

Lab 8

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Lab: Lab 7

Date: 11/3/2021

Program Description:

This program was made to practice reading an external file using C++. The program opens a file and reads it line by line and it pushes all the data into a vector. Using built-in C++ library like algorithm the program sorts the read data from the file. The program uses lambda to sort the data.

Program Source code:

ReadFile.cpp

```
C++ ReadFile.cpp > main()
1  #include "ReadFile.h"
2
3  int main()
4  {
5      vector<Person *> fptr;
6      printMeFirst("Haichuan Wei", "Read File lab");
7      readInfo("person.txt", fptr);
8      printSortInfo(fptr, -1); // no sort
9      printSortInfo(fptr, 0); // sorted by month
10     printSortInfo(fptr, 1); // sorted by year
11     return 0;
12 }
```

Lab 8

ReadFile.h

```
24 #include <algorithm> // used for vector sort
25 #include <iomanip> // output format setw
26 #include "printMeFirst.h"
27 #include "Person.h"
28 using namespace std;
29
30 void readInfo(string filename, vector<Person *> &fptr)
31 {
32     ifstream infile(filename);
33     string line;
34     while (getline(infile, line))
35     {
36         istringstream iss(line);
37         string fname, lname, gender;
38         int month, day, year;
39         iss >> fname >> lname >> gender >> year >> month >> day;
40         Person *p = new Person(fname, lname, gender, year, month, day);
41         fptr.push_back(p);
42     }
43     infile.close();
44 }
45
46 void printSortInfo(vector<Person *> &fptr, int sortType)
47 {
48     if (sortType == -1)
49     {
50         // no sort
51         cout << "Print out unsorted Person" << endl;
52         for (int i = 0; i < fptr.size(); i++)
53         {
54             fptr[i]->printInfo();
55         }
56         cout << endl;
57     }
58     else if (sortType == 0)
59     {
60         // sorted by month
61
62         // sorted by month
63         cout << "Print out sorted by month" << endl;
64         sort(fptr.begin(), fptr.end(), [](Person *p1, Person *p2)
65             { return p1->getMonth() < p2->getMonth(); });
66         for (int i = 0; i < fptr.size(); i++)
67         {
68             fptr[i]->printInfo();
69         }
70         cout << endl;
71     }
72     else if (sortType == 1)
73     {
74         // sorted by year
75         cout << "Print out sorted by year" << endl;
76         sort(fptr.begin(), fptr.end(), [](Person *p1, Person *p2)
77             { return p1->getYear() < p2->getYear(); });
78         for (int i = 0; i < fptr.size(); i++)
79         {
80             fptr[i]->printInfo();
81         }
82         cout << endl;
83     }
84 }
85 #endif // _ReadFile_h
```

Lab 8

Person.cpp

```
1  #include "Person.h"
2  #include <iostream>
3  using namespace std;
4  Person::Person(string fn, string ln, string s, int m, int d, int y)
5  {
6      fname = fn;
7      lname = ln;
8      gender = s;
9      year = m;
10     month = d;
11     day = y;
12 }
13 void const Person::printInfo()
14 {
15     if (fname.length() < 8)
16     {
17         cout << fname << "\t\t";
18     }
19     else
20     {
21         cout << fname << "\t";
22     }
23     cout << lname << "\t" << gender << "\t" << month << "\t" << day << "\t" << year << endl;
24 }
25
26 int Person::getMonth()
27 {
28     return month;
29 }
30 int Person::getYear()
31 {
32     return year;
33 }
34 string Person::getLastName()
35 {
36     return lname;
37 }
38 string Person::getFirstName()
39 {
40     return fname;
```

Pesron.h

```
50 #ifndef _Person_h
51 #define _Person_h
52 #include <string>
53
54 class Person
55 {
56 public:
57     Person(std::string fn, std::string ln, std::string s, int m, int d, int y);
58     void const printInfo();
59     int getMonth(); // return month
60     int getYear(); // return year
61     std::string getLastName();
62     std::string getFirstName();
63
64 private:
65     std::string fname, lname, gender;
66     int month, day, year;
67 };
68
69 class CompareYear
70 {
71 public:
72     bool operator()(Person *p1, Person *p2)
73     {
74         return p1->getYear() < p2->getYear();
75     };
76
77     class CompareMonth
78     {
79 public:
80         bool operator()(Person *p1, Person *p2)
81         {
82             return p1->getMonth() < p2->getMonth();
83         };
84     };
85
86     class CompareLastName
87     {
88 public:
89         bool operator()(Person *p1, Person *p2)
90         {
91             return p1->getLastName() < p2->getLastName();
92         };
93     };
94
95 #endif // _ReadFile_h
```

Lab 8

Person.txt

```
person.txt
1  Hillary Clinton F 1947 10 26
2  Bill Clinton M 1946 08 19
3  George Bush M 1946 07 06
4  Laura Bush F 1946 11 04
5  Barack Obama M 1961 08 04
6  Michelle Obama F 1964 01 17
7  Donald Trump M 1946 06 14
8  Melania Trump F 1970 04 26
9  Joe Biden M 1942 11 20
10 Jill Biden F 1951 06 0
```

Code Output:

All data displayed matched the example

```
C:\Users\Arthur\Documents\Github\Cpp_Projects\Intermediate C++\Lab 8>wsl
arthur@DESKTOP-UP5LF24:/mnt/c/Users/Arthur/Documents/Github/Cpp_Projects/Intermediate C++/Lab 8$ ./ReadFile
Program written by: Haichuan Wei
Course Info: Read File lab
Date: Sun Nov 14 16:52:15 2021

Print out unsorted Person
Hillary Clinton F 10 26 1947
Bill Clinton M 8 19 1946
George Bush M 7 6 1946
Laura Bush F 11 4 1946
Barack Obama M 8 4 1961
Michelle Obama F 1 17 1964
Donald Trump M 6 14 1946
Melania Trump F 4 26 1970
Joe Biden M 11 20 1942
Jill Biden F 6 0 1951

Print out sorted by month
Michelle Obama F 1 17 1964
Melania Trump F 4 26 1970
Donald Trump M 6 14 1946
Jill Biden F 6 0 1951
George Bush M 7 6 1946
Bill Clinton M 8 19 1946
Barack Obama M 8 4 1961
Hillary Clinton F 10 26 1947
Laura Bush F 11 4 1946
Joe Biden M 11 20 1942

Print out sorted by year
Joe Biden M 11 20 1942
Donald Trump M 6 14 1946
George Bush M 7 6 1946
Bill Clinton M 8 19 1946
Laura Bush F 11 4 1946
Hillary Clinton F 10 26 1947
Jill Biden F 6 0 1951
Barack Obama M 8 4 1961
Michelle Obama F 1 17 1964
Melania Trump F 4 26 1970

arthur@DESKTOP-UP5LF24:/mnt/c/Users/Arthur/Documents/Github/Cpp_Projects/Intermediate C++/Lab 8$ _
```

Lab 8

```
C:\Users\Arthur\Documents\Github\Cpp_Projects\Intermediate C++\Lab 8>wsl
arthur@DESKTOP-UP5LF24:/mnt/c/Users/Arthur/Documents/Github/Cpp_Projects/Intermediate C++/Lab 8$ ./ReadFile
Program written by: Haichuan Wei
Course Info: Read File lab
Date: Sun Nov 14 16:52:15 2021

Print out unsorted Person
Hillary      Clinton F      10      26      1947
Bill         Clinton M      8       19      1946
George      Bush M        7       6       1946
Laura       Bush F       11       4       1946
Barack      Obama M       8       4       1961
Michelle    Obama F       1      17      1964
Donald     Trump M       6      14      1946
Melania     Trump F       4      26      1970
Joe        Biden M     11      20      1942
Bill       Biden F      6       0      1951

Print out sorted by month
Michelle    Obama F       1      17      1964
Melania     Trump F       4      26      1970
Donald     Trump M       6      14      1946
Bill       Biden F      6       0      1951
George      Bush M       7       6       1946
Bill        Clinton M      8      19      1946
Barack      Obama M       8       4       1961
Hillary     Clinton F     10      26      1947
Laura       Bush F      11       4       1946
Joe        Biden M     11      20      1942

Print out sorted by year
Joe        Biden M     11      20      1942
Donald     Trump M      6      14      1946
George      Bush M       7       6       1946
Bill        Clinton M      8      19      1946
Laura       Bush F      11       4       1946
Hillary     Clinton F     10      26      1947
Bill       Biden F      6       0      1951
Barack      Obama M       8       4       1961
Michelle    Obama F       1      17      1964
Melania     Trump F       4      26      1970

arthur@DESKTOP-UP5LF24:/mnt/c/Users/Arthur/Documents/Github/Cpp_Projects/Intermediate C++/Lab 8$ _
```