**CMSC B240 Computer Organization - Spring 2025**
**Lab Activity #5**

**LC-# Specs**

**Memory**

- Address space: _____

- Addressability: _____

**CPU**
    **ALU**
- Word Length: _____

- Operations: _____

- Registers: _____

    **Control Unit**
- Condition Codes: _____

- Address of next instruction is stored in: _____

- After fetching, an instruction is stored in: _____

**Input**
- Device: _____

- Registers: _____

**Output:**
- Device: _____

- Registers: _____

**Instruction Codes**

- ADD: 0001
- AND: 0101
- NOT: 1001
- LOAD: 0010
- BRANCH: 0000
- HALT: 1111

**LC3Tools**

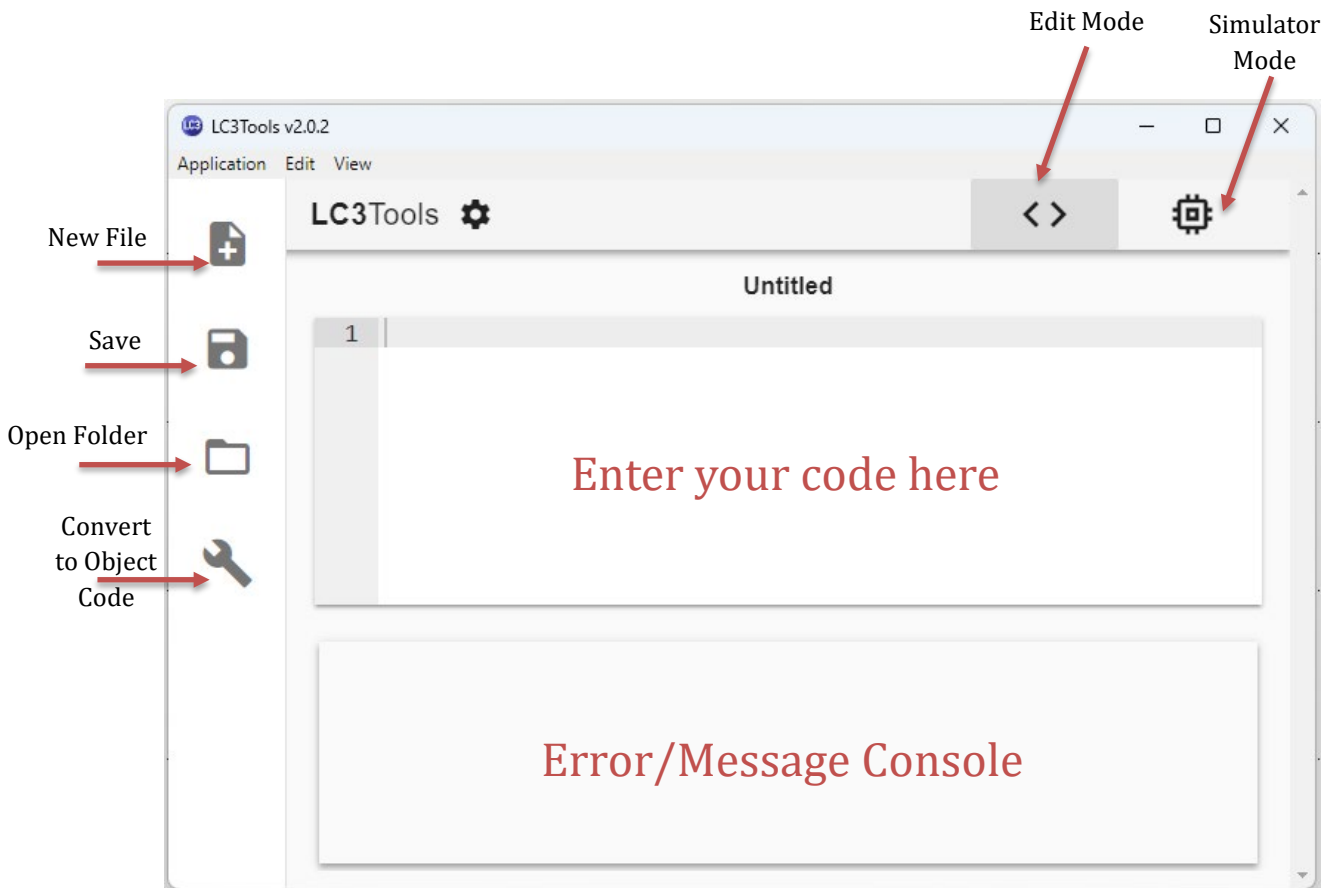Start the LC3Tools App. You will see the screen below:



**Figure 1: The LC-3 Startup Screen (in Edit Mode)**

Next, go ahead and enter the multiplication program and save it in the file: **multiply.bin** (you will need to navigate to the folder where you intend to store all your LC-3 programs).

The next step is to convert the program into machine code (object code). Press on the Tool icon to do the conversion. Any errors discovered will be reported on the Error Message Console. Or, you will get a successful conversion message. That implies that an object code file has been created in the same folder where you saved the source code (it will be called, **multiply.obj**).

Switch to **simulator mode** and you will get the screen shown in Figure 2.
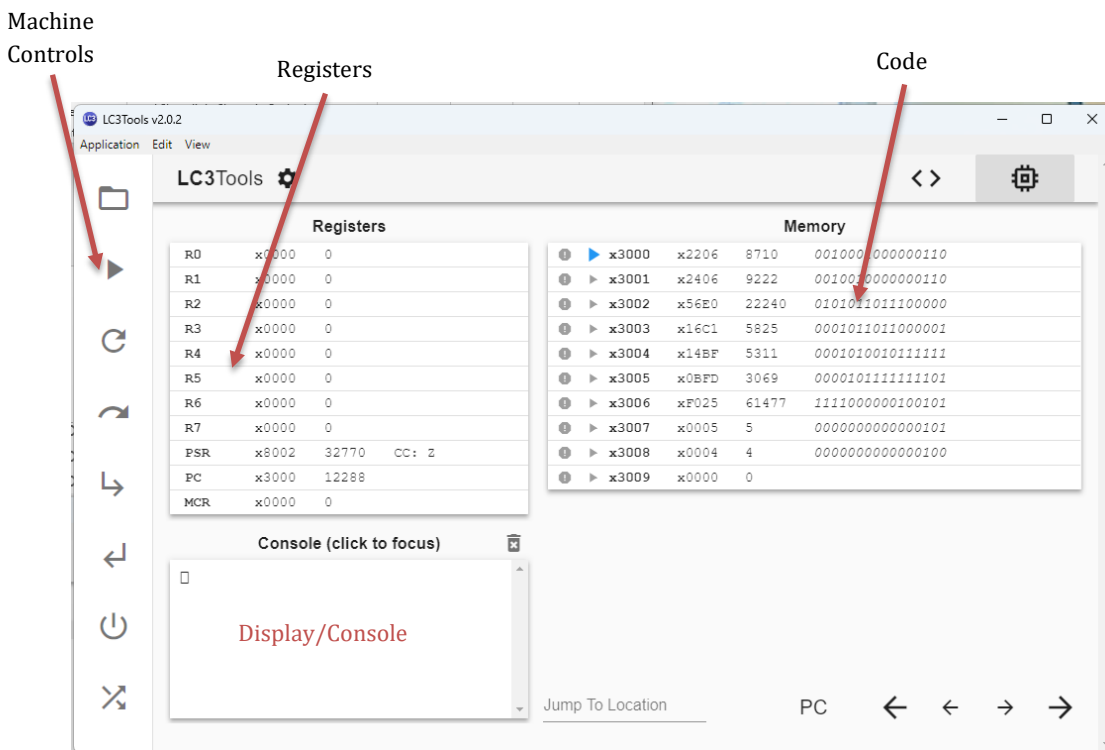
Machine
Controls

Registers

Code



**Figure 2: The LC-3 in Simulator Mode**

Go ahead and try to run the program as shown in class.

**Task:** Write an LC-3 Machine Language program to do integer division using repeated subtraction. That is, implement the code to do the following (as expressed in C/Java):

```
int A = 11;
int B = 3;
int Q = Ab/;       // Q will now be 3
int R = A%B;       // R will now be 2
```

First, write the algorithm (as we did for the multiplication program), then do register assignment, and then code the instructions. On paper. Review the program to make sure that you have coded it correctly. Then enter, run, and test it in the simulator.