

This is My First C++ Program!

So how do I start?

The following is a brief description of the process of writing a simple C++ program such as found on the first two programming assignments in CMPS 150.

The Example Problem:

Write a program that accepts a Fahrenheit temperature and returns the temperature expressed as a Celsius temperature. Use this formula:

$$\frac{5}{9} (\text{Fahrenheit} - 32)$$

1. Creating the File

- a. First, on Solaris UNIX, open a console window and move to your CMPS 150 directory. Type:

```
cd cs150x
```

where the *x* is the number of your section.

Note: If you are not working on a UCS system, you will have to FTP your file to a UCS system and place it in the correct directory. If Unix and C++ are new to you, it is a good idea to work directly in the Solaris lab at ULL in order to minimize potential problems and so you can concentrate directly on your coding.

- b. Second, select your editor. For example, if you are using nedit on a Solaris Unix machine, start the nedit editor in the console window by typing:

```
nedit name-of-file.cc
```

where *name-of-file.cc* is the name of the file to edit or create

Don't forget to name the file with an ending of ".cc". *(If you are connected using an X-Terminal program in Windows or working Slogin from Linux, you may add an "&" at the end of the editor command to allow you to move back and forth among the windows you are working in.)*

2. Enter the basic pre-compiler instructions and create the main statement.

- a. Since the program needs to perform console output (output to the monitor screen), the only library necessary to include is *iostream*. Other than that, we need to set up the namespace we will use and the function main. The result is:

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

int main()
{
    return 0;
}
```

- b. For a beginning programmer, a good idea is to stop and compile after adding code to a program. This allows you to deal with the syntax errors reported by the compiler a little at a time rather than trying to debug the program all at once after it has been completely written. To compile this example program, save the changes made in the editor and type the following in the console window.

```
g++ -o myprog name-of-file.cc
```

where *myprog* is the name of the program to create
name-of-file.cc is the name of the C++ code file

If the file compiles cleanly (no errors reported), run the program by typing:

```
myprog
```

where *myprog* is the name of the program the compiler created

If the file compiles with errors, consult the line number of the top-listed error and find that line in your editor. (Most editors will display line numbers if you ask them nicely. For example, in Nedit, go to preferences and select Show Line Numbers.) Once you have corrected the top-listed error, save the program and re-compile it. Continue this process until your code compiles cleanly, then run the program. (*Note: At this stage, the program will do nothing!*)

3. Create the variables you think you will need.

This program needs a variable to store the data the user will enter (temperature in Fahrenheit) and a variable to store the results of the calculations (the same temperature, but in Celsius). Since the formula clearly involves a fraction, we will need to make these variables from a floating-point data type.

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

int main()
{
    double fahrenheit, celsius;

    return 0;
}
```

4. Write the prompts for user input and the input statement to accept the user input:

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

int main()
{
    double fahrenheit, celsius;

    cout << "Enter the temperature in Fahrenheit: ";
    cin >> fahrenheit;

    return 0;
}
```

Note: It is a good time to re-compile and run your program to test the new code and to see the program interact with the user.

5. Write the assignment statement to calculate the temperature in degrees Celsius from degrees Fahrenheit. The challenge here is to express the formula in the terms of C++. Notice how 5, 9 and 32 have been changed from integers to numbers with fractions.

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

int main()
{
    double fahrenheit, celsius;

    cout << "Enter the temperature in Fahrenheit: ";
    cin >> fahrenheit;

    celsius = 5.0 / 9.0 * (fahrenheit - 32.0);

    return 0;
}
```

Note: It is a good time to re-compile and run your program to test the new code.

6. Write code to output the results to the console window (monitor screen). Be sure and include string output to function as a label for the number output.

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

int main()
{
    double fahrenheit, celsius;

    cout << "Enter the temperature in Fahrenheit: ";
    cin >> fahrenheit;

    celsius = 5.0 / 9.0 * (fahrenheit - 32.0);

    cout << fahrenheit
         << " degrees Fahrenheit is the same as "
         << celsius
         << " degrees Celsius" << endl;

    return 0;
}
```

Note: Compile, debug and run your program as normal.

7. Add the code to control the output of floating point numbers.

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

int main()
{
    double fahrenheit, celsius;

    cout.setf(ios::fixed, ios::floatfield);
    cout.setf(ios::showpoint);
    cout.precision(1);

    cout << "Enter the temperature in Fahrenheit: ";
    cin >> fahrenheit;

    celsius = 5.0 / 9.0 * (fahrenheit - 32.0);

    cout << fahrenheit
         << " degrees Fahrenheit is the same as "
         << celsius
         << " degrees Celsius" << endl;

    return 0;
}
```

Note: Compile, debug and run your program as normal.

8. Add the documentation required to submit the program.

```

// *****
// Author      : Lucrezia Borgia
// CLID       : lxb1480
// Class      : CMPS1509
// Assignment  : pa0
// Date Assigned : a long time ago
// Due Date    : too soon
// Due Time    : 10:00 PM
//
// Program Description:
// This program accepts a temperature expressed
// in Fahrenheit, the converts and outputs it
// Celsius.
//
// --Certificate of Authenticity--
// I certify that this assignment is entirely
// my own work.
// *****

#include <iostream>
using namespace std;

int main()
{
    double fahrenheit, celsius;

    cout.setf(ios::fixed, ios::floatfield);
    cout.setf(ios::showpoint);
    cout.precision(1);

    cout << "Enter the temperature in Fahrenheit: ";
    cin >> fahrenheit;

    celsius = 5.0 / 9.0 * (fahrenheit - 32.0);

    cout << fahrenheit
         << " degrees Fahrenheit is the same as "
         << celsius
         << " degrees Celsius" << endl;

    return 0;
}

```

Note: Be sure to compile and run the program again before you submit it to insure that it still works correctly.

9. Submit your program according to the instructions on your assignment.

10. Example Run and Submit:

```
g++ -o pa0 pa0.cc
pa0
Enter the temperature in Fahrenheit: 72
72.0 degrees Fahrenheit is the same as 22.2 degrees Celsius
```