CS-116

Lab2: Vector

The purpose of this lab is for you to familiar with C++ vector and using Makefile. Makefile is used so you can compile multiple source codes files and link them to a program executable.

I have also provided a sample Makefile for you to use for all labs within this class. If you want to know more about Makefile, here is more information from the website:

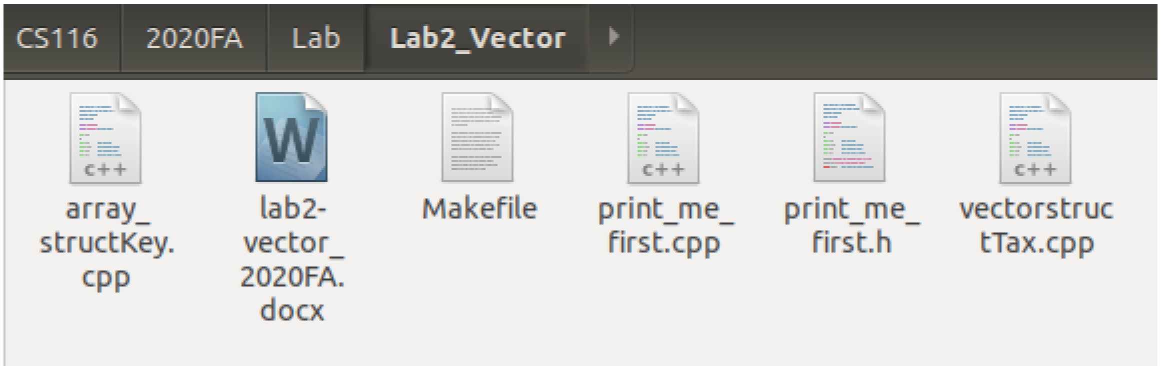
- Here is my online tutoring on Makefile:
  - https://cccconfer.zoom.us/rec/share/IA1QctzokujOV1MiD3tYFzC49kL2tR9M1eVI8O225NEeqdpECgtqkV59cUahPK6L.pGGYeneVFWxLuJgy

- Online tutorial:
  - https://www.tutorialspoint.com/makefile/why_makefile.htm

I have provided an example of this lab written in array, you need to modify the program so it is implemented in vector and use Makefile per the requirement below:

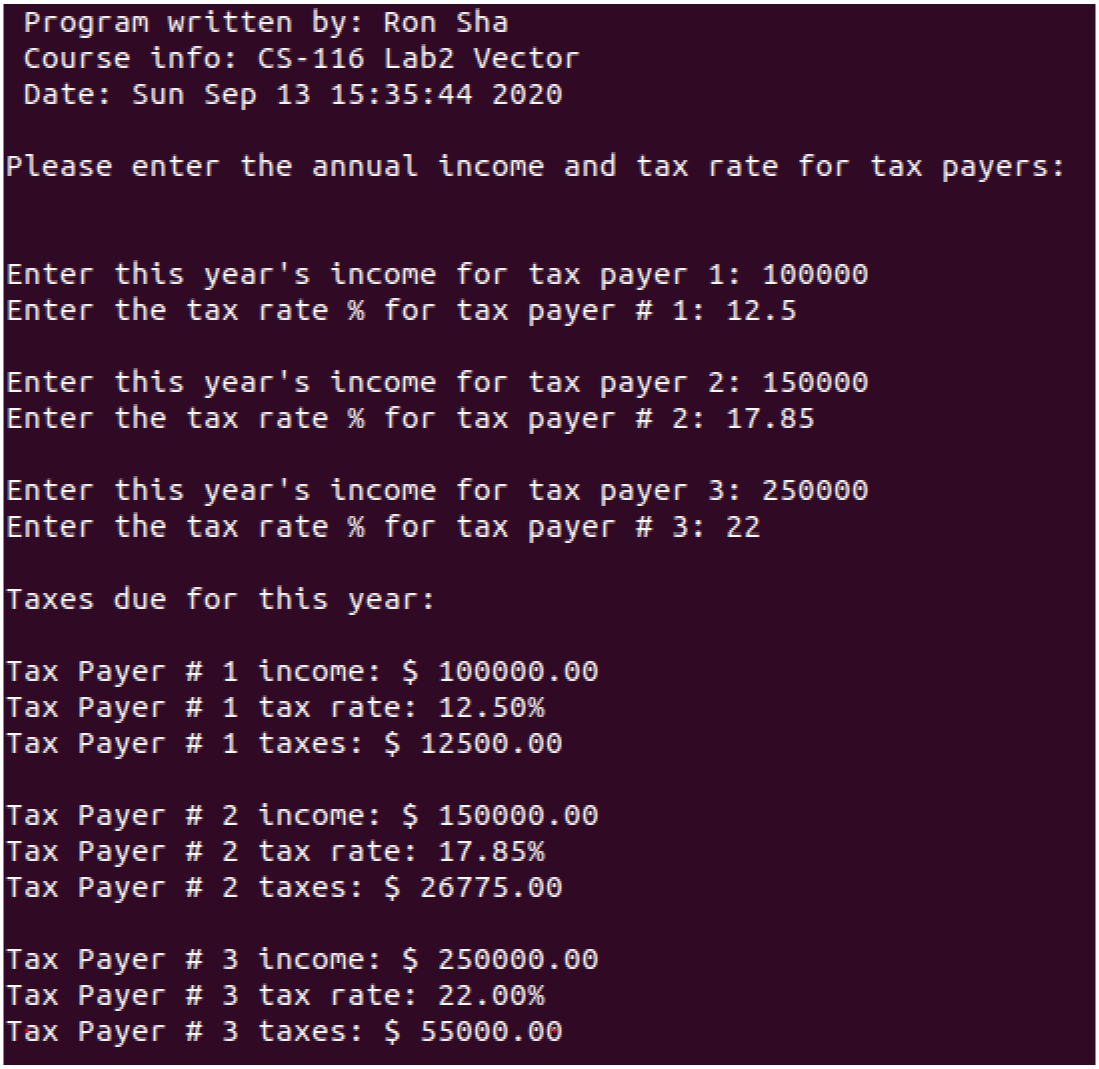
1. Create a new folder and place all lab2 files in this folder.
2. In lab1, you wrote the print_me_first() function. You need to change the print_me_first to function, and save the file to print_me_first.cpp file.
3. You need to use Makefile for this lab since we will have separate .cpp files. Please use the sample Makefile I have created for this lab. Please refer to my lecture as I will go over Makefile. In the lab folder, you should have the following files in the folder:
   a) Makefile
   b) print_me_first.cpp
   c) vectorstructTax.cpp

   For example, your folder should be similar as below:



4. Create a new cpp **vectorstructTax.cpp**, make sure it is in the same folder where the Makefile is located.
5. Use the sample array_structKey.cpp file, and reimplement it but uses **vector** instead. The new cpp filename should be **vectorstructTax.cpp since I used it in the Makefile. If you change to a different name, you need to modify Makefile to reflect the new name change.**
6. In the **vectorstructTax.cpp file,** you also need to #include “print_me_first.h” (please refer to my lecture)

- In the sample array_structKey.cpp, it uses array *taxPayer taxPayerList[3];*
- **Create a new file vectorstructTax.cpp**
    - In this lab, you need to use ***vector<taxPayer *> taxPayerList;***
    - Rewrite the array_structKey.cpp program but using vector instead.
    - Your need to call print_me_first() function at the beginning of your program.
    - Your new vectorstructTax.cpp should have the following output:



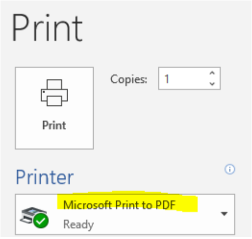
```
 Program written by: Ron Sha
 Course info: CS-116 Lab2 Vector
 Date: Sun Sep 13 15:35:44 2020

Please enter the annual income and tax rate for tax payers:


Enter this year's income for tax payer 1: 100000
Enter the tax rate % for tax payer # 1: 12.5

Enter this year's income for tax payer 2: 150000
Enter the tax rate % for tax payer # 2: 17.85

Enter this year's income for tax payer 3: 250000
Enter the tax rate % for tax payer # 3: 22

Taxes due for this year:

Tax Payer # 1 income: $ 100000.00
Tax Payer # 1 tax rate: 12.50%
Tax Payer # 1 taxes: $ 12500.00

Tax Payer # 2 income: $ 150000.00
Tax Payer # 2 tax rate: 17.85%
Tax Payer # 2 taxes: $ 26775.00

Tax Payer # 3 income: $ 250000.00
Tax Payer # 3 tax rate: 22.00%
Tax Payer # 3 taxes: $ 55000.00
```

- **Test Cases:**
  - You must use the same numbers in the screenshot as test cases

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

**To submit your assignment in canvas, you must submit TWO files (one pdf and one zip) as follows:**

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.



Copies: 1

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.

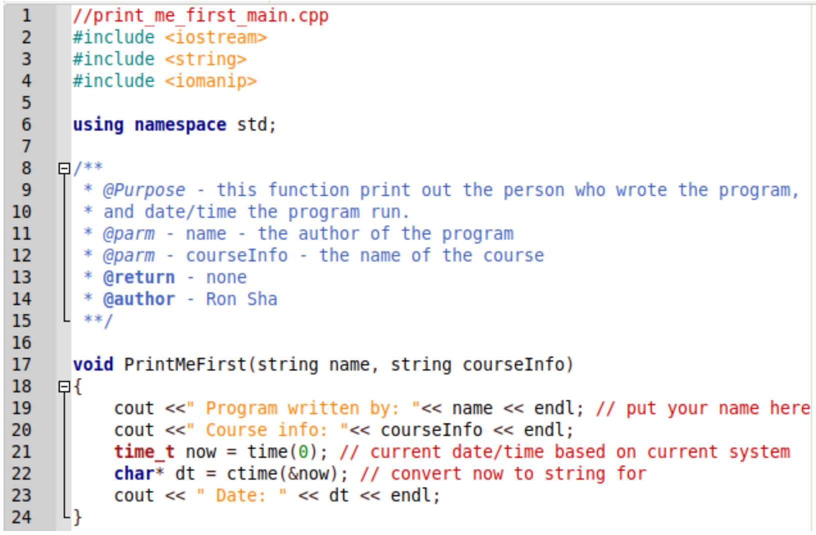
## 2. Program Source Code

- Include all the source codes (program files) you have written for this lab (screenshots are ok)
- Before each program screenshot, please identify the program file name before the screenshot.
- 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)

**Below is an example of source code**

**File: print_me_first_main.cpp (list the program file individually)**



```
//print_me_first_main.cpp
#include <iostream>
#include <string>
#include <iomanip>

using namespace std;

/**
 * @Purpose - this function print out the person who wrote the program,
 * and date/time the program run.
 * @parm - name - the author of the program
 * @parm - courseInfo - the name of the course
 * @return - none
 * @author - Ron Sha
 **/

void PrintMeFirst(string name, string courseInfo)
{
    cout <<" Program written by: "<< name << endl; // put your name here
    cout <<" Course info: "<< courseInfo << endl;
    time_t now = time(0); // current date/time based on current system
    char* dt = ctime(&now); // convert now to string for
    cout << " Date: " << dt << endl;
}
```

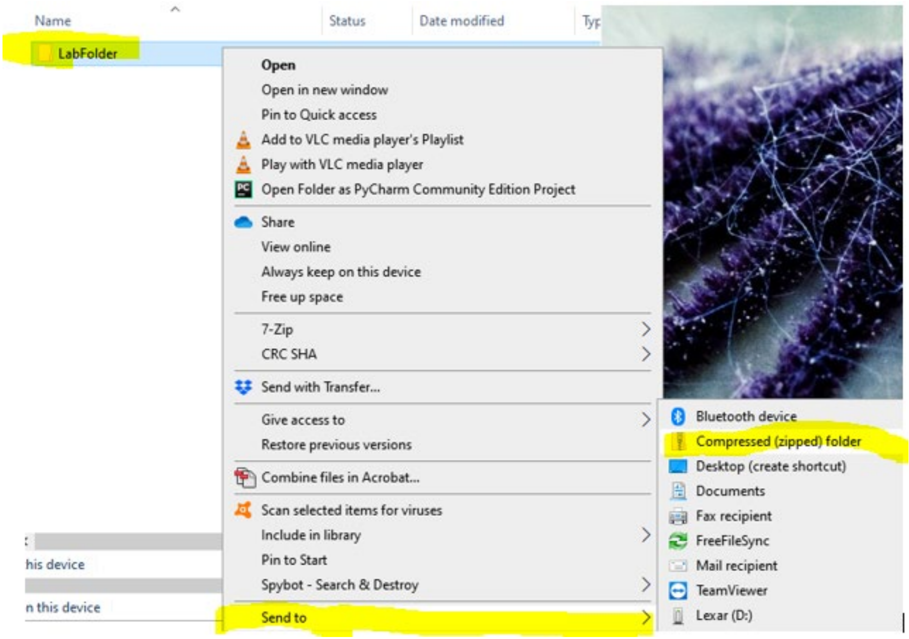
**File: list other cpp files separately. For each cpp files, please identify the cpp file name, then followed with the screenshots.**

## 3. Program Output

- Attach all the program outputs (screenshots)
- Do not 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.**