8 Bit Arithmetic Operations using Trainer Kit

Ex No. : 1   Date: 02/02/2021

a. 8 bit Hexadecimal Addition

Aim:

  To write an assembly language program to implement 8 bit hexadecimal addition.

Algorithm:

  (a) Load input 1 into AL register
  (b) Load input 2 into BL register
  (c) Add the contents of AL & BL
  (d) Move the result from AL register into memory
  (e) Stop

Program:

MOV   AL,44H

MOV   BL,55H

ADD   AL,BL

MOV   [8500],AL

HLT

Table:

Memory	Label	Mnemonics	Operand	Opcode	Comments
8000		MOV	AL,44H	B0,44	Move 44H into AL register
8002		MOV	BL,55H	B3,55	Move 55H into BL register
8004		ADD	AL,BL	02,C3	Add the contents of AL&BL
8006		MOV	[8500],AL	A2,00,85	Move the sum from AL to memory
8009		HLT		F4	Stop

Sample input & output:

Input:

    Input 1--- 44H

    Input 2--- 55H

Output:

    [8500] --- 99

Result:

    Thus 8 bit hexadecimal addition has been performed successfully and the output is displayed.

b. 8 bit Hexadecimal Subtraction

Aim:

   To write an assembly language program to implement 8 bit hexadecimal subtraction.

Algorithm:

   (a) Load input 1 into AL register
   (b) Load input 2 into BL register
   (c) Subtract the contents of BL from AL
   (d) Move the result from AL register into memory
   (e) Stop

Program:

MOV   AL,55H

MOV   BL,44H

SUB   AL,BL

MOV   [8500],AL

HLT

Table:

Memory	Label	Mnemonics	Operand	Opcode	Comments
8000		MOV	AL,55H	B0,55	Move 44H into AL register
8002		MOV	BL,44H	B3,44	Move 55H into BL register
8004		SUB	AL,BL	2A,C3	Subtract BL from AL
8006		MOV	[8500],AL	A2,00,85	Move the contents of AL to memory
8009		HLT		F4	Stop

Sample input & output:

Input:

    Input 1--- 55H

    Input 2--- 44H

Output:

    [8500] --- 11

Result:

    Thus 8 bit hexadecimal subtraction has been performed successfully and the output is displayed.

c. 8 bit Hexadecimal Multiplication

Aim:

    To write an assembly language program to implement 8 bit hexadecimal multiplication.

Algorithm:

    (a) Load input 1 into AL register
    (b) Load input 2 into BL register
    (c) Multiply the contents of AL and BL
    (d) Move the result from AX register into memory
    (e) Stop

Program:

```
MOV   AL,22H
MOV   BL,01H
MUL   BL
MOV   [8500],AX
HLT
```

Table:

Memory	Label	Mnemonics	Operand	Opcode	Comments
8000		MOV	AL,22H	B0,22	Move 22H into AL register
8002		MOV	BL,01H	B3,01	Move 01H into BL register
8004		MUL	BL	F6,E3	Multiply contents of AL&BL
8006		MOV	[8500],AX	A3,00,85	Move the product from AX to memory
8009		HLT		F4	Stop

Sample input & output:

Input:

    Input 1--- 22H

    Input 2--- 01H

Output:

    [8500] --- 22

    [8501] --- 00

Result:

    Thus 8 bit hexadecimal multiplication has been performed successfully and the output is displayed.

d. 8 bit Hexadecimal Division

Aim:

To write an assembly language program to implement 8 bit hexadecimal division.

Algorithm:

(a) Load 00H into AH register
(b) Load input 1 into AL register
(c) Load input 2 into BL register
(d) Divide the contents of AX by BL
(e) Move the quotient from AL register into memory
(f) Move the remainder from AH to memory
(g) Stop

Program:

```
MOV   AH,00H
MOV   AL,55H
MOV   BL,01H
DIV   BL
MOV   [8500],AL
MOV   [8501],AH
HLT
```

Table:

Memory	Label	Mnemonics	Operand	Opcode	Comments
8000		MOV	AH,00H	C6,C6,00	Move 00H into AH register
8002		MOV	AL,55H	B0,55	Move 55H into AL register
8005		MOV	BL,01H	B3,01	Move 01H into BL register
8007		DIV	BL	F6,F3	Divide AX by BL
8009		MOV	[8500],AL	A2,00,85	Move quotient from AL to memory
800C		MOV	[8501],AH	88,26,01,85	Move remainder from AH to memory
8010		HLT		F4	Stop

Input:

    AH --- 00H

    Input 1(AL) --- 55H

    Input 2(BL) --- 01H

Output:

    [8500] --- 55 (Quotient)

    [8501] --- 00 (Remainder)

Result:

    Thus 8 bit hexadecimal division has been performed successfully and the output is displayed.