Microprocessor, Assembly Language & Computer Interfacing Sessional

EEE-3212

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Lab-8:

Problem – Write an assembly language program to solve this equation (a*b)+(c*d) result will be store in location 2008H location. Where

a=1

b=2

c=3

d=4

Program

LDA 2000 ;a=1

MOV B,A

LDA 2001;b=2

MOV D,A

MVI A,00

L1: ADD B;A=a*b

DCR D

JNZ L1

MOV C,A

LDA 2002 ;c=3

MOV B,A

LDA 2003 ;d=4

MOV D,A

MVI A,00

L2: ADD B ;A=c*d

DCR D

JNZ L2

ADD C ;A=(a*b)+(c*d)

STA 2008 ;result store

HLT

8085 program to the factorial of a number.

Problem Write an assembly language program for calculating the factorial of a number using the 8085 microprocessor.

Example –

Input: 04H
Output: 18H

as 04*03*02*01
= 24 in decimal
=> 18H

Program

```
LDA 2000

MOV B,A

MVI D,01H

LOOP1: CALL MULT

DCR B

JNZ LOOP1

STA 2001

HLT
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```
MULT: MOV E,B

MVI A,00

LOOP2: ADD D

DCR E

JNZ LOOP2

MOV D,A

RET
```

ALGORITHM

1. Load the data into register B

2. To start multiplication set D to 01H

3. Jump to step 7

4. Decrements B to multiply previous number

5. Jump to step 3 till value of B>0

6. Take memory pointer to next location and store result

7. Load E with contents of B and clear accumulator

8. Repeatedly add contents of D to accumulator E times

9. Store accumulator content to D

10. Go to step 4

EXPLANATION –

1.First set register B with data.

2.Set register D with data by calling MULTIPLY subroutine one time.

3.Decrement B and add D to itself B times by calling MULTIPLY subroutine as 4*3 is equivalent to 4+4+4 (i.e., 3 times).

4.Repeat the above step till B reaches 0 and then exit the program.

5.The result is obtained in D register which is stored in memory

Calculate the sum of a series of even numbers

Problem: Calculate the sum of a series of even numbers

Example –

2500 H = 4
2501 H = 20
2502 H = 15
2503 H = 13
2504 H = 22
Result = 2505 = 20+22= 42H

Program

1.LDA 2500H
2.MOV C, A   : "Initialize counter"
3.MVI B, 00H   : "sum = 0"
4.LXI H, 2501H   : "Initialize pointer"
5.BACK: MOV A, M : "Get the number"
6.ANI 01H   : "Mask Bit l to Bit7"
7.JNZ SKIP   : "Don't add if number is ODD"
8.MOV A, B   : "Get the sum"
9.ADD M   : "SUM = SUM + data"
10.MOV B, A   : "Store result in B register"
11.SKIP: INX H   : "increment pointer"
12.DCR C   : "Decrement counter"
13.JNZ BACK   : "if counter 0 repeat"
14.MOV A, B   :
15.STA 2505H   : "store sum"
16.HLT   : "Stop"

A number is said to be odd if its lower bit is 1 otherwise even. Therefore to identify whether the number is even or odd, we perform AND operation with 01 by the help of **ANI** instruction. If number is odd then we will get 01 otherwise 00 in accumulator. **ANI** instruction also affect the flags of 8085. Therefore if accumulator contains 00 then zero flag becomes set otherwise reset.

8085 program to count total even numbers in series of 10 numbers

Problem: Write 8085 Assembly language program to count number of even numbers in a block of data, where the block size is 10. The block is starting from location 2000H.

Example –

Input	
2000	2
2001	1
2002	4
2003	3
2004	5
2005	6
2006	7
2007	10
2008	12
2009	9

Output	
20010	5

Labels	Mnemonics	Comments
	LXI H,8000H	Point to the starting byte
	MVI C,0AH	Initialize count to 0AH
	MVI B, 00H	Clear B register
LOOP	MOV A,M	Load the item from memory
	ANI 01H	AND A with01H
	JNZ SKIP	If Z = 1, jump to skip
	INR B	Increase B by1
SKIP	INX H	Point to next location
	DCR C	Decrease C by1
	JNZ LOOP	if Z = 0, goto loop
	MOV A, B	Load the count to A
	STA 8050H	Store the result at 8050H
	HLT	Terminate the program

Thank You