Experiment No.1

Aim :- Write assembly language program to add two 8-bit (hexadecimal) Numbers. The numbers are storage at memory location 1000H and 1001H. Store the result at memory location 1002H.

Example :- i) Numbers are 09H and 01H.
ii) Numbers are 11H and 22H.

Given data :- i) 1000H – 09H / 11H
ii) 1001H – 01H / 22H
iii) 1002H – Result

Assembly Language Program :-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
1003		LXI	H,1000H	21	Get Address of 1st No. in HL-pair
1004				00	
1005				10	
1006		MOV	A,M	7E	Get 1st No. in accumulator
1007		INX	H	23	Increment HL pair by 1
1008		ADD	M	86	Add 1st and 2nd No.
1009		STA	1002H	32	Store sum in 1002H
100A				02	
100B				10	
100C		HLT		76	Stop the Program

Result :- After execution of program, Addition of two numbers, result is formed to be
i) 0AH in memory location in 1002H
ii) 33H in memory location in 1002H

- E N D-

Experiment No.2

Aim :- Write assembly language program to Subtract two 8-bit (hexadecimal) Numbers. The numbers are Store at memory location 1000H and 1001H. Store the result at memory location 1002H.

Example :- i) Numbers are 09H and 01H.
ii) Numbers are 22H and 11H.

Given data :- i) 1000H – 09H
ii) 1001H – 01H
iii) 1002H – Result

Assembly Language Program :-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
1003		LXI	H,1000H	21	Get Address of 1st No. in HL-pair
1004				00	
1005				10	
1006		MOV	A,M	7E	Get 1st No. in accumulator
1007		INX	H	23	Increment HL pair by 1
1008		SUB	M	96	Subtract 1st No. from 2nd No.
1009		STA	1002H	32	Store Result in 1002H
100A				02	
100B				10	
100C		HLT		76	Stop the program

Result :- After execution of program, subtraction of two numbers, result is formed to be
i) 08H in memory location in 1002H
ii) 11H in memory location in 1002H

Experiment No.3

Aim :- Write assembly language program to find smaller/greater of two numbers

Example :- i) Numbers are 84H and 99H.

Given data :- i) 1000H – 84H
ii) 1001H – 09H
iii) 1002H – Result

Assembly Language Program :-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
1003		LXI	H,1000H	21	Get address of 1st No.in HL-pair
1004				00	
1005				10	
1006		MOV	A,M	7E	Get 1st No.in accumulator
1007		INX	H	23	Increment HL pair by 1
1008		CMP	M	BE	Add 1st and 2nd No.
1009		JNC	AHEAD	D2	Store sum in 1002H
100A				0D	
100B				10	
100C		MOV	A,M	7E	End program
100D	AHEAD:	STA	1002H	32	
100E				02	
100F				10	
1010		HLT		76	

Result :- After execution of program, greatest number 84H was found at memory location 1002 H

***Note:*-JCN instruction when replaced with JC instruction gives smallest of two numbers.**

- E N D-

Experiment No.4

Aim :- Write an assembly language program to convert of memory location C000 H to an ASCII character memory location C000 contains a single hexadecimal digit. Store result at location C001 H

Input :- (C000) = 0C

Assembly Language Program :-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
1000		LDA	C000	3A	Get DATA
1001				00	
1002				C0	
1003		CPI	10	FE	is DATA 10 OR MORE
1004				0A	
1005		JC	ASCZ	DA	Jump if carry
1006				0A	
1007				10	
1008		ADI	'A'-'9'-'1'	C6	Yes add offset
1009				07	
100A	ASCZ:	ADI	'O'	C6	Add offset for ASCII
100B				30	
100C		STA	C001	32	Store ASCII result
100D				01	
100E				C0	
100F		HLT		76	

Result :- If [C000] = 0C then Result = [C001] = 43

- E N D -

Experiment No.5

Aim :- Write ALP to add all the BCD numbers in a block from 1000 H to 8008 H . Store Sum at memory location 100A H. [Assume sum is 8 bit]

Input : -

1000 H = 01	1003 H = 01	1006 H= 01
1001 H = 01	1004 H = 01	1007 H = 01
1002 H = 01	1005 H = 01	1008 H = 01

100A H= RESULT

Assembly Language Program :-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
100B		LXI	H,1000H	21	; HL pair at starting address
100C				00	
100D				10	
100E		MVI	C,09H	0E	; Register C as counter
100F				09	
1010		XRA	A	AF	; Clear Accumulator
1011	UP:	ADD	M	86	;[A] + [H][L] → [A]
1012		DAA		27	; Decimal Addition
1013		INX	H	23	
1014		DCR	C	0D	;Decrement Loop counter by 1
1015		JNZ UP		C2	; Go up until C=0
1016				11	
1017				10	
1018		STA 100AH		32	;Store BCD sum at memory 100A H
1019				0A	
101A				10	
101B		HLT		76	; Halt

Result : - BCD addition was found at location 100A H and was = 09

Experiment No. 6

Aim : -Write an ALP to copy block of four consecutive bytes storage from 1000 H to 1003 H. Transfer the entire block to new location from C004 H. .

Input :-1000 = 11H C004 H = result
1001 = 22H C005 H = result
1002 = 33H C006 H = result
1003 = 44H C007 H = result

Assembly Language Program:-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
1009		LXI	H,1000H	21	;Load HL Register Pair
100A				00	
100B				10	
100C		LXI	B,C004H	01	;Load BC Register Pair
100D				04	
100E				C0	
100F		MVI	C,04H	0E	; Set Counter as 04
1010				04	
1011	BACK:	MOV	A,M	7E	; Get first number in Accumulator
1012		STAX B		02	; Store the content of A to Memory
1013		INX H		23	; Increment the register pair
1014		INX B		03	; Increment the register pair
1015		DCR C		0D	; Decrement Counter by 1
1016		JNZ BACK		C2	; if Z=0 the perform loop
1017				10	
1018				10	
		HLT		76	;Stop the Program

Result :-

After execution of program the data in memory block 1000H – 1003 H was copied from 1004 H to 1007 H as follows

1000 = 11H 1004 H = 11 H
1001 = 22H 1005 H = 22 H
1002 = 33H 1006 H = 33 H
1003 = 44H 1007 H = 44 H

-E N D -

Experiment No. 7

Aim :- A block of data is stored in memory location from 1000H to 1004H. Write an assembly language Program to shift the data contain of block in reverse order storing from memory location C005H.

Input :-

1000H = 01H 1003H = 04H
1001H = 02H 1004H = 05H
1002H = 03H

Assembly Language Program:-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
100AH		LXI	H, 100AH	21	;Set up H – L pair as pointer to source
100BH				04	
100CH				10	
100DH		LXI	D, C005H	11	;Set up DE as a pointer to destination
100EH				05	
100FH				C0	
1010H		MVI	C, 05H	0E	;Set up counter C = 05
1011H				05	
1012H	TOP:	MOV	A, M	7E	;Get data from memory
1013H		STAX	D	12	;Store it at desetination
1014H		DCX	H	2B	;Decrement source Pointer
1015H		INX	D	13	;Increment D
1016H		DCR	C	0D	;Decrement count
1017H		JNZ	TOP	C2	;Jump is count is not zero
1018H				12	
1019H				10	
101AH		HLT		76	;Stop

Result :- After execution of program number are found 05, 04,03,02,01 in successive memory location C005H

- E N D -

Experiment No. 8

Aim :- Write an ALP to count total number occurrences of data bytes 9CH in a memory block of length 10 bytes starting from 1000H. Store the count in register E.

Input :-

1000H = 11H	1003H = 44H	1006H = 9CH	1009H = 77H
1001H = 9CH	1004H = 9CH	1007H = 66H	
1002H = 33H	1005H = 55H	1008H = 9CH	

Assembly Language Program:-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
100AH		LXI	H, 1000H	21	;Set up H – L pair as pointer to source
100BH				00	
100CH				10	
100DH		MVI	C,0AH	0E	;Set counter as 10 number
100EH				01	
100FH		MVI	E,00H	1E	; Initialize E reg. as 00H
1010H				00	
1011H		MVI	A,9CH	3E	; Initialize A reg. as 9CH
1012H				9CH	
1013H	TOP:	CMP	M	BE	; Compare the content of memory with content of A.
1014H		JNZ	DOWN	C2	; if Z= 1 then increment the content of reg. E
1015H				18	
1016H				10	
1017H		INR	E	IC	
1018H	DOWN:	INX	H	23	; Increment of HL reg. pair
1019H		DCR	C	0D	;Decrement the counter
101AH		JNZ	TOP	C2	;If Z= 0 perform loop
101BH				13	

101CH			10	
101DH		HLT	76	;Stop the program

Result :- After execution of program count in register E was 04H

- E N D -

Experiment No. 9

Aim :- A block of data is stored in memory location from 1000H to 1002H. Another block is stored from 1003H to 1005H. Write an ALP to exchange these two block of data with each other.

Input :-

1000H = 11H 1003H = 44H
1001H = 9CH 1004H = 9CH
1002H = 33H 1005H = 55H

Assembly Language Program:-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
100AH		LXI	H, 1000H	21	;Set up HL pair as pointer to source
100BH				00	
100CH				10	
100DH		LXI	D, 1003H	11	;Set up DE pair as pointer to destination
100EH				03	
100FH				10	
1010H		MVI	C,03H	0E	; Set counter
1011H				03	
1012H	TOP:	MOV	A,M	7E	; Transfer no. in Acc.
1013H		MOV	B,A	47	; Copy Acc into B reg.
1014H		LDAX	D	1A	; Load Acc from memory (DE)
1015H		MOV	M,A	77	; Copy Acc to memory (HL)
1016H		MOV	A,B	78	;Copy Reg. B to reg. A
1017H		STAX	D	12	; Store the content of Acc. Into memory
1018H		INX	H	24	; Increment the HL
1019H		INX	D	14	; Increment the DE
101AH		DCR	C	0D	; Decrement the C reg.

101BH		JNZ TOP	C2	; If Z= 0 perform loop
101CH			12	
101DH			10	
101EH		HLT	76	; Stop the Program

Result :- After execution of program the content of two block are exchange.

- E N D -

Experiment No. 10

Aim :- Write an ALP the divide one byte Hexadecimal number, when dividend is stored in memory location 1000H and divisor is stored in memory location 1001H. Store the quotient and reminder in memory location 1002H and 1003H

Input :-

1000H = 24H Dividend
1001H = 02H Divisor

Assembly Language Program:-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
100AH		LXI	H, 1000H	21	;Set up HL pair as pointer to source
100BH				00	
100CH				10	
100DH		MVI	C,00H	0E	; Set C reg. as 00
100EH				00	
100FH		MOV	A,M	7E	; Get dividend in Acc.
1010H		INX	H	23	; Increment HL Reg.
1011H	UP:	CMP	M	BE	; Compare the Acc. With Memory
1012H		JC	DOWN	DA	; If C= 0 the down
1013H				1A	
1014H				10	
1015H		SUB	M	12	; Perform subtraction
1016H		INR	C	0C	; Increment C Reg.
1017H		JMP	UP	C3	; jump to the top
1018H				11	
1019H				10	
101AH	DOWN:	INX	H	23	; Increment HL Reg.
101BH		MOV	M,C	71	; Copy content of C to Memory

101CH		INX H	23	; Increment HL Reg.
101DH		MOV M,A	77	; Copy content of A to Memory
101EH		HLT	76	; Stop the Program

Result :- After execution of program the content of 1002H = 12H and 1003H = 00H.

- E N D -

Experiment No. 11

Aim :- Write an ALP that interchange digits of number stored at location 1000H and stores the result at 1001H. Also perform the original number and the interchanged number and store the result at location 1002H

Input :-

1000H = 23H 1002H – 55H
1001H = 32H

Assembly Language Program:-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
100AH		LXI	H, 1000H	21	;Set up HL pair as pointer to source
100BH				00	
100CH				10	
100DH		MOV	A,M	7E	; Copy the content of memory to Acc.
100EH		RRC		0F	;Rotate the content
100FH		RRC		0F	;of the accumulator
1010H		RRC		0F	;4 times
1011H		RRC		0F	;Right side
1012H		INX	H	23	; Increment the HL
1013H		MOV	M,A	77	; Store interchange in memory
1014H		DCX	H	2B	; Decrement HL
1015H		ADD	M	86	; Perform the original number with interchanged number
1016H		STA	1002H	32	; Store the result at memory
1017H				02	
1018H				10	
1019H		HLT		76	; Stop the Program

101AH				

Result :- After execution of program the content of 1002H = 55H.

- E N D -

Experiment No. 12

Aim :- Write an ALP to count the number of odd data bytes occurring a block of data stored from location 1001h to 1004H. Store the result at location 1005H

Input :-

1000H = 01H 1002H = 03H 1004H = 05
1001H = 04H 1003H = 06H 1005H = result

Assembly Language Program:-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
100AH		LXI	H, 1000H	21	;Set up HL pair as pointer to source
100BH				00	
100CH				10	
100DH		MVI	C,05H	0E	; Set Counter as 05
100EH				05	
100FH		MVI	B,00H	06	; Initialize reg B = 0
1010H				00	
1011H	TOP:	MOV	A,M	7E	; Get first number in Acc
1012H		RRC		0F	; Rotate the content of Acc right
1013H		JNC	DOWN	D2	; if C= 0 then down
1014H				17	
1015H				10	
1016H		INR	B	04	; if C=1 then increment the content of reg B
1017H	DOWN:	INX	H	23	; Increment the HL reg.pairs
1018H		DCR	C	0D	; Decrement the reg. C
1019H		JNZ	TOP	C2	; If Z= 0 then goto TOP
101AH				11	
101BH				10	

101CH		MOV A,B	78	; Store the result at
101DH		STA 1005H	32	; the memory location
101EH			05	; 1005 H
101FH			10	
1020H		HLT	76	; Stop the Program

Result :- After execution of program the content of 1005H = 03H.

- E N D -

Experiment No. 13

Aim :- Write an ALP to count the number of ONE'S in an 8bit hexadecimal number stored at 1000H. Store the result at location 1001H

Input :-

1000H = 98H => 10011000
1001H = 03H

Assembly Language Program:-

Memory location	Label	Mnemonics		Hex Code	Comments
		Opcode	Operand		
100AH		LXI	H, 1000H	21	;Set up HL pair as pointer to source
100BH				00	
100CH				10	
100DH		MVI	C,08H	0E	; Set Counter as 05
100EH				08	
100FH		MVI	B,00H	06	; Initialize reg B = 0
1010H				00	
1011H		MOV	A,M	7E	; Get first number in Acc
1012H	TOP:	RRC		0F	; Rotate the content of Acc right
1013H		JNC	DOWN	D2	; if C= 0 then down
1014H				17	
1015H				10	
1016H		INR	B	04	; if C=1 then increment the content of reg B
1017H	DOWN:	INX	H	23	; Increment the HL reg.pairs
1018H		DCR	C	0D	; Decrement the reg. C
1019H		JNZ	TOP	C2	; If Z= 0 then goto TOP

101AH			12	
101BH			10	
101CH		MOV A,B	78	; Store the result at
101DH		STA 1001H	32	; the memory location
101EH			01	; 1005 H
101FH			10	
1020H		HLT	76	; Stop the Program

Result :- After execution of program the content of 1001H = 03H.

- E N D -