CSE108 – Computer Programming Laboratory
(Spring 2021)
Lab #10

May 22, 2021.

Hand-in Policy: Via Teams. No late submissions will be accepted. File name that you submit should be as following: *StudentNo.c*

Collaboration Policy: No collaboration is permitted.

Grading: This lab will be graded on the scale of 100.

Write a single program which realizes following tasks respectively.

1. You should write a small library and a program in C programming language.
- The library should use a struct called '**Book**'. This struct should keep three strings (for title, author and subject of a book), and an integer (for identification and publication year of a book).
- The program should keep these records for books in a struct array named Books that is allocated dynamically.
- If the array is full, increase the size of the array so you can add new books.
- The program will have a menu as shown in Figure 1. You should design the menus as shown in the figure.
- If the user entered an invalid option, print the message "TRY AGAIN" on the screen, and let them return to the menu again. The program continues until the user select "EXIT" option. If the user chooses the "EXIT SUBMENU" option while in the submenu, it is routed back to the main menu.
- Figure 2 shows how the user adds a new book.
- If the user selects the 2nd option in the Main menu, the user is routed to the submenu.

Figure 1. Menu Types

Figure 2. Add New Book Screen

- Figure 3 shows the result of the searched book from the list of books according to the title of the book. Likewise, it allows you to bring 1 book according to the features given in other options. If the user enters an incorrect input, handle it and redirect them back to the menu.
- Figures 5 and 6 show the list of books. In option 5, you must first sort the books by year in descending order. Then you have to return the list. In the 6th option, you should sort the books in ascending order according to the book_id value, in other words, according to the order in which they are registered in the system. Other rules also apply in these cases.

```
SUBMENU
        1. Get by Title
        2. Get by Author
        3. Get by Subject
        4. Sorted List by Year (DESC)
        5. List All Books
        6. EXIT SUBMENU

Choose = 1
***********************
Enter a books title = 1984
Book found
Title => 1984
Author => George Orwell
Subject => Dystopian and Post Apocalyptic Fiction
Year => 1949
***********************
```
Figure 3. Search Book by Title

```
SUBMENU
        1. Get by Title
        2. Get by Author
        3. Get by Subject
        4. Sorted List by Year (DESC)
        5. List All Books
        6. EXIT SUBMENU

Choose = 2
***********************
Enter a books Author = Suzanne Colins
Book found
Title => The Hunger Games
Author => Suzanne Colins
Subject => Dystopian and Post Apocalyptic Fiction
Year => 2008
***********************
```
Figure 4. Search Book by Author

```
SUBMENU
        1. Get by Title
        2. Get by Author
        3. Get by Subject
        4. Sorted List by Year (DESC)
        5. List All Books
        6. EXIT SUBMENU

Choose = 4
***********************

List of Books
***********************
1. Book;
Title => The Hunger Games
Author => Suzanne Colins
Subject => Dystopian and Post Apocalyptic Fiction
Year => 2008
***********************
2. Book;
Title => 1984
Author => George Orwell
Subject => Dystopian and Post Apocalyptic Fiction
Year => 1949
***********************
3. Book;
Title => Brave New World
Author => Aldous Huxley
Subject => Dystopian and Post Apocalyptic Fiction
Year => 1932
***********************
```
Figure 5. List of books sorted by year

```
SUBMENU
        1. Get by Title
        2. Get by Author
        3. Get by Subject
        4. Sorted List by Year (DESC)
        5. List All Books
        6. EXIT SUBMENU

Choose = 5
***********************

List of Books
***********************
1. Book;
Title => The Hunger Games
Author => Suzanne Colins
Subject => Dystopian and Post Apocalyptic Fiction
Year => 2008
***********************
2. Book;
Title => Brave New World
Author => Aldous Huxley
Subject => Dystopian and Post Apocalyptic Fiction
Year => 1932
***********************
3. Book;
Title => 1984
Author => George Orwell
Subject => Dystopian and Post Apocalyptic Fiction
Year => 1949
***********************
```
Figure 6. List of books sorted by book_id

General rules:

❖ You are not allowed to use any library other than;
   ➢ <stdio.h>
   ➢ <string.h>
   ➢ <stdlib.h>

❖ You cannot use **realloc()** or **malloc()** for dynamic allocation operation. You can only use **calloc().**
❖ If there is more than one match while performing any search, select the first one.
❖ You can write your own functions to make things easier.
❖ Don't forget that the program shouldn't terminate when an operation is done.
❖ You can use other variables, arrays etc. to make things easier.
❖ To read a string which includes spaces, use following codes:

```
fflush(stdin);
scanf("%[^\n]%*c", string);
```