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CENG320L

Lab 9 Report

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1. Lab Overview

The purpose of this lab was to learn floating point arithmetic through working through the Lab 8 problem with floating point instead of fixed point. For me, this mainly gave me actual practice with floating point, as far as the different registers and instructions which are used. It was all sort of hypothetical before, just a “this is something that could be done”, but this is the first time I was able to put it into practice and actually look at how it works and if my understanding of how it worked was correct. This program prompts the user to input a high limit, low limit, and the number of rows in the table. These rows are the partitions which will be used; for example, if the lower limit is 2 and the upper limit is 4, and there are 5 rows, the x-values would be 2, 2.5, 3, 3.5, and 4. This program does the calculation to solve for $f(x) = (x^3 - x^2 - 2x) / ((x - 2)^4 / 11) + 3$ and outputs the solutions into a table for the user to see. It simply loops through the table values, outputting the solutions for each $f(x)$ and then moving onto the next until the upper limit is reached.

2. Bugs and Hurdles

The only real hurdle which I had was troubleshooting my program outputting one too few values; it would get all the way up to the upper limit and then stop before outputting the last one. I ended up realizing that I was simply using a blt instead of a ble, and that fixed the issue immediately by allowing one extra loop of the arithmetic and print calls.

3. Results

I feel as though I have cemented the ideas in my mind about how to do floating point arithmetic, and the pieces which I have read in the book and done in the homework make more sense now. This lab allowed me to see whether my preconceived notions about how to use floating point were correct or not, and give me some real feedback from a compiler rather than just guessing that my code would probably work. In the end, the whole program seems to work correctly and runs without any warnings.

```
This program will produce a table given a domain for x to evaluate the function f(x).
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```
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) |
|----------|----------|
| 4.000000 | 8.979592 |
| 4.285714 | 9.446221 |
| 4.571429 | 9.390030 |
| 4.857143 | 8.973511 |
| 5.142857 | 8.364925 |
| 5.428571 | 7.688591 |
| 5.714286 | 7.019203 |
| 6.000000 | 6.394464 |
| 6.285714 | 5.829338 |
| 6.571429 | 5.326462 |
| 6.857143 | 4.882503 |
| 7.142857 | 4.491687 |
| 7.428571 | 4.147614 |
| 7.714286 | 3.844117 |
| 8.000000 | 3.575621 |

```
s101080740@george:~/CENG320/lab9$
```