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CENG320L

Lab 8 Report

28 November, 2022

1. Lab Overview

The purpose of this lab was to learn to work with fixed point math in assembly. This requires lots of focus on where the radix point is, so that it is up to the programmer to keep track of where it is as well as what will happen to it as it is used in calculations later on. This program tells the user that it will create a table for *f(x)* = `(x^3 - x^2 - 2x) / ( (x - 2)^4 / 11) + 3 )`. Next, the user is prompted to enter the lower and upper limits of x, as well as how many rows they want in the table. The table will then be generated with two columns, one being x and one being f(x). The number of rows will have to do with how many partitions there are, for the x-values. For example, if the x-values are to range from 2 to 4 with 5 rows, then the x-values which will be solved are 2, 2.5, 3, 3.5, and 4. The program loops through the values, solving for each f(x) value and outputting it to the terminal. Once it reaches the upper limit, it kicks out.

2. Bugs and Hurdles

The main hurdle which I encountered during this lab was only outputting 4 decimal places of precision, but it was not too bad of a fix. I solved this issue by adding a for loop in the printS function which would loop 4 times, outputting a decimal number of the fractional part each time. After I added this small change, then the table which was outputted was much more clean and professional-looking.

3. Results

After completing this lab, I feel much more comfortable with fixed point arithmetic, as well as commenting my code to make sure I know what is going on. This was a really good exercise in terms of making sure I know what is going on with my code, since I had to keep track of the imaginary radix point and make sure of where it would end up. The whole program seems to run just fine, and gives no warnings. My numbers for labs 8 and 9 also match with the testing that I completed on them, which is satisfactory for me.

```
This program will produce a table given a domain for x to evaluate the function f(x).

 f(x) = ( x^3 - x^2 -2x ) / ( ( ( x - 2 )^4 / 11 ) + 3 )

Please enter a lower limit for x: 4

Please enter an upper limit for x: 8

Please enter the number of rows in the table: 15

x       f(x)
4.0000  8.9795

4.2857  9.4462

4.5714  9.3900

4.8571  8.9735

5.1428  8.3650

5.4285  7.6886

5.7142  7.0193

5.9999  6.3945

6.2856  5.8294

6.5713  5.3265

6.8570  4.8826

7.1427  4.4918

7.4284  4.1477

7.7141  3.8442

7.9998  3.5757

s101080740@george:~/CENG320/lab8$
```