A) Objectives (1/2 page maximum)

B) Hardware Design (none for this lab)

C) Software Design (upload **fixed.h** **fixed.c main.c** files to Canvas as instructed by your TA)

D) Measurement Data (none for this lab)

E) Analysis and Discussion (1 page maximum). In particular, answer these questions

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

First off, it makes the system more straightforward and easier for debugging. Secondly, the more calls between modules, the higher the latency will be.

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.

Reduces computation power required therefore making the program faster

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

fixed-point over floating point: much faster

floating-point over fixed-point: more precise

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

Binary fixed-point: rescaling operations is done faster via bit shifts.

Decimal fixed-point: when fractional powers of ten is required.

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. The cost is that the arithmetic operations will be slower. Also, there is only single precision (“float”) and no double precision (“double”)