BRAC University

CSE260 - Assignment 03 - Summer '22

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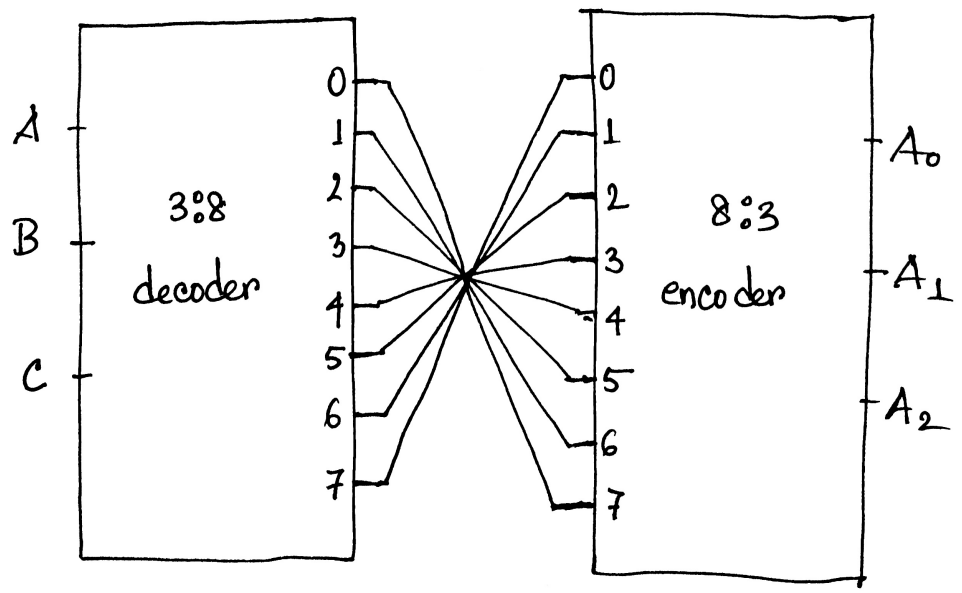
Answer to question no. 01

A circuit that implements the 1's complement number system using encoder and decoder.

Truth table:

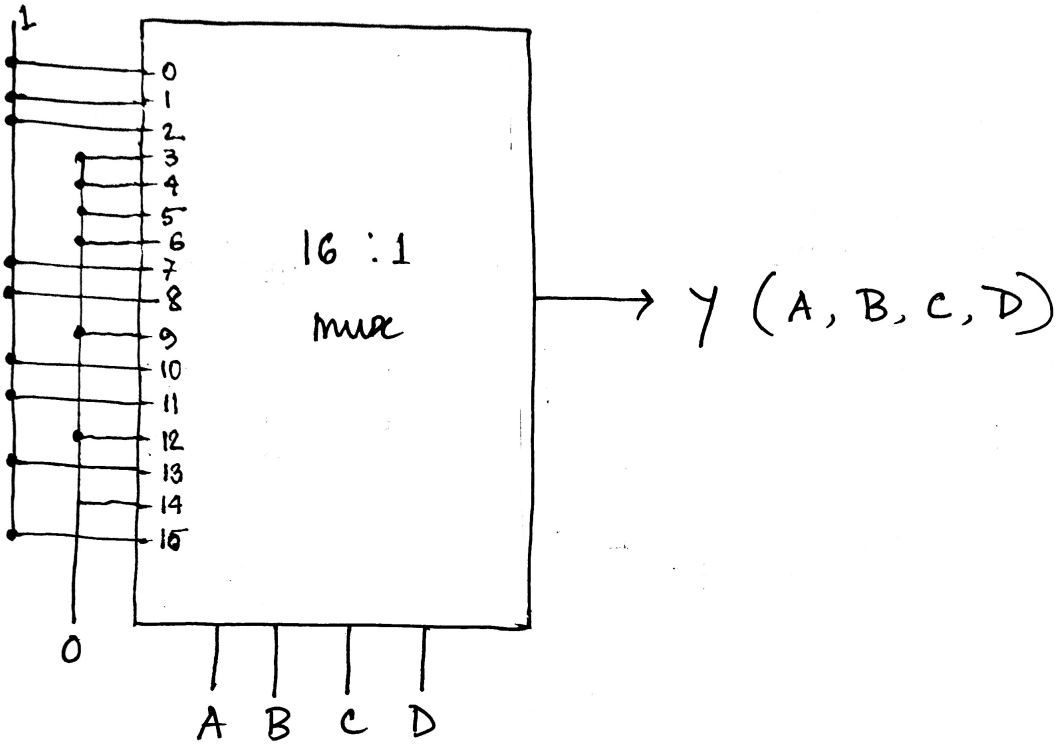
Minterms	C	B	A	Minterms	A_2	A_1	A_0
0	0	0	0	7	1	1	1
1	0	0	1	6	1	1	0
2	0	1	0	5	1	0	1
3	0	1	1	4	1	0	0
4	1	0	0	3	0	1	1
5	1	0	1	2	0	1	0
6	1	1	0	1	0	0	1
7	1	1	1	0	0	0	0



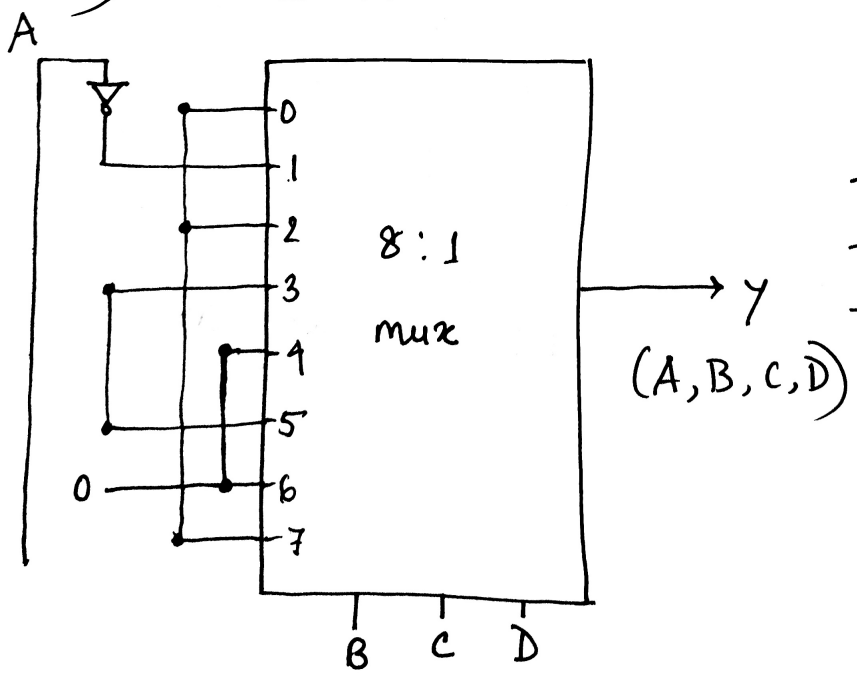
Answer to question no. 02

$$F(A, B, C, D) = \Sigma (0, 1, 2, 7, 8, 10, 11, 13, 15)$$

a) 16 : 1 mux



b) 8 : 1 mux.

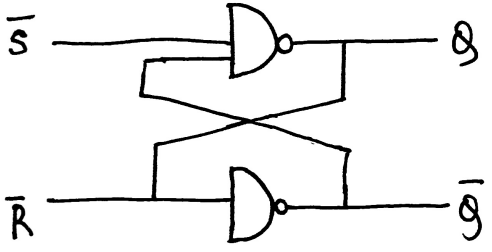


0	1	2	3	4	5	6	7	
1	1	1	0	0	0	0	1	$\bar{A}$
1	0	1	1	0	1	0	1	A
1	$\bar{A}$	1	A	0	A	0	1	

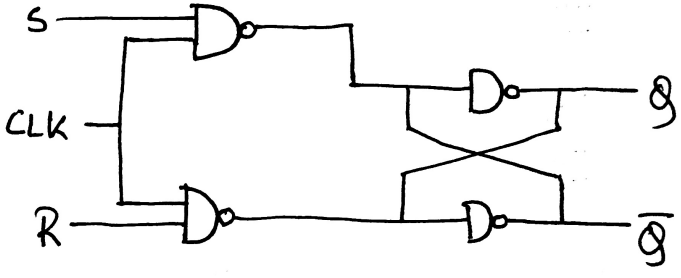
Answer to question no. 03

SR latch and SR FF are two completely different things. The difference is a gating or clocking mechanism. SR latch is dependent on the inputs. On the other hand, SR FF is triggered by the clock.

SR Latch



SR Flip-Flop



Truth Tables

SR Latch

S	R	Q	$\bar{Q}$
0	0	not used	
0	1	1	0
1	0	0	1
1	1	no change	

SR Flip-Flop

S	R	Q	$\bar{Q}$
0	0	No change	
0	1	0	1
1	0	1	0
1	1	not used.	

Answer to question no. 04

Truth table of D FF:

D	Q_n	Q_{n+1}
0	x	0
1	x	1

Exitation table of Jk:

Q_n	Q_{n+1}	J	k
0	0	0	x
0	1	1	x
1	0	x	1
1	1	x	0

Now the table is:-

D	Q_n	Q_{n+1}	J	K
0	0	0	0	x
0	1	0	x	1
1	0	1	1	x
1	1	1	x	0

Equation of 'J' using k-map:

Q_n \ D	0	1
0		1
1	x	x

Therefore $J = D$.

Equation of 'k' using k-map:

Q_n \ D	0	1
0	x	x
1	1	

Therefore $k = \overline{D}$

Circuit Diagram