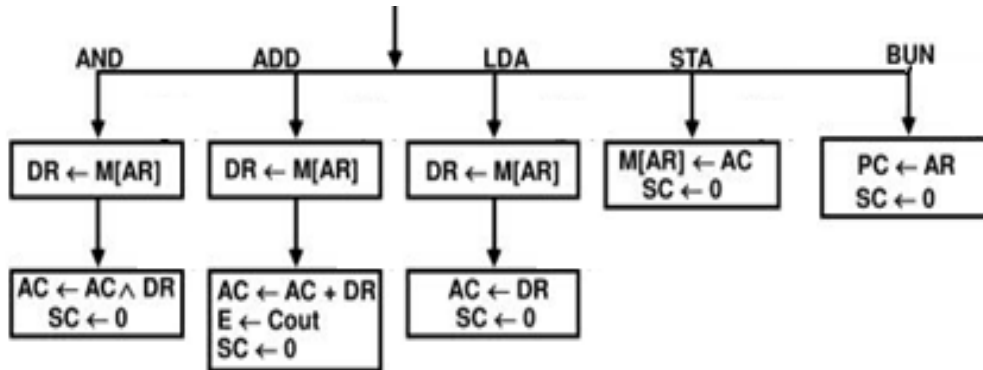


Computer Organization small Projects

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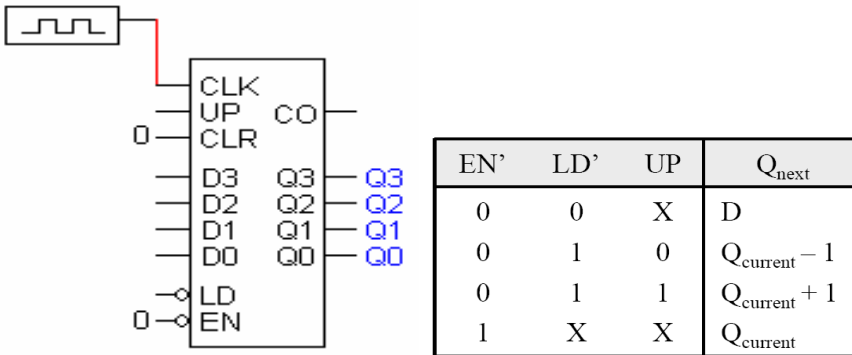
- 1- Give a complete comparative study of 8085, 6502, and NSC micro-processors.
- 2- *SHOW HOW TO* Design a microprogrammed control unit that implement the instructions shown in the following flowchart.



- 3- *SHOW HOW TO* Design an ALU with shifter with the following number of instructions, so that it can do the basic arithmetic and logic operations. according to the following table;

Select	Operation	Symbol
00000	Transfer A	TSFA
00001	Increment A	INCA
00010	ADD A + B	ADD
00101	Subtract A - B	SUB
00110	Decrement A	DECA
01000	AND A and B	AND
01010	OR A and B	OR
01100	XOR A and B	XOR
01110	Complement A	COMA
10000	Shift right A	SHRA
11000	Shift left A	SHLA

- 4- [4.A] Below is a Counter-4 bits. The possible operations on every positive clock edge are summarized in the abbreviated table.



Also, the output CO is equal 0 only when the counter's current state is 1111 and UP = 1, or when the current state is 0000 and UP = 0:

$$CO = (Q_3 Q_2 Q_1 Q_0 UP + Q_3' Q_2' Q_1' Q_0' UP')'$$

Show how you can add *primitive gates only* to make $Q_3 Q_2 Q_1 Q_0$ count in the following repeating sequence. 7, 6, 5, 4, 3, 2, 1, 0, 8, 9, 10, 11, 12, 13, 14, 15, ...

[4.B] Consider a 4-bit register with the following

- parallel data inputs ABCD
- left serial input LSI (This is the serial input for a left shift.)
- right serial input RSI = 0 (This is the serial input for a right shift.)
- The three control inputs S2, S1, S0 operate as shown in the following table. Show the design of the register using MUXs and FFs [Flip Flop]

S2	S1	S0	Operation
0	0	0	left shift
0	0	1	circular left shift
0	1	0	right shift
0	1	1	circular right shift
1	0	0	no change
1	0	1	parallel load
1	1	0	complement each bit
1	1	1	set to 1111

5- *SHOW HOW TO* Design a hardwired control unit that implement the instructions shown in the following table.

	Operation	Symbol
1.	Transfer A	TSFA
2.	Increment A	INCA
3.	ADD A + B	ADD
4.	Subtract A - B	SUB
5.	Decrement A	DECA
6.	AND A and B	AND
7.	OR A and B	OR
8.	XOR A and B	XOR
9.	Complement A	COMA
10.	Shift right A	SHRA
11.	Shift left A	SHLA