

Units 4, 5, 6

Data Manipulation

1.

		Description
LOAD R1, 2A	11 2A	Load the value from memory location 2A into register R1.
LOAD R2, 01	22 01	Load the value '01' into register R2.
XOR R1, R2, R2	91 22	Compare the value in register R1 with '01'.
JUMP R1, 30	B1 30	If R2 is equal to '0', JUMP to address 30.
LOAD R2, 00	22 00	Load the value '00' into register R2.
STORE R2, 27	32 27	Store '00' in memory location '27'.
LOAD R1, 7F	11 7F	Load the value from memory location 7F into register R1.
ROTATE R1, 08	A1 08	Reverse the bits in register R1.
STORE R1, 7F	31 7F	Store the reversed value back into memory location '7F'.
HALT	C0 00	End of the program.
LOAD R2, FF	22 FF	(address 30) Load the value 'FF' into register R2.
STORE R2, 27	32 27	Store 'FF' in memory location '27'.
HALT	C0 00	End of the program.

2.

- R0 = 0, R1 = 0, R2 = 0, R3 = 0, ...

	PC	IR	Instruction	Round 1	Round 2
1	1E	14 24	LOAD R4, 24	R4 = MEM[24] = 11	
2	20	10 26	LOAD R0, 26	R0 = MEM[26] = 12	
3	22	23 2F	LOAD R3, 2F	R3 = 2F	
4	24	11 2F	LOAD R1, 2F	R1 = MEM[2F] = 40	R1 = MEM[2F] = 40
5	26	12 25	LOAD R2, 25	R2 = MEM[25] = 2F	R2 = MEM[25] = 30
6	28	A0 20	ADD R2, 01	R2 = 30	R2 = 31
7	2A	32 25	STORE R2, 25	MEM[25] = 30	MEM[25] = 31
8	2C	53 13	ADD R3, R1, R3	R3 = 6F	R3 = AF
9	2E	A0 40	ADD R4, 01	R4 = 12	R4 = 13
10	30	B4 24	JUMP R4, 24	R4 == R0	R4 ≠ R0

11	32	C0 00	HALT		Program Halts
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R0	R1	R2	R3	R4
$(12)_{16} = 18$	$(40)_{16} = 64$	$(31)_{16} = 49$	$(AF)_{16} = 175$	$(13)_{16} = 19$

Ans: 175