMISSION GUIDELINES

- You need to submit a complete folder in the form of the zip file which will contain the project report and complete code ***containing all the files for the project((.cpp file, Input/output files)) on Google Classroom before 11:00 AM on Monday (21 – 12 – 2020).*** Name the folder as the roll number of the group members. Also, write roll numbers and name of the members in the subject line of the ***email (You need to submit on email too).*** Code should be documented and well written in C++. It must compile.

- The group will consist of at most two members. Those students who have not yet posted their groups on classroom thread, go mention there. No change of groups will be allowed later in any case.

You will be tested on the following PLO's and SLO's

PLO 05 - Modern Tool Usage							
An ability to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities, with an understanding of the limitations.							
SLO	Statement↓	Score→	Exemplary (5)	Proficient (4)	Developing (3)	Beginning (2)	Novice (1)
5.1	**Identification:** Identifies only relevant techniques, resources and modern IT tools that can be used to solve / simulate a complex engineering activity		5.1.4 + Identifies only relevant modern IT tools that can be used to solve / simulate a complex engineering activity	5.1.3 + Identifies only relevant resources that are needed to solve / simulate a complex engineering activity	Identifies only relevant techniques / algorithms that can be used to solve / simulate a complex engineering activity	Identifies techniques / algorithms that can be used to solve / simulate a complex engineering activity but some are irrelevant	Makes no attempt to identify any technique/algorithm that can be used to solve / simulate a complex engineering activity
5.2	**Selection/Creation:** Compares, selects and creates techniques, resources and modern IT tools to solve / simulate a complex engineering activity		Creates/ develops techniques, resources and modern IT tools to solve / simulate a complex engineering activity	Correctly compares and selects amongst the identified modern IT tools that are to be used to solve / simulate a complex engineering activity	Correctly compares and selects amongst the identified resources that are to be used to solve / simulate a complex engineering activity	Correctly compares and selects amongst the identified techniques/ algorithms that are to be used to solve / simulate a complex engineering activity	Cannot correctly compare identified techniques/ algorithms that are to be used to solve / simulate a complex engineering activity
5.3	**Application:** Applies the selected and developed techniques resources and modern IT tools to solve / simulate a complex engineering activity		Demonstrates mastery of the techniques / modern IT tools that can be used to solve / simulate a complex engineering activity	Appropriately uses the selected / developed modern IT tool to solve / simulate a complex engineering activity	Adequately uses the selected / developed resources to solve / simulate a complex engineering activity	Correctly implements the selected / created techniques / algorithms to solve / simulate a complex engineering activity	Makes no attempt to implement selected technique / algorithm to solve / simulate a complex engineering activity
5.4	**Verification and Improvement:** Verify and improve the developed solution / model		Improves the techniques / algorithms to develop a better solution / model	Technically lists the limitations / shortcomings of the techniques / algorithms along with those of the proposed model/ solution	Can technically and correctly justify the model / solution and the validity of the implemented techniques / algorithms	Attempts to verify the model / solution	Makes no attempts to verify the model / solution
5.5	**Analysis and Synthesis:** Analyzes and syntheses information obtained from the developed model / solution.		Discusses the limitations of analysis and proposes applications/ future work as an extension to the current development and modeling	Predict results through simulation and modeling	Analyzes the results obtained through simulation and modeling	Technically presents the solution / model using appropriate and relevant tools	Cannot present a valid model / solution

PLO 11 - Project Management							
An ability to demonstrate management skills and apply engineering principles to one's own work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.							
SLO	**Statement↓**	**Score→**	**Exemplary (5)**	**Proficient (4)**	**Developing (3)**	**Beginning (2)**	**Novice (1)**
11.1	**Integration and Scope Management:** Defines and plans the project and processes to control its execution, change and configuration.		Exercises configuration management practices	Exercises change control practices	Develops work breakdown structure	Develops project management plan	Makes no attempt to develop project management plan
11.2	**Time Management:** Plans and exercises conscious control over the amount of time spent on specific activities to increase efficiency or productivity.		Demonstrates skills to control schedule and the project finishes within ±5% of the scheduled time	Demonstrates skills to control schedule and the project finishes within ±10% of the scheduled time	11.2.1 + Estimates activity duration and envelops activity schedule	Defines and sequences activities	Makes no attempt to define and sequence activities
11.3	**Cost Management:** Plans and controls the budget of a project		Demonstrates skills to control costs and the final cost remains within ± 10% of the allocated budget	Demonstrates skills to control costs and the final cost remains within ± 25% of the allocated budget	11.3.1 + Estimates costs and allocates Budgets	Performs resource identification and planning	Makes no attempt to perform resource identification and planning
11.4	**Quality Management:** Plans and controls activities and tasks needed to maintain a desired level of excellence		Suggests workable/ manageable actions to improve quality	Calculates cost of quality	11.4.1 + Assures and controls quality	Develops a quality management plan	Makes no attempt to develop a quality management plan
11.5	**Human Resource Management:** Manages people within a team to achieve desired outcome while maintaining a		Resolves conflicts effectively using predefined strategies while the team maintains a productive working relationship	Work is effectively and fairly distributed between team members and the team maintains a productive working relationship	Member roles are defined according to their skills.	Team members are selected based on the requirement of the multi-disciplinary project	There is no delineation of who does what in the project
	productive working relationship.						
11.6	**Communication Management:** planning, implementing, monitoring, and revision of all the channels of communication		Gathers, summarizes, and distributes all relevant information in a formal final report on the completion of the project	Performance information are collected, analyzed, and disseminated in performance reports	Data regarding different aspects of the project during its execution is collected effectively and is distributed to the shareholders in a timely manner	Develops a communications management plan	Makes no attempt to develop a communications management plan

PLO 09 - Individual and Team Work							
An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings							
SLO	**Statement↓**	**Score→**	**Exemplary (5)**	**Proficient (4)**	**Developing (3)**	**Beginning (2)**	**Novice (1)**
9.1	**Work effectively:** work effectively, as an individual or in a team, in multidisciplinary settings		Takes ownership and helps others	Actively participates in group discussions/ meetings and workshops	Completes assigned task on time without any help	Needs help from others to complete assigned task	Does not work