# HW2

# Library management system

- Create a C++ program to manage a library using **class**
- The program should allow users to perform the following operations:
  - Add a new book (-10 points)
  - Search for a book by published year (-10 points)
  - Check out a book (-10 points)
  - Return a book (-10 points)
  - List all books (-10 points)
  - Exit (-10 points)

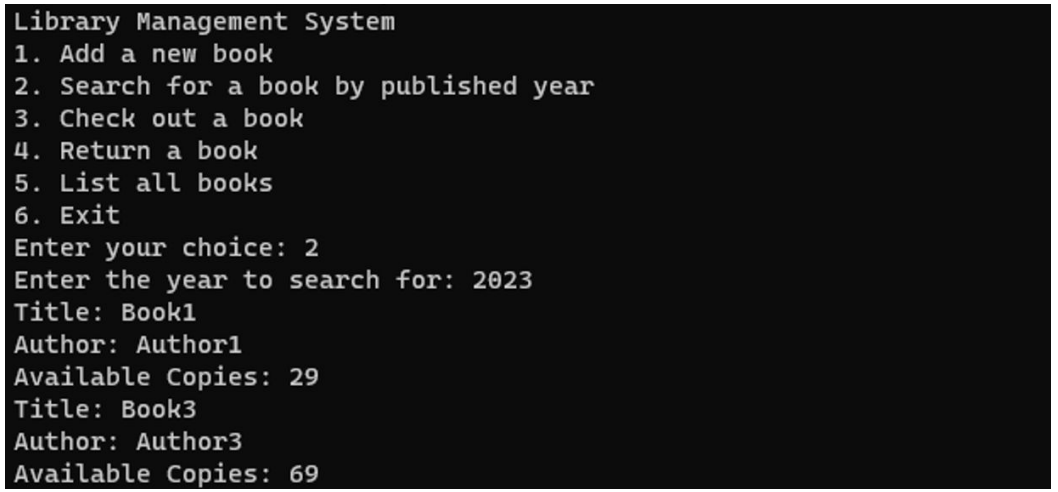
# Add a new book

- **Operation 1 – Add a new book to the library**
- Users should be able to input book details such as **published year**, **author**, and the **number of available copies**
- Each information should be stored in a data structure

```
Library Management System
1. Add a new book
2. Search for a book by published year
3. Check out a book
4. Return a book
5. List all books
6. Exit
Enter your choice: 1
Enter book title: Book1
Enter author: Author1
Enter published year: 2020
Enter the number of available copies: 10
Book added to the library.
```

# Search for a book by published year

- **Operation 2 – Search for a book by published year**
- Users should be able to search for a book by published year
- The program should display the details of the book if it exists in the library
- The results must be sorted in lexicographical order by the book's title from smallest to largest



# Check out a book

- **Operation 3 – Check out a book.**
- Allow users to borrow a book
- If the book is available, decrease the number of available copies
- If the book is not available, display a message indicating that the book is checked out

# Check out a book

```
Library Management System
1. Add a new book
2. Search for a book by published year
3. Check out a book
4. Return a book
5. List all books
6. Exit
Enter your choice: 3
Enter the title of the book to check out: Book2
Book checked out successfully.
Library Management System
1. Add a new book
2. Search for a book by published year
3. Check out a book
4. Return a book
5. List all books
6. Exit
Enter your choice: 3
Enter the title of the book to check out: Book2
Sorry, the book is currently checked out.
```

# Return a book

- **Operation 4 – Return a book**
- Users should be able to return a book they have borrowed
- Increase the number of available copies for the returned book

```
Library Management System
1. Add a new book
2. Search for a book by published year
3. Check out a book
4. Return a book
5. List all books
6. Exit
Enter your choice: 4
Enter the title of the book to return: Book2
Book returned successfully.
```

# List all books

- **Operation 5 - List all books**
- Display a list of all the books in the library, including their titles, authors, and the number of available copies
- The results must be sorted in lexicographical order by the book's title from smallest to largest

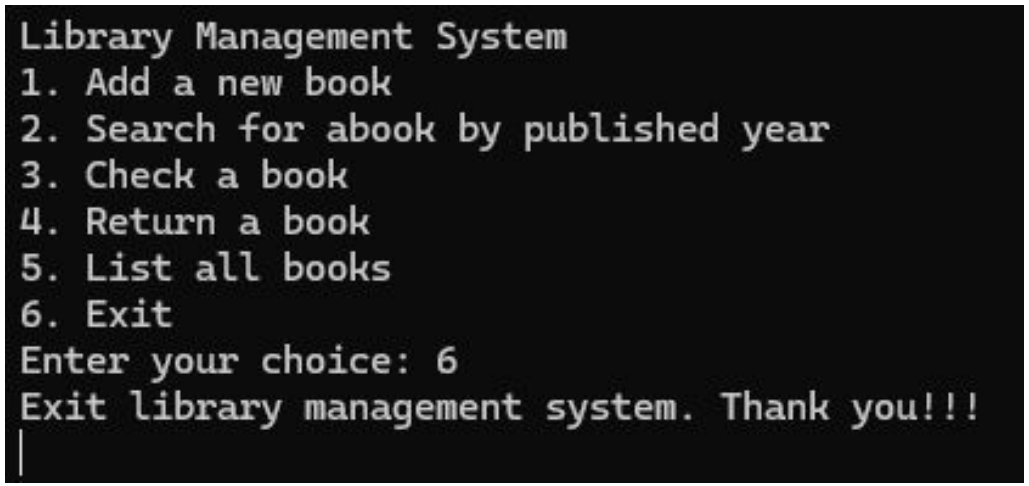
```
Library Management System
1. Add a new book
2. Search for a book by published year
3. Check out a book
4. Return a book
5. List all books
6. Exit
Enter your choice: 5
Library Books:
Title: Book1
Author: Author1
Available Copies: 28

Title: Book3
Author: Author3
Available Copies: 69

Title: Book2
Author: Author2
Available Copies: 2
```

# Exit

- **Operation 6 – Exit**
- Exit the library system



# Optional Enhancement

- You are allow to add additional book information, operation or even visualize the system to enhanced the user experience
- Please describe the additional features clearly in your demo video and especially in your report
- Example:
  - Additional book information, such as genre, publisher, and overview
  - Additional operation
    - Search for a book by other book information
    - Show the book overview

# Limitations

- You can not use STL **map**, **set, multimap and multiset** to store book information
- You must use **class** to implement your library system
- Please don’t use any other programming language or .exe files
- Please implement the sorting algorithm by yourself, you can’t use <algorithm> library

# Report

- The report should be clear and organized
- The report should describe how you fulfill the requirements
- Your report must include:
  - What data structure do you store the book's information? Provide a explanation
  - What algorithm is used to sort the books? Provide a explanation
  - What algorithm is used to search for books? Provide a explanation
  - Screenshots of all the required operations
- The file name should be named HW2_學號_學生名.pdf

# Demo video

- You need to record all operations of your library system
- The video should be clear and demonstrate all you working operations
- The video should be no more than **5 minutes**
- Editing is allowed (but faking your results is not allowed)
- The file name should be named HW2_學號_學生名

# README File

- The README file should be clear and detailed
- The README file should describe how to use your library system
- Your README file must include the input format
- The file name should be named
  OOPDS_HW2_學號_學生名.txt/.md

# Scores and Submission

- The content will affect your grade
- Basic score: 75
- You might get a higher score (up to 100) if you successfully enhance your system with other operations
- Delay / Copy = 0
- You can add a README file in the zip if you want
- Compress all your files into HW2_學號_學生名.zip (-20 points)
  - Report (-10 points)
  - Demo video (-10 points)
  - Source code (-10 points)
- Uploaded onto E3 platform before 06/08 (Sun.) 11:55 pm