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University Library & Book Bank Management System

Overview of Project

You are required to develop a University Library & Book Bank Management System. It is like a library management system but has more features than Library Management System such that apart from management of books issuance to students, it also supports the donations of books from the students and then issuing those books to deserving students for the tenure of one semester. Currently only one type of user can login to the system which is librarian. Librarian will have unique user name and password. More than one librarians are also supported for the system.

Phase 2

In this phase, parameters of the functions will be changed to structs instead of parallel arrays.

Global Constants

All of these constants are of integer data type and should be declared constant

- MAX_BOOK_ID: contains the maximum characters in book Id (Set it to 13)
- DATE_SIZE: set it to 11
- MAX_COPY_NUMBER: contains the maximum characters in book copy number (Set it to 17)
- MAX_BOOKS: contains the size of array for storage of books. Set it to 200
- MAX_CAEGORIES: set it to 30
- MAX_STUDENTS: set it to 100
- MAX_BOOK_NAME: Maximum characters in book name. Set it to 60
- MAX_CATEGORY_NAME: Maximum characters in category name. Set it to 20
- MAX_STUDENT_NAME: Maximum characters in student name. Set it to 60
- MAX_REGISTRATION_NUMBER: Maximum characters in registration number. Set it to 12
- MAX_CATEGORY_NUMBER: Maximum characters in category number. Set it to 4

Structs:

Following structs will be created for the phase 2

Struct Name	Attributes
Book	char Id[] char Name[] int Edition
Category	char Id[] char Name[]
Date	int Day int Month int Year
BookCopy	char Id[] Date PurchaseDate
Student	char RegistrationNo[] char Name[] int Session

	Date AdmissionDate

Functions

You are required to develop following functions. You cannot use changed function names, parameters and return types. Respect the case sensitiveness of the functions. (Otherwise project will NOT BE GRADED)

- bool **isValidBookId**(char bookId[])
- bool **isValidBookName**(char bookName[])
- bool **isValidCopyNumber**(char bookCopy[])
- bool **isValidCategoryName**(char catNo[])
- bool **isValidCategoryNumber**(char catName[])
- bool **isValidDate**(Date date)
  Function will check that date is valid or not. E.g. month cannot be 13, day cannot be 32, similarly day cannot be 30 in case of February
- bool **isValidRegistrationNo**(char regNo[])
  Registration Number should start with 4 digit, e.g. following registration numbers are valid
  2013-CS-1
  2014-CW-43
  2015-ME-543
  No other format should be accepted
- bool **isValidStudentName**(char stdName[])

Category Related function: **None of these functions take input using cin unless specified**
- bool **isExist**(Category arr[], int arraySize, char catId[])
- bool **addCategory**(Category arr[], int arraySize, Category newCategory)
- bool **editCategory**(Category arr[], int arraySize, char catId[], Category newData)
- bool **deleteCategory**(Category arr[], int arraySize, char catId[])
- void **printCategories**(Category arr[], int arraySize)
- bool **saveCategories**(Category arr[], int arraySize)
  save categories in the file named categories.csv in the following format

098,Science
052,Technology

- bool **loadCategories**(Category arr[], int arraySize)
  reads data from categories.csv
- void **readInCategory**(Category& category)
  This function takes the input using cin and store the entered data in category variable

Book Related functions: **None of these functions take input using cin unless specified**
- bool **isExist**(Book arr[], int arraySize, char bookId[])
  Function checks whether there exists a book with given bookId
- bool **addBook**(Book arr[], int arraySize, Book newBook)
  don't add book if same book id exist, return false
- bool **editBook**(Book arr[], int arraySize, char bookId[], Book newData)
- bool **deleteBook** (Book arr[], int arraySize, char bookId[])
- void **printBooks**(Book arr[], int arraySize)
- bool **saveBooks**(Book arr[], int arraySize)
  save books in the file named books.csv in the following format

```
098-EN-19383,Intro to Programming,3
057-EN-19233,Game Theory,4
057-UR-13453,Islamic History,3
```

- bool **loadBooks**(Book arr[], int arraySize)
  reads data from books.csv
- void **readInBook**(Book& book)
  This function takes the input using cin and store the entered data in book variable

Book Copy Related functions: **None of these functions take input using cin unless specified**
- bool **isExist**(BookCopy arr[], int arraySize, char copyId[])
- bool **addBookCopy**(BookCopy arr[], int arraySize, BookCopy newBookCopy)
- bool **editBookCopy**(BookCopy arr[], int arraySize, char bookCopyId[], BookCopy newData)
- bool **deleteBookCopy**(BookCopy arr[], int arraySize, char bookCopyId[])
- void **printBookCopies**(BookCopy arr[], int arraySize, char bookId[])
  function only prints the book copy of particular book id, not all
- bool **saveBookCopies**(BookCopy arr[], int arraySize)
  save book copies in the file named bookcopies.csv in the following format

```
098-EN-19383#111,12-11-2019
057-EN-19233#002,15-01-2020
057-UR-13453#005,14-11-2018
```

- bool **loadBookCopies**(BookCopy arr[], int arraySize)
  reads data from bookcopies.csv
- void **readInBookCopy**(BookCopy &bookCopy)
  This function takes the input using cin and store the entered data in bookCopy variable

Student Related functions: **None of these functions take input using cin unless specified**
- bool **isExist**(Student arr[], int arraySize, char regNo[])
- bool **addStudent**(Student arr[], int arraySize, Student newStudent)
  You have to make sure that registration number is not duplicated while adding
- bool **editStudent**(Student arr[], int arraySize, char regNo[], Student newData)
- bool **deleteStudent** (Student arr[], int arraySize, char regNo[])
- void **printStudents**(Student arr[], int arraySize)
- bool **saveStudents**(Student arr[], int arraySize)
  save students in the file named students.csv in the following format

```
2013-CS-143,Ali,2013,12-10-2012
2014-CS-432,Ahmed,2015,12-10-2010
2013-CS-532,Aslam,2013,12-10-2013
2011-CS-001,Bilal,2013,12-10-2013
```

- bool **loadStudents**(Student arr[], int arraySize)
  reads data from students.csv
- void **readInStudent**(Student& student)
  This function takes the input using cin and store the entered data in student variable

Functions related to file Main Menu
- void **printMenu**()
- void **TakeMenuInput**(int& mainOption, char& subOption)

Note:

- Do not declare arrays globally, all the arrays should be declared in main.

Sample Output

- Functions will be used to complete the following program

```
** Welcome to University Library Management System **
Choose the following option
1     Category Management(A,E,L,D)
2     Books Management(A,E,L,D)
3     Book Copies Management(A,E,L,D)
4     Student Management(A,E,L,D)
0     Exit Program(0E)

Choose the option:
```

- When user enters 1 then category management options will be available.

```
Choose the option: 1A
Enter the details of the category(Id Name) : 098 Fictions
Category has been added successfully
```

```
Choose the option: 1D
Enter the category Id to delete: 098
Category has been deleted successfully
```

```
Choose the option: 1L
        Category Id     Name
        098             Fictions
        056             Technology
```

```
Choose the option: 1E
Enter the Category Id to edit: 056
Enter the new details of the category: 062 Science
Category has been edited successfully
```

- When user enter 2 then Book management options will be available

```
Choose the option: 2A
Enter the details of the book(Id Edition Name) : 098-EN-98712 9 C++ Intro
Book has been added successfully in category 098
```

```
Choose the option: 2A
Enter the details of the book(Id Edition Name) : 052-EN-98712 9 C++ Intro
Category 052 has not been added, first add the category
```

```
Choose the option: 2L
        Book Id         Name            Edition         Category
        056-EN-98712    C++ Intro       9th             Technology
        062-EN-98712    Applied Physics 2nd             Science
```

```
Choose the option: 2E
Enter the Book Id to edit: 098-EN-98712
Enter the new details of the Book: 056-UR-98712 9 C++ Intro
Book has been edited successfully
```

- When user enters 3 then Book Copies management options will be available.

```
Choose the option: 3A
Enter the details of the sample(Id Date-of-Purchase): 098-EN-98712#001 12-11-2019
Book copy has been added successfully
```

```
Choose the option: 3D
Enter the category Id to delete: 098-EN-98712#001
Book copy has been deleted successfully
```

```
Choose the option: 3L
Enter the book id for details: 098-EN-98712
        Copy Id              Purchase Date
        098-EN-98712#001     12-11-2019
        098-EN-98712#007     15-12-2019
```

```
Choose the option: 3E
Enter the Book copy to edit: 098-EN-98712#001
Enter the new details of the book copy: 098-EN-98712#002 12-11-2019
Book copy has been edited successfully
```

- When user enters 4 then Student management options will be available.

```
Choose the option: 4A
Enter the details of the student(regNo session AdmissionDate Name): 2012-CS-4 2011 12-11-2011 Ali
Student has been added successfully
```

```
Choose the option: 4D
Enter the student registration No. to delete: 2012-CS-4
Student has been deleted successfully
```

```
Choose the option: 4L
        Registration Number   Name           Session        Admission Date
        2013-CS-1             Muhammad Ali   2013           11-11-2013
        2015-CS-432           Ahmed Ali      2014           01-01-2015
```

```
Choose the option: 4E
Enter the student registration No to edit: 2013-CS-1
Enter the new details of the student: 2012-CS-4 2011 12-11-2011 Ali
Student has been edited successfully
```

- When the user will press 0E then program will be closed and all the data will be saved in files. Otherwise program should not be closed, it should display main menu after completion of a task
- On loading the program, all the data should be loaded in the arrays.