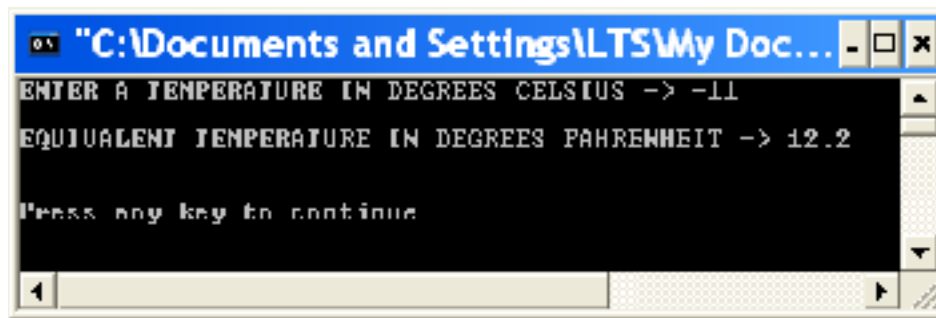

Lab 8 – User Defined Functions

Call by Value Functions

- 1a) Write a C++ program that will prompt a user for a temperature in degrees Celsius and then calculates and prints out the temperature in degrees Fahrenheit.

Interaction with the user should resemble the following:



Use the following algorithm:

1. Declare and initialize variables for temperature Celsius and temperature Fahrenheit.
 2. prompt the user for a temperature in degrees Celsius
 3. read the temperature into memory
 4. apply the conversion factor $\text{tempF} = (9.0/5.0) * \text{tempC} + 32.0$
 5. Print out the result to the user.
- 1b) Write a function called `convertTemperature` that implements the code from part a). Before you start to design your function, answer the following questions:
- a. Assuming the formula $\text{tempF} = (9.0/5.0) * \text{tempC} + 32.0$, which variable is the input to this function?

Input to function (*parameter*) _____

Data type of input _____

- b. Which variable is the result this function?

Result of function (*return value*) _____

Data type of result _____

```
#include<iostream.h>
```

```
//FUNCTION DEFINITION
```

```
Return_Value_Data_Type Function_Name (Input_Variable_Data_Type Input_Variable_Name)
{
    //declare and initialize tempF

    //apply the conversion factor

    //return tempF to the main() program
}
```

```
//MAIN PROGRAM
```

```
void main()
{
    //DECLARE AND INITIALIZE INPUT

    //PROMPT USER FOR INPUT

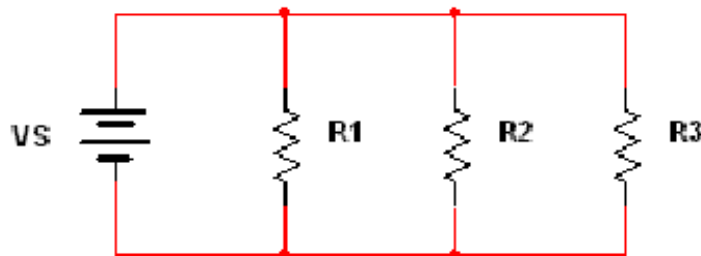
    //READ DATA INTO MEMORY

    //FUNCTION CALL AND PRINT OUT RESULT TO USER

} //end main function
```

Call by Reference Functions

Part 1 Call by Value: Write a program that uses 2 functions to will solve for the total resistance and current in a parallel resistor circuit (image below). Use the main() program to prompt the user for the three resistor values and voltage, then store those values into an array. To carry out the calculations call on array positions. Return the value for the total parallel resistance to the main program and print it out. Call on a second function to solve for total current.



Interaction with the user should resemble the following with the addition of voltage and total current:

```

"C:\Documents and Settings\LT5\My Docume...
PARALLEL RESISTANCE CIRCUIT SOLVER

ENTER R1 [OHMS] -> 560
ENTER R2 [OHMS] -> 2200
ENTER R3 [OHMS] -> 1000

R PARALLEL -> 308.617 OHMS

THANK YOU FOR USING THE PARALLEL RESISTANCE CIRCUIT SOLVER
Press any key to continue_
  
```

Use the following algorithm:

1. Declare local variables
2. Prompt user for three resistor values and read them into memory
3. Function call. Implement the formula $r_{\text{Parallel}} = 1/(1/R1 + 1/R2 + 1/R3)$.
4. Print out the result for R parallel in the main() program.

Before you start to design your function, answer the following questions:

Input(s) to function (*parameter*) _____ Data type of input(s) _____

Result of function (*return value*) _____ Data type of result _____

Part 2 Call by Reference: To make things more efficient re-code **Part 1 Call by Value** to interact with the user in `main()`, and carry out only 1 function call to return both the total current and total resistance. (hint: you may need to use a different type of function that does not return values. How many input values will there be in the function definition? How will the values be changed in main by calling on a function definition?)