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EE445L Lab1 Report

Objective: There were to main objectives to this first lab. The first was to observe how fixed point can be stored and used to represent values depending on a fixed resolution. The second was to familiarize ourselves with the dimensions of the LCD display and how to print things onto it.

Software Design: Check GitHub
https://github.com/EE445L-FALL-2022/ECE445L-lab-1-ktong314

Analysis and Discussion:

1) **When should you use fixed-point over floating point? When should you use floating point over fixed point?**
   Fixed point should be used when dealing with extremely specific or precise numbers. Because the overall range is smaller, fixed-point can be used to represent extremely precise values. One example where fixed-point should be used is when transferring and saving large amounts money and errors cannot be tolerated.
   Floating point, while not as precise can represent a much larger range of values. When storing and transferring data with varying scales where the exact value can be rounded, floating point should be used over fixed point.
2) **Give an example application for fixed-point. Describe the problem and choose an appropriate fixed-point format.**
   An example as mentioned earlier is money, where the specific value is extremely important when it comes to calculating and accumulating costs. Another application of fixed point is using it to store and calculate mass. When constructing a building, the exact mass of various structures is important to how well the building will stand. The fixed point resolution could be 0.001 or to whatever resolution to is negligible for the building.
3) **Can we use floating point on the ARM Cortex M4? If so, what is the cost?**
   The ARM Cortex can use floating point because it has a single precision FPU. However this means it can use floating point in hardware. Software floating point would require a double precision FPU.