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Second Semester Experiments in Microprocessor Lab

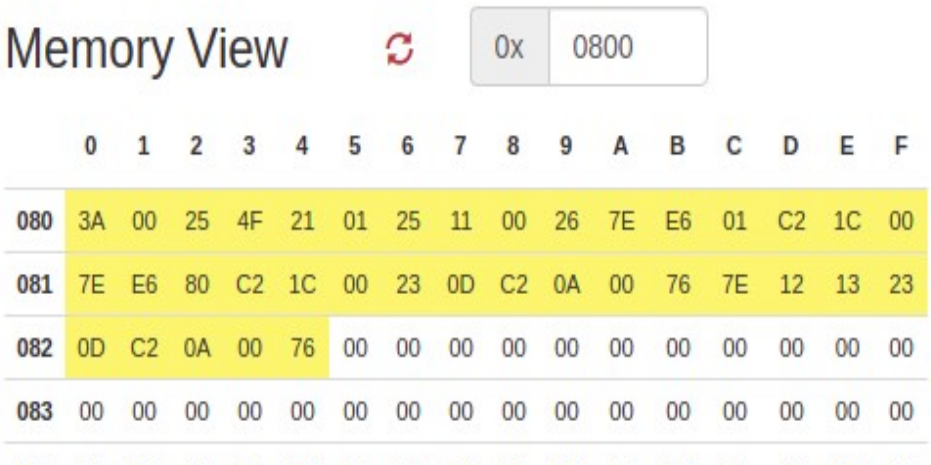
Problem Sheet #3

1. A set of N data bytes is stored in m/m locations starting from 2501H. The value of N is stored in 2500 H . Write a program to store these data bytes from m/m location 2600 H if D 0 or D 7 is 1; otherwise reject the data byte.

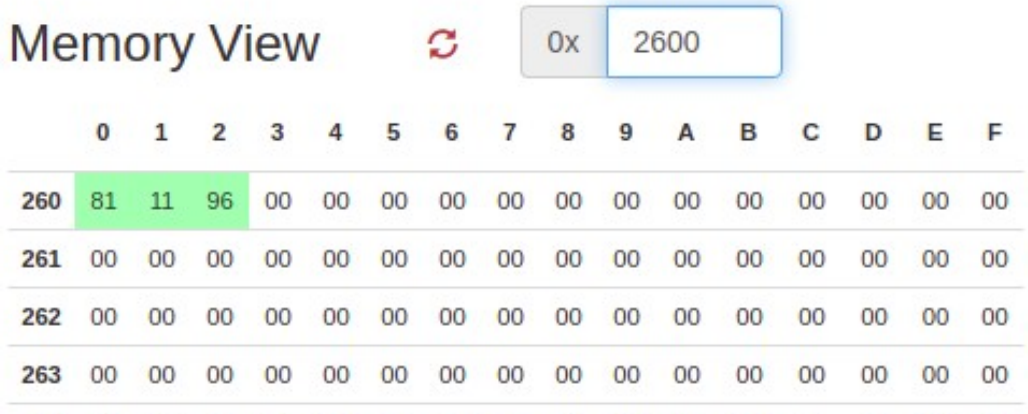
Line#	Address in Hex	Label	Instruction	Opcode (in hex)	Remarks
1	0800		LDA 2500H	3A	A = M[2500H]
2	0801			00	
3	0802			25	
4	0803		MOV C, A	4F	C = A
5	0804		LXI H, 2501H	21	H = 2501H
	0805			01	
	0806			25	
6	0807		LXI D, 2600H	11	D = 2600H
	0808			00	
	0809			26	
7	080A	START	MOV A,M	7E	A = M
8	080B		ANI 01H	E6	A = A AND 01H
	080C			01	
9	080D		JNZ STORE	C2	Jump to STORE if zero does not occur
	080E			1C	
	080F			08	
10	0810		MOV A,M	7E	A = M
11	0811		ANI 80H	E6	A =A AND 80H
	0812			80	
12	0813			C2	Jump to STORE if zero does not

	0814		JNZ STORE	1C	occur
	0815			08	
13	0816		INX H	23	H -> H + 1
14	0817		DCR C	0D	C = C - 1
15	0818		JNZ START	C2	Jump to START if zero does not occur
	0819			0A	
	081A			08	
16	081B	STORE	MOV A,M	7E	A = M
17	081C		STAX D	12	Store value of D at desired location
18	081D		INX D	13	D -> D + 1
19	081E		INX H	23	H -> H + 1
20	081F		DCR C	0D	C = C - 1
21	0820		JNZ START	C2	Jump to START if zero does not occur
	0821			0A	
	0822			08	
22	0823		HLT	76	Halt

Simulator with loaded machine code:



Sample input and output (M[2500]=05H, M[2501]=81H, M[2502]=11H, M[2503]=42H, M[2504]=26H, M[2501]=96H):



2. There are N data bytes stored from m/m location 2200 H . The value of N is stored in 21FF H . Write an 8085 program to find the sum of integers whose LSB and MSB are 1. Store the result in 2500 H and 2501 H .

Line#	Address in Hex	Label	Instruction	Opcode (in hex)	Remarks
1	0800		LDA 21FFH	3A	A = M[24FFH]
2	0801			FF	
3	0802			21	
4	0803		MOV C, A	4F	C = A
5	0804		LXI H, 2200H	21	H = 2501H
	0805			00	

	0806			22	
	0807		MVI B, 00H	06	B = 00H
	0808			00	
	0809		MVI E, 00H	1E	E = 00H
	080A			00	
7	080B	START	MOV A,M	7E	A = M
8	080C		ANI 01H	E6	A = A AND 01H
	080D			01	
9	080E		JNZ PROCEED	C2	Jump to PROCEED if zero does not occur
	080F			19	
	0810			08	
10	0811		INX H	23	H -> H + 1
11	0812		DCR C	0D	C = C - 1
12	0813		JNZ START	C2	Jump to START if zero does not occur
	0814			0B	
	0815			08	
13	0816		JMP FINAL	C3	Jump to FINAL
	0817			33	
	0818			08	
14	0819	PROCEED	MOV A,M	7E	A = M
15	081A		ANI 80H	E6	A = A AND 80H
	081B			80	
16	081C		JNZ STORE	C2	Jump to STORE if zero does not occur
	081D			27	
	081E			08	
17	081F		INX H	23	H -> H + 1
18	0820		DCR C	0D	C = C - 1
19	0821		JNZ START	C2	Jump to START if zero does not occur
	0822			0B	
	0823			08	
20	0824		JMP FINAL	C3	Jump to FINAL
	0825			33	

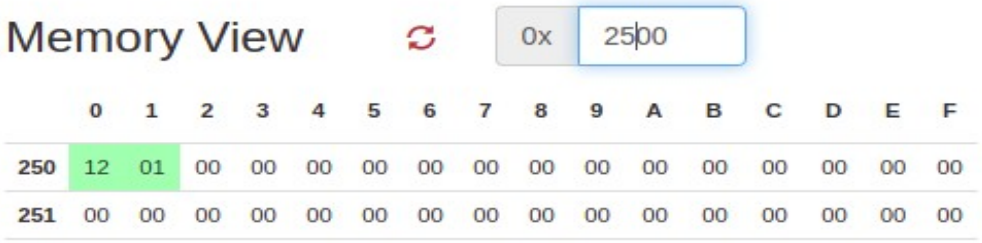
	0826			08	
21	0827	STORE	MOV A,M	7E	A = M
22	0828		ADD B	80	A = A + B
23	0829		JNC SKIP	D2	Jump to SKIP if Cy is not raised
	082A			2D	
	082B			08	
24	082C		INR E	1C	E = E + 1
25	082D	SKIP	MOV B,A	47	B = A
26	082E		INX H	23	H -> H + 1
27	082F		DCR C	0D	C = C - 1
28	0830		JNZ START	C2	Jump to START if zero does not occur
	0831			0B	
	0832			08	
29	0833	FINAL	LXI H, 2500H	21	H = 2500H
	0834			00	
	0835			25	
30	0836		MOV M,B	70	M = B
31	0837		INX H	23	H -> H + 1
32	0838		MOV M,E	73	M = E
33	0839		HLT	76	Halt

Simulator with loaded machine code:

Memory View 0x 0800

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
080	3A	FF	21	4F	21	00	22	06	00	1E	00	7E	E6	01	C2	19
081	00	23	0D	C2	0B	00	C3	33	00	7E	E6	80	C2	27	00	23
082	0D	C2	0B	00	C3	33	00	7E	80	D2	2D	00	1C	47	23	0D
083	C2	0B	00	21	00	25	70	23	73	76	00	00	00	00	00	00
084	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Sample input and output (M[2500]=05H, M[2501]=81H, M[2502]=11H, M[2503]=42H, M[2504]=26H, M[2501]=96H):

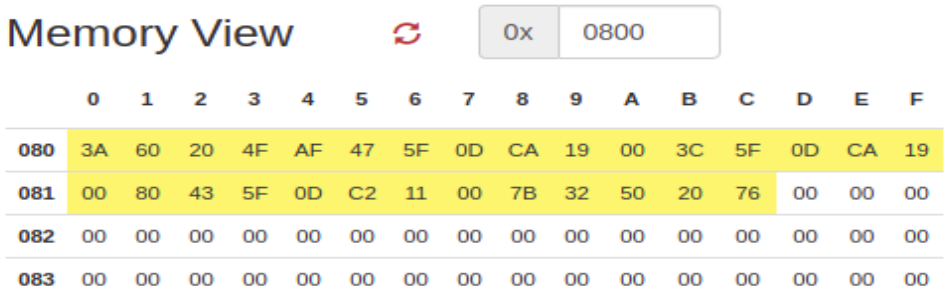


3. Write an 8085 program to generate N th fibonacci number using function and store it in 2050 H . The value of N (8-bits) is stored in memory 2060 H .

Line#	Address in Hex	Label	Instruction	Opcode in Hex	Remarks
1	0800		LDA 2060H	3A	A = M[2060H]
2	0801			60	
3	0802			20	
4	0803		MOV C,A	4F	C = A
5	0804		XRA A	AF	Clear Accumulator
6	0805		MOV B,A	47	B = A
7	0806		MOV E,A	5F	E = A
8	0807		DCR C	0D	C = C - 1
9	0808		JZ EXIT	CA	Jump to EXIT if zero occurs
	0809			19	
	080A			08	
10	080B	LOOP	ADD B	80	A = A + B
11	080C		MOV B,E	43	B = E

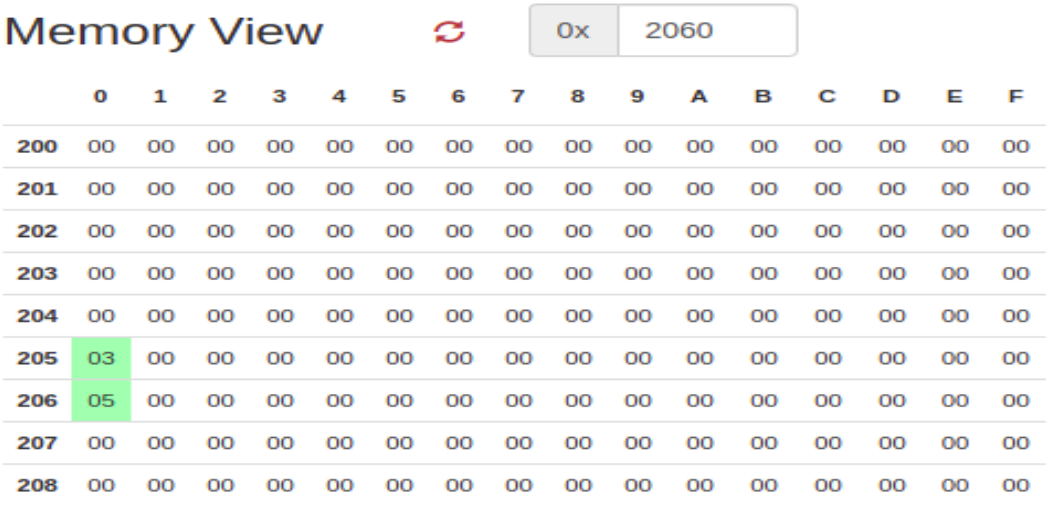
12	080D		MOV E,A	5F	E = A
13	080E		DCR C	0D	C = C - 1
14	080F		JNZ LOOP	C2	Jump to LOOP if zero does not occur
	0810			11	
	0811			08	
15	0812		MOV A,E	7B	A = E
16	0813	EXIT	STA 2050H	32	M[2050H] = A
				50	
				20	
17	0814		HLT	76	Halt

Simulator with loaded machine code:



	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
080	3A	60	20	4F	AF	47	5F	0D	CA	19	00	3C	5F	0D	CA	19
081	00	80	43	5F	0D	C2	11	00	7B	32	50	20	76	00	00	00
082	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
083	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Sample input and output (M[2060H] = 05H, M[2050H] = 03H):



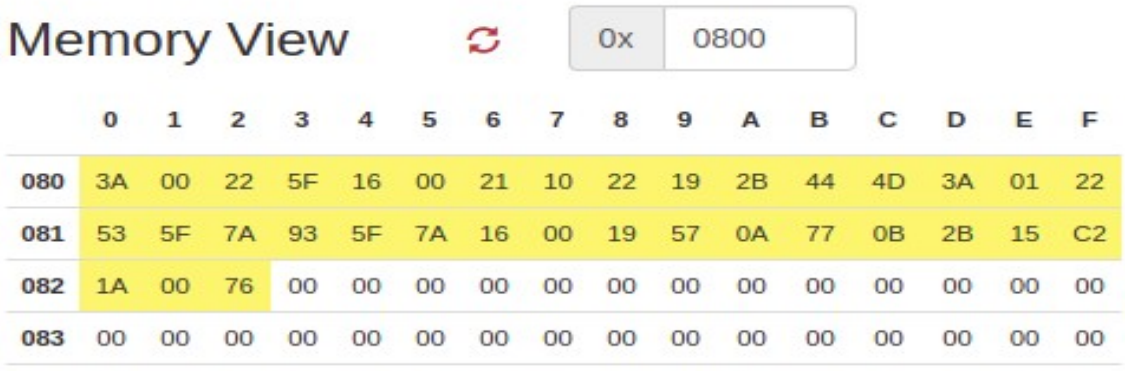
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
200	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
201	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
202	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
203	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
204	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
205	03	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
206	05	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
207	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
208	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

4. Write a program to transfer a block of bytes of size N from location1 to location2 (location2 > location1) when the size of overlap between the two locations is defined by M. The values of N and M are stored in 201E H and 201F H , respectively.

Line#	Address in Hex	Label	Instruction	Opcode in Hex	Remarks
1	0800		LDA 2200H	3A	A = M[2200H]
2	0801			00	
3	0802			22	
4	0803		MOV E,A	5F	E = A
5	0804		MVI D,00H	16	D = 00H
6	0805			00	
7	0806		LXI H, 2210H	21	H = 2210H
	0807			10	
	0808			22	
8	0809		DAD D	19	HL = HL + DE
9	080A		DCX H	2B	H ->H - 1
10	080B		MOV B,H	44	B = H
11	080C		MOV C,L	4D	C = L
12	080D		LDA 2201H	3A	A = M[2201H]
	080E			01	
	080F			22	
13	0810		MOV D,E	53	D = E
14	0811		MOV E,A	5F	E = A
15	0812		MOV A,D	7A	A = D
16	0813		SUB E	93	A = A - E
17	0814		MOV E,A	5F	E = A
18	0815		MOV A,D	7A	A = D
19	0816		MVI D, 00H	16	D = 00H
	0817			00	
20	0818		DAD D	19	HL = HL + DE

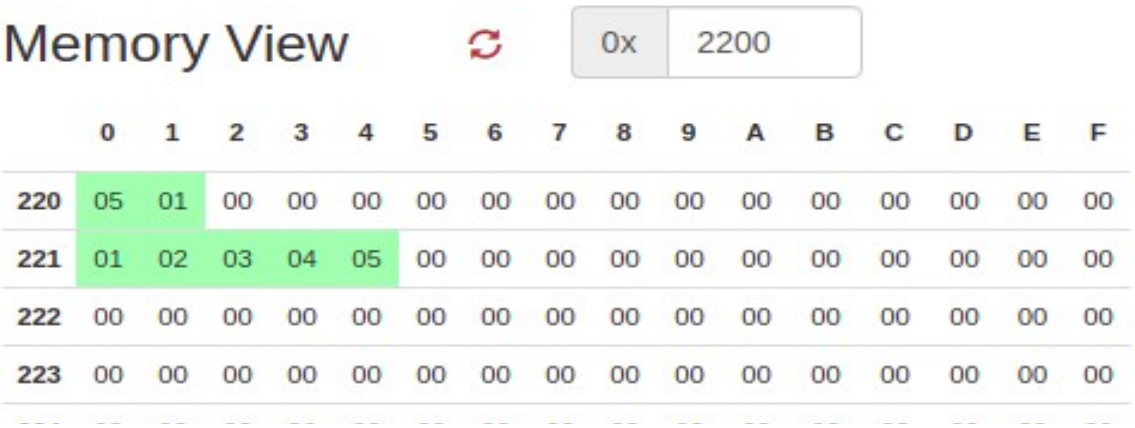
21	0819		MOV D,A	57	D = A
22	081A	REPEAT	LDAX B	0A	A = M[B]
23	081B		MOV M,A	77	M = A
24	081C		DCX B	0B	B -> B - 1
25	081D		DCX H	2B	H -> H - 1
26	081E		DCR D	15	D = D - 1
27	081F		JNZ REPEAT	C2	Jump to REPEAT if zero does not occur
	0820			1A	
	0821			08	
28	0822		HLT	76	Halt

Simulator with loaded machine code:



	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
080	3A	00	22	5F	16	00	21	10	22	19	2B	44	4D	3A	01	22
081	53	5F	7A	93	5F	7A	16	00	19	57	0A	77	0B	2B	15	C2
082	1A	00	76	00	00	00	00	00	00	00	00	00	00	00	00	00
083	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Sample input and output (M[2200] = 05H, M[2201] = 01H, M[2210H] = 01H, M[2211H] = 02H, M[2212H] = 03H, M[2213H] = 04H, M[2214H] = 05H):



	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
220	05	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00
221	01	02	03	04	05	00	00	00	00	00	00	00	00	00	00	00
222	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
223	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

Memory View

0x 2200

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
220	05	01	00	00	00	00	00	00	00	00	00	00	00	00	00	00
221	01	02	03	04	01	02	03	04	05	00	00	00	00	00	00	00
222	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
223	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
224	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00