

Lab 2

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Andrew O'Neil-Smith

Objective-

This lab's objective is to write an 8051 assembly program to calculate $(A+B)^2$ in two different ways.

Equipment used-

Software: a text editor and an 8051 ASM assembler

A step debugger that can be used to execute a program one step at a time

Register, code memory, data memory, and input/output port contents are displayed to aid debugging.

Flow Chart-

Test Results-

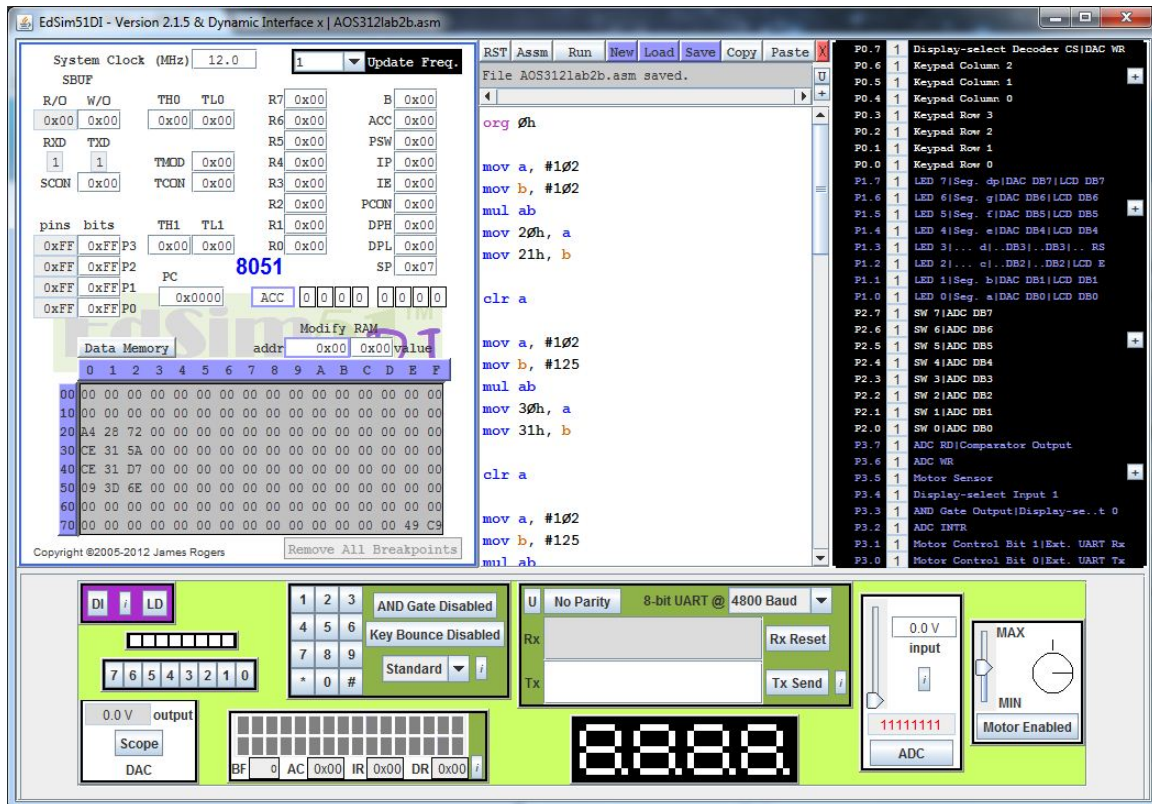
This screenshot shows that the first part of the given code was computed correctly, getting C949h.

The screenshot displays the EdSim51DI software interface, showing the execution of assembly code and the resulting hardware simulation. The main window is divided into several sections:

- System Configuration:** System Clock (MHz) is set to 12.0. The CPU registers are shown, with the Program Counter (PC) at 8051 and the Accumulator (ACC) at C949.
- Assembly Code:** The code being executed is:

```
org 30H
0030| mov B, #125
0033| CLR A
0034| ADD A, #102
0036| ADD A, B
0038| MOV B, A
003A| MUL AB
003B| MOV 20H, A
003D| MOV 21H, B
END
```
- Data Memory:** A table showing memory addresses from 00 to 70. The value at address 00 is C949, which is the result of the first instruction.
- Hardware Simulation:** The bottom section shows a simulated hardware environment with a keyboard, a display showing '8888', an ADC output of 11111111, and a motor control indicator.

This screen shows that our code computes C949h correctly, located in the bottom right corner of Data Memory.



Conclusion-

This lab required us to think in a non-conventional way to perform the proper order of operations. It helped me to understand how the 8051 does simple math, with the help of the ADDC function.

Program-

```
org 0h
;;A*A
mov a, #102
mov b, #102
mul ab
mov 20h, a
mov 21h, b
```


;;Lower of AB + lower Bsquared

mov a, 40h

add a, 50h

mov 42h, a

clr a

;;upper of AB + Lower Bsquared

mov a, 41h

addc a, 51h

mov 52h, a

clr a

;;Lower of final result

mov a, 22h

add a, 42h

mov 7Eh, a

clr a

;; Upper of final result

mov a, 32h

addc a, 52h

mov 7Fh, a

end