LAB 2: Intel 8051 CPU PROGRAMMING
DATA MANIPULATION INSTRUCTIONS

OBJECTIVES

At the end of the laboratory works, you should be able to write simple assembly language programs for the Intel 8051 CPU using data manipulation instructions.

INTRODUCTION

The capability of a CPU depends on its data manipulation instructions which include the arithmetic, logical, rotate, and bit manipulation. Some of the arithmetic instructions are ADD, ADDC, SUBB, INC, DEC, MUL, DIV. The logical instructions are ANL, ORL, XRL.

Some of the rotate instructions are RL, RLC, RR, RRC, and SWAP. Bit manipulation deals with bit operations, and the instructions are SETB, CLR bit, and MOV bit.

EQUIPMENTS

1. A Personal computer installed with the MCU 8051 IDE Editor/Assembler/Simulator
2. Intel 8051 Trainer Board

PROCEDURE

All the programs in the exercises have to be written and assembled using the MCU8051IDE Assemble/simulator. To observe the results, the programs have to be compiled and executed in the Simulator. The contents of the affected registers and memory locations have to be examined through single stepping or breakpoints setting.

EXERCISES

1. Write and execute a program that adds data in R1 and R2. The result must be stored in R5. Comment on your results.

2. Write and execute a program that adds the four 8-bit numbers 10H, 5FH, B9H and CFH. The result must be stored in external memory location 1500H. Comment on your results.

3. Write and execute a program that will subtract 15H from F0H. Store the result in memory location 2000H and explain the results.

4. Write and execute a program that multiply 22H by 04H using MUL. Explain on the result obtained.

5. Write and execute a program that divides 02H by 50H using DIV. Explain on the result obtained.
6. Write and execute a program that logically AND the data in R4 with 55H. Put any data in R4 and explain on the result obtained.

7. Modify Part 6 to perform a logical OR for the same data. Execute the program and explain on the results obtained.

8. Load any data into R5. Rotate the data to the right twice. Execute the program and explain on the results obtained.