Assembly language Programming

Applications

- With out the assembly language programming microprocessor can not works. Instructions are the patterns which is require by the microprocessor to done any task.

Program-1

Statement : Store the data byte 32H into memory location 4000H.

MVI A, 32H : Store 32H in the accumulator

STA 4000H : Copy accumulator contents at addres s 4000H HLT : Terminate program execution

Program

LXI H : Load HL with 4000H MVI M : Store 32H in memory location pointed by HL register pair (40 00H)

HLT : Terminate program execution

Program-2 Addition of two number

- MVI A, 24H :load Reg ACC with 24H
- MVI B , 56H : load Reg B with 56H
- ADD B : ACC= ACC+B
- OUT 01H :Display ACC contents on port 01H
- HALT : End the program
- Result: 7A (All are in Hex)
- DAA operation for Decimal Adjust A+6=10H

Program.3. Exchange the contents of memory locations 2000H and 4000H

- LDA 2000H : Get the contents of memory location 2000H into accumulator
- MOV B, A : Save the contents into B register
- LDA 4000H : Get the contents of memory location 4000Hinto accumulator
- STA 2000H : Store the contents of accumulator at address 2000H
- MOV A, B : Get the saved contents back into A register
- STA 4000H : Store the contents of accumulator at address 4000H

Program 4. Subtract the contents of memory location 4001H from the memory location 2000H and place the result in memory location 4002H.

Program - Subtract two 8-bit numbers

Sample problem:

(4000H) = 51H

(4001H) = 19H

Result = 51H - 19H = 38H

Source program:

LXI H, 4000H : HL points 4000H

MOV A, M : Get first operand

INX H : HL points 4001H

SUB M : Subtract second operand

INX H : HL points 4002H

MOV M, A : Store result at 4002H.

HLT : Terminate program execution

Program 5.Add the 16-bit number in memory locations 4000H and 4001H to the 16-bit number in memory locations 4002H and 4003H. The most significant eight bits of the two numbers to be added are in memory locations 4001H and4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.

(4000H) = 15H (4001H) = 1CH

(4002H) = B7H

(4003H) = 5AH

Result = 1C15 + 5AB7H = 76CCH

(4004H) = CCH

(4005H) = 76H

Continue

- LHLD 4000H : Get first I6-bit number in HL
- XCHG : Save first I6-bit number in DE
- LHLD 4002H : Get second I6-bit number in HL
- MOV A, E : Get lower byte of the first number
- ADD L : Add lower byte of the second number
- MOV L, A : Store result in L register
- MOV A, D : Get higher byte of the first number
- ADC H : Add higher byte of the second number with CARRY

- MOV H, A : Store result in H register
- SHLD 4004H : Store I6-
bit result in memory locations 4004H and 4005H.
- HLT : Terminate program execution

Program.6:Subtract the 16-bit number in memory locations 4002H and 4003Hfrom the 16-bit number in memory locations 4000H and 4001H. The most significant eight bits of the two numbers are in memory locations 4001H and 4003H.Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H

Sample problem :

(4000H) = 19H

(400IH) = 6AH (4004H) = I5H (4003H) = 5CH

Result = 6A19H - 5C15H = OE04H (4004H) = 04H

(4005H) = OEH

Continue

Source program:

- LHLD 4000H : Get first 16-bit number in HL
- XCHG : Save first 16-bit number in DE
- LHLD 4002H : Get second 16-bit number in HL
- MOV A, E : Get lower byte of the first number
- SUB L : Subtract lower byte of the second number
- MOV L, A : Store the result in L register
- MOV A, D : Get higher byte of the first number
- SBB H : Subtract higher byte of second number with borrow
- MOV H, A : Store l6-
  bit result in memory locations 4004H and 4005H.
- SHLD 4004H : Store l6-
  bit result in memory locations 4004H and 4005H.
- HLT : Terminate program execution

Program.7:Find the l's complement of the number stored at memory location4400H and store the complemented number at memory location 4300H.

Sample problem: (4400H) = 55H
Result = (4300B) = AAB Source

program:

- LDA 4400B : Get the number
- CMA : Complement number
- STA 4300H : Store the result
- HLT : Terminate program execution

Program.8:Multiply two 8-bit numbers stored in memory locations 2200H and2201H by repetitive addition and store the result in memory locations 2300H and2301H

Sample problem:

(2200H) = 03H (2201H) = B2H

Result = B2H + B2H + B2H = 216H = 216H

(2300H) = 16H

(2301H) = 02H

Continue

Source program

- LDA 2200H
- MOV E, A
- MVI D, 00 : Get the first number in DE register pair
- LDA 2201H MOV C, A : Initialize counter
- LX I H, 0000 H : Result = 0
- BACK: DAD D : Result = result + first number
- DCR C : Decrement count
- JNZ BACK : If count 0 repeat
- SHLD 2300H : Store result
- HLT : Terminate program execution

Scope of research

- Develop the new method which is require less running time, less memory space and also have less no of instructions.