CSC230 Lab 1

Due: Feb 6th, 11:59pm

Goal: This lab will give you practice editing and running C++ programs, using **Emacs**, **cin**, **cout**, **two-dimensional array**, and **nested for loops**.

Please try your best to finish the lab in class, and submit it to CANVAS. Use command "**jar**" to zip all your .cpp files and .o files into lab1.jar. Submit lab1.jar to CANVAS. To use command "jar", type the following command at prompt

jar –cvf lab1.jar *

The above command will put all files (that is meaning of *) under <u>current directory</u> into lab1.jar. If you want put several selected files from the directory, list the filenames at * place. For example, you want to put two files, foo and bar, into lab1.jar. You can type the following command

jar –cvf lab1.jar foo bar

Sometimes, you may have a jar file, such as lab1.jar. If you want to open this jar file and extract all the files inside this jar file, you can type the following command

jar –xvf lab1.jar

Please note lab1.jar can be any jar file you may have.

PART I: Getting started

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1. Please login the computer by using your TCNJ email username and password. If the login process does not work, check your Internet cable connection. If cable connection is fine, restart your computer and try again.
2. Open a terminal in the computer. You can type Unix commands inside the terminal now. For a Mac machine, you can find terminal icon in the bottom of the window. If you want to do the work on your own Linux machine, like Ubuntu. You can do this by selecting the "Dash Home" icon at upper left, typing "terminal" in the search bar, then clicking on the "Terminal" program. There's also a keyboard shortcut: hold down the Ctrl and Alt keys while typing "t".

3. Warning: DO NOT, at this time or any point in the future, delete the .login, .bashrc, and .emacs files under your directory. If you would like to customize your account, do so by adding new commands to the end of these files, not replacing the files.

PART II: Read a file, input the data to a two dimensional matrix
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After logging in, please do the following steps.

1. Create a directory for lab1 by typing

    mkdir lab1

2. Change into your lab1 directory:
    cd lab1

3. Download 0505matrix file from Canvas to lab1 directory.

4. Run Emacs by typing
    emacs Lab1.cpp

    In this C++ program, Lab1.cpp, please write code that will do the following things:
    - Use **cin** to read two integers x and y
    - Use x and y to create an two dimensional array, which has size x (row) and y (column)
    - Write a nested for loop to read (**cin**) char values, assign these values to the elements of the two dimensional array
    - Write another nested for loop to print out the values of the two-dimensional array. The values should be printout out row-by-row.

5. Save the file by using "C-x C-s". Compile the program within Emacs using:
    ESC !

    This will allow you to run a shell command:
    g++ -g Lab1.cpp

    "g++" is the name of the C++ compiler. "-g" is a switch to tell the compiler to generate the information the debugger will need.

6. Use the control sequence C-x ' to jump directly to errors found by g++. (Be sure to use the single opening quote, not the apostrophe.) Figure out what's wrong, correct the errors, save the file using "C-x C-s", and compile the code.

PART III: test the code

Once g++ is able to compile the code, it will create a file called a.out in the same directory. In a shell (an xterm or an Emacs buffer called *shell*), type

./a.out < 0505matrix

Here "< " sign means input redirection. Whenever program a.out tries to read data from keyboard, it will get data from file 0505matrix. The file 0505matrix contains the following data

```
5 5
u r a q o
f t c n j
k r h p r
e a v o t
z h g a h
```

The program read the first two values, 5 and 5, to x and y. Then the program uses x and y to create a two-dimensional array. Then it reads the following values and assigns them to each element of the array. After reading is done, the program prints out the values of the array, row by row. For the file of 0505matrix, the result will be

```
u r a q o
f t c n j
k r h p r
e a v o t
z h g a h
```

Hint:

- The array size must be from the input. **Do NOT hard code** the array size. For example, do NOT write a code like:

  int arr[5][5];

  Your program should work with different input, which may have different array sizes. If the array size is hard-coded, the program will not be able to work with the input values of different sizes.

- It is normal that you will have questions about C++ language itself, you can check the following website
  http://www.cplusplus.com/reference/
  This link points to "Standard C++ Library Reference". There is a lot of information, not all of which will make sense right now, but you should be able to find a description of the data type or the statement that you have question.

- When you think you have found the error, correct it, save the file, recompile it, and execute it to see if the problem is solved.

- Aside: You may think the executable file generated by g++ is Lab1. In fact, by default, the executable file name is a.out. If you prefer a different executable filename, such as myLab1, you type the following command to compile the source file
  g++ -g Lab1.cpp –o myLab1

Wrap up

When you're done, jar three files to lab1.jar

jar –cvf lab1.jar Lab1.cpp a.out

Submit lab1.jar to Canvas.

Make sure you logout before you leave!

If you cannot finish lab in class, please save all your files. Next time you login the computer in the lab, you can continue work on your files. Please save them before you logout.
- If you work in a Linux lab, please save the file to your machine. Whenever you come back to any computer in the Linux lab, you will see the saved files.
- If you are working in the Mac lab, please save the file to a CLOUD. The Mac machine will erase everything you saved once you logout.