

Course T1Y2: Advanced Algorithms

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## Lab6 assignment-FILE IO

Exercise1:

```
#include <iostream>
#include <fstream>
#include <sstream>
#include <string>
using namespace std;

struct Book
{
    string ISBN, title, category, authors, price,
publishedYear;
    Book *next;
};

class LinkedList
```

```
{

    Book *head, *tail;
    int size;

public:
    LinkedList()
    {
        head = NULL;
        size = 0;
    }
    ~LinkedList()
    {
        while (head)
        {
            Book *temp = head;
            head = head->next;
            delete temp;
        }
    }

    void insertBegin(const string &ISBN, const string
&title, const string &category, const string &authors,
const string &price, const string &publishedYear)
    {

        Book *b = new Book{ISBN, title, category,
authors, price, publishedYear, head};
```

```

        head = b;
        size++;
    }

    void displayList()
    {
        Book *t;
        t = head;
        for (int i = 0; i < size; i++)
        {

            cout << ". ISBN: " << t->ISBN << ", Title: "
<< t->title << ", Category: " << t->category << ",
Authors: " << t->authors << ", Price: " << t->price <<
", Published Year: " << t->publishedYear << endl;
            t = t->next;
        }
    }

    void csvSplit(const string &line, string &ISBN,
string &title, string &category, string &authors, string
&price, string &publishedYear)
    {
        stringstream ss(line);
        getline(ss, ISBN, ',');
        getline(ss, title, ',');
        getline(ss, category, ',');
        getline(ss, authors, ',');

```

```

        getline(ss, price, ',');
        getline(ss, publishedYear, ',');
    }
};

int main()
{
    LinkedList *mylist = new LinkedList;
    ifstream myfile;
    myfile.open("C:\\Users\\MSI PC\\Desktop\\lab6\\book-
list.csv", ios::in);

    if (!myfile.is_open())
    {
        cout << "Error: Could not open the file!" <<
endl;
        return 1;
    }

    string line;
    while (getline(myfile, line))
    {
        string ISBN, title, category, authors, price,
publishedYear;
        mylist->csvSplit(line, ISBN, title, category,
authors, price, publishedYear);
        mylist->insertBegin(ISBN, title, category,
authors, price, publishedYear);
    }
}

```

```

mylist->displayList();
myfile.close();
delete mylist;
return 0;
}

```

```

book-list.csv > data
1  ISBN , Title , Category , Authors , Price , Published Year
2  9780143128540 , The Alchemist , Fiction , Paulo Coelho , 10.99 , 1988
3  9780451524935 , 1984 , Dystopian , George Orwell , 9.99 , 1949
4  9780743273565 , The Great Gatsby , Classic , F. Scott Fitzgerald , 14.99 , 1925
5  9780061120084 , To Kill a Mockingbird , Fiction , Harper Lee , 12.99 , 1960
6  9780316769488 , The Catcher in the Rye , Fiction , J.D. Salinger , 11.99 , 1951
7  9780439139595 , Harry Potter and the Prisoner of Azkaban , Fantasy , J.K. Rowling , 15.99 , 1999
8  9780545010221 , Harry Potter and the Deathly Hallows , Fantasy , J.K. Rowling , 16.99 , 2007
9  9780062316097 , The Subtle Art of Not Giving a F*ck , Self-Help , Mark Manson , 18.99 , 2016
10 9780307474278 , The Road , Col 2: Title , Post-Apocalyptic , Cormac McCarthy , 14.99 , 2006
11 9780307947307 , Becoming , Biography , Michelle Obama , 19.99 , 2018
12 9780747581086 , The Kite Runner , Fiction , Khaled Hosseini , 13.99 , 2003
13 9780590353427 , Harry Potter and the Sorcerer's Stone , Fantasy , J.K. Rowling , 10.99 , 1997
14 9780385472579 , The Things They Carried , Fiction , Tim O'Brien , 12.50 , 1990
15 9780553296983 , Dune , Science Fiction , Frank Herbert , 9.99 , 1965
16 9780060935467 , Life of Pi , Fiction , Yann Martel , 10.99 , 2001
17 9780439554930 , Harry Potter and the Goblet of Fire , Fantasy , J.K. Rowling , 13.99 , 2000
18 9781451673319 , Fahrenheit 451 , Dystopian , Ray Bradbury , 11.99 , 1953
19 9780812981605 , The Nightingale , Historical Fiction , Kristin Hannah , 16.99 , 2015
20 9781594634024 , The Girl on the Train , Thriller , Paula Hawkins , 14.99 , 2015
21 9780062457738 , Eleanor Oliphant Is Completely Fine , Fiction , Gail Honeyman , 15.99 , 2017
22 9780307465351 , Gone Girl , Thriller , Gillian Flynn , 14.99 , 2012
23 9780765331820 , The Name of the Wind , Fantasy , Patrick Rothfuss , 17.99 , 2007
24 9780062457714 , Circe , Mythology , Madeline Miller , 18.99 , 2018
25 9780143131847 , Where the Crawdads Sing , Mystery , Delia Owens , 16.99 , 2018
26 978-0-14-311158-0 , The Color Purple , Fiction , Alice Walker , $11.99 , 1982
27

```

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS GITLens SPELL CHECKER
PS C:\Users\MSI PC\Desktop\lab6\output> cd 'c:\Users\MSI PC\Desktop\lab6\output'
PS C:\Users\MSI PC\Desktop\lab6\output> & .\lab6-1.exe
, Title: The Color Purple , Category: Fiction , Authors: Alice Walker , Price: $11.99 , Published Year: 1982
, ISBN: 9780143131847 , Title: Where the Crawdads Sing , Category: Mystery , Authors: Delia Owens , Price: 16.99 , Published Year: 2018
, ISBN: 9780062457714 , Title: Circe , Category: Mythology , Authors: Madeline Miller , Price: 18.99 , Published Year: 2018
, ISBN: 9780765331820 , Title: The Name of the Wind , Category: Fantasy , Authors: Patrick Rothfuss , Price: 17.99 , Published Year: 2007
, ISBN: 9780307465351 , Title: Gone Girl , Category: Thriller , Authors: Gillian Flynn , Price: 14.99 , Published Year: 2012
, ISBN: 9780062457738 , Title: Eleanor Oliphant Is Completely Fine , Category: Fiction , Authors: Gail Honeyman , Price: 15.99 , Published Year: 2017
, ISBN: 9781594634024 , Title: The Girl on the Train , Category: Thriller , Authors: Paula Hawkins , Price: 14.99 , Published Year: 2015
, ISBN: 9780812981605 , Title: The Nightingale , Category: Historical Fiction , Authors: Kristin Hannah , Price: 16.99 , Published Year: 2015
, ISBN: 9781451673319 , Title: Fahrenheit 451 , Category: Dystopian , Authors: Ray Bradbury , Price: 11.99 , Published Year: 1953
, ISBN: 9780439554930 , Title: Harry Potter and the Goblet of Fire , Category: Fantasy , Authors: J.K. Rowling , Price: 13.99 , Published Year: 2000
, ISBN: 9780060935467 , Title: Life of Pi , Category: Fiction , Authors: Yann Martel , Price: 10.99 , Published Year: 2001
, ISBN: 9780553296983 , Title: Dune , Category: Science Fiction , Authors: Frank Herbert , Price: 9.99 , Published Year: 1965
, ISBN: 9780385472579 , Title: The Things They Carried , Category: Fiction , Authors: Tim O'Brien , Price: 12.50 , Published Year: 1990
, ISBN: 9780590353427 , Title: Harry Potter and the Sorcerer's Stone , Category: Fantasy , Authors: J.K. Rowling , Price: 10.99 , Published Year: 1997
, ISBN: 9780747581086 , Title: The Kite Runner , Category: Fiction , Authors: Khaled Hosseini , Price: 13.99 , Published Year: 2003
, ISBN: 9780307947307 , Title: Becoming , Category: Biography , Authors: Michelle Obama , Price: 19.99 , Published Year: 2018
, ISBN: 9780307474278 , Title: The Road , Category: Post-Apocalyptic , Authors: Cormac McCarthy , Price: 14.99 , Published Year: 2006
, ISBN: 9780062316097 , Title: The Subtle Art of Not Giving a F*ck , Category: Self-Help , Authors: Mark Manson , Price: 18.99 , Published Year: 2016
, ISBN: 9780545010221 , Title: Harry Potter and the Deathly Hallows , Category: Fantasy , Authors: J.K. Rowling , Price: 16.99 , Published Year: 2007
, ISBN: 9780439139595 , Title: Harry Potter and the Prisoner of Azkaban , Category: Fantasy , Authors: J.K. Rowling , Price: 15.99 , Published Year: 1999
, ISBN: 9780316769488 , Title: The Catcher in the Rye , Category: Fiction , Authors: J.D. Salinger , Price: 11.99 , Published Year: 1951
, ISBN: 9780061120084 , Title: To Kill a Mockingbird , Category: Fiction , Authors: Harper Lee , Price: 12.99 , Published Year: 1960
, ISBN: 9780743273565 , Title: The Great Gatsby , Category: Classic , Authors: F. Scott Fitzgerald , Price: 14.99 , Published Year: 1925
, ISBN: 9780451524935 , Title: 1984 , Category: Dystopian , Authors: George Orwell , Price: 9.99 , Published Year: 1949
, ISBN: 9780143128540 , Title: The Alchemist , Category: Fiction , Authors: Paulo Coelho , Price: 10.99 , Published Year: 1988

```

Exercise2:

```
#include <iostream>
#include <fstream>
#include <string>
using namespace std;

struct Employee
{
    string name, gender, email, age, salary;
};

int main()
{
    const int n = 10;
    Employee employees[n];

    for (int i = 0; i < n; i++)
    {
        cout << "Enter details for Employee " << (i + 1)
<< ":" << endl;

        cout << "Name: ";
        cin >> employees[i].name;

        cout << "Age: ";
        cin >> employees[i].age;

        cout << "Gender: ";
```

```

        cin >> employees[i].gender;

        cout << "Email: ";
        cin >> employees[i].email;

        cout << "Salary: ";
        cin >> employees[i].salary;

        cout << endl;
    }

    ofstream myfile;
    myfile.open("C:\\Users\\MSI
PC\\Desktop\\lab6\\exercise-2.csv", ios::out);

    if (!myfile.is_open())
    {
        cout << "Error: Could not open the file!" <<
endl;
        return 1;
    }

    myfile << "Name, Age, Gender, Email, Salary" << endl;

    for (int i = 0; i < n; i++)
    {
        myfile << employees[i].name << ","
            << employees[i].age << ","

```

```
        << employees[i].gender << ","  
        << employees[i].email << ","  
        << employees[i].salary << endl;  
    }  
  
    myfile.close();  
  
    return 0;  
}
```



```
PS C:\Users\MSI PC\Desktop\lab6\output> & .\'lab6-2.exe'
```

```
Enter details for Employee 1:
```

```
Name: long  
Age: 12  
Gender: m  
Email: example@gmail.com  
Salary: 110k
```

```
Enter details for Employee 2:
```

```
Name: ko  
Age: 12  
Gender: f  
Email: example@gmail.com  
Salary: 100k
```

```
Enter details for Employee 3:
```

```
Name: rith  
Age: 13  
Gender: m  
Email: example@gmail.com  
Salary: 140k
```

```
Enter details for Employee 4:
```

```
Name: lim  
Age: 15  
Gender: m  
Email: example@gmail.com  
Salary: 120k
```

```
Enter details for Employee 5:
```

```
Name: rith  
Age: 17  
Gender: f  
Email: example@gmail.com  
Salary: 122k
```

```
Enter details for Employee 6:
```

```
Name: jame  
Age: 16  
Gender: m  
Email: example@gmail.com  
Salary: 120k
```

```
Enter details for Employee 7:
```

```
Name: hone  
Age: 17  
Gender: f  
Email: example@gmail.com  
Salary: 133k
```

```
Enter details for Employee 8:
```

```
Name: nith  
Age: 21  
Gender: m  
Email: example@gmail.com  
Salary: 144k
```

```
Enter details for Employee 9:
```

```
Name: joker  
Age: 23  
Gender: m  
Email: example@gmail.com  
Salary: 177k
```

```
Enter details for Employee 10:
```

```
Name: batman  
Age: 19  
Gender: f  
Email: example@gmail.com  
Salary: 199k
```

```
PS C:\Users\MSI PC\Desktop\lab6\output> █
```

```
ercise-2.csv > data
1 Name, Age, Gender, Email, Salary
2 long, 12, m, example@gmial.com, 110k
3 ko, 12, f, example@gmial.com, 100k
4 rith, 13, m, example@gmial.com, 140k
5 lim, 15, m, example@gmial.com, 120k
6 rith, 17, f, example@gmial.com, 122k
7 jame, 16, m, example@gmial.com, 120k
8 hone, 17, f, example@gmial.com, 133k
9 nith, 21, m, example@gmial.com, 144k
0 joker, 23, m, example@gmial.com, 177k
1 batman, 19, f, example@gmial.com, 199k
2
```

Exercise3:

```
#include <iostream>
#include <fstream>
#include <sstream>
#include <string>
#include <climits>
#include <vector>
using namespace std;

struct Student
{
    string StudentID, Name, Gender;
    int MathScore, EnglishScore, ScienceScore;
};

int main()
{
    vector<Student> studentList;
```

```

    ifstream infile("C:\\Users\\MSI
PC\\Desktop\\lab6\\data.csv", ios::in);
    ofstream outfile("C:\\Users\\MSI
PC\\Desktop\\lab6\\data_report.csv", ios::out);

    if (!infile.is_open() || !outfile.is_open())
    {
        cout << "Error: Could not open the file!" <<
endl;
        return 1;
    }

    string line;
    getline(infile, line);
    while (getline(infile, line))
    {
        stringstream ss(line);
        Student student;
        string mathScore, englishScore, scienceScore;
        getline(ss, student.StudentID, ',');
        getline(ss, student.Name, ',');
        getline(ss, student.Gender, ',');
        getline(ss, mathScore, ',');
        getline(ss, englishScore, ',');
        getline(ss, scienceScore, ',');

        student.MathScore = stoi(mathScore);
        student.EnglishScore = stoi(englishScore);
    }
}

```

```
        student.ScienceScore = stoi(scienceScore);

        studentList.push_back(student);
    }

    int totalStudents = studentList.size();
    int maleCount = 0, femaleCount = 0;
    int maxScore = 0;
    int minScore = INT_MAX;
    int totalscore;

    for (const auto &student : studentList)
    {

        if (student.Gender == "M")
        {
            maleCount++;
        }
        else if (student.Gender == "F")
        {
            femaleCount++;
        }

        totalscore = student.MathScore +
student.EnglishScore + student.ScienceScore;

        if (totalscore > maxScore)
        {
```

```

        maxScore = totalscore;
    }

    if (totalscore < minScore)
    {
        minScore = totalscore;
    }
}

outfile << "Total Students:" << totalStudents <<
endl;
outfile << "Males:" << maleCount << endl;
outfile << "Females:" << femaleCount << endl;
outfile << "Max Score:" << maxScore << endl;
outfile << "Min Score:" << minScore << endl;

infile.close();
outfile.close();

cout << "Data report has been written to
data_report.csv" << endl;

return 0;
}

```

Read the file from

```

1  StudentID,Name,Gender,MathScore,EnglishScore,ScienceScore
2  S001,John Doe,M,88,92,85
3  S002,Jane Smith,M,78,84,90
4  S003,James Brown,M,90,88,92
5  S004,Emily Davis,F,82,89,87
6  S005,Michael Johnson,M,95,93,94
7  S006,Lisa Lee,F,75,78,80
8  S007,David Wilson,M,85,80,88
9  S008,Olivia Martinez,F,91,95,90
10 S009,Daniel Clark,M,84,85,88
11 S010,Sophia Clark,F,89,92,91
12

```

Then write in

```

... C++ lab6-1.cpp C++ lab6-2.cpp C++ lab6-3.cpp C++ Exercise3.cpp
data_report.csv > data
1  Total Students:10
2  Males:6
3  Females:4
4  Max Score:282
5  Min Score:233
6

```