ELEG 3923 Microprocessor System Design

Lab 1 Introduction to 8051 Development Environment

Part 2 Hardware Development Environment

I. Objectives

- To understand the operation of register banks and stacks.
- To simulate 8051 programs with Keil uVision3.
- To load and run programs from 8051 hardware development kit.

II. Materials

- Keil uVision3 development environment.
- 8051 hardware development kit (MDE-8051)
- Jumper kit

III. Procedures

Activity 1. Register Banks.

1. Write a program to find the sum of 15H and 80H, and store the results in R2 of register bank 3. Record the contents of R2 and PSW, and explain the contents of R2.
2. Write a program to store 10H and FFH at R0 and R7 of all the four register banks by changing the values PSW.3 and PSW.4.
3. Write a program to store 10H and FFH at R0 and R7 of all the four register banks by directly using the address of the registers.

Activity 2. Stack.

1. Write and assemble a program to move the data 35H, 10H, 15H, 99H into R0 – R3. Push the data into stack, and then pop them up. Trace and record the contents of stack and SP register. (Are they in RAM or ROM? Which address range you should observe to get the contents of stack?)
2. Move the data 67H, 95H, 38H, 99H, 83H, 52H into RAM locations 09H, 0DH, 0CH, 08H, 0AH, 0BH, respectively. Draw a diagram to show the contents of the stack (register bank 1). Set SP = DH. According to the diagram, write the data in the order as they will be poped out of stack. Pop the contents to registers R0 – R5 in Register Bank 2, and verify your analysis with the simulator. (NOTE: the operand of PUSH and POP must be addresses, and you cannot use register name).

Activity 3. 8051 Hardware development kit

1. Load and execute program on 8051 hardware development kit by following the "ELEG 3923 Hardware Manual" posted on course website. Understand the sample program.
2. Write an assembly program to use the on-board switch to control the on-board LED. You need to use the jumper wire to connect the switch to P2, and the LED to P1.

IV. Questions

1. Upon reset, what is the value in the SP register? Upon pushing data onto the stack, the SP register is _____ (decremented, incremented). Upon popping data from the stack, the SP register is _____ (decremented, incremented).