LAB 5
ARITHMETIC OPERATIONS II

OBJECTIVES:

➢ To write a program to convert data from hex to ASCII.
➢ To write a program to find the average of a set of hex data.

REFERENCES:

➢ Mazidi and McKinlay, "The 8051 Microcontroller and Embedded Systems," Chapters 6 or 7.

MATERIALS:

➢ 8051 assembler/C compiler and simulator.

ACTIVITY 1

Write a program to get a byte of hex data from P1, convert it to decimal, and then to ASCII. For example, if P1 has FBH, which is equal to 251 in decimal, after conversion we will have 32H, 35H, and 31H. Place the ASCII result in RAM locations starting at 40H. Using a simulator, single-step the program and examine the data.

ACTIVITY 2

Write a program to convert 4 bytes of hex data to ASCII and place the result in RAM locations starting at 50H. The hex data is stored in ROM starting at 150H. The data is stored as follows:

```
          ORG   150H
MYDATA:   DB    7FH,3CH,54H,2AH            ;pick your own data
```

Using a simulator, single-step the program and examine the data.

ACTIVITY 3

Write a program to find the average age of a group of children in a class. There are 12 children, ranging in age from 5 to 10 years old. Pick your own data. Notice that you must first bring the data from ROM space into the CPU's RAM and then add them together. Using a simulator, single-step the program and examine the data.

ACTIVITY 4

Write a program to find the average of the following numbers. Notice that they are ASCII and must be converted to BCD before the average is calculated.

```
          ORG 120H
MYDATA:   DB    '8','9','4','7','6','2','5'     ;pick your own data
```

Notice that you must first bring the data from ROM space into the CPU's RAM, then add them together. Using a simulator, single-step the program and examine the data.