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**Lab 1 Report**

Objectives

* Refamiliarize w/ microcontroller & LCD
* Understand floating & fixed point
* Implement fixed point
* Draw on LCD

Extra Credit:

* Use debugger
* Use logic analyzer
* Use ASM and C together

Extra Credit Measurement Data

Test 1 (floating, C) –

Start Time: 0.510416 s

End Time: 0.541138 s

Execution Time: 0.030722 s

Test 2 (fixed, C) –

Start Time: 0.510416 s

End Time: 0.511952 s

Execution Time: 0.001536 s

Test 3 (floating, asm) –

Start Time: 0.510416 s

End Time: 0.511133 s

Execution Time: 0.000717 s

Test 4 (fixed, asm) –

Start Time: 0.510416 s

End Time: 0.511081 s

Execution Time: 0.000665 s

Analysis and Discussion

1) In what way is it good design to minimize the number of arrows in the call graph for your system?

- Less dependency, less data flow

2) Why is it important for the decimal point to be in the exact same physical position independent of the number being displayed? Think about how this routine could be used with the ST7735\_SetCursor command.

- Allow to right-justify, assuming same number of decimal places

3) When should you use fixed-point over floating point? When should you use floating-point over fixed-point?

- Use fixed point when values all have same resolution, easy to calculate

- Use floating point if values have different resolutions

4) When should you use binary fixed-point over decimal fixed-point? When should you use decimal fixed-point over binary fixed-point?

5) Give an example application (not mentioned in the book) for fixed-point. Describe the problem, and choose an appropriate fixed-point format. (no software implementation required).

6) Can we use floating point on the ARM Cortex M4? If so, what is the cost?

- Yes, there is a floating point unit

- Cost: Power to run FPU? Extra processing power when using FPU?