Lab 8 – Read File

This lab will read a file, person.txt, and store the data into a vector of person. It then will print out the vector that is sorted by person's birth year and sorted by person's birth month. You can use sort function which is part of #include <algorithm> library.

Please refer to in class lecture for more details how this is done, in addition you can review the sort documentation here: https://www.cplusplus.com/reference/algorithm/sort/

1. Define a **class Person** which contains the following:

    class Person
    {
             public:
                         Person(string fn,string ln, string s, int m, int d, int y);
                         void const printInfo() ;
                         int getMonth() ; // return month
                         int getYear() ; return year
                         string getLastName();
                         string getFirstName();
             private:
                         string fname, lname, gender;
                         int month, day, year;
    };

2. All implementations must be in .cpp file, and definition in .h file
3. The input file, person.txt has the following data:

    Hillary Clinton F 1947 10 26
    Bill Clinton M 1946 08 19
    George Bush M 1946 07 06
    Laura Bush F 1946 11 04
    Barack Obama   M 1961 08 04
    Michelle Obama F 1964 01 17
    Donald Trump M 1946 06 14
    Melania Trump F 1970 04 26
    Joe Biden M 1942 11 20
    Jill Biden F 1951 06 03

4. To use vector, sort and read file: Make sure you include the following header files:

    #include <fstream>
    #include <sstream>
    #include <iostream>
    #include <string>
    #include <vector>

```
#include <algorithm>  // used for vector sort
#include <iomanip>    // output format setw
#include <string.h>
```

- You need write readInfo function which takes filename and Person vector as input, read the file and place all person's name in the file into the Person vector pointer.
- You need to write printSortInfo function which will take the person vector pointer and sort flag as parameter input. Parameter fptr is the person vector pointer, and parameter sortflag will determine how you want the vector to be sorted.
- You need to write class CompareMonth(), CompareYear(), CompareLastName() for the sort function. Please refer to class lecture on file and sort.
- All the functions must have proper function header documentation.
- Your output must be nicely formatted by aligning each columns.
- You MUST use the following test driver program for this lab.
- Please review in class lecture on vector sort and how to read file.

```cpp
int main () {
   vector<Person *> fptr;

   printMeFirst("Ron Sha", "Read File lab");
   readInfo("person.txt", fptr);

   printSortInfo(fptr, -1); // no sort
   printSortInfo(fptr, 0); // sorted by month
   printSortInfo(fptr, 1); // sorted by year

   return 0;
}
```

```cpp
int main () {
    vector<Person *> fptr;

    printMeFirst("Ron Sha", "Read File lab"); //change to yourname
    /* The function readinfo:
     *    Read person.txt file and then store the info into vector
     *    pointer of person
     */

    readInfo("person.txt", fptr); // open the person.t
    //print out the person's vector

    /*
     * PrintSortInfo - print out all the person's record in the
     *      person vector fptr
     *
     * @parm fptr :  vector of Person
     * @parm sortBy :  -1   the print out will not be sorted, just as
     *                      it is stored in the vector
     *                 0   the print out will be sorted by person's
     *                      birth month.  You can use c++ sort library
     *                 1   the print out will be sorted by person's
     *                      birth year.  You can use c++ sort library
     */
    printSortInfo(fptr, -1); // no sort
    printSortInfo(fptr, 0); // sorted by month
    printSortInfo(fptr, 1); // sorted by year

    return 0;
}
```

The output of the program is similar to below:

```
Print out unsorted person vector
        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        3       1951


Print out sorted person vector by Month
       Michelle          Obama  F        1       17       1964
        Melania          Trump  F        4       26       1970
         Donald          Trump  M        6       14       1946
           Jill          Biden  F        6        3       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 person vector 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        3       1951
         Barack          Obama  M        8        4       1961
       Michelle          Obama  F        1       17       1964
        Melania          Trump  F        4       26       1970
```

Lab Submission: See the lab submission requirements published in canvas.

1. **Attach pdf file** which contains source codes you have written and program output screenshot so I can easily read in one file. You can use a word editor to place all the required programs and screenshots, and then use 'Print' to 'Microsoft Print to PDF' to save to a pdf file

Print

Copies: 1

Print

Printer ⓘ

Microsoft Print to PDF
Ready
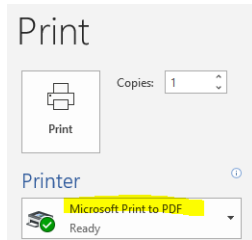
The **pdf file MUST have the following sections (1. Program Description, 2. Program Source Code and 3. Program Output).**

1. Program Description

- brief *description* of the purpose of the *program and*
- an explanation of what your software does and what problem it solves

2. Program Source Code

- Include all the source codes (program files) you have written for this lab (screenshots are ok)
- Your program must have adequate documentation for your source codes:
  - Program description – see above on Program Description
  - **You must put the following function headers for each function (the function header MUST be placed just above the function declaration in your source code). For Functions, it must have:**
    - *Function name: name of this function*
    - *Function description: the purpose of this function and how to use it*
    - *@param param_name and what the parameter/argument is used for*
    - *@return what is returned from the function*
- Make sure your screenshots are readable (not too small)

<mark>**Below is an example of source code**</mark>
File: print_me_first_main.cpp (list the program file individually)

```
1   //print_me_first_main.cpp
2   #include <iostream>
3   #include <string>
4   #include <iomanip>
5
6   using namespace std;
7
8   /**
9    * @Purpose - this function print out the person who wrote the program,
10   * and date/time the program run.
11   * @parm - name - the author of the program
12   * @parm - courseInfo - the name of the course
13   * @return - none
14   * @author - Ron Sha
15   **/
16
17  void PrintMeFirst(string name, string courseInfo)
18  {
19      cout <<" Program written by: "<< name << endl; // put your name here
20      cout <<" Course info: "<< courseInfo << endl;
21      time_t now = time(0); // current date/time based on current system
22      char* dt = ctime(&now); // convert now to string for
23      cout << " Date: " << dt << endl;
24  }
```

File: list other cpp files separately

3. Program Output

- Attach all the program outputs (screenshots)
- Don't place Source code and program output side by side as it is not readable in screenshot
- Make sure your screenshots are readable (not too small)
- Your main program outputs MUST include your name printout (use the print_me_first function/program).

2. **Attach zip file** which contains all your source code (you can zip the folder) and functions. Even if you only have one source file, you MUST still do a zip file of the folder. I must be able to compile and run your program from all the source code programs after I unzip your zip file.

You should create a folder for each lab, and place all your programs, functions and all other files related to this lab in this lab folder. To submit the lab folder, you can use "Send to -> compress" in window file explorer to create a zip file of the folder.
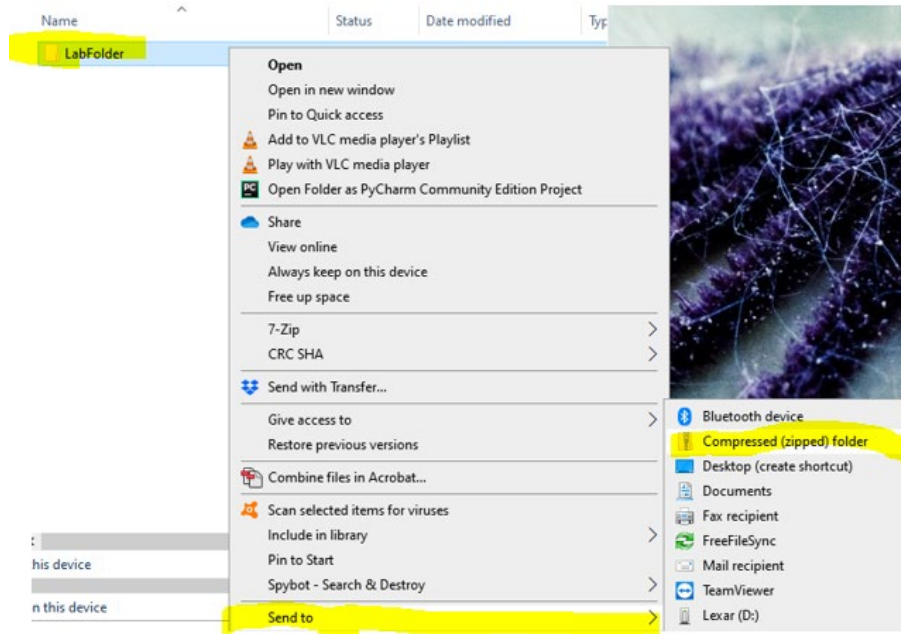
3. Now you can upload both the **pdf file** and **zip file** separately as your assignment submission in canvas.