

Certificate

Name: ARKASYOTI NASKAR

Class: BCSE -II

Roll No: 002110501144

Exam No:

Institution JADAVPUR UNIVERSITY

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MICROPROCESSOR Laboratory during the academic
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ASSIGNMENT-1

Q1. Load the contents of the memory locations 2200H and 2201H into registers. Add these registers and store the result in memory locations 2202H and 2203H.

MVI C, 00H	; C \leftarrow 00H
LXI H, 2200H	; HL \leftarrow 2200 (H = 22, L = 00)
MOV A, M	; A \leftarrow [HL]
INX H	; HL \leftarrow HL + 1
ADD M	; A \leftarrow A + [HL]
JNC SKIP	; If Carry = 0, goto SKIP label else continue
INR C	; C \leftarrow C + 1
SKIP: INX H	; HL \leftarrow HL + 1
MOV M, A	; [HL] \leftarrow A (store the sum)
INX H	; HL \leftarrow HL + 1
MOV M, C	; [HL] \leftarrow C (store the carry)
HLT	; Halt the program.

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2000	MVI C, 00H	0E
2001		00
2002	LXI H, 2200H	21
2003		00
2004		22
2005	MOV A, M	7E
2006	INX H	23
2007	ADD M	86
2008	JNC SKIP	D2
2009		0C
200A		20
200B	INR C	0C
200C	SKIP; INX H	23
200D	MOV M, A	77
200E	INX H	23
200F	MOV M, C	71
2010	HLT	76

Q2. Find the sum of N numbers stored in consecutive locations starting from 2500H. The value of N is stored in 2200H. Store the result in locations 2300H and 2301H.

LXI H, 2500H	; HL \leftarrow 2500 (H \leftarrow 25, L \leftarrow 00)
LDA 2200H	; A \leftarrow [2200]
MOV C, A	; C \leftarrow A
MVI A, 00H	; A \leftarrow 00H
MVI B, 00H	; B \leftarrow 00H
BACK: ADD M	; A \leftarrow A + [HL]
JNC SKIP	; If Carry = 0, goto SKIP label else continue
JNR B	; B \leftarrow B + 1
SKIP: INX H	; HL \leftarrow HL + 1
DCR C	; C \leftarrow C - 1
JNZ BACK	; If C = 0 then continue, else goto BACK label
LXI H, 2300H	; HL \leftarrow 2300 (H \leftarrow 23, L \leftarrow 00)
MOV M, A	; [HL] \leftarrow A
INX H	; HL \leftarrow HL + 1
MOV M, B	; [HL] \leftarrow B
HLT	; Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2100	LXI H,2500H	25
2101		00
2102		25
2103	LDA 2200H	3A
2104		50
2105		22
2106	MOV C,A	4F
2107	MVI A,00H	3E
2108		50
2109	MVI B,00H	06
210A		50
210B	BACK: ADD M	86
210C	JNC SKIP	D2
210D		10
210E		21
210F	INR B	04
2110	SKIP: INX H	23
2111	DCR C	0D
2112	JNZ BACK	C2
2113		0B
2114		21
2115	LXI H,2300H	21
2116		50
2117		23
2118	MOV M,A	7F
2119	INX H	23
211A	MOV M,B	70
211B	HLT	76

Q3. Find the sum of the least significant 4 bits and the most significant 4 bits in a byte stored in memory location 2500H. Store the result in 2550H.

LDA 2500H	; A \leftarrow [2500]
MOV C, A	; C \leftarrow A
ANI 0FH	; Perform AND operation with 0FH and store it into A
MOV B, A	; B \leftarrow A
MOV A, C	; A \leftarrow C
XRA B	; A \leftarrow A \oplus B
RRCL	; Rotate Right Accumulator
RRCL	
RRCL	
RRCL	
ADD B	; A \leftarrow A + B
STA 2550H	; [2550] \leftarrow A
HLT	; Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2400	LDA 2500H	3A
2401		50
2402		25
2403	MOV C,A	4F
2404	ANI OFH	E6
2405		OF
2406	MOV B,A	47
2407	MOV A,C	7D
2408	XRA B	A8
2409	RRC	OF
240A	RRC	OF
240B	RRC	OF
240C	RRC	OF
240D	ADD B	80
240E	STA 2550H	32
240F		50
2410		25
2411	HLT	76

Q4. Write a program to count the 1s and 0s of a byte stored in 2500H. Store the result in 2510H and 2511H.

MVI D, 00H ; D \leftarrow 00H
MVI B, 00H ; B \leftarrow 00H
MVI C, 08H ; C \leftarrow 08H
LDA 2500H ; A \leftarrow [2500]
BACK: RLC ; Rotate left Accumulator
JL CNT1 ; If carry=1 goto CNT1 label else continue
CNT0: INR D ; D \leftarrow D+1
JMP CONTINUE; Jump to CONTINUE LABEL
CNT1: INRB ; B \leftarrow B+1
CONTINUE: DCR C ; C \leftarrow C-1
JNZ BACK ; If C=0 continue, else goto BACK label
MOV A,B ; A \leftarrow B
STA 2510H ; [2510] \leftarrow A
MOV A,D ; A \leftarrow D
STA 2511H ; [2511] \leftarrow A
HLT ; Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2300	MVI D,00H	16
2301		00
2302	MVI B,00H	06
2303		00
2304	MVI C,08H	0E
2305		08
2306	LDA 2500H	3A
2307		00
2308		25
2309	RLC	07
230A	JC CNT1	DA
230B		11
230C		23
230D	CNT0; INRD	14
230E	JMP CONTINUE	C3
230F		312
2310		23
2311	CNT1; INRB	04
2312	CONTINUE; ACR L	0D
2313	JNZ BACK	02
2314		09
2315		23
2316	MOVA, B	78
2317	STA 2510H	32
2318		10
2319		25
231A	MOV A, D	7A
231B	STA 2511H	32
231C		11
231D		25
231E	HLT	76

Q5. Write a program to add two 16-bits binary numbers.

say, $[2501] = 01$, $[2502] = 02$,
 $[2503] = 03$, $[2505] = 04$

LHLD 2501H ; $L \leftarrow [2501]$, $H \leftarrow [2502]$
XCHG ; exchange contents of HL and DE register pair
LHLD 2503H ; $L \leftarrow [2503]$, $H \leftarrow [2504]$
DAD D ; Double Addition, [HL] and [DE] will be added
SHLD 2505H ; $2505 \leftarrow [H]$, $2506 \leftarrow [L]$
HLT ; Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2600	LHLD 2501H	2A
2601		01
2602		05
2603	XCHG	EB
2604	LHLD 2503H	2A
2605		03
2606		25
2607	DAD D	19
2608	SHLD 2505H	22
2609		05
260A		25
260B	HLT	F6

ASSIGNMENT - 2

Q5. Two numbers MN_H and KL_H are stored in 2050_H and 2051_H respectively. Write a program to assemble them as NK_H and LM_H store them in 2052_H and 2053_H

LDA 2050H ; A $\leftarrow [2050]$

ANI 0FH ; And operation with 0FH
RLC ; Rotate left Accumulator

RLC

RLC

RLC

MOV B,A ; B $\leftarrow A$

LDA 2051H ; A $\leftarrow [2051]$

ANI F0H ; And operation with F0H
RRCL ; Rotate Right Accumulator

RRCL

RRCL

ADD B ; A $\leftarrow A+B$

STA 2052H ; [2052] $\leftarrow A$

LDA 2050H ; A $\leftarrow [2050]$

ANI F0H ; And operation with F0H
RRCL ; Rotate Right Accumulator

RRCL

RRCL

RRCL

MOV B,A ; B $\leftarrow A$

LDA 2051H ; A $\leftarrow [2051]$

ANI 0FH ; And operation with 0FH

RLC ; Rotate Left Accumulator

RLC

RLC

RLC

ADD B ; A $\leftarrow A+B$

STA 2053H ; [2053] $\leftarrow A$

HLT ; Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>	<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2000	LDA 2050H	3A	201F	RR C	OF
2001		50	2020	MOV B,A	47
2002		20	2021	LDA 2051H	3A
2003	ANI OFH	E6	2022		51
2004		0F	2023		90
2005	RLC	07	2024	ANI OFH	E6
2006	RLC	07	2025	"	OF
2007	RLC	07	2026	RLC	07
2008	RLC	07	2027	RLC	07
2009	MOV B,A	47	2028	RLC	07
200A	LDA 2051H	3A	2029	RLC	07
200B		51	202A	ADDB	80
200C		20	202B	STA 2053H	32
200D	ANI FOH	E6	202C		53
200E		F0	202D		90
200F	RR C	0F	202E	HLT	76
2010	RR C	0F			
2011	RR C	0F			
2012	RR C	0F			
2013	ADDB	80			
2014	STA 2052H	32			
2015		52			
2016		20			
2017	LDA 2050H	3A			
2018		50			
2019		20			
201A	ANI FOH	E6			
201B		F0			
201C	RR C	0F			
201D	RR C	0F			
201E	RR C	0F			

Q2. Two numbers A and B are stored in 2050H and 2051H respectively. Write a program to perform multiplication of A and B and store the result in 2052H and 2053H.

LXI H, 2050H	; HL \leftarrow 2050H (H \leftarrow 20, L \leftarrow 50)
MOV B, M	; B \leftarrow [HL]
INX H	; HL \leftarrow HL + 1
MOV C, M	; C \leftarrow [HL]
XRA A	; A \leftarrow A \oplus A, i.e. A \leftarrow 00H
MVI D, 00H	; D \leftarrow 00H
LOOP: ADD B	; A \leftarrow A + B
JNC SKIP	; If Carry = 0 goto SKIP label else continue
INR D	; D \leftarrow D + 1
SKIP: DCR C	; C \leftarrow C - 1
JNZ LOOP	; If C = 0 continue, else goto Loop label
INX H	; HL \leftarrow HL + 1
MOV M, A	; [HL] \leftarrow A
INX H	; HL \leftarrow HL + 1
MOV M, D	; [HL] \leftarrow D
HLT	Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Op code</u>
2000	LXI H, 2050H	21
2001		50
2002		20
2003	MOV B, M	46
2004	INX H	23
2005	MOV C, M	4F
2006	XRA A	AF
2007	MVI D, 00H	16
2008		00
2009	LOOP; ADD B	80
200A	JNC SKIP	D2
200B		0E
200C		20
200D	INR D	14
200E	SKIP; DCR C	0D
200F	JNZ LOOP	C2
2010		09
2011		20
2012	INX H	23
2013	MOV M, A	77
2014	INX H	23
2015	MOV M, D	79
2016	HLT	76

Q3. N numbers are stored in consecutive m/m location starting from 2050H. The value of N is stored in 204FH —
 (i) find the maximum among the N numbers.
 (ii) find the minimum among the N numbers.

LDA	204FH	; A $\leftarrow [204F]$
MOV	B,A	; B $\leftarrow A$
LXI	H,2050H	; HL $\leftarrow 2050$ (H $\leftarrow 20$, L $\leftarrow 50$)
MOV	A,M	; A $\leftarrow [HL]$
MOV	C,M	; C $\leftarrow [HL]$
MOV	D,M	; D $\leftarrow [HL]$
DCR	B	; B $\leftarrow B - 1$
LOOP1:	INX H	; HL $\leftarrow HL + 1$
	MOV A,M	; A $\leftarrow [HL]$
	CMP C	; Compare (A-C)
	JC MAX	; If Carry = 1 goto MAX label else continue
	MOV C,A	; C $\leftarrow A$
MAX:	CMP D	; Compare (A-D)
	JNC MIN	; If Carry = 0 goto MIN label else continue
	MOV D,A	; D $\leftarrow A$
MIN:	DCR B	; B $\leftarrow B - 1$
	JNZ LOOP1	; If B = 0 continue, else goto LOOP1 label
	MOV A,C	; A $\leftarrow C$
	LXI H,3000H	; HL $\leftarrow 3000$ (H $\leftarrow 30$, L $\leftarrow 00$)
	MOV M,A	; [HL] $\leftarrow A$
	INX H	; HL $\leftarrow HL + 1$
	MOV M,D	; [HL] $\leftarrow D$
	HLT	; Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2100	LDA 204FH	3A
2101		4F
2102		20
2103	MOV B,A	47
2104	LXI H,2050H	21
2105		50
2106		20
2107	MOV A,M	7E
2108	MOV C,M	4E
2109	MOV D,M	56
210A	DCR B	05
210B	LOOP1; INX H	23
210C	MOV A,M	7E
210D	CMP C	B9
210E	JC MAX	DA
210F		12
2110		21
2111	MOV C,A	4F
2112	MAX: CMP D	BA
2113	JNC MIN	D2
2114		57
2115		21
2116	MOV D,A	57
2117	MIN: DCR B	05
2118	JNZ LOOP1	C2
2119		0B
211A		21
211B	MOV A,C	79
211C	LXI H,3000H	21
211D		50
211E		30
211F	MOV M,A	FF
2120	INX H	23
2121	MOV M,D	72
2122	HLT	76

(iii) Sort the N numbers in ascending order.

LXI H, 204FH	; HL \leftarrow 204F (H \leftarrow 20, L \leftarrow 4F)
MOV C, M	; C \leftarrow [HL]
DCR C	; C \leftarrow C - 1
REPEAT: MOV D, C	; D \leftarrow C
LXI H, 2050H	; HL \leftarrow 2050 (H \leftarrow 20, L \leftarrow 50)
LOOP: MOV A, M	; A \leftarrow [HL]
INX H	; HL \leftarrow HL + 1
CMP M	; Compare (A - [HL])
JC SKIP	; If Carry = 0 continue else goto SKIP label
MOV B, M	; B \leftarrow [HL]
MOV M, A	; [HL] \leftarrow A
DCX H	; HL \leftarrow HL - 1
MOV M, B	; [HL] \leftarrow B
INX H	; HL \leftarrow HL + 1
SKIP: DCR D	; D \leftarrow D - 1
JNZ LOOP	; If D = 0 continue, else goto LOOP label
DCR C	; C \leftarrow C - 1
JNZ REPEAT	; If C = 0 continue, else goto REPEAT label
HLT	Halt the program.

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
220D	LXI H, 204FH	21
220E		4F
2202		20
2203	MOV C, M	4E
2204	DCR C	0D
2205	REPEAT: MOVD, C	51
2206	LXI H, 2050H	21
2207		50
2208		20
2209	LOOP: MOVA, M	7E
220A	JNX H	93
220B	CMP M	B6
220C	JC SKIP	DA
220D		14
220E		22
220F	MOV B, M	46
2210	MOV M, A	77
2211	DCX H	2B
2212	MOV M, B	70
2213	JNX H	23
2214	SKIP: DCR D	15
2215	JNZ LOOP	C2
2216		09
2217		22
2218	DCR C	0D
2219	JNZ REPEAT	C2
221A		05
221B		22
221C	HLT	76

(iv)

Sort the N numbers in descending order.

LXI H, 204FH	;	HL \leftarrow 204F (H \leftarrow 20, L \leftarrow 4F)
MOV C, M	;	C \leftarrow [HL]
DCR C	;	C \leftarrow C-1
REPEAT: MOV D, C	;	D \leftarrow C
LXI H, 2050H	;	HL \leftarrow 2050 (H \leftarrow 20, L \leftarrow 50)
LOOP: MOV A, M	;	A \leftarrow [HL]
INX H	;	HL \leftarrow HL+1
CMP M	;	Compare (A-M)
JNC C SKIP	;	If Carry = 0 goto SKIP label else continue
MOV B, M	;	B \leftarrow [HL]
MOV M, A	;	[HL] \leftarrow A
DCX H	;	HL \leftarrow HL-1
MOV M, B	;	[HL] \leftarrow B
INX H	;	HL \leftarrow HL+1
SKIP: DCR D	;	D \leftarrow D-1
JNZ LOOP	;	If D > 0 goto LOOP label else continue
DCR C	;	C \leftarrow C-1
JNZ REPEAT	;	If C = 0 continue, else goto REPEAT label
HLT	;	Halt the program.

Address	Mnemonics	Opcode
2200	LXI H,204FH.	21 4F
2201		
2202		20
2203	MOV C,M	4E
2204	DCR C	0D
2205	REPEAT: MOV D,C	51
2206	LXI H,2050H	21
2207		50
2208		20
2209	LOOP: MOVA,M	7E
220A	INX H	23
220B	CMP M	BE
220C	JNC SKIP	D2
220D		14
220E		22
220F	MOV B,M	46
2210	MOV M,A	77
2211	DCX H	2B
2212	MOV M,B	70
2213	INX H	23
2214	SKIP: DCR D	15
2215	JNZ LOOP	C2
2216		09
2217		22
2218	DCR C	0D
2219	JNZ REPEAT	C2
221A		05
221B		22
221C	HLT	76

Q1. N numbers are stored in consecutive m/m location starting from 2050H. The value N is stored in 204FH. Write a program to copy the even and odd numbers starting from 2100H and 2200H respectively. Store the total no. of even and odd numbers in 2300H and 2301H respectively.

LXI H, 204FH ; HL < 204F (H < 20, L < 4F)	LXI H, 2050H ; HL < 2050
MOV C, M ; C < [HL]	LXI D, 2200H ; DE < 2200
MVI B, 00H ; B < 00	LOOP2 : MOVA, M; A < [HL]
LXI D, 2300H ; DE < 2300 (D < 23, E < 00)	RRC ; Right Rotate Acc.
INX H ; HL < HL + 1	JNC SKIP2; If Carry > 0 goto SKIP2
LOOP1 : MOV A, M; A < [HL]	RLC ; Rotate left Accumulator
RRC ; Right Rotate Accumulator	STAX D ; Store result in DE
JL SKIP1; If Carry = 1, goto SKIP1	INX D ; DE < DE + 1
INR B ; B < B + 1	SKIP2 : INX H; HL < HL + 1
RLC ; Rotate left Accumulator	DCR C; C < C - 1
STAX D ; Store result in D registerpair	JNZ LOOP2; Goto LOOP2 if C > 0
INX D ; DE < DE + 1	HLT ; Halt the program
SKIP1 : INX H ; HL < HL + 1	
DCR C ; C < C - 1	
JNZ LOOP1; If C	
LXI H, 204FH ; HL < 204F (H < 20, L < 4F)	
MOV C, M ; C < [HL]	
MOV A, C ; A < C	
LXI H, 2300H ; HL < 2300 (H < 23, L < 00)	
MOV M, B ; [HL] < B	
INX H ; HL < HL + 1	
SUB B ; A < A - B	
MOV N, A ; [HL] < A	

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>	<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2000	LXI H,204FH	21	2025		50
2001		4F	2026		20
2002		20	2027	LXI D,2200H	11
2003	MOV C,M	4F	2028		00
2004	MVI B,00H	06	2029		22
2005		50	202A	LDPL2; MOVA,M	7E
2006	LXI D,2100H	11	202B	RRC	0F
2007		00	202C	JNC SKIP2	D2
2008		21	202D		32
2009	INX H	23	202E		20
200A	LOOP1; MOVA,M	7E	202F	RLC	07
200B	RRC	0F	2030	STAXD	12
200C	JZ SKIP1	DA	2031	INXD	13
200D		13	2032	SKIP2; INX H	23
200E		20	2033	DCR C	0D
200F	INR B	04	2034	JNZ LOOP2	C2
2010	RLC	07	2035		2A
2011	STAX D	12	2036		20
2012	INXD	13	2037	HLT	76
2013	SKIP1; INX H	23			
2014	DCRC	0D			
2015	JNZ LOOP1	C2			
2016		0A			
2017		20			
2018	LXI H,204FH	21			
2019		4F			
201A		20			
201B	MOVE,M	4F			
201C	MOVA,C	79			
201D	LXI H,2300H	21			
201E		00			
201F		23			
2020	MOV M,B	70			
2021	INX H	23			
2022	SUB B	90			
2023	MOV M,A	77			
2024	LXI H,2050H	21			

Q5. N numbers are stored in consecutive m/m location starting from 2050H. The value N is stored in 204FH. Write a program to test whether a number stored in 204FH is present in the list. If present, store its position in the list at 204DH, otherwise

LXI H, 204FH	; HL \leftarrow 204F (H \leftarrow 20, L \leftarrow 4F)
MOV C, M	; C \leftarrow [HL]
DCX H	; HL \leftarrow HL - 1
MOV B, M	; B \leftarrow [HL]
INX H	; HL \leftarrow HL + 1
JNX H	; HL \leftarrow HL + 1
LOOP: MOV A, M	; A \leftarrow [HL]
XRA B	; A \leftarrow A \oplus B
JZ BREAK	; If A = 0, then goto BREAK label, else continue
JNX H	; HL \leftarrow HL + 1
DCR C	; C \leftarrow C - 1
JNZ LOOP	; If C = 0 continue, else goto LOOP label
LXI H, 204DH	; HL \leftarrow 204D (H \leftarrow 20, L \leftarrow 4D)
MVI M, FFH	; [HL] \leftarrow FFH
HLT	; Halt the program
BREAK: LDA 204FH	; A \leftarrow [204F]
SUB C	; A \leftarrow A - C
INR A	; A \leftarrow A + 1
STA 204DH	; 204D \leftarrow [A]
HLT	; Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2100	LXI H, 204F H	21
2101		4F
2102		20
2103	MOV C, M	4E
2104	DCR X H	2B
2105	MOV B, M	46
2106	INX H	2D
2107	INX H	23
2108	LOOP; MOV A, M	7E
2109	XRA B	A8
210A	JZ BREAK	CA
210B		18
210C		21
210D	INX H	23
210E	DCR C	0D
210F	JNZ LOOP	C2
2110		08
2111		21
2112	LXI H, 204D H	21
2113		4D
2114		20
2115	MVI M, FF H	36
2116		FF
2117	HLT	76
2118	BREAK; LDA 204F H	3A
2119		4F
211A		20
211B	SUB C	91
211C	JNR A	3C
211D	STA 204D H	32
211E		4D
211F		20
2120	HLT	76

ASSIGNMENT-3

Q1. A set of N data bytes is stored in m/m locations starting from 2501H. The value of N is stored in 2500H. The value of N is stored in 2500H. Write a program to store these data bytes from m/m location 2600H if D0 or D7 is 1; otherwise reject data type.

LDA 2500H ;	$A \leftarrow [2500]$
MOV B,A ;	$B \leftarrow A$
LXI H,2501H ;	$HL \leftarrow 2501 (H \leftarrow 25, L \leftarrow 01)$
LXI D,2600H ;	$DE \leftarrow 2600 (D \leftarrow 26, E \leftarrow 00)$
LOOP: MOV A,M ;	$A \leftarrow [HL]$
MOV C,A ;	$C \leftarrow A$
RLC ;	Right Rotate Accumulator
JNC CHECK2 ;	If carry=0 goto CHECK2 label else continue
STORE: XCHG ;	Exchange the value of HL and DE register pair
MOV M,C ;	$[HL] \leftarrow C$
XCHG ;	$[HL] \leftrightarrow [DE]$
INXD ;	$D \leftarrow D+1$
JMP BACK ;	goto BACK label
CHECK2 ; RLC ;	Rotate left Accumulator
RLC ;	Rotate left Accumulator
JC STORE ;	If carry=0 continue, else goto STORE label
BACK : INX H ;	$HL \leftarrow HL+1$
DCR B ;	$B \leftarrow B-1$
JNZ LOOP ;	If B=0 continue, else goto LOOP label
HLT ;	Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2000	LDA 2500H	3A
2001		00
2002		05
2003	MOV B,A	47
2004	LXI H,2501H	21
2005		01
2006		25
2007	LXI D,2600H	11
2008		00
2009		06
200A	LOOP: MOV A,M	7E
200B	MOV C,A	4F
200C	RRC	0F
200D	JNC CHECK2	D2
200E		17
200F		20
2010	STORE: XCHG	E8
2011	MOV M,C	71
2012	XCHG	E8
2013	INX D	13
2014	JMP BACK	C3
2015		1C
2016		20
2017	CHECK2: RLC	0F
2018	RLC	0F
2019	JL STORE	DA
201A		10
201B		20
201C	BACK: INX H	23
201D	DCR B	05
201E	JNZ LOOP	C2
201F		0A
2020		20
2021	HLT	76

Q2. There are N data bytes stored from m/m location 2200H. The value N is stored in 23FFH. Write an 8085 program to find the sum of integers whose LSB and MSB are 1. Store the result in 2500H and 2501H.

LDA 23FFH	;	A \leftarrow [23FF]
MOV B,A	;	B \leftarrow A
LXI H,2200H	;	HL \leftarrow 2200 (H \leftarrow 22, L \leftarrow 00)
MVI D, 00H	;	D \leftarrow 00H
MOV C,D	;	C \leftarrow D
LOOP: MOV A,M	;	A \leftarrow [HL]
RRC	;	Rotate Right Accumulator
JNC SKIP	;	If Carry = 0 goto SKIP label else continue
RLC	;	Rotate Left Accumulator
RLC	;	Rotate left Accumulator
JNC SKIP	;	If Carry = 0 goto SKIP label else continue
RRC	;	Rotate right Accumulator
ADDD	;	A \leftarrow A + D
MOV D,A	;	D \leftarrow A
JNC SKIP	;	If Carry = 0 goto SKIP label else continue
INRC	;	C \leftarrow C + 1
SKIP: INX H	;	HL \leftarrow HL + 1
DCR B	;	B \leftarrow B - 1
JNZ LOOP	;	If B \neq 0 continue else goto LOOP label
LXI H,2500H	;	HL \leftarrow 2500 (H \leftarrow 25, L \leftarrow 00)
MOV M,D	;	[HL] \leftarrow D
JNX H	;	HL \leftarrow HL + 1
MOV M,C	;	[HL] \leftarrow C
HLT	;	Halt the program.

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2000	LDA 2FFFH	3A
2001		FF
2002		01
2003	MOV B,A	47
2004	LXI H,2200H	01
2005		00
2006		02
2007	MVI D,50H	16
2008		00
2009	MOV C,D	4A
200A	LOOP; MOV A,M	7E
200B	RR C	0F
200C	JNC SKIP	D8
200D		1B
200E		20
200F	RLC	07
2010	RLC	07
2011	JNC SKIP	02
2012		1B
2013		20
2014	RR C	0F
2015	ADD D	82
2016	MOV D,A	57
2017	JNC SKIP	D2
2018		1B
2019		20
201A	JNRC	0C
201B	SKIP; JNX H	2B
201C	DCR B	05
201D	JNZ LOOP	CQ
201E		0A
201F		20
2020	LXI H,2500H	21
2021		00
2022		25
2023	MOV M,D	72
2024	INX H	23
2025	MOV M,C	71
2026	HLT	76

Q3. Write a 8085 program to generate Nth Fibonacci Number using function and store it in 2050H. The value of N (8-bits) is stored in memory 2060H.

LXI H, 2060H	;	HL \leftarrow 2060 [H \leftarrow 20, L \leftarrow 60]
MOV C, M	;	C \leftarrow [HL]
MVI B, 00H	;	B \leftarrow 00H
MVI E, 01H	;	E \leftarrow 01H
XRA A	;	A \leftarrow A \oplus A
LOOP: ADD B	;	A \leftarrow A + B
MOV B, E	;	B \leftarrow E
MOV E, A	;	E \leftarrow A
DCR C	;	C \leftarrow C - 1
JNZ LOOP	;	If C = 0 continue else goto LOOP label.
STA 2050H	;	[2050] \leftarrow A
HLT	;	Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2000	LXI H, 2060H	21
2001		60
2002		20
2003	MOV C, M	4E
2004	MOV B, 00H	06
2005		00
2006	MOV E, 03H	1E
2007		01
2008	XRA A	AF
2009	LOOP: ADD B	80
200A	MOV B, F	43
200B	MOV E, A	5F
200C	DEC C	0D
200D	JNZ LOOP	02
200E		09
200F		90
2010	STA 4050H	32
2011		50
2012		20
2013	HLT	76

Q4. Write a program to transfer a block of bytes of size N from location 1 to location 2 (location 2 > location 1) where the size of overlap between the two locations is defined by M. The values of N and M are stored in 201EH and 201FH respectively.

LDA 201EH ; A \leftarrow [201E]

MOV L,A ; L \leftarrow A

LXI D,2020H ; DE \leftarrow 2020

LXI B,2020H ; BC \leftarrow 2020

LDA 201FH ; A \leftarrow [201F]

MOV H,A ; H \leftarrow A

MOV A,L ; A \leftarrow L

DCR A ; A \leftarrow A-1

ADD E ; A \leftarrow A+E

MOV E,A ; E \leftarrow A

JNC X

INR D ; D \leftarrow D+1

X: MOV A,L ; A \leftarrow L

DCR A ; A \leftarrow A-1

SUB H ; A \leftarrow A-H

ADD L ; A \leftarrow A+L

ADD C ; A \leftarrow A+C

MOV C,A ; C \leftarrow A

JNC SKIP

INR B ; B \leftarrow B+1

SKIP: LDAX D ; A \leftarrow [DE]

STAX B ; BC \leftarrow [A]

DCX B ; BC \leftarrow BC-1

DCX D ; DE \leftarrow DE-1

DCR L ; L \leftarrow L-1

JNZ SKIP

HLT ; Halt the program

<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>	<u>Address</u>	<u>Mnemonics</u>	<u>Opcode</u>
2200	LDA 205FH	3A	2220	SKIP; LDAX D	1A
2201		1E	2221	STAX B	02
2202		20	2222	DCX B	0B
2203	MOVL,A	6F	2223	DCX D	1B
2204	LXI D,2020H	11	2224	DCRL	2D
2205		20	2225	JNZ SKIP	C2
2206		20	2226		20
2207	LXI B,2020H	01	2227		22
2208		20	2228	HLT	76
2209		20			
220A	LDA 205FH	3A			
220B		1F			
220C		20			
220D	MOV H,A	67			
220E	MOVA,L	7D			
220F	DCRA	3D			
2210	ADDE	83			
2211	MOVE,A	5F			
2212	JNC X	D2			
2213		16			
2214		22			
2215	INRD	14			
2216	X: MOVA,L	7D			
2217	DCRA	3D			
2218	SUBH	94			
2219	ADDL	85			
221A	ADDC	81			
221B	MOVQ,A	4F			
221C	JNC SKIP	D2			
221D		20			
221E		22			
221F	INRB	04			

Q5. Write a program to flash "BCSE II" in the address and data fields with flashing rate of 0.5 seconds.

LXI SP, 20FFH

CALL: CLEAR

MVI A, 08H ; for finite loop of 8 times

STA 3000H

START: XRA A

MOV B, A

LXI H, 2050H

CALL: OUTPUT

MVI A, 01H

MVI B, 00H

LXI H, 2054H

CALL: OUTPUT

LXI D, 0000H

CALL: DELAY

CALL: CLEAR

LXI D, 0000H

CALL: DELAY

LDA 3000H

SBI 01H

STA 3000H

JNZ START

2050 0B 0C 05

2053 0E 01 01

Address	Mnemonics	Opcode	Address	Mnemonics	Opcode
2000	LXI SP,20FFH	31	2021		BC
2001		FF	2022		03
2002		20	2023	CALL;CLEAR	CD
2003	CALL;CLEAR	CD	2024		47
2004		47	2025		03
2005		03	2026	LXI D,0000H	11
2006	MVI A,08H	3E	2027		00
2007		08	2028		00
2008	STA 3000H	32	2029	CALL;DELAY	CD
2009		00	202A		BC
200A		30	202B		03
200B	START;XRA A	AF	202C	LDA 3000H	3A
200C	MOV B,A	47	202D		00
200D	LXI H,2050H	21	202E		30
200E		50	202F		DE
200F		20	2030		01
2010	CALL;OUTPUT	CD	2031	STA 3000H	32
2011		D0	2032		00
2012		05	2033		30
2013	MVI A,05H	3E	2034	JNZ START	C2
2014		01	2035		0B
2015	MVI B,00H	06	2036		00
2016		00			
2017	LXI H,2054H	21			
2018		54			
2019		20			
201A	CALL;OUTPUT	CD			
201B		D0			
201C		05			
201D	LXI D,0000H	11			
201E		00			
201F		00			
2020	CALL;DELAY	CD			