Sabancı University

Faculty of Engineering and Natural Sciences
CS204 Advanced Programming
Fall 2016-2017

Homework 2–Pointers and linked lists

Due: 17/10/2016,12:30 pm
(Late submission penalty: -20%)

PLEASE NOTE:

Your program should be a robust one such that you have to consider all relevant programmer mistakes and extreme cases; you are expected to take actions accordingly!

You HAVE TO write down the code on your own.
You CANNOT HELP any friend while coding.
Plagiarism will not be tolerated!

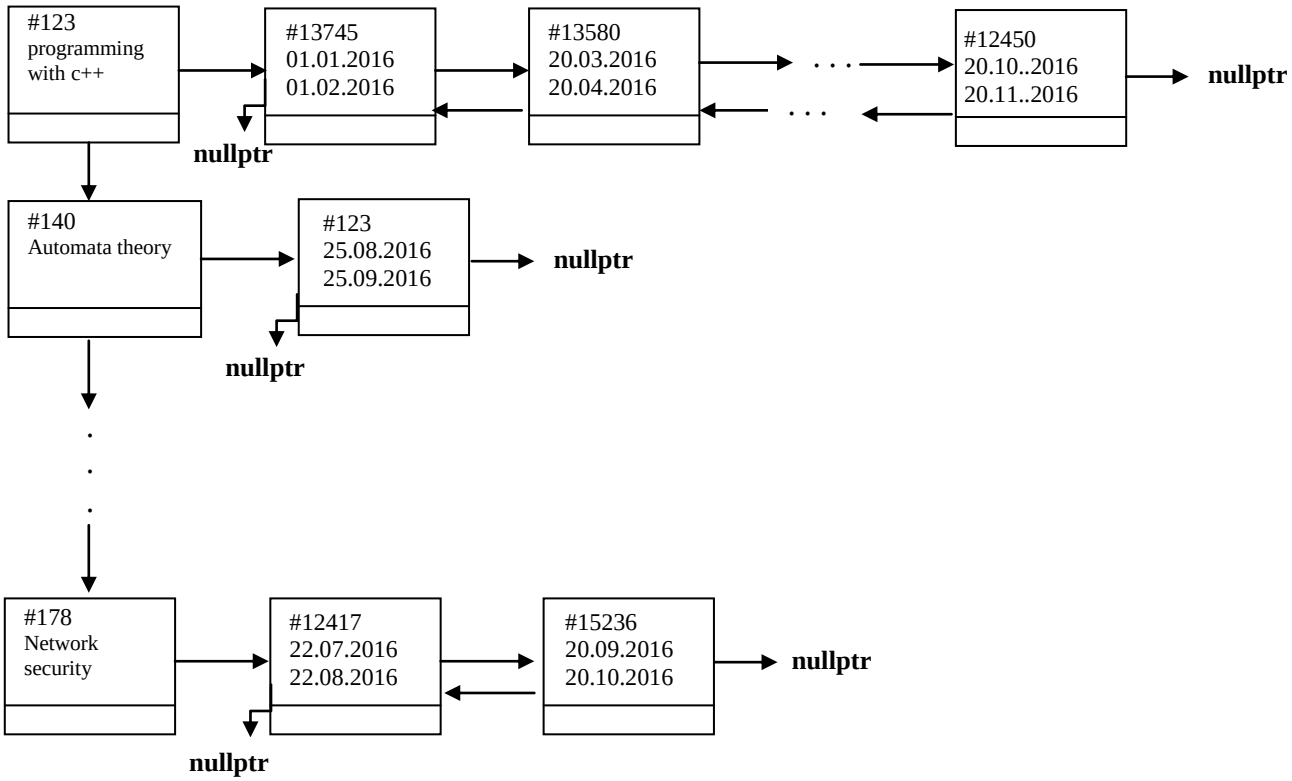
Introduction

The aim of this homework is to get familiar with basic pointer usage and simple/double linked-lists and operations on them such as searching a specific node, dynamically adding or deleting a node in a list, creating new node in a list, printing a list, printing a certain node in a list.

In this homework, you are askedto manage the booksthatcan be borrowed by students in SU information center.The system must use a*linked-list* ***for each book*** to store the borrowing information that is sorted by date. The necessary data will be given from the console. The system will be explained in more detail in subsequent sections of this homework specification.

The Data Structures

In this homework, you **must** use a new data-structure, simply a linked list of linked lists, of books. The main linked list will contain double linked lists (where each node has two pointers to point the node on its left and right). Sample borrowing information based on this structureis illustrated in the figure bellow.**You are not allowed to use arrays, vectors and standard containers in this homework.**



For each borrowed book, you are asked to store the borrowingstudent id, borrowing date and return date of the book. For each book, you should store book's unique id and its name. While the simple linked list of books can be constructed on any order (not necessarily sorted), the double-linked list of the borrow information should always be chronologically sorted (there cannot be two nodes in a borrow list with same start date since each book can only be borrowed by one person at a time).

The Program Flow

There are various operations you need to implement. These are as follows:

1. Add a book
2. Borrow/return a book
3. Display all previous circulation informationfor a bookin reverse chronological order
4. Deletea book
5. Find all the books which are previously borrowed by a student
6. Find all the books which iscurrently borrowed by a student
7. Display all book
8. Exit

At the beginning, the program displays a menu and asks the user for the operation to be executed. In this menu, each operation has an index between 1 and 8.Your program reads the user's choice from the standard input (keyboard) and performs the requested operation.

The node structure and the function to print the main menu are given below to make your job easier. You **must** use these for the homework.

```
structBook
{
	int bookID;
	string bookName;
	Book* next;
	BorrowInfo *borrowInfos;
};

structBorrowInfo
{
	int   studentID;
	Date borrowDate;
	Date returnDate;
	BorrowInfo* next;
	BorrowInfo *prev;
};


void DisplayMenu()
{
cout <<"*********************************************************************"<< endl;
cout <<"*  Welcome to the Online Library Manager                             *"<< endl;
cout <<"*  Please select one option:                                         *"<< endl;
cout <<"*  1. Add a book                                                     *"<< endl;
cout <<"*  2. Borrow/Return the book        *"<< endl;
cout <<"*  3. Display all previous circulation information for a book  *"<< endl;
cout <<"*  4. Delete a book                 *"<< endl;
cout <<"*  5. Find all books which are previously borrowed by a student   *"<< endl;
cout <<"*  6. Find all books which are currently borrowed by a student  *"<< endl;
cout <<"*  7. Display book list  *"<< endl;
cout <<"*********************************************************************"<< endl <<
endl;
cout <<"Your choice: " ;
}
```

1. Add a book

This menu option will be used to add a new book in any order in the linked list. While adding a book following rules must be satisfied:

- For each book, you should store book's **unique** id and its name. If the user tries to add a book with **already existing id** to the list, an appropriate warning must be displayed and the node should not be added. (see execution 1)

Execution 1

```
Your choice: 1
Enter the ID of a book: 123
Enter the name of the book: programming with c++
BookID 123 added to the list.

Your choice: 1
Enter the ID of a book: 123
Enter the name of the book: programming with c++
The book is already exist in the list
```

2. Borrow/refund

This menu option will be used to add new borrow information or to return a borrowed book.

- bookId will be asked. If the book Id is not exists, a related message must be displayed and go back to main menu. (see execution 2)
- If book Id exist in the list, the program will ask user of his choice (B for borrow and R for return). If user chooses B thenstudent Id and borrow date are requested. If student Id is already exist in the borrowing information of the book, a related message is shown and this borrow information will not added to the list since each student could not borrow a book more than once (see execution 3).If student do not exist in the list and borrowing date is valid then the new node is created. The borrowing date is valid if it is greater than the return date of previous borrow info(in execution 3 adding operation is unsuccessful while adding a new borrowing information for student Id 18 with borrow date of 25/07/2016; the reason is that the return date of previous node is 31/07/2016 which is greater than the current requested borrowing date. In other word this book has not returned by student Id 12 yet. So student 18 could not borrow it in 25/07/2016.)
- When creating a new borrowing information for the book, only a student Id and borrowing date is asked and return date is assigned automatically one month later than the borrowing date (each borrowing duration is one month except a borrower return the book sooner using return option R). In this homework we are going to use date.h and date.cpp class (which will be given to you) to define date variable for borrowing and returning date of a book. (a details for this class will be explained at the end of document. (In Execution 4, we add another borrows information to book Id 123, using option 3 of menu will display all circulation information of the book. As it is shown, the return datesare calculated by adding 30 days to borrowing date).

Execution 2

```
Your choice: 2
Enter the ID of the book: 12
The book is not exist to be borrowed.
**********************************************************************
*  Welcome to the Online Library Manager                        *
*  Please select one option:                                  *
*  1. Add a book                                            *
*  2. Borrow/Return the book                                  *
*  3. Display all previous circulation information for a book      *
*  4. Delete a book                                         *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
**********************************************************************
Your choice:
```

Execution 3 (assume book Id=123 was added before)

```
Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(press B for borrow and R for return):B
Enter the ID of the Student: 12
Enter the start date for borrowing the book in format DD MM YYYY: 01 07 2016
Borrow information for book ID 123 and student ID 12 is added to the list.

*****************************************************************
*  Welcome to the Online Library Manager                        *
*  Please select one option:                                    *
*  1. Add a book                                                *
*  2. Borrow/Return the book                                    *
*  3. Display all previous circulation information for a book   *
*  4. Delete a book                                             *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*****************************************************************
Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for return): B
Enter the ID of the Student: 12
Enter the start date for borrowing the book in format DD MM YYYY: 10 07 2016
Student with ID:12 could not borrow the book more than once.

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for return):B
Enter the ID of the Student: 18
Enter the start date for borrowing the book in format DD MM YYYY: 25 07 2016
You could not borrow this book. The book is on hold untill: July 31 2016

Your choice:
```

Execution 4

```
Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for return): B
Enter the ID of the Student: 23
Enter the start date for borrowing the book in format DD MM YYYY: 5 8 2016
Borrow information for book ID 123 and student ID: 23 is added to the list.


*****************************************************************
*  Welcome to the Online Library Manager                        *
*  Please select one option:                                    *
*  1. Add a book                                                *
*  2. Borrow/Return the book                                    *
*  3. Display all previous circulation information for a book   *
*  4. Delete a book                                             *
*  5. Find all the books which are previously borrowed by a student *
```

```
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
****************************************************************

Your choice: 3 (this option will be described in option 3 of menu)
Enter ID of the book for displaying its circulation  in reverse chronological
order :123
StudentID           BorrowDate           ReturnDate
23                August 5 2016          September 4 2016 (= Borrowdate+30)
12                  July 1 2016          July 31 2016 (= Borrowdate+30)
```

The following rulesare applied when R (for return) is chosen:

- In order to modifyreturn date of a book, you have to search doubly linked list with respect to student IDwhich is asked from user. If student Id is not found in the list, an appropriate message is displayed and goes back to main menu.If student exist in the list, the validity of requested return date is checked.The requested return date must be greater than its corresponding borrowing date; also it should be less than the borrow date of its next node.

Execution 5

```
Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(press B for borrow and R for return):R
Enter the ID of the Student: 45
Enter the return date for the book in format DD MM YYYY: 07 09 2016
You have not borrowed this book!

Your choice: 3
Enter ID of the book for displaying its circulation :123
StudentID           BorrowDate           ReturnDate
23                    August 5 2016          September 4 2016
12                    July 1 2016              July 31 2016


****************************************************************
*  Welcome to the Online Library Manager                       *
*  Please select one option:                                   *
*  1. Add a book                                               *
*  2. Borrow/Return the book                                   *
*  3. Display all previous circulation information for a book  *
*  4. Delete a book                                            *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
****************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(press B for borrow and R for return):R
```

```
Enter the ID of the Student: 12
Enter the return date for the book in format DD MM YYYY: 6 8 2016
Return date can not be later since there is a request for the book on August 5
2016

*****************************************************************
*  Welcome to the Online Library Manager                        *
*  Please select one option:                                    *
*  1. Add a book                                                *
*  2. Borrow/Return the book                                    *
*  3. Display all previous circulation information for a book   *
*  4. Delete a book                                             *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*****************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(press B for borrow and R for return):R
Enter the ID of the Student: 12
Enter the return date for the book in format DD MM YYYY: 20 6 2016
Return date could not be sooner that the borrow date!


*****************************************************************
*  Welcome to the Online Library Manager                        *
*  Please select one option:                                    *
*  1. Add a book                                                *
*  2. Borrow/Return the book                                    *
*  3. Display all previous circulation information for a book   *
*  4. Delete a book                                             *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*****************************************************************

Your choice:
```

3. Display all borrowing information of a book

This option will be used to display circulation information of a book in reverse chronological order. Program should request for book Id from user to retrieve all its borrowing information.

- If Book is not exists, display a related message.
- If the nook is not borrowed till now (means no borrowing info has been added to the book yet), display a related message (see execution 6).

Execution 6

```
*****************************************************************
*  Welcome to the Online Library Manager                        *
*  Please select one option:                                    *
*  1. Add a book                                                *
*  2. Borrow/Return the book                                    *
*  3. Display all previous circulation information for a book   *
*  4. Delete a book                                             *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*****************************************************************

Your choice: 1
Enter the ID of a book: 123
Enter the name of the book: Programming with c++
BookID 123 added to the list.


*****************************************************************
*  Welcome to the Online Library Manager                        *
*  Please select one option:                                    *
*  1. Add a book                                                *
*  2. Borrow/Return the book                                    *
*  3. Display all previous circulation information for a book   *
*  4. Delete a book                                             *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*****************************************************************

Your choice: 3
Enter ID of the book for displaying its circulation in reverse chronological
ord
er:123
Circulation info for this book not exists.


*****************************************************************
*  Welcome to the Online Library Manager                        *
*  Please select one option:                                    *
*  1. Add a book                                                *
*  2. Borrow/Return the book                                    *
*  3. Display all previous circulation information for a book   *
*  4. Delete a book                                             *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*****************************************************************
```

```
Your choice: 3
Enter ID of the book for displaying its circulation in reverse chronological
order:140
The book is not exists!


*********************************************************************
*  Welcome to the Online Library Manager                            *
*  Please select one option:                                        *
*  1. Add a book                                                    *
*  2. Borrow/Return the book                                        *
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                 *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*********************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(press B for borrow and R for return):B
Enter the ID of the Student: 18
Enter the start date for borrowing the book in format DD MM YYYY: 14 08 2016
Borrow information for book ID 123 and student ID: 18 is added to the list.

*********************************************************************
*  Welcome to the Online Library Manager                            *
*  Please select one option:                                        *
*  1. Add a book                                                    *
*  2. Borrow/Return the book                                        *
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                 *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*********************************************************************

Your choice: 3
Enter ID of the book for displaying its circulation in reverse chronological
ord
er:123
StudentID          BorrowDate           ReturnDate
18                 August 14 2016       September 13 2016


*********************************************************************
*  Welcome to the Online Library Manager                            *
*  Please select one option:                                        *
*  1. Add a book                                                    *
*  2. Borrow/Return the book                                        *
*  3. Display all previous circulation information for a book       *
```

```
*  4. Delete a book                                                    *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*****************************************************************

Your choice:
```

4. Delete a book

This option will be used to deletea book and its corresponding circulation information from the list. It will ask user for book Id. If there is no book in the list, it shows a message that a list is empty and goes back to the menu. If the list is not empty, but the book Id not exists, then show a related message and go back to menu. If the book exists, deletes the book and its circulation information.

Execution 7

```
*********************************************************************
*  Welcome to the Online Library Manager                            *
*  Please select one option:                                        *
*  1. Add a book                                                    *
*  2. Borrow/Return the book                                        *
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                 *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*********************************************************************

Your choice: 4
Enter ID of the book you want to be deleted: 12
There is no book in the list


*********************************************************************
*  Welcome to the Online Library Manager                            *
*  Please select one option:                                        *
*  1. Add a book                                                    *
*  2. Borrow/Return the book                                        *
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                 *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*********************************************************************

Your choice: 1
Enter the ID of a book: 123
Enter the name of the book: c++
BookID 123 added to the list.


*********************************************************************
*  Welcome to the Online Library Manager                            *
```

```
*  Please select one option:                                          *
*  1. Add a book                                                      *
*  2. Borrow/Return the book                                          *
*  3. Display all previous circulation information for a book         *
*  4. Delete a book                                                   *
*  5. Find all the books which are previously borrowed by a student   *
*  6. Find all the books which are currently borrowed by a student    *
*  7. Display book list  *
**********************************************************************

Your choice: 4
Enter ID of the book you want to be deleted: 12
The book is not exist!


**********************************************************************
*  Welcome to the Online Library Manager                              *
*  Please select one option:                                          *
*  1. Add a book                                                      *
*  2. Borrow/Return the book                                          *
*  3. Display all previous circulation information for a book         *
*  4. Delete a book                                                   *
*  5. Find all the books which are previously borrowed by a student   *
*  6. Find all the books which are currently borrowed by a student    *
*  7. Display book list  *
**********************************************************************

Your choice: 4
Enter ID of the book you want to be deleted: 123
The book with ID: 123 is successfully deleted from the list


**********************************************************************
*  Welcome to the Online Library Manager                              *
*  Please select one option:                                          *
*  1. Add a book                                                      *
*  2. Borrow/Return the book                                          *
*  3. Display all previous circulation information for a book         *
*  4. Delete a book                                                   *
*  5. Find all the books which are previously borrowed by a student   *
*  6. Find all the books which are currently borrowed by a student    *
*  7. Display book list  *
**********************************************************************

Your choice: 4
Enter ID of the book you want to be deleted: 123
There is no book in the list


**********************************************************************
*  Welcome to the Online Library Manager                              *
*  Please select one option:                                          *
*  1. Add a book                                                      *
*  2. Borrow/Return the book                                          *
```

```
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                 *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*********************************************************************

Your choice:
```

5. **Find all the books which are previously borrowed by a student**

   This option will display the books which are borrowed by student before today. Search through doubly linked lists of all books to find requested student. If such student is found, then display the book ID(s) and name(S). (Example executions for menu options 5,6,7 are in following sample runs).

6. **Find all the books which are currently in hold by a student**

   This option will display books that are borrowed by student at the moment; every book which is borrowed by a user and its return date is later than today will be displayed. Search through doubly linked lists of all books to find requested student. If such student is found and return date is greater than today date, then display the book ID(s) and name(s).

7. **Display Book list**

   This option will display list of books. If there are no books in the list, show related message and go back to menu.

8. **Exit**

   When this option is selected, your program is terminated. In order to make sure that you make no memory leak, your program **must** return all the dynamically allocated memory to the heap before the termination.

   After each menu option is selected and the required processing is performed, the menu should be displayed and a new option is selected continuously until the user enters "7" to Exit.

Date class description

Date class is a class for manipulating dates. You have to copy both date.h and date.cpp in same directory of your project in visual studio. In addition you have to #include “date.h” at the beginning of your code (cpp file). Date have two constructors. One of them is default

Date d; // construct date with default value of today d is today day

Date d (MM,DD,YYYY); // construct date with specified values d is 25 Sep 2016

d.Month() // return month corresponding to date
d.Day() // return day corresponding to date
d.Year() // return year corresponding to date

You can use following operators (+,-,<,<=,>,>=,==,!=,ostream & operator <<) with Date type variables.

example:
Date d; // d is today(current) date
d+3 ; //add 3 days to current date

Date borrowDate (4, 24,2016); //24 April 2016
borrowDate+4; //28 April 2016

Sample Runs

```
**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 1
Enter the ID of a book: 123
Enter the name of the book: c++
BookID 123 added to the list.


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 110
Please select a valid number from menu
**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
```

```
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 1
Enter the ID of a book: 110
Enter the name of the book: automata
BookID 110 added to the list.


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 1
Enter the ID of a book: 140
Enter the name of the book: Network Security
BookID 140 added to the list.


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for return):B
Enter the ID of the Student: 18
Enter the start date for borrowing the book in format DD MM YYYY: 10 05 2016


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
```

```
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                 *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for return):B
Enter the ID of the Student: 23
Enter the start date for borrowing the book in format DD MM YYYY: 12 05 2016
You could not borrow this book. The book is hold since: June 9 2016


**********************************************************************
*  Welcome to the Online Library Manager                           *
*  Please select one option:                                       *
*  1. Add a book                                                   *
*  2. Borrow/Return the book                                       *
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for return):B
Enter the ID of the Student: 23
Enter the start date for borrowing the book in format DD MM YYYY: 12 06 2016
Borrow information for book ID 123 and student ID: 23is added to the list.


**********************************************************************
*  Welcome to the Online Library Manager                           *
*  Please select one option:                                       *
*  1. Add a book                                                   *
*  2. Borrow/Return the book                                       *
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for return):B
Enter the ID of the Student: 134
```

```
Enter the start date for borrowing the book in format DD MM YYYY: 20 07 2016
Borrow information for book ID 123 and student ID: 134is added to the list.


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 7
List contains:
Book ID: 123 Name: c++
Book ID: 110 Name: automata
Book ID: 140 Name: Network Security


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 3
Enter ID of the book for displaying its circulation:123
StudentID           BorrowDate           ReturnDate
134              July 20 2016             August 19 2016
23               June 12 2016             July 12 2016
18                May 10 2016             June 9 2016


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
```

```
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 2
Enter the ID of the book: 110
Do you want Borrow or return the book(prees B for borrwo and R for return):B
Enter the ID of the Student: 23
Enter the start date for borrowing the book in format DD MM YYYY: 25 04 2016


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 2
Enter the ID of the book: 110
Do you want Borrow or return the book(prees B for borrwo and R for return):B
Enter the ID of the Student: 100
Enter the start date for borrowing the book in format DD MM YYYY: 28 5 2016
Borrow information for book ID 110 and student ID: 100is added to the list.


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 3
Enter ID of the book for displaying its circulation:110
StudentID           BorrowDate           ReturnDate
100                 May 28 2016          June 27 2016
23                  April 25 2016        May 25 2016


**********************************************************************
*  Welcome to the Online Library Manager                             *
```

```
*  Please select one option:                                          *
*  1. Add a book                                                      *
*  2. Borrow/Return the book                                          *
*  3. Display all previous circulation information for a book         *
*  4. Delete a book                                                   *
*  5. Find all the books which are previously borrowed by a student   *
*  6. Find all the books which are currently borrowed by a student    *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 2
Enter the ID of the book: 140
Do you want Borrow or return the book(prees B for borrwo and R for return):B
Enter the ID of the Student: 18
Enter the start date for borrowing the book in format DD MM YYYY: 07 10 2016


**********************************************************************
*  Welcome to the Online Library Manager                              *
*  Please select one option:                                          *
*  1. Add a book                                                      *
*  2. Borrow/Return the book                                          *
*  3. Display all previous circulation information for a book         *
*  4. Delete a book                                                   *
*  5. Find all the books which are previously borrowed by a student   *
*  6. Find all the books which are currently borrowed by a student    *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 3
Enter ID of the book for displaying its circulation:140
StudentID           BorrowDate           ReturnDate
18            October 7 2016             November 6 2016


**********************************************************************
*  Welcome to the Online Library Manager                              *
*  Please select one option:                                          *
*  1. Add a book                                                      *
*  2. Borrow/Return the book                                          *
*  3. Display all previous circulation information for a book         *
*  4. Delete a book                                                   *
*  5. Find all the books which are previously borrowed by a student   *
*  6. Find all the books which are currently borrowed by a student    *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 2
Enter the ID of the book: 140
Do you want Borrow or return the book(prees B for borrwo and R for return):B
Enter the ID of the Student: 23
```

```
Enter the start date for borrowing the book in format DD MM YYYY: 05 05 2016
You could not borrow this book. The book is hold since: November 6 2016


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 5
Enter ID of the students to see all books previously borrowed by him/her:18
Book ID: 123 Name: c++


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 5
Enter ID of the students to see all books previously borrowed by him/her:23
Book ID: 123 Name: c++
Book ID: 110 Name: automata


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************
```

```
Your choice: 6
Enter ID of the students to see all books previously borrowed by him/her:18
Book ID: 140 Name: Network Security


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice:

**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 1
Enter the ID of a book: 123
Enter the name of the book: c++
BookID 123 added to the list.


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 2
Enter the ID of the book: 12
```

```
The book is not exist to be borrowed.

*********************************************************************
*  Welcome to the Online Library Manager                            *
*  Please select one option:                                        *
*  1. Add a book                                                    *
*  2. Borrow/Return the book                                        *
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                 *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*  8. Exit               *
*********************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for retur
Enter the ID of the Student: 18
Enter the start date for borrowing the book in format DD MM YYYY: 07 10
Borrow information for book ID 123 and student ID: 18 is added to the li


*********************************************************************
*  Welcome to the Online Library Manager                            *
*  Please select one option:                                        *
*  1. Add a book                                                    *
*  2. Borrow/Return the book                                        *
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                 *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*  8. Exit               *
*********************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for retur
Enter the ID of the Student: 18
Enter the return date for the book in format DD MM YYYY: 12 11 2016


*********************************************************************
*  Welcome to the Online Library Manager                            *
*  Please select one option:                                        *
*  1. Add a book                                                    *
*  2. Borrow/Return the book                                        *
*  3. Display all previous circulation information for a book       *
*  4. Delete a book                                                 *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*  8. Exit               *
```

```
**********************************************************************

Your choice: 3
Enter ID of the book for displaying its circulation:123
StudentID           BorrowDate             ReturnDate
18              October 7 2016             November 12 2016


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
**********************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for retur
Enter the ID of the Student: 25
Enter the start date for borrowing the book in format DD MM YYYY: 20 11
Borrow information for book ID 123 and student ID: 25 is added to the li


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student  *
*  6. Find all the books which are currently borrowed by a student   *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 3
Enter ID of the book for displaying its circulation:123
StudentID           BorrowDate           ReturnDate
25            November 20 2016             December 20 2016
18              October 7 2016             November 12 2016


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
```

```
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 2
Enter the ID of the book: 123
Do you want Borrow or return the book(prees B for borrwo and R for retur
Enter the ID of the Student: 18
Enter the return date for the book in format DD MM YYYY: 24 11 2016
Return date can not be later since there is a request for the book on No
0 2016


**********************************************************************
*  Welcome to the Online Library Manager                             *
*  Please select one option:                                         *
*  1. Add a book                                                     *
*  2. Borrow/Return the book                                         *
*  3. Display all previous circulation information for a book        *
*  4. Delete a book                                                  *
*  5. Find all the books which are previously borrowed by a student *
*  6. Find all the books which are currently borrowed by a student  *
*  7. Display book list  *
*  8. Exit               *
**********************************************************************

Your choice: 8
All dynamically allocated memory have been return to heap

Program Exiting...
```

Some Important Rules:

In order to get a full credit, your programs must be efficient and well presented, presence of any redundant computation or bad indentation, or missing, irrelevant comments are going to decrease your grades. You also have to use understandable identifier names, informative introduction and prompts. Modularity is also important; you have to use functions wherever needed and appropriate.

When we grade your homeworks we pay attention to these issues. Moreover, in order to observe the real performance of your codes, we may run your programs in *Release* mode and **we may test your programs with very large test cases**.

What and where to submit (PLEASE READ, IMPORTANT): You should prepare (or at least test) your program using MS Visual Studio 2012 C++. We will use the standard C++ compiler and libraries of the abovementioned platform while testing your homework. It'd be a good idea to write your name and last name in the program (as a comment line of course).

Submissions guidelines are below. Some parts of the grading process are automatic. Students are expected to strictly follow these guidelines in order to have a smooth grading process. If

you do not follow these guidelines, depending on the severity of the problem created during the grading process, 5 or more penalty points are to be deducted from the grade.
Name your cpp file that contains your program as follows:

"SUCourseUserName_YourLastname_YourName_HWnumber.cpp"

Your SUCourse user name is actually your SUNet username that is used for checking sabanciuniv e-mails. Do NOT use any spaces, non-ASCII and Turkish characters in the file name. For example, if your SUCourse user name is cago, name is Çağlayan, and last name is Özbugsızkodyazaroğlu, then the file name must be:

Cago_Ozbugsizkodyazaroglu_Caglayan_hw2.cpp

Do not add any other character or phrase to the file name. Make sure that this file is the latest version of your homework program. Compress this cpp file using WINZIP or WINRAR programs. Please use "zip" compression. "rar" or another compression mechanism is NOT allowed. Our homework processing system works only with zip files. Therefore, make sure that the resulting compressed file has a zip extension. Check that your compressed file opens up correctly and it contains your cpp file.

You will receive no credits if your compressed zip file does not expand or it does not contain the correct file. The naming convention of the zip file is the same as the cpp file (except the extension of the file of course). The name of the zip file should be as follows:

SUCourseUserName_YourLastname_YourName_HWnumber.zip

For example zubzipler_Zipleroglu_Zubeyir_hw1.zip is a valid name, but

hw1_hoz_HasanOz.zip, HasanOzHoz.zip

are**NOT** valid names.

Submit via SUCourse ONLY! You will receive no credits if you submit by other means (e-mail, paper, etc.).

Successful submission is one of the requirements of the homework. If, for some reason, you cannot successfully submit your homework and we cannot grade it, your grade will be 0.

Good Luck!
CS204 Team (Leyli Javid Khayati, Kamer Kaya)