

ECE 71 – Engineering Computations in C

Class Assignment – February 10, 2009

Professor Kriehn

Due By: Midnight on Thursday, September 24, 2009

Print out your algorithms and commented code for each of your homework solutions.

HOMEWORK #7 – Quadrants

Write a program that tells the user which quadrant a pair of variables is in if the variables x and y are to be plotted on a y versus x graph using nested if-else statements. The different conditions that you need to test for are:

Quadrant 1	Positive x Axis
Quadrant 2	Positive y Axis
Quadrant 3	Negative x Axis
Quadrant 4	Negative y Axis
Origin	

Specifications:

Include a prompt that asks a user to input a coordinate pair before you scan in the values from the keyboard, such as “Input Coordinate Pair: ”. (You must include the colon in your prompt). The program should then read in the values and determine where the point is located on the xy plot. Please note that the Grader Program will submit data to your program by entering two numbers that are separated by a space. The first number is associated with x , and the second with y .

The output should return one of the 9 string values listed above (exactly) to the screen. When you print the results, do not print out anything other than one of the phrases or words listed above. Please note that the Grader Program is case sensitive.

For instance, if you execute the program, and input a values of 0 5.3, the following information should be displayed:

```
~> hw7.o
Input Coordinate Pair: 0 5.3
Positive y Axis
~>
```

For the above input, your program should display this **exactly**. If your program does not follow these specifications exactly, the Grader Program will not accept your submission.

Submit:

Once you have verified the operation of your program, submit your source code to the Grader Program.

HOMEWORK #8 – Degrees Celsius to Degrees Fahrenheit

Write a program that prompts the user to enter a temperature, followed by a letter representing Celsius (C) or Fahrenheit (F). Then prompt the user for the conversion type and print the results to the screen with one decimal point. If the user enters a letter other than 'C' or 'F', the program should print an error message.

Specifications:

You must use the switch statement for this program, and the program should be able to recognize lowercase ('c' or 'f') or uppercase ('C' or 'F') letters for Celsius or Fahrenheit temperatures. If you execute the program with the following inputs, the following information should be displayed:

```
~> hw8.o
Enter a temperature: 32.4
Enter 'C' for Celsius or 'F' for Fahrenheit: C
Choose a conversion ('C' for Celsius or 'F' for Fahrenheit): F
The temperature is: 90.3 F.
~> hw8.o
Enter a temperature: 32.4
Enter 'C' for Celsius or 'F' for Fahrenheit: x
Unknown Syntax!
~> hw8.o
Enter a temperature: 32.4
Enter 'C' for Celsius or 'F' for Fahrenheit: C
Choose a conversion ('C' for Celsius or 'F' for Fahrenheit): A
Unknown Syntax!
~>
```

Submit:

Once you have verified the operation of your program, submit your source code to the Grader Program.

HOMEWORK #9 – Airspeed

Write a program that calculates the speed of sound in air for a given Fahrenheit temperature. The program should then convert the temperature T to Celsius, and use the following formula:

$$c = 331.3\sqrt{1 + T/273.15} \text{ m/s}$$

where T represents the temperature in Celsius, and the speed c is given in m/s. Print your results to the screen in m/s and in ft/s, each with two decimal places.

Specifications:

Use 4 significant digits for your conversion factor between m/s to ft/s (which should be defined as a constant). If you execute the program, the following information should be displayed:

```
~> hw8.o
Enter a temperature in Fahrenheit: 32.4
The airspeed is 331.43 m/s, or 1087.44 ft/s.
~>
```