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Assembly Language Programing (PART 2)**

Label	Mnemonics+ operand	Comments
LOOP	DCR D JZ end INX H JMP Start	; Decrement the D reg. by 1 ; if D = 0 then go to end. ; Increment the HL pair by 1. ; Again go to start.
	MOV A, C STA 4070 H	; Transfer content of reg. C to acc. ; Store result at 4070 H.
END	RST 1	; stop processing.

- 66) Write a program segment to find the largest number in a series. The length of the series is stored at 2500H and the numbers are stored from 2501H. Store the result at 2405H.

Ans :

Label	Mnemonics+ operand	Comments
START	LXI H, 2500 H MOV C, M SUB A	; address for count ; count in reg. C ; clear accumulator
LOOP	INX H CMP M JNC AHEAD No	; Address of next memory ; compare with previous no is it greater ? ; No larger is in ACC go to AHEAD.
AHEAD	MOV A, M DCR C JNZ loop	; get larger no in acc ; decrement counter ; not over series ? go to loop.
END	STA 2450 H HLT	; store the result at 2450 H ; stop processing.

- 67) Trace the following program and write the purpose of the program : (October, 2007)

Ans. :

Label	Mnemonics+ operand	Comments
	LXI H, 2500H	; Load HL pair by 2500 H
	MVI B, 01H	; Load immediate register B by 01
	MOV A, M	; Take data from memory to accumulator
	CMA	; Complement the accumulator contents
	ADD B	; Add 01 to accumulator
	INX H	; Increment HL by 1
	MOV M, A	; Transfer content of accumulator to memory
	HLT	; Stop

Ans : The purpose of this program is to find 2's complement of a number stored at 2500 H and to store at result at 2501 H.

68) Sixteen bytes of data are stored in memory locations at C050H to C05FH. Transfer the entire block of data to new memory location starting at C070H. **October 2007**

Ans :

Label	Mnemonics+ operand	Comments
START	LXI H, C050H	; Set up HL as a pointer to source.
	LXI D, C070 H	; Set up DE as a pointer to destination.
	MVI B, 10H	; Set up B to count 16 bytes.
	MOV A, M	; get data byte from memory.
NEXT	STAX D, M	; store data byte at destination.
	INX H	; increment source pointer.
	INX D.	; increment destination pointer
	DCR B	; decrement count
	JNZ NEXT	; if not zero, go back
END	HLT	; Stop processing.

69) Write an assembly language program to copy a block of data having starting address 2000H to a new destination with starting address 3000H. Length of the block is stored at 1FFFH. **Mar 2009**

Ans :

Label	Mnemonics+ operand	Comments
START	LDA 1FFF	; Copy block length into accumulator
	MOV H, A	; Copy block length from accumulator to Reg H
	LXI B, 2000 H	; Initialise BC pair to starting address of source location
	LXI D, 3000 H	; Initialise DE pair to starting address of destination location
NEXT	LDAX B	; Copy number from source memory location to accumulator
	STAX D	; Copy number from accumulator to destination memory location
	INX B	; Increment source memory pointer contents by one
	INX D	; Increment destination memory pointer contents by one
	DCR H	; Decrement counter by one to count number of transfers
	JNZ Next	; Repeat steps if all data still remain to be copied.
END	HLT	; Stop processing

- 70) A block of data is stored in memory starting from memory location D0071H. The length of the block is stored at memory location D000H. Write an assembly language program to sort the contents of block in ascending order. **(March, 2008)**

Ans.:

Label	Mnemonics+ operand	Comments
Start	MVI B, 00 H LXI H, D000 H MOV C, M INX H MOV A, M DCR C INX H CMP M	; Initialise register B with data 00. ; Initialise H - L pair ; Store the length of block in register C ; Increment H - L pair 1 ; Move contents of memory to accumulator ; Decrement count ; Increment H - L pair ; Compare the contents of accumulator and first memory location. ; Jump to label dn if contents of accumulator is less than that of memory location.
Up	JC dn	; Move contents of memory to register D ; Move contents of accumulator to memory location ; Decrement HL register pair ; Move contents of register D to memory location ; Increment HL register pair ; Load immediate data 01H to register B ; Decrement the counter stored in register C ; Go to label up, if the counter C has not reached zero ; Decrement register B by unity ; Is zero ? Yes go to label start ; Stop processing
dn	MOV D, M MOV M, A DCX H MOV M, D INX H MVI B, 01 H DCR C INZ Up DCR B JZ Start HLT	

- 71) Write an assembly language program to exchange the two hexadecimal digits of a number stored at memory location 2500H. Store the new number at memory location 2501H. **(March, 2008)**

Ans.:

Label	Opcode Operand	Comments
	LXI H 2500 H MOV A M RRC RRC RRC RRC RRC INX H MOV M A HLT	; Initialise H - L pair memory address 2500H. ; Get the number in accumulator ; Rotate accumulator to right ; Increment H - L pair ; Store contents of accumulator to memory ; Stop processing

- 72) A block of data is stored in memory locations from C080H. Length of block is stored at C07FH. Write an assembly language program that searches for the first occurrence of data byte ABH in the given block. Store the address of the occurrence in HL register pair. If number is not found, then HL register pair must contain FFFFH.

(March.2008)

Ans :

Label	Opcode Operand	Comments
START	LDA C07F H	; Copy block length into accumulator
	MOV C, A	; Copy block length from accumulator to Reg C
	LXI H, C080 H	; Load H - L pair with starting address
	MVI A, AB H	; Initialise search element (AB) in register A
UP	CMP M	; Compare number in memory to the number ABH in accumulator
	JZ end	; Number in memory is AB ? Yes jump to end.
	INX H	; Increment H - L pair
	DCR C	; Decrement contents of block length counter Reg C
	JNZ UP	; Repeat all steps until all locations are checked
	LXI H, FFFF H	; Load H - L pair with address FFFF H
END	HLT	; Stop processing

- 73) Write an assembly language program to perform the multiplication of two eight bit numbers where multiplicand is stored at memory location 2501H and 2502H. Multiplier is stored at 2503H. Result is to be stored at memory location 2504H and 2505H.

(March. 2008)

Ans :

Label	Opcode Operand	Comments
START	LHLD 2501 H	; Get multiplicand in H - L pair
	XCHG	; Multiplicand in D - E pair
	LDA 2503 H	; Multiplier in accumulator
	LXI H, 0000 H	; Initial value of produce equal to 0000 in H - L pair
	MVI C, 08 H	; Count equal to 8 in register C
UP	DAD H	; Shift partial product left by one bit
	RAL	; Rotate multiplier left by one bit
	JNC dn	; Is carry ? No, jump to lable dn
	DAD D	; Product = Product + Multiplicand
dn	DCR C	; Decrement counter stored in register C
	JNZ UP	; Jump, if no zero to label up
	SHLD 2504 H	; Store the result in 2504 and 2505 H
END	HLT	; Stop processing

- 74) Write a sub-routine to fill the memory locations 2800H to 28FFH with the hexadecimal numbers 00H to FFH respectively. **(March, 2008)**

Ans:

Label	Opcode Operand	Comments
START	LXI H, 2800 H	; Initialise H - L pair with starting address
	MVI A, 00 H	; Load accumulator with data 00
	MVI B, FF H	; Count in Register B
UP	MOV M, A	; Copy the data 00H in memory location 2800H
	INX H	; Increment H - L pair
	INR A	; Increment the contents of accumulator by one
	DCR B	; Decrement counter
	JNZ UP	; Count = 0 ? No jump to label up
END	HLT	; Stop processing

- 75) Write an assembly language program to find how many times data BCH appears in a memory block D050H to D059H. Store the count in register C. **(October, 2008)**

Ans :

Label	Opcode Operand	Comments
START	LXI H, D050H	; Initialize H-L pair to memory address D050H
	MVI A, BCH	; Move immediate the data BCH to accumulator
	MVI B, 0AH	; Initialize register B to store the Count.
	MVI C, 00H	; Initialize the register C to 00H.
X2	CMP M	; Compare the Contents of memory location with the data present in accumulator
	JNZ X1	; Jump to label X1 if it is not Zero.
	INR C	; Increment the register C by 1
X1	INX H	; Increment HL - pair by 1
	DCR B	; Decrement register B by 1
	JNZ X2	; Is not Zero ? Jump to label X2.
END	HLT	; Stop processing

- Write an assembly language program to find the largest number in a block of data starting from the address 3500H. Length of the block is stored at memory location address 34FFH . Store the result at address 4500H . **(October 2008)**

Label	Opcode Operand	Comments
START	LXI H, 34FFH	; Initialize HL - pair with address 34FFH
	MOV C, M	; block length in register C
	SUB A	; Initialize accumulator with 00H
L2	INX H	; Increment HL pair by 1

Label	Opcode Operand	Comments
	CMP M	; Compare the next number with accumulator
	JNC L1	; Number in accumulator greater? Yes, jump to L1
	MOV A, M	; No, Bring the greater number in accumulator
LI	DCR C	; Decrement Count
	JNZ L2	; Count = 0 ? No jump to label L2
	STA 4500 H	; Store largest at location 4500 Hq
END	HLT	; Stop processing

- 77) Write an assembly language program to add two BCD numbers stored at locations 3500H and 3501H. Place the BCD result in location 3502H and onward with LSB first. **(Oct. 2008)**

Ans :

Label	Opcode Operand	Comments
START	LXI H, 3500H	; Initialise HL pair to memory address 3500 H
	MVI B, 00H	; Initialise register to store MSB of sum
	MOV A, M	; Move first number in accumulator
	INX H	; Get address of next number
	ADD M	; Add next number to accumulator
	DAA	; Decimal adjust accumulator
	JNC L1	; Is Carry ? No, jump to label L1
	INR B	; Increment register B
L1	INX H	; Increment HL pair by 1
	MOV M, A	; Store LSB of Sum in memory
	MOV A, B	; Move MSB of Sum in accumulator
	INX H	; Increment HL pair by 1
	MOV M, A	; Store MSB of Sum in memory
END	HLT	; Stop processing

- 78) Write an assembly language program to subtract the number stored in memory location 3601H from the number stored in memory location 3600H. Store positive result at location 3602H. **(March 2002, Oct. 2008)**

Ans :

Label	Opcode Operand	Comments
START	LXI, H, 3600 H	; Initialise HL pair to memory address 3600H
	MOV A, M	; Move memory Content to accumulator
	INX H	; Increment HL pair by 1
	SUB M	; Subtract memory Content from accumulator
	JP LOOP	; If result is positive jump to LOOP
	CMA	; Complement the contents of accmulator

Label	Opcode Operand	Comments
LOOP	ADI 01	; Take 2's complement by adding 1.
	INX H	; Increment HL pair by 1
END	MOV M, A	; Store the result in memory location
	HLT	; Stop processing

79) Write an assembly language program to divide a byte stored at location 2050H by a non zero byte stored at location 2051H. Place the quotient at memory location 2052H and the remainder at location 2053H. **(October 2008)**

Ans :

Label	Opcode Operand	Comments
START	MVI C, 00H	; Intialise Contents of register C to Zero
	LXI H, 2050H	; Load the HL pair with the address of the dividend
LOOP	MOV A, M	; Copy dividend from memory to accumulator
	INX H	; Make HL pair point at the address of the divisor
	CMP M	; Compare the divisor to the accumulator Contents
	JC NEXT	; If the divisor is smaller than the accumulator contents, then jump to NEXT to copy results to memory
NEXT	INR C	; Increment Contents of register C by unity
	SUB M	; Subject the divisor from accumulator Contents
	JMP LOOP	; Unconditionally jump to LOOP to Continue process
	INX H	; Increment HL Contents by Unity to point at 2052H
	MOV M, C	; Copy quotient from register C to memory location 2052 H.
	INX H	; Increment HL contents by Unity to point of 2053 H.
END	MOV M, A	; Copy remainder from accumulator to memory to memory 2053 H.
	HLT	; Stop processing

80) Write an assembly language program to transfer a block of data stored in memory location from D100H to D1FFH in reverse order in new memory location starting at D200H. **(Oct. 2008)**

Ans :

Label	Opcode Operand	Comments
START	LXI H, D1FFH	; Intialise HL pair with address for last location of Source block
	LXI B, D200H	; Initialise BC pair with address for first location of destination block
	MOV D, L	; Get the count in Register D.

Label	Mnemonics/Operands	Comments/Remarks
MI	MOV A, M	; Get the number of accumulator
	STAX B	; Store the number of address pointed to by B-C pair
	DCX H	; Decrement HL pair
	INX B	; Increment B-C pair
	DCR D	; Decrement Count
	JNZ MI	; Is Count Zero? No, jump to label MI
END	HLT	; Stop processing

- 81) Write an assembly language program to exchange 8 bit number stored in memory location 4000 H. Store new number at memory location 4001 H. (March - 2009)

Ans :

Label	Mnemonics/Operands	Comments/Remarks
	LXI H,4000H	; Load the HL pair at 4000
	MVI C, 08 H	; Set counter for 8 bit
	MOV A, M	; Take number in acc
UP	RRC	; Rotate the contents of accumulator
	DCR C	; Decrement count
	JNZ UP	; Is not zero ? go to up
	STA 4001 H	; Store result
	HLT	; Stop processing

- 82) Write assembly language program to find sum of all the numbers stored in a memory block. Block starts from 2C05H and length of the block is at 2C04H. Store the sum at 2C03H. (Oct. 2009)

Ans :

Label	Mnemonics/Operands	Comments/Remarks
START	LXI H, 2C04H	; HL pair points to length
	MOV C, M	; length moves to Register C
	SUB A	; Initialize sum = 0
UP	INX H	; Increment pointer by 1
	ADD M	; Add accumulator with content
	DCR C	Decrement length by 1
	JNZ UP	; is not zero, repeat
	STA 2C03H	; Store sum to 2C03H
	HLT	; Stop

83) Write assembly language program to divide all the numbers of a block by 2. Block is from 4000H to 4009 H. **(Oct. 2009)**

Ans :

Label	Mnimonics/Operands	Comments/Remarks
START	LXI H, 4000 H	; Initialize HL pair by 4000 as a pointer to block
	MVI C, 0AH	; Set Counter Register by 0A
UP	MOV A, M	; Move the byte from memory to accumulator
	RRC	; Divide accumulator by 2
	MOV M, A	; MOV the result from accumulator to memory
		; DCR C Decrement counter by 1
	JNZ UP	; is not zero, repeat
	HLT	; stop

84) Write assembly language program to count number of one (1) in 8 bit number which is stored at 208BH. **(Oct. 2009)**

Ans :

Label	Mnimonics/Operands	Comments/Remarks
START	LDA 208BH	; Load accumulator by operand
	MVI C, 08H	; Initialize counter C by 08H
	MVI E, 00H	; Initialize counter E by 00H
UP	RRC	; Check for one
	JNC SKIP	; Is digit is zero, SKIP does not increment count
	INR E	; Is digit I increment count
SKIP	DCR C	; Decrement counter C by 1
	JNZ UP	; is not zero, repeat
	HLT	; Stop.

85) Write assembly language program to fill memory block from 2000H to 2009 H with data BBH and 44H alternately. **(Oct.2009)**

Ans :

Label	Mnimonics/Operands	Comments/Remarks
START	LXI H, 2000H	; Set HL pair at starting address
	MOV C, 0AH	; Register C as counter
	MVI A, BBH	; Copy BBH to Accumulator
UP	MOV M, A	; Copy [A] to Memory Location
	CMA	; Complement Accumulator to get 44H
	INX H	; get next address
	DCR C	; Decrement counter by one
	JNZ, UP	; is counter is zero? No Go [UP]
	HLT	; Yes stop processing

- 86) Write assembly language program to find smallest number in a memory block. Block starts from 2600H . Length of the block is at 25FFH. Store the smallest number in register E. (October 2009)

Ans :

Label	Mnimonics/Operands	Comments/Remarks
START	LXI H, 25FFH	; Store the length
	MOV C, M	; in Register C
	INX H	; Get starting address
	DCR C	
	MOV A, M	; Copy first number in accumulator
	MVI E, 00	; Register E = 00
UP	INX H	; Go to next number address
	CMP M	; Compare two numbers
	JC DN	; is number in accumulate is smaller? Yes then Jump to (DN)
	MOV A, M	; No copy smaller number to accumulator
DN	DCR C	; Decrement C by one
	JNZ UP	; Jump to (UP) until C becomes zero
	MOV E, A	; Store the result in Register E
	7HLT	; Stop

- 87) Write assembly language program to arrange two numbers stored at 1201 H and 1202 H in descending order. (October 2009)

Ans :

Label	Mnimonics/Operands	Comments/Remarks
START	LXI H, 1201H	; Copy number stored at
	MOV B, M	; 1201 to Register B
	INX H	; HL pair pointing at 1202 H
	MOV A, M	; Copy number at 1202H to Accumulator
	CMP B	; Compare two numbers
	JC END	; are they in order? Yes jump to (END)
	MOV M, B	; Contents of 1201 are at 1202H
	DCX H	; HL pair at 1201H
	MOV M, A	; Contents of 1202 are at 1201
END	HLT	; Stop

- 88) Write a program in assembly language to find greatest number among a contents of block of memory which starts from D001H, the length of block is stored at D000H. Store the greatest number at the end of block. **(March - 2010)**

Ans :

Label	Mnemonics	Comments
START	LXI, D000H	; Load HL with D000H
	MOV C, M	; Move (M) to Reg. C
	DCR C	; Decrement C by 1
UP	MOV A, M	; Move (M) to ACC
	INX H	; Increment HL by 1
	CMP M	; Compare (M) with ACC
	JNC DOWN	; Jump if No Carry to DCR C
	MOV A, M	; Move (M) to ACC
DOWN	DCR C	; Decrement C by 1
	JNZ UP	; Jump if No Zero to MOV A, M
	INX H	; Increment HL by 1
	MOV M, A	; Move [A] to memory
	HLT Stop	; Stop

- 89) Write a program in assembly language to sum the series. Stored from D001, length of series is at D000H. Store result from D100H. **(March - 2010)**

Ans :

Label	Mnemonics	Comments
START	LXI H, D000H	; Load HL with D000H
	MOV C, M	; Move (M) to Reg. C
	MVI A, 00H	; Move 00 to ACC
	MVI B, 00H	; Move 00 to Reg. B
L2	INX H	; Increment HL
	ADD M	; Add (M) to ACC
	JNC L1	; Jump if No Carry to L1
	INR B	; Increment B
L1	DCR C	; Decrement C
	JNZ L2	; Jump if No Zero to L2
	LXI H D100H	; Move D 100 to HL
	MOV M, A	; Store LSBs of sum to D100H
	INX H	; Increment HL
	MOV M, B	; Store MS Bs
	HLT	; Stop

- 90) Write a program in assembly language to subtract contents of memory location D001H from the contents of memory location D00H. Store absolute difference at D002H.

(Mar. - 2010)

Ans :

Label	Mnemonics	Comments
	LXI H, D001 H	; Load HL with the D000H
	MOV A, M	; Move (M) to ACC
	INX H	; Increment HL by 1
	SUB M	; Subtract (M) from (A)
	JNC L1	; Jump if No carry to L1
	CMA	; Compliment ACC
	INR A	; Increment ACC
L1	INX H	; Increment HL by 1
	MOV M	; Move [A] to Memory
	HLT	; Stop

- 91) Give appropriate comments to the following program :

(March - 2010)

Label	Mnemonics	Comments
	STC	
	CMC	
	MVI A,08H	
	LXI H, D001H	
LOOP	MOV M, A	
	INX H	
	DCR C	
	JNZ LOOP	
	HLT	

Ans :

Label	Mnemonics	Comments
	STC	; Set Carry
	CMC	; Complimentary Carry
	MVI A, 08H	; Move immediate 08 to ACC
	MVI C, 0AH	; Move immediate 0AH to C register
	LXI H, D001H	; Load with Doo1H
LOOP	MOV M, A	; Move [ACC] to Memory
	INX H	; Increment HL by 1
	DCR C	; Decrement C by 1
	JNZ LOOP	; Jump if No Zero to Loop
	HLT	; Stop

- 92) There is block of memory stored from D001H, the length of block is stored at memory location D000H. Write a program in assembly language to check, whether contents of these blocks are in sequence (consecutive) or not. (March - 2010)
If contents of blocks are in sequence (consecutive) then memory location D100H should contain 00H, else FFH.

Ans :

Label	Mnemonics	Comments
L2	LXI H, D000H	; Load HL with D000H
	MOV C, M	; Move [M] to C
	DCR C	; Decrement C
	INX H	; Increment HL by 1
	MOV A, M	; Move [M] to ACC
	INR A	; Increment ACC
	INX H	; Increment HL by 1
	CMP M	; Compare [A] with memory
	JNZ L1	; Jump if No Zero to L1
	DCR C	; Decrement C
	JNZ L2	; Jump if No Zero to L2
	LXI H D100H	; Load HL with D100H
	MVI M, 00H	; Move 00 to Memory
	JMP L3	; Jump to L3
L1	LXI H, D00H	; Load HL with D100
	MVI M, FFH	; Move FF to Memory
L3	HLT	; Stop

- 93) Trace the following program and show contents of the following by filling blanks : (Mar. 2010)

Lable	Mnemonics
	MVI A, 05H
	LXI H, D001H
	MVI C, 05H
LOOP	MOV M, A
	DCR A
	INX H
	DCR C
	JNZ LOOP
	HLT

[D005] = _____

[A] = _____

[C] = _____

Reg. H = _____

Reg. L = _____

Ans : Trace program and show contents of the following by filling the blanks :

[D005] = 01H

[A] = 00H

[C] = 00H

Reg. H = D0H

Reg. L = 06H

94) A series of numbers are stored in memory locations from C001H to C008H. Write a program in assembly language to find largest number among these numbers. Store largest number in memory location C009H. **(October 2010)**

Ans :

Label	Mnemonics	Comments
LOOP	LXI H C001H	; Set HL Pair to C001H
	MVI A 00 H	; Largest = 00 H
	MVI C 08 H	; Set count = 08H
	CMP M	; Compare with previous no. Is it greater ?
	JNC AHEAD	; No. large in Acc. go to AHEAD
AHEAD	MOV A M	; Get large in Acc.
	INX H	; Increment HL pair
	DCR C	; Decrement count
	JNZ LOOP	; Repeat if count \neq 0
	MOV M A	; Store large in C009H
	HLT	; Stop

95) Write an assembly language program to count number of times the data A4H is found in a block of memory locations starting from 4000H. Length of block is stored in location 3FFFH. Store result in -location 5000H. **(October 2010)**

Ans :

Label	Mnemonics	Comments
LOOP	LXI H, 3FFFH	; Load HL pair with 2FFFH
	MOV C, M	; Get count in C reg.
	INX H	; Increment HL Pair
	MOV A, M	; Get no. in Acc.
	CPI A4H	; Check A4 with Acc.
	JNZ NEXT	; if number not found, then jump to NEXT
	INR B	; Store count in B

Label	Mnemonics	Comments
	DCR C	; Decrement count
	JNZ LOOP	; Repeat loop if count \neq 0
	MOV A, B	; Store count in Acc.
	STA 5000 H	; Store result At 4000H
	HLT	; Stop

96) Write an assembly language program to fill memory locations 3000H to 30FFH with the hexadecimal numbers 00H to FFH respectively. **(October 2010)**

Ans:

Label	Mnemonics	Comments
	LXI H, 3000H	; Initialize HL pair with starting address
	MVI A, 00H	; A = 0
	MVI B, FFH	; Count in reg. B
UP	MOV M, A	; Copy data 00H in 3000H
	INX H	; Increment HL pair
	INR A	; Increment content in A by 1.
	DCR A	; Decrement count
	JNZ UP	; Jump to label up if count is not zero
	HLT	; Stop

97) Write an assembly language program to copy a block of data having starting address 7900H to the new location 9100H. The length of block is stored at memory location 78FFH. **(October 2010)**

Ans:

Label	Mnemonics	Comments
	LXI H, 78FFH	; Load HL pair with 78FFH
	LXI D, 9100H	; Starting address of destination
	MOV C, M	; Move count in Reg. C
	INX H	; Increment HL Pair
LOOP	MOV A, M	; Transfer memory to Acc.
	STA X D	; Store Acc. to new location
	INX H	; Increment HL Pair
	INX D	; Increment DE Pair
	DCR C	; Decrement count
	JNZ LOOP	; Jump to loop if count is not zero
	HLT	; Stop

98) A block of data is stored in memory locations from D001 H The length of block is stored in memory location D000H. Write a program in assembly language that searches for first occurrence of data 11 H in given block. Store address of this occurrence in H-L pair. If the number is not found, then H-L. pair should contain 0000H. **(October 2010)**

Ans :

Label	Mnemonics	Comments
LOOP	LXI H, D000H	; Load HL pair with D000H
	MOV C, M	; Move count in Reg. C
	MVI A, 11H	; Set Acc. = 11H
	INX H	; Increment HL Pair
	CMP M	; Compare memory and Acc.
	JZ ESCAPE	; If memory location in block =11, then jump
	DCR C	; Decrement count
	JNZ LOOP	; Repeat if count \neq 0
ESCAPE	LXI H, 0000H	; Set HL pair to 0000H if number found
	HLT	; Stop

- 99) A Hex number is stored at location C000H. Write an assembly language program to interchange its digit. The new number is to be stored at C001H. Add original number with new number and store result at location C010H. (October 2010)

Ans :

Label	Mnemonics	Comments
	LXI H, C000H	; Load HL pair with C000H
	MOV A, M	; Move number in Acc.
	RRC	; Rotate right one bit four times for nibble exchange
	RRC	
	RRC	
	RRC	
	RRC	
	STA C001 H	; Store no. in C001 H
	ADD M	; Add original number with exchange
	STA C010H	; Store result in C010H
	HLT	; Stop

- 100) Write an Assembly Language Program to separate nibbles of a number stored at memory location 2000H. Multiply separated nibbles and store result. (March 2011)

Ans :

Label	Mnemonics	Comments
	LXI H, 2000H	; set HL = 2000H
	MOV A, M	; move memory to A
	MOV B, M	; move memory to B
	ANI 0FH	; get lower nibble
	MOV C, A	; store it in C
	MOV A, B	; get B to A

Label	Mnemonics	Comments
	ANI F0H	; get higher nibble
	RRC	; Rotate A to right without Carry
	RRC	
	RRC	
	RRC	
	MOV D, A	; Store it in D
	MVI A, 00H	; clear A
rep	ADD D	; add A and D
	DCR C	; decrement C
	JNZ rep	; jump, if no zero to rep.
	STA 4000H	; store A at 4000H
	HLT	; stop program

- 101) Write a program in Assembly Language. to transfer a block of data from 1050 to 1059 to memory location whose starting address is 1070H. **(March 2011)**

Ans :

Label	Mnemonics	Comments
	MVI H, 0AH	; set H = 0AH
	LXI B, 1050H	; set BC = 1050 H
	LXI D, 1070H	; set DE= 1070H
rep	LDAX B	; get 1050H contents
	STAX D	; store at 1070 H
	INX B	; increment BC
	INX D	; increment DE
	DCR H	; decrement H
	JNZ rep	; jump, if no zero to rep
	HLT	; stop program

- 102) Write an Assembly Language Program to count number of even data bytes occurring in a block starting from memory location C030H to C039H. **(March 2011)**
Store result at the memory location C040H.

Ans:

Label	Mnemonics	Comments
	LXI H, 2000H	; set HL = 2000H
	MVIC, 00H	; clear C reg
	MVI B, 0AH	; set B = 0AH
	LXI H, C030H	; set HL = C030H
rep	MOV A, M	; get M to A
	RRC	; rotate A to right
	JC next	; jump, if carry to next
	INRC	; increment C

Label	Mnemonics	Comments
next :	INX H	; increment HL
	DCR B	; decrement B
	JNZ rep	; jump, if no zero to rep.
	MOV A, C	; get C to A
	STA C040H	; store A at C040 H
	HLT	; stop program

- 103) Write an Assembly Language Program to exchange position of digit of number stored at C040H. Multiply original number with the exchanged number, the result to be stored at memory location starting from C041H onwards.

(March 2011)

Ans :

Label	Mnemonics	Comments
rep	MVI C, 00H	; clear C register
	LXI H, C040H	; HL = C040H
	MOV A, M	; get M to A
	MOV B, M	; get M to B
	RRC	} ; rotate A ; to right ; without carry ;
	RRC	
	RRC	
	RRC	
	MOV D, A	; get A to D
	MVI A, 00H	; clear A
	ADD D	; add A and D
	JNC next	; jump, if no carry to next
	INR C	; increment C
	next DCR B	; decrement B
	JNZ rep	; jump, if no zero to rep.
	INX H	; increment HL
	MOV M, A	; get A to M
	INX H	; increment HL
	MOV M, C	; get C to M
	HLT	; stop program

- 104) Write an Assembly Language program to add two 16 bit numbers. The numbers are stored at memory location C030H and C031H, and the second number stored at C032H and C033H. Store result at memory location C034H and C035H. Store final carry at C036H.

(March 2011; July 18)

Ans. :

Label	Mnemonics	Comments
	MVI A, 00H	; clear A
	LHLD C030H	; load HL directly
	XCHG	; exchange HL and DE
	LHLD C032H	; load HL directly
	DAD D	; double add HL and DE
	JNC next	; jump, if no carry to next
	INR A	; increment A
next	SHLD C034H	; store HL directly
	STA C036H	; store A at C036H
	HLT	; stop program

- 105) Write a program in assembly language to find the position of a data 05H in a block of memory D001H to D005H. If data is found then store the position of data at memory location D100H else store 00H at the same memory location. (Oct. 2011)

(Note : It is assumed that data 05 may present only at once.)

Label	Mnemonics	Comments
	MVI A, 05 H	; more immediate data 05H to Acc.
	MVI C, 05 H	; move immediate data 05H to Reg. C
	MVI D, 01 H	; move immediate data 01H to reg. D
	LXI H, D001H	; Load HL with D001H
UP	CMP M	; compare memory content with Acc.
	JZ NEXT	; jump if zero to label NEXT
	INX H	; increment HL pair
	INR D	; increment DE pair
	DCR C	; Decrement C reg.
	JNZ UP	; jump if No zero to label UP
	LXI H, D100H	; Load HL with D100H
	MVI M, 00H	; move 00 to memory location D100H
NEXT	IMP L1	; jump to halt
	LXI H, D100 H	; Load HL with D100 H
L1	MOV M, D	; move contents in D to D100 H
	HLT	; stop

- 106) Write a program in assembly language to double the contents of block of memory from D001H to D00AH. Store the doubled contents at same memory locations.
(Note : It is assumed that contents are not exceeding 0FH.) **(Oct. 2011, July 2019)**

Ans. :

Label	Mnemonics	Comments
LOOP	MVI C, 0AH	; move count 0A to reg. C
	LXI H, D001 H	; Load HL with D001 H
	MOV A, M	; move no. in block to Acc.
	RAL	; Rotate accumulator left
	MOV M, A	; Move Acc. content to memory
	INX H	; increment HL pair 11-'
	DCR C	; Decrement count
	JNZ LOOP	; jump to label LOOP for next no
	HLT	; stop

- 107) Write a program to exchange the two nibbles, stored at 2500H. Store the exchanged it at number at 2501H. **(Oct. 2011)**

Label	Mnemonics	Comments
	LXI H, 2500 H	; Load HL with 2500 H
	MOV A, M	; Get no. in 2500 H to Acc.
	RRC	; Rotate 4 times to exchange nibble
	RRC	
	RRC	
	RRC	
	INX H	; increment HL pair to point 2501 H
	MOV M, A	; move Acc. contents to 2501 H
	HLT	; stop

- 108) Write a assembly language program to copy the contents of a block of memory which is from 2501H to 2505H, to another block begins from 3501H. **(Oct. 2011)**

Ans. :

Label	Mnemonics	Comments
LOOP	MVI C, 05 H	; Load block count 05H in C reg.
	LXI H, 2501 H	; Load HL with 2501 H
	LXI D, 3501 H	; Load DE with 3501 H
	MOV A, M	; Move no. pointed by HL to Acc.
	STAX D	; Store Acc. to memory pointed by DE.
	INX H	; increment HL pair
	INX D	; increment DE pair
	DCR C	; Decrement block count
	JNZ LOOP	; jump to exchange next no.
	HLT	; stop

- 109) There are two blocks of memory, one is from 2,501H to 2505H. Another is from 3501H to 3505H. Write a program in assembly language to check whether contents of these two blocks are exactly same or not. **(Oct. 2011)**
 If contents are same then memory location D100H should contain 00H else FFH.

Ans.:

Label	Mnemonics	Comments
L2	MVI C, 05 H	; Load block count 05 H in C reg.
	LXI H, 2501 H	; Load HL with 2501 H
	LXI D, 3501 H	; Load DE with 3501 H
	LDAX D	; Load Acc. by memory pointed by DE
	CMP M	; Compare-data pointed by HL pair with Acc.
	JNZ L1	; jump if no. is not same to label L1
	INX H	; increment HL pair
	INN D	; increment DE pair
	DCR C	; Decrement count
	JNZ L2	; if count is not zero then jump to L2
	LXI H, D100 H	; Load HL with D100 H
L1	MVI M, 00 H	; Load 00H in memory D100 H
	DAP L3	; jump to stop
	LXI H, D100 H	; Load HL with D100 H
	MVI M, FFH	; store FFH in memory D100 H
	HLT	; stop

- 110) Write a program in assembly language to rotate the content of memory location D000H toward left by one bit position and add original contents with rotated number and store the result from D001H. **(Oct. 2011)**

Ans.:

Label	Mnemonics	Comments
LOOP	MVI C, 00 H	; Clear C reg. To store MSB
	LXI H, D000 H	; Load HL with D000H
	MOV A, M	; move no. in Acc,
	MOV B, A	; move no. in Acc. to B reg.
	RAL	; Rotate accumulator left through carry
	ADD B	; Add Acc. i.e. rotated no. with B reg.
	JNC LOOP	; jump if no carry to LOOP

- 111) An 8 bit number is stored in memory location 4400H. Write an assembly language program to count 'Zero' in the given. number. Store count in memory location 4500H. **(March 2012)**

Ans. :

Label	Mnemonics	Comments
	MVI C, 08 H	; Get rotational count in Reg. C
	MVI B, 00 H	; Initialize Reg. B rare
	LXI H, 4400 H	; Load HL with 4400 H
	MOV A, M	; take no. in Accumulator
UP	RRC	; Rotate Acc. right by 1 bit s:
	JC Down	; is carry? Yes then jump to label Down
	INR B	; Count no. of zero in Reg. B ..
Down	DCR C	; Decrement test count
	JNZ UP	; is zero? No then jump to label UP
	MOV A, B	; Get count in Acc.
	STA 4500	; Store zero count in 4500 H
	HLT	; stop

- 112) A series of numbers are stored in memory locations from C001H to C008 H. Write a program in assembly language to find smallest number among these numbers. Store smallest number in memory location C009H. **(March 2012)**

Ans. :

Finding of smallest Number

Label	Mnemonics	Comments
LOOP	LXI H, C001 H	; Set HL to C001 H
	MVI A, FF H	; smallest = FF H = Acc.
	MVI C, 08 H	; set count = 08 H
	CMP M	; Compare, is smallest
	JC AHEAD	; if smallest in A then jump to label AHEAD
	MOV A, M	; Get smaller no. in A reg.
	INX H	; increment HL pair
	DCR C	; Decrement count
	JNZ LOOP	; Repeat if count # 0
	MOV M, A	; store smallest no. in C009 H
	HLT	; stop

- 113) Write an assembly language program to counter number of odd data byte occurring in a block starting from memory location A001H to A0FFH. Store result in memory location B000H. **(March 2012)**

Ans.: Count No. of odd data in a block

Label	Mnemonics	Comments
LOOP	MVI H, A001 H	; Load HL with A001 H
	MVI C, FF H	; store count FF in reg. C
	MVI B, 00 H	; set B = 0 for count
	INX H	; increment HL pair 'll.
	MOV A, M	; move no. in Acc.
	RRC	; Rotate right to check odd
AHEAD	JNC AHEAD	; if no carry i.e. if no. is even then jump to label AHEAD
	INR B	; if carry, increment count
	DCR C	; if carry, increment count
	JNZ LOOP	; Decrement test count ,,
	MOV A, B	; if count # 0 then jump to label LOOP
	STA B000H	; store count in Acc.
	HLT	; store result in B000H
		; stop

114) Hex number is stored at location ABOOH. Write an assembly language program to interchange its digit. The new number is to be stored at ABO1H. Add original number with new number and store result at location ABCDH. (March 2012)

Ans.: Interchange given no. and add with previous no.

Label	Mnemonics	Comments
	LXI H, A1300 H	; Load HL with ABOO H i.e. given no.
	MOV A, M	; Get given no. in Acc.
	RRC	} ; Rotate 4 times to exchange nibbles of given no.
	RRC	
	RRC	
	RRC	
	INX H	; Increment HL pair to point AB01 H
	MOV M, A	; Store exchanged no. in AB01 H
	DCX H	; Decrement HL pair to point AB00 H
	ADD M	; Add exchanged and previous no.
	STA ABCD	; Store result in ABCD
	HLT	; Stop

115) Write an assembly language program to add two BCD numbers stored at locations. AB00H and AB01H. Place BCD result in location ABO2H and onwards starting with LSB. (March 2012)

Ans.: Add two BCD number

Label	Mnemonics	Comments
	LXI H, AB00 H	; Load HL with AB00 H
	MVI B, 00 H	; Store MSB of sum in reg. B
	MOV A, M	; Move no. in Acc.
	INX H	; increment HL pair
	ADD M	; Add no. in AB00 H with AB01 H
	DAA	; Decimal adjust accumulator
	JNC GO	; is carry ? no then jump to label GO
	INR B	; Increment reg. B
GO	STA AB02 H	; Store LSB of sum in location AB02 H
	MOV A, B	; Get MSB in accumulator
	STA AB03 H	; Store MSB of sum in location AB03 H
	HLT	; Stop

- 116) Write a program in assembly language to find 2's Complement of 8 bit number stored in memory location C000H. Store result at memory location. C001H.

(March 2012)

Ans.: 2's complement of 8 bit number

Label	Mnemonics	Comments
	LXI H, C000H	; Load HL with C000 H
	MOV A, M	; Get no. in Acc.
	CMA	; Complement given number
	INR A	; increment A reg. By 1 to get 2's complement
	INX H	; increment HL pair
	MOV M, A	; place result in C001 H
	HLT	; stop

- 117) Write an Assembly Language Program to multiply the given BCD data at location C050H and C051H. Store the result in C060H and C061H respectively.

(Oct. 2012)

Ans.:

Label	Mnemonics	Comments
	MVI A, 00H	; clear Accumulator
	MVI C, 00H	; clear c reg
	LXI H, C050H	; initialize HL with C050 H
	MOV B, M	; Get data from m to B

Label	Mnemonics	Comments
	INX H	; increment HL by 1
UP	ADD M	; Add m with A
	DAA	; Decimal adjust Accumulator
	JNC Next	; Jump if no carry to next
	INR C	; increment C reg
Next	DCR B	; Decrement B reg
	JNZ UP	; jump if no zero to up
	LIX A, CO60H	; Initialize HL pair
	MOVM,A	; Get data from A to m
	INX H	; Increment HL by 1
	MOV M , C	; Get data from c to m
	HLT	; stop

- 118) Write a program in assembly language that converts a BCD number stored at C030H to its Hexadecimal Equivalent. Store the hexadecimal result in C031H. **(Oct. 2012)**

Ans. :

Label	Mnemonics	Comment
	LXI H, C030 H	; Initialize HL pair with co30 H
	MOV A, M	; Get data from M to A
	MOV B M	; Get data from M to B
	ANI OF H	; Logical AND with Accumulator
	MOV C, A	; Get data in C
	MOV A, B	; Get data from B to A
	ANI F0 H	; Logical AND with Accumulator
	RRC	} ; Rotate Accumulator four times right
	RRC	
	RRC	
	RRC	
	MOV D, A	; Get data from A to D
	MVI A, 00H	; clear Acc
	MVI E, 0A H	; set E = 0AH
UP	ADD D	; Add D with A
	DCR E	; Decrement E

Label	Mnemonics	Comment
	JNJ UP	; Jump if no zero to up.
	ADD C	; Add c with A
	INX H	; Increment HL A to M
	HLT	; stop

- 119) Write an Assembly Language Program that multiplies the original number. Stored at C030H with its lower nibble. Store the result starting from C031 H onwards.

(Oct. 2012)

Ans. :

Label	Mnemonics	Comment
	MVI C, 00H	; Clear C reg
	LXI H, C030 H	; Initialize HL with c030H
	MOV A, M	; Get data from M to A
	MOV B, M	; Get data from m to B
	ANI 0FH	; Logical AND ACC
	MOV D, A	; Get data from A to D
	MVI A, 00H	; Clear ACC
GO	ADD B	; Add B with A
	JNC next	; jump if no carry to next
	INR C	; Increment C reg
Next	DCR D	; Decrement D reg
	JNZGO	; Jump if no zero to go
	INX H	; increment HL by 1
	MOV M, A	; Get data from A to M
	INX H	; Increment HL by 1
	MOV M, C	; Get data from C to M
	HLT	; stop

- 120) Write assembly language program to count number of even data bytes occurring in a block stored from memory location C0511-1 and onwards. The length of block is stored in location C050H. Store result in location. C060H.

(March 2013)

Ans. :

Label	Instruction	Comments
START	LXI H, C050 H	; Initialize HL pointer to C050 H
	MOV C, M	; Get length of block in reg C
	MVI B, 00H	; Initialize reg. B to store count

Label	Instruction	Comments
	INX H	; Increment HL pair by 1
UP	MOV A, M	; Get the number in accumulator
	RRC	; Check even number
	JC DOWN	; Jump on carry to label DOWN
	INR B	; No carry increment count
DOWN	INX H	; Increment HL pair by 1
	DCR C	; Decrement C by 1
	JNZ UP	; Is zero ? No jump to label UP
	MOV A, B	; Store count in register A
	STA C060H	; store result in C060H
END	HLT	; stop

- 121) Write an assembly language program to perform multiplication of two 8-bit numbers where multiplicand is stored at the memory locations C051H and C052H and multiple is stored at C053H. The result is to be stored at memory location address C054H to C055H. **(March 2013)**

(Note : 8-bit multiplicand is extend to 16-bit)

Ans. :

Label	Instruction	Comments
START	LHLD C051H	; Get multiplicand in HL pair
	XCHG	; multiplicand in DE pair
	LDA C053H	; Multiplier in accumulator
	LXI H, 0000 H	; Initial value of product = 0000H
	MVIC, 08H	; count equal to 08 in reg. C
BACK	DAD H	; shift partial product left by one bit
	RAL	; Rotate multiplier left by 1 bit, Is multiplier bit = 1
	JNC GO	; No jump to. label GO
	DAD D	; Product = product + multiplicand
GO	DCR C	; Decrement count
	JNZ BACK	; jump if no zero to label BACK
	SHLD C054H	; store result at C054H
END	HLT	; STOP

- 122) Write assembly language program to count occurrence of the data. ABH in a memory block starting from 4000H to 400FH. Store count at memory location 4500H. **(March 2013)**

Ans. :

Label	Instruction	Comments
START	MVI C 00H	; Initialize reg C with 00H
	MVI A, ABH	; Get data ABH in accumulator
	LXI H, 4000 H	; Initialize HL pointer to 4000H
	MOV B, 10 H	; Get count in register B
LOOP	CMP M	; Compare no in M with ACC
	JNZ NEXT	; Is zero ? No jump to label NEXT
	INR C	; Increment count C by 1
NEXT	INX H	; Increment HL pair by 1
	DCR B	; Decrement count
	JNZ LOOP	; Is zero ? No jump to label LOOP
	MOV A, C	; Yes move count to A
	STA 4500H	; Store count in 4500H
END	HLT	; stop

- 123) A block of data is stored in memory locations from 7500 H to 75FFH, Write an assembly language program to transfer block in reverse order to memory location 7600H and onwards. (March 2013)

Ans. :

Label	Instruction	Comments
START	LXI H, 75 FFH	; Initialize HL with 75 FF H
	LXI B, 7600H	; Initialize BC with destination address
	MOV D, L	; Get count FF H in reg. C
BACK	MOV A, M	; Get number in accumulator
	STAX B	; Store no. at address pointed by BC
	DCX H	; Decrement HL
	INX B	; Increment BC
	DCR D	; Decrement count
	JNZ BACK	; Is count zero & No then jump to BACK
END	HLT	; stop

- 124) Write an assembly language program to find largest element in block of data. The length is in memory location D000H and block begins in memory location D002H. Store maximum in D000H. Assume that all number are 8-bit unsigned binary numbers. (March 2013)

Ans. :

Label	Instruction	Comments
START	LXI H, D 001H	; Address for count in HL pair
	MOV C, M	; Get count in reg. C
	SUB A	; clear accumulator
LOOP	INX H	; Go to address of next memory
	CMP M	; Compare memory with ACC
	JNC AHEAD	; No larger in ACC, go to label. AHEAD
	MOV A, M	; Get larger no. In acc
AHEAD	DCR C	; Decrement count
	JNZ LOOP	; Go to label loop
	STA D000H	; Store result at D000H
END	HLT	; stop

- 125) Write an Assembly Language Program to Count the Number of times data 7EH is found in a block of memory location starting from 3000H. Length of block is stored in location 2FFFH. Store the result in location 2000H. **(Oct. 2013)**

Ans. :

LABEL	MNEMONICS	COMMENTS
START	LXI H, 00 H	; Set count = 00H
	LXI H, 2FFF H	; Set HL pointer to 2FFF H
	MOV C, M	; Get count in register C
LOOP	INX H	; [H-L] = [H-L] + 1
	MOV A, M	; Memory contents in A
	CPI 7EH	; Check whether [H-L] = 7EH or not
	JNZ NEXT	; If zero ? No - jump to NEXT
	INR B	; Count = count + 1
NEXT	DCR C	; Decrement count
	JNZ LOOP	; Repeat LOOP if count ≠ 0
	MOV A, B	; Store count in A reg.
	STA 2000 H	; Store count in 2000 H.
END	HLT	; Stop

- 126) Write a program in Assembly Language that multiply two 8-bit numbers stored in memory location D000H and D001H. Store the two byte result in consecutive memory locations starting from D002H. **(Oct. 2013)**

Ans. :

LABEL	MNEMONICS	COMMENTS
START	LXI H, 0000 H	; Set initial product = 0
	LDA, D000 H	; Set [A] = N1
	MOV E, A	; Set [E] = N1
	LDA D001H	; Set [A] = N2
LOOP	MVID, 00H	; Set [D] = 00H
	DAD D	; Product = product + N1
	DCR A	; N2 = N2 - 1
	JNZ LOOP	; Repeat if N2 ≠ 0
END	SHLD D002 H	; Store product in D000 and D001 H.
	HLT	; Stop

- 127) Write an Assembly Language program that divides two one byte hex numbers where dividend is stored in memory location C000H and divisor is stored in memory location C001H. store quotient and remainder in memory location C002H and C003H respectively. (Oct. 2013)

Ans. :

LABEL	MNEMONICS	COMMENTS
START	LXI H, C000 H	; Set HL pointer to dividend
	MVI C, 00 H	; Set initial quotient = 00H
	MOV A, M	; Set A = Divident
	INX H	; Set HL pointer to divisor
LOOP	CMPM	; IS N1 ≥ N2 ?
	JC Escape	; Go to Escape if N1 < N2
	SUB M	; N1 = N1 - N2
	INR C	; Quotient = Quotient + 1
ESCAPE	JMP LOOP	; Jump to again compare N1 and N2
	INXH	; Increment HL pair
	MOV M, C	; Store quotient in C002 H
	INX H	
END	MOV M, A	; Store remainder in C003H
	HLT	; Stop

- 128) Write an ALP to calculate Sum of Series of Number. The length of the series is in memory location C100H and Series itself begins in memory location C101H. Assume Sum to be an 8-bit No. Store Result in C204H. (Oct. 2013)

Ans. :

LABEL	MNEMONICS	COMMENTS
START	LXI H, C101 H MOV C, M MVI A, 00H MOV B, A INX H ADD M DAA JNC AHEAD INR B DAA DCRC JNZ LOOP STA C204H MOV A, B STA C205 H HLT	; Set HL pointer to C101 H ; Get count in register C. ; Make LSBs of SUM = 00H. ; Make MSBS of SUM = 00H ; Set HL to point the number in series ; Add previous No + Next No ; Decimal adjust accumulator ; Is carry ? No goto AHEAD ; Yes add carry to MSBS of sum ; Adjust accumulator to decimal content ; Decrement count ; Is count = 0? No jump to LOOP ; Store LSBs of the sum to C204 H ; Get MSBS of sum in Accumulator ; Store MSBS ; Stop
END	HLT	; Stop

129) An Assembly Language Program to Find 2's Complement of five numbers stored from memory location C030H and onwards. Store the result from memory location D000H.

Ans. :

LABEL	MNEMONICS	COMMENTS
START	LXI H, C030 H LXI B, D000 H MVI D, 05H MOV A, M CMA INR A STAX B INX H INX B DCR D JNZ LOOP HLT	; Initialize HL with first number ; Initialize BC with Destination ; Store count in reg. D ; Get the number in Accumulator ; One's complement of No. in A. ; 2's complement of No. in A. ; Store 2's complement at address pointed by BC pair. ; Increment HL pair ; Increment BC pair ; Decrement count in reg. D ; Is count zero ? No jump to LOOP ; Stop
LOOP	MOV A, M CMA INR A STAX B INX H INX B DCR D JNZ LOOP HLT	
END	HLT	; Stop

130) Write ALP to store 00H in register B only if the contents memory location 201FH are odd. Otherwise store EEH in register B.

(March 2014)

Ans. :

LABEL	MEMEMONICS	COMMENTS
START	MVI B, EEH	: Assume no. is even i.e. B = EEH
	LDA 201FH	: contents of 201FH are loaded in A
	RRC	: Rotate right to check LSB for ODD or EVEN
	JNC END	: If No. is EVEN then go to END
	MVI B, 00H	: Store 00H in B for ODD No.
END	HLT	: Stop

- 131) Write ALP to find largest element in a memory block from D000H to D00FH. Store largest number at memory location C500H.

March 2010

Ans. :

LABEL	MEMEMONICS	COMMENTS
START	LVI HL, D000H	: Set HL pair at starting address
	MVI C, 0FH	: Reg. C used as loop counter
	MOV A, M	: Contents of memory are coupled to A.
UP	INX H	: Go to next address
	CMP M	: Compare (A) and (H) (L)
	JC DOWN	: If carry = 1 i.e. (A) < (H) (L) then go to DOWN
	MOV A, M	: Move largest no. to A.
DOWN	DCR C	: Decrement loop counter by one
	JNZ UP	: Jump to UP until counter becomes zero
	STA C500H	: Store /largest no. at C500H
END	HLT	: stop

- 132) Write ALP to add all the BCD numbers in a block from 2001H To 2009H. Store SUM at memory location 2000AH. Assume SUM is 8 bit!

March 2010

Ans. :

LABEL	MEMEMONICS	COMMENTS
START	LVI H, 2001H	: Point HL pair at starting address 2001H
	MVI C, 09H	: Reg. C as counter
	XRA A	: Clear A
	ADD M	: (A) + (H) (L) → A
	DAA	: Decimal adjust accumulator for BCD addition
UP	INX H	: Increment HL pair

LABEL	MNEMONICS	COMMENTS
	DCR C	;Decrement Loop counter
	JNZ UP	; Go up until c = 0
	STA 2000H	; Store BCD sum at 2000H
END	HLT	; Stop

- 133) Write ALP to find SUM of a number and its reverse which is stored at memory location 2080H. Store SUM at 2081H

(March 2014)

Ans.:

LABEL	MNEMONICS	COMMENTS
START	LDA 2080H	; Load A with contents of 2080 H
	MOV B, A	; Copy A to reg. B
	RRC	} Rotate 4 times Right to obtain reverse of a no.
	RRC	
	RRC	
	RRC	
	ADDB	; Add A & B
	STA 2081 H	; Store sum at 2081 H
END	HLT	

- 134) Write ALP to count total number of occurrences of data 9CH in a memory block of length 16 byte, starting from 1000H. Store count in Register E.

(March 2014)

Ans.:

LABEL	MNEMONICS	COMMENTS
START	LXI H, 1000H	; Point HL pair at starting address
	MVI C, 10 H	; Register C used as counter
	MVI E, 00H	; E = 00H
	MVIA, 9CH	; Load A with 9CH
	CMPI	; Compare A = 9CH with contents of memory
UP	JNZ DOWN	; If contents are not same then jump to DOWN
	INR E	; Increment E by one
	INX H	; Go to next address
	DCR C	; Decrement counter
DOWN	JNZ UP	; Jump to UP until count = 0
	HLT	

- 135) Write ALP to copy 10 consecutive bytes from memory 2025H to memory locations BCBCH onwards.

(March 2014)

Ans.:

LABEL	MNEMONICS	COMMENTS
START	LXI H, 2025 H	; point HL pair at starting address
	LXI B, BCBC H	; BC pair point at destination address
	MVI D, 0AH	; Register D used as counter

LABEL	MNEMONICS	COMMENTS
BACK	MOV A, M STAXB INX H INX B DCR D JNZ BACK HLT	; (HL) → (A) ; (A) → (B) (C) ; Go to next address (source) ; Next destination address ; Decrement loop counter by 1 ; Jump back until D = 0 ; Stop

- 136) Write a program in assembly language to multiply two 8 bit data, where multiplier is stored at D000H and multiplicand is stored at D001H memory locations. Store the 16 bit product from memory location D002H. **(Oct. 2014)**

Ans. :

Label	Mnemonics	Comments
	MVI B, 00 H LXI H, D000H MOV C, M MVI A, 00H INX H ADD M JNC LOOP1 INR B DCR C JNZ LOOP2 INX H MOV M, B INX H MOV M, A HLT	; Move 00H to B ; Load HL with D000H ; Move M to C ; Move 00 H to A ; Increment HL Pair ; ADD M with A ; Jump if No carry to ; Increment B ; Increment C ; Jump if No Zero ; Increment HL ; Move B to M ; Increment HL ; Move A to M ; Stop.
LOOP 2		
LOOP 1		

- 137) Give the proper comments to following program. Also write the purpose of program : **(Oct. 2014)**

Label	Mnemonics	Comments
	MVI C, 0AH	; Move Immediate data 0A to C reg.
	MOV A, C	; Move C to A reg.
	RRC	; Rotate Acc.(Accumulator) right by 1 bit

Label	Mnemonics	Comments
L1	MOV C, A	; Move A to C reg.
	LXI H, D001H	; Load HL with D001
	LXI D, D00AH	; Load DE with D00A
	LDAX D	; Load Acc with M whose address is in HL
	MOV B, M	; Move the contents of Memory location whose Address is in HL to B
	XCHG	; Exchange HL with DE
	MOV M, B	; Move B to Memory
	STAX D	; Store Accumulator to Memory
	XCHG	; Exchange HL with DE
	INX H	; Increment HL
	DCX D	; Decrement DE
	DCR C	; Decrement C
	JNZ L1	; Jump if No Zero to L1
HLT	; Stop	

138) There is block of memory, from 2501H to 250AH. Write a program to replace the odd numbers with data 'FFH' in given block. **(Oct. 2014)**

Ans. :

Label	Mnemonics	Comments
L2	MVI C, 0A H	; Move Immediate 0A to C
	LXI H, 2501 H	; Load HL with 2501 H
	MOV A, M	; Move M to Accumulator
	RRC	; Rotate Accumulator Right
	JNC L1	; Jump if no carry to L1
	MVI M, FF H	; Move Immediate FF to M
L1	INX H	; Increment HI
	DCRC	; Increment C
	JNZ L2	; Jump if No Zero to L2
	HLT	; Stop

139) Write a program in assembly language to exchange the nibbles of each memory location contents of a block which begins from 2501H, the length of block is at 2500H. Store the result at same memory locations. **(Oct. 2014)**

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