**LIBRARYPROJECT**

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**FIRST,** we started by creating 3 structures of a Typedef, the first structure is about BOOKS and we named it book and it contains:

1. Char Tittle.
2. Char Author.
3. Char Publisher.
4. Char Date of Publish.
5. Char Category.
6. Char ISBN.
7. Int Copies.
8. Int Available copies.

The second structure is about MEMBERS and we named it member and it contains:

1. Char First Name.
2. Char Last Name.
3. Int ID.
4. Char Street.
5. Char City.
6. Char Building.
7. Char Phone Number.
8. Char Age.
9. Char E-mail.

The Third structure is about BORROWING and we named it borrow and it contains:

1. Int Borrow ID.
2. Char Borrow ISBN.
3. Char Date of Return.
4. Char Date of Borrowed.
5. Char Date returned.

**SECOND**, we started by creating The Functions:

**Function Number (1):**

The Function name is: Valid\_Mail.

The return Type: Integer.

The Parameter: 1) An E-mail String.

2) A pointer to the st- Member.

3) An Integer of the number of the Members.

The Body:

The function takes the email as a string and then after that a for loop is used to search upon the array of members at the emails section by using **strcasecmp** function and checks if this email is already taken by another user, it returns a 1 if this email is taken and 0 if it's valid.

C:\Users\Administrator\Desktop\Valid function.PNG

**Function Number (2):**

The Function name is: ifString.

The return Type: Integer.

The Parameters: 1) Integer N and N represent the size of the string.

2) String to check and has size N.

The Body:

This function is to check whether the string is an Integer or a Character or Mix of both or none of this. So it contains an I which is a counter to the loops and flags which called letter and number and both of them (number , letter ) are initialized by 0 , the function take the parameter and make an array of characters which called check and after that it check the index of the character which is [i] and check by ASCII Whether it’s between a and z or between A or Z so it will make the flag letter =1 and if the array of check entered is between 0 and 9 so the flag number will be 1. And we made 3 cases of the If condition that if the number=1 and letter=0 so this string is an integer, if the letter =1 and the number =0 so that the string is a word and finally if the number=1 and the letter=1 also so that the string is a mix of both numbers and words ex: 5Ahmed8 else it is none of this so it’s a symbol.

**Function Number (3):**

The Function name: MostPop

The return Type: void no return.

The Function Parameters: 1) Integer Number of Books.

2) Structure of books.

3) Structure of borrow.

4) Integer Number of borrowed books.

The Body:

This Function is made in order to get the most popular book by the number of times the books are borrowed so that we made an array of integers which size is by the number of books, we initialized I, counter, z, x=0, after that we made an ISBN string , and will print on the screen Book Tittle , Books author and Book ISBN. After that we will make a for loop by the number of the books entered and will make the count=0 after that we will call the function that called string copy that copy the second string to the first string directly so it will copy the ISBN of each book from the structure of books into the new string that we declared in the function which called also ISBN, and after that we will make another for loop but at this time with the size of number of borrowed books given in the parameters and by making an if condition that by comparing with the string case compare in order to check a part from the ISBN not all the ISBN both the new String ISBN with the structure of the borrowed books and check if the book is borrowed or not and if borrowed so that the counter will increase ++, after that we will make another array that have the size of the count which is the size of the ISBN found in the structure of the borrowed books , we initialized another 3 integers y, m, max and we made a for loops with the size of m and we assumed that the most popular book is the array of 0 and we made another loops with the int y and has the size of the array-1 and we made an if condition that if the size of max<array of size y+1 so that the maximum will be max=array[y+1] finally he will print the First maximum or the most popular (borrowed) books.

C:\Users\Administrator\Desktop\most pop.PNG

**Function Number (4):**

The Function name: OverDueBooks

The return Type: void no return.

The Function Parameters: 1) Pointer to Structure of the borrowed Books.

2) Integer of number of borrowed Books.

The Body:

The function main idea is to display the overdue books and their number, a string called sTime is initialized and a pointer to Character named Add , 6 Integers which are the day , month , year of the dueto return date and also the day , month and year of the actual time and an iterator and counter=0 , so That we made a for loop with the size of number of borrowed books and the body of the loop we called the function string copy that will copy the string which the pointer of borrowing is pointing at which is the date of return in the String which called sTime , and the pointer string add will take the string before the ‘,’ by using the function strtok that take 2 parameters the string you want to take and the symbol that you want to stop at so that we will make the day of return = the pointer add and we will call the function atoi in order to change the array “String” into an integer and also we will make the add pointer to point on which after the ‘,’ so it will be the month borrowed and after that we will make the pointer point again to what after the ‘,’ so it will be the year of the borrowed and we will call the function getTime so it take the pointers to the day, month , year returned and we made a 3 cases of if condition that first if the year returned > year Borrowed so count++ and if the month returned > month borrowed so that also the count ++ and finally if the day returned > day borrowed so count ++ and after that it will print the total number of the over dueBooks by printing the count.

C:\Users\Administrator\Desktop\overdure.PNG

**Function Number (5):**

The Function name: Count\_Borrow

The return Type: Integer.

The Function Parameters: 1) Pointer to the structure borrow.

2) Integer Number of Borrowed Books.

3) Integer Number of ID.

The Body:

This function is made to check how many books does the user have, the function starts to compare the user's ID with the array of borrowed books ID section and count the number of times that ID appeared with taking into consideration that the Returned Date section is "NULL" only, and then it returns that value

**Function Number (6):**

The Function name: Return­\_Book.

The return Type: void no return.

The Function Parameters: 1) Pointer to structure of Borrow.

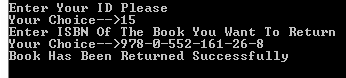
2) Integer Number of borrowed books.

3) Pointer to Structure of book.

4) Integer Number of books.

The Body:

In this function its main idea is to return back a borrowed book to the Library System, it scans from the user the Id and the ISBN so that the system will take the id and the ISBN and put it in a for loop to check on it if it's already in the data base, an if condition is placed so that if the ID scanned equal the pointer that is pointing on the borrow Id and also by using the function “**strcasecmp”** in order to check the ISBN and the result of the function must be zero and also by using "**strcasecmp"** to check that the returned date is "NULL" , so that the book will be returned successfully and it will break from the for loop and after that type to you the book is returned successfully.



**Function Number (7):**

The Function name: month.

The return Type: Integer.

The Function Parameters: 1) String with the month day.

The Body:

This function its main idea is to return the value of the month in integer when it's given in string , it compares by using the function string case compare that compares the input string with the functions' prepared strings to return the right month number, ex. Jan returns 1 , whether it Feb it will return 2 and so on.

**Function Number (8):**

The Function name: Delete\_Member.

The return Type: Integer.

The Function Parameters: 1) Array of structure of members.

2) Integer of number of members.

The Body:

The main idea of the Function is to delete a member from the system so at first we will scan from the user the id of the member that he wants to delete, after that a for loop by the number of members is made to check if the Id is in the system not by looping in all the structure of the members and if the id doesn’t exist, the flag will equal -1 and the function returns zero , if the Id exists, last, first name will be printed and the flag would equal 1 and the function returns "1", while in the main function the function is called and the returned value is subtracted from the total number of members so when the updater operates it won't print that last ID back to the file.

C:\Users\Administrator\Desktop\delete member.PNG

**Function Number (9):**

The Function name: Add\_Member.

The return Type: Integer.

The Function Parameters: 1) Pointer to the member structure.

2) Integer to the Number of members.

3) Integer of the Last ID.

The Body:

The Function main idea is to add a member in the library system and the member must fill the information in order to be added in the system he must enter his: first name, surname, building he lives at, street he lives at , city , phone number , age and the e-mail .

After that the system will add his information in the array of members structure in each section , we scan the information from the user by using the function get string and if he entered a inappropriate information like if he entered his phone number instead of his name an error message will appear , stopping the system from crashing.

The function is called in the main as **remove members**  function where it returns 1 and the number of members is increased by one , making the **updater** prints this new member in the file.

**Function Number (10):**

The Function name: Updater\_Member.

The return Type: void

The Function Parameters: 1) Pointer to structure of members.

2) Integer of number of members.

The Body:

So that the main idea of the function is to take the information from the array of members and after that put it or store it in a file, so that we will open the file and then after that we will add the information in the file by using the function fprintf that will add the information to the file after that we will close the fill in order to save and keep the memory in the file.

**Function Number (11):**

The Function name: Updater\_Borrowed.

The return Type: Integer.

The Function Parameters: 1) Pointer to structure of borrowed.

2) Integer of number of borrowed.

The Body:

The function has the main idea of the function update member it take the information from array of borrowed books and after that open a file and take the information and save it in the file by using the function fprintf and save the information in the file and after that close the file inorder to keep the information saved on the file.

**Function Number (12):**

The Function name: Borrowing.

The return Type: Integer.

The Function Parameters: 1) Pointer to structure of books.

2) Integer of number of books.

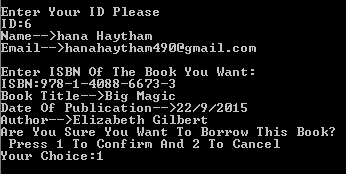
3) Pointer to structure of members.

4) Integer number of members.

5) Pointer to structure of borrow.

6) Integer number of borrowed.

The Body:

The function starts scanning the user's ID and the ISBN of the wanted book , by using if conditions and a flag to make sure that the information entered is true , An integer count is declared and given the returned value of the function **Count Borrow** , and check whether this user have the right to borrow again or not (if less than 3 books), A confirmation message is displayed to the user with the book's info. , after confirmation the system starts calling function **gettime** to get the day , month and year as a prepared string in the form of dd/mm/yyyy which is the last parameter in the function(by reference) and also get the time as individual integers (First three parameters) and pass these integers to the function **Addtime** which adds 15 days on the current date, finally all of that is saved into the array of Borrowed Books and a "NULL" is placed in Date returned value.

**Function Number (13):**

The Function name: Delete Book.

The return Type: Integer.

The Function Parameters: 1) Array of structure of Books.

2) Integer of number of Books.

The Body:

The Function main idea also is as same as the idea of delete member it first search for the ISBN of the book and see whether it exist or not and if it exist the book is moved into the last place in the array and the function returns -1 which decrease number of Books in the main preventing the updater from printing it in the file.

**Function Number (14):**

The Function name: Updater\_Book.

The return Type: void.

The Function Parameters: 1) Pointer to structure of books.

2) Integer of number of books.

The Body:

The Function main idea is as same as update member so that it takes the information from the system and then open a file and after that add the information in the file by using the function fprintf and after that we close the file by using fclose(); in order to keep the information saved in the file.

**Number (15):**

The Function name: Add\_Book.

The return Type: Integer.

The Function Parameters: 1) Pointer to structure of Books.

2) Integer of number of Books.

The Body:

The Function has the main idea of add Member it scan from the user all the information which is related to the Book ex: Name, author, publisher, ISBN, Date and number of copies .. Then after that the system take the information and check if it’s true and all the information are correct and go and save each information in the structure of books and after that prints on the screen the information the user has entered and that the book is added successfully while in the main the number of books is increased by one (returned Value) making the updater prints one more book which is the new one.

**Function Number (16):**

The Function name: Print\_Book.

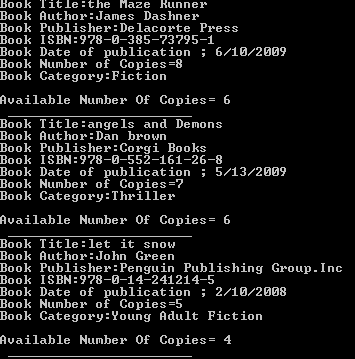
The return Type: Void.

The Function Parameters: 1) Pointer to structure of Books.

2) Integer of number of Books.

The Body:

The main idea of the function is to print the information of the book in a good way by printing the number of the books and its category, tittle, author, ISBN, Publisher, Date, Number of copies and the available number of copies and print in the shape of a table.

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**Function Number (17):**

The Function name: Counter.

The return Type: Integer.

The Function Parameters: 1) Pointer to a file.

2) String name of file.

The Body:

The main idea of the function is to count the number of the character that are on the file in each line by making a for loop that is initialized by the character c and the condition of the loop that this character doesn’t equal to the end of file and if that the character doesn’t equal \n which is a new line so that the counter will increase by 1.

**Function Number (18):**

The Function name: SearchBooks.

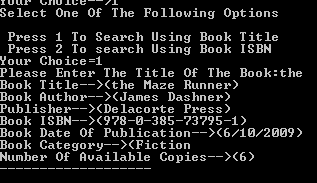
The return Type: Integer.

The Function Parameters: 1) Pointer to structure of books.

2) Integer of number of Books.

The Body:

The main idea of the function is to search about a book either by using ISBN or by using it’s Tittle and after that if you choose search about the book by using the tittle so that we take the string you entered and by using the function strstr so that we will either the book is found or not found and if it’s found so that the system will call the function print book and after that all the information of the book will appear to you on the screen and also the same steps will be done if you searched by using the ISBN.



**Function Number (19):**

The Function name: Add\_Copy.

The return Type: Void.

The Function Parameters: 1) Pointer to structure of Books.

2) Integer of number of Books.

The Body:

The main idea of the function is to add another copy to a book that already exist in the system so we will scan from the user the ISBN of the book and by calling the function strcmp that if there is an ISBN that already exist in the library or not and after that we scan from the user the number of copies that he wants to add and if the number entered is -ve number so an error will appear to him that there is no number of copies with -ve so he must enter a positive number and after that we will increase the number of copies that already saved in the system by the new number of the added copies by the user.

**Function Number (20):**

The Function name: main

The return Type: int

The Function Parameters:

Our **main function** starts with reading the files one after another in ***"Read"*** mode assuming that all the data entered in the file is entered via our program not manually using WordPad or Text.

Number of Members , Books or Borrowing info. is calculated by using the function **counter** , after that an array of structures is declared using these calculations to determine its size plus twenty places which is maximum number of books or members to add per system launch.

Taking the information from the file is done by a **While loop** containing Function **fgets** which takes a complete line (which is a book, a member or a borrow info.) and place it into a variable of string type named ***LINE***, then that string is divided into tokens by **strtok** function where a pointer to a character points for every token individually and place it into an array of structures which already declared, till **EOF** condition occurs and **fgets** function returns a zero, stopping the **while loop.**

Then a Pre-Main menu is displayed to choose whether you are a new Member or not , in case you are new then function **add member** is called and a new member is added to the array **ONLY!!.**

then the main menu will appear waiting for his choice which mainly depend on **if condition** to call the function preferred , all of that placed in a **while loop** where it's condition is an integer named c which equals to 1 ,at the end of every operation the user is asked whether he wants to exit or not by changing the value of c depending on the value entered if it's not equal to 1 so the program ends and it exits , same idea is used in back button.