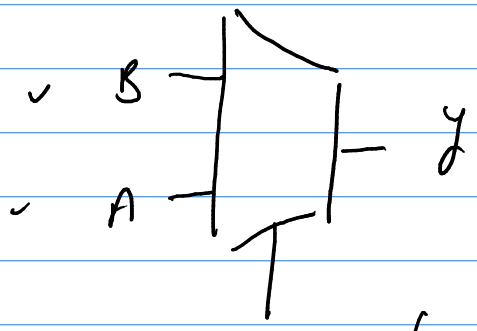
11 - 04 - 2022

Lecture # 6

Y = En = A , B

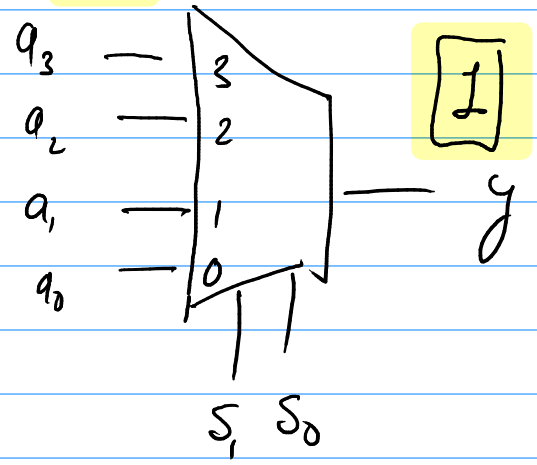
A = 0

B = 1



S (Select line).

2^n



1

n

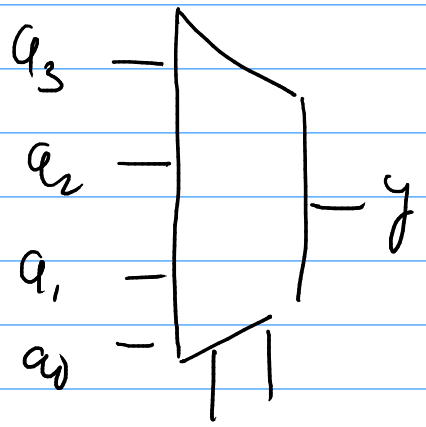
Y	S_1	S_0
q_0	0	0
q_1	0	1
q_2	1	0
q_3	1	1

2 : 1

$y = A$ $\quad$ $S = 0$

$y = B$ $\quad$ $S = 1$

$$y = S' \cdot A + S \cdot B$$



y	S_1	S_0
q_0	0	0
q_1	0	1
q_2	1	0
q_3	1	1

$$y = S_1' S_0' \cdot q_0 + S_1' S_0 \cdot q_1 + S_1 S_0' q_2 + S_1 S_0 q_3$$

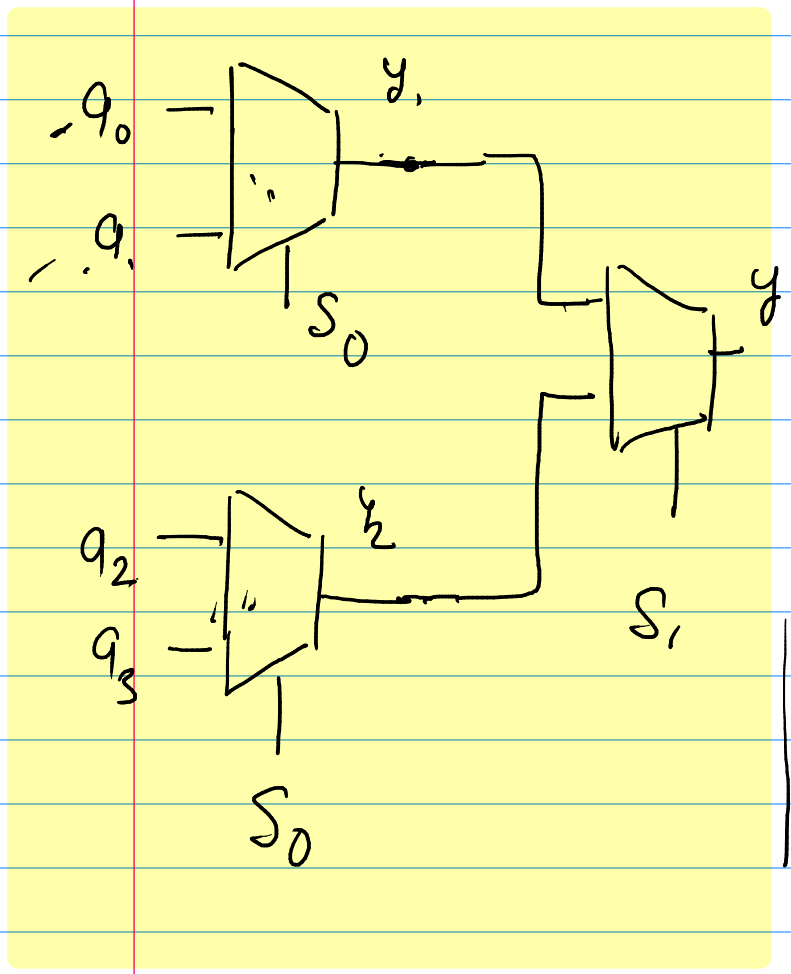
Multiplexer

2:1 , 4:1 , 8:1

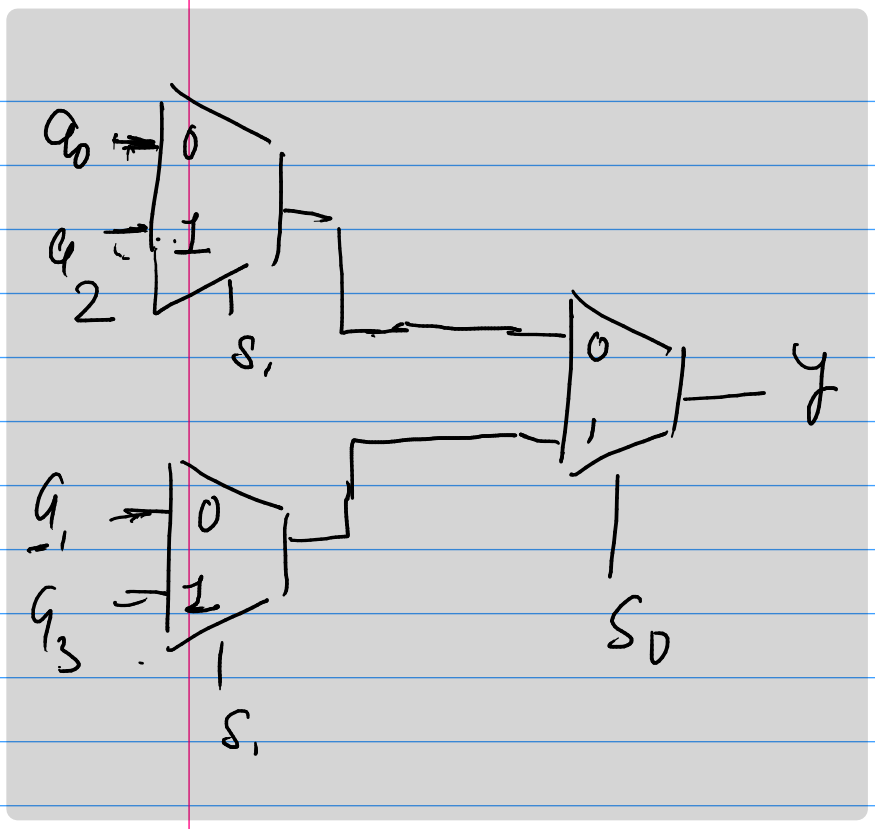
2^n = i/p

n = select line

1 = o/p

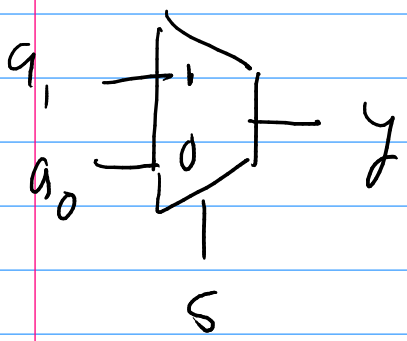


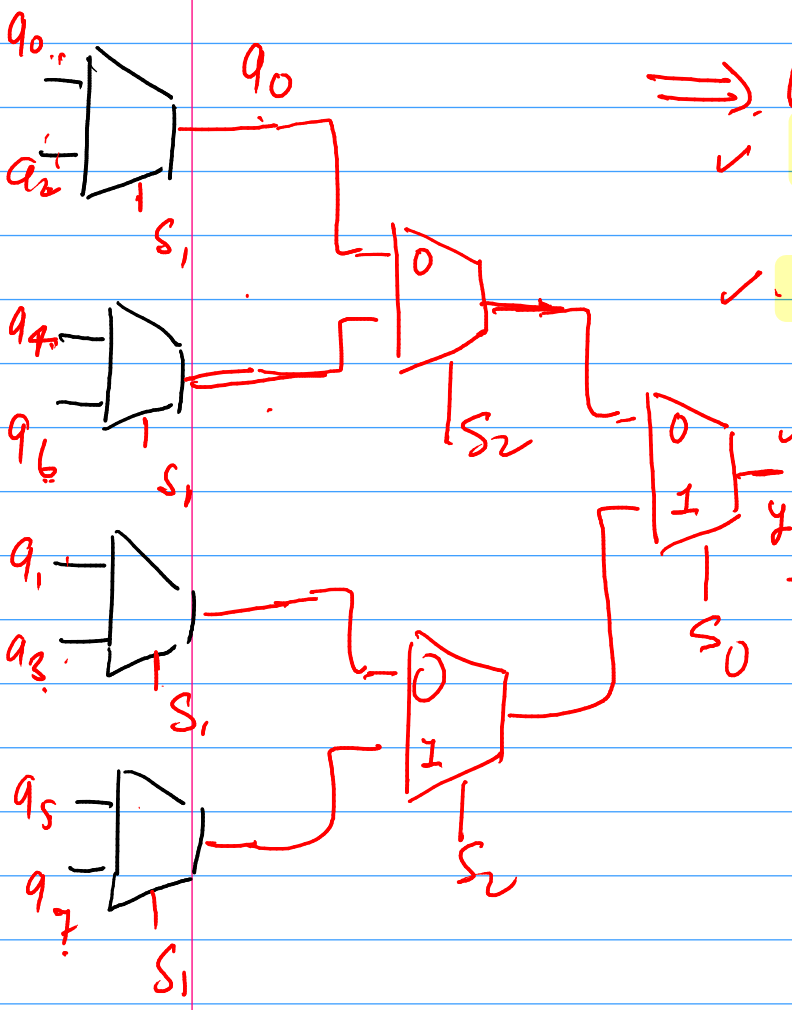
y	S_1	S_0
q_0	0	0
q_1	0	1
q_2	1	0
q_3	1	1



y	S_1	S_0
q_0	0	0
q_1	0	1
q_2	1	0
q_3	1	1

Q ⇒ Can you do 8:1 mux using 2:1 mux





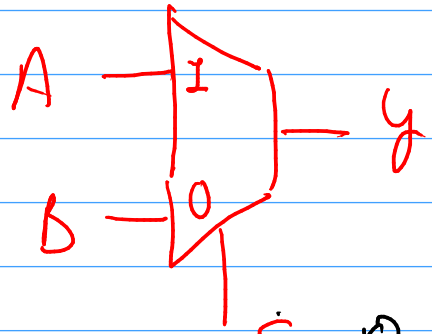
y	S_2	S_1	S_0
q_0	0	0	0
q_1	0	0	1
q_2	0	1	0
q_3	0	1	1
q_4	1	0	0
q_5	1	0	1
q_6	1	1	0
q_7	1	1	1

2:1

2:1 Mux

$A \cdot B$

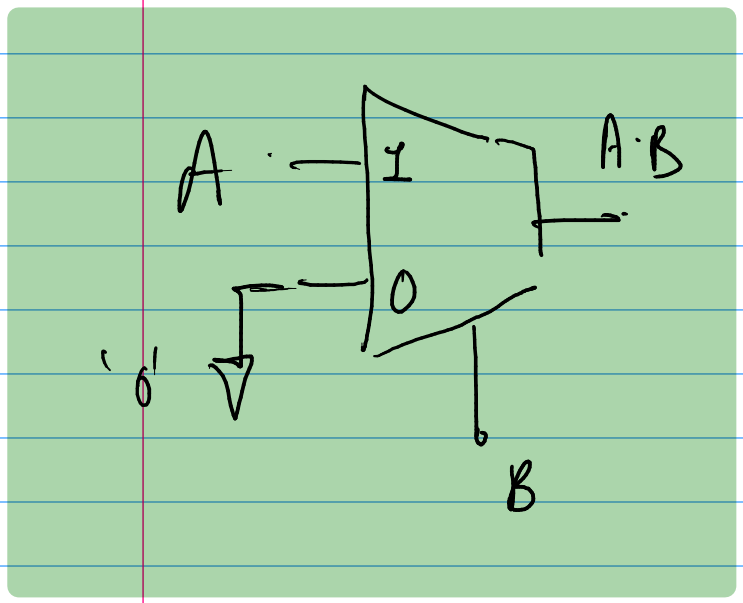
Y



$y = A.S + B.S'$

B

+ 0



$AB + 1 \cdot B' = Y$

$AB + 0$

AB

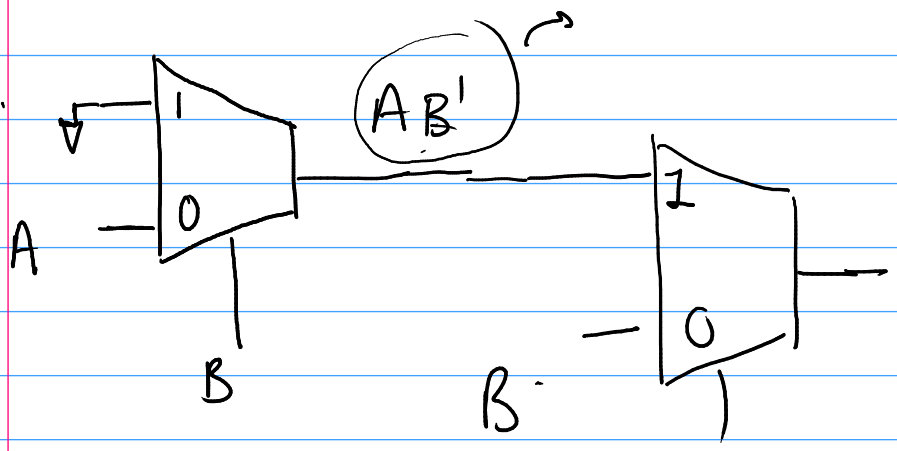
AB

$= AB' + A'B$ ↝

$Y = SA + S'B$

$= AB'$

$AB' \cdot A + A'B$



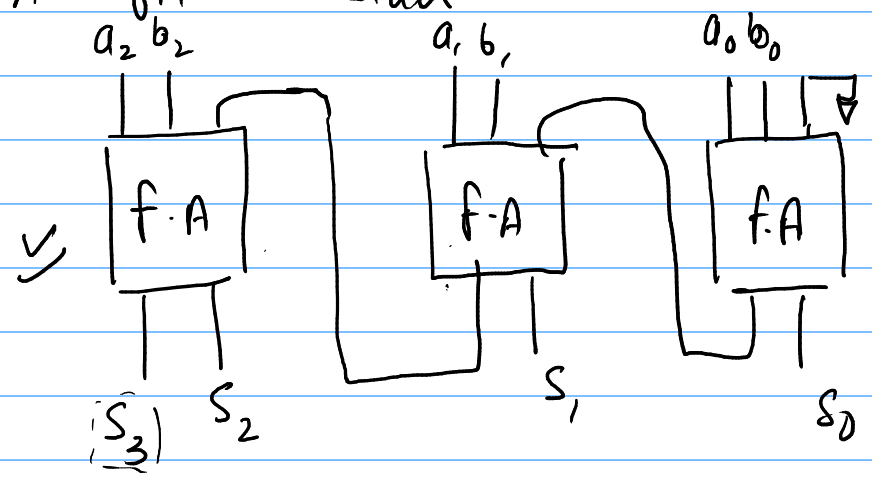
$AB' \cdot A + A'B$

$= AB' + A'B$

$= A \oplus B$

#

n bit adder



$S = A \oplus B \oplus C$

$C_4 = AB + BC + CA$

OR

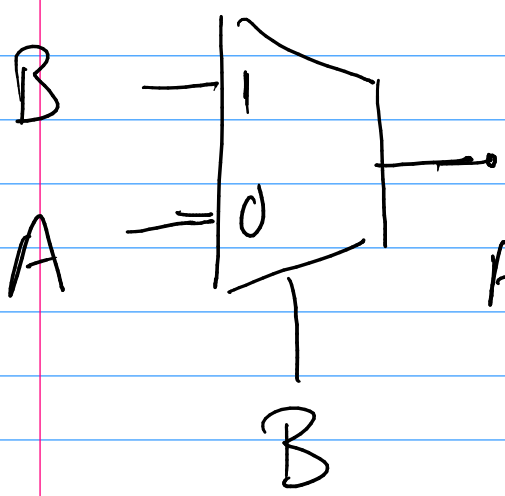
$\Rightarrow$ $A + B$

$AB' + B =$

$\Rightarrow$ $AB' + B \cdot B = Y$

$AB' + B = Y$

$A + B = Y$



$AB' + B$

$= A + B$

$Y = B\,a_1 + B'a_0$

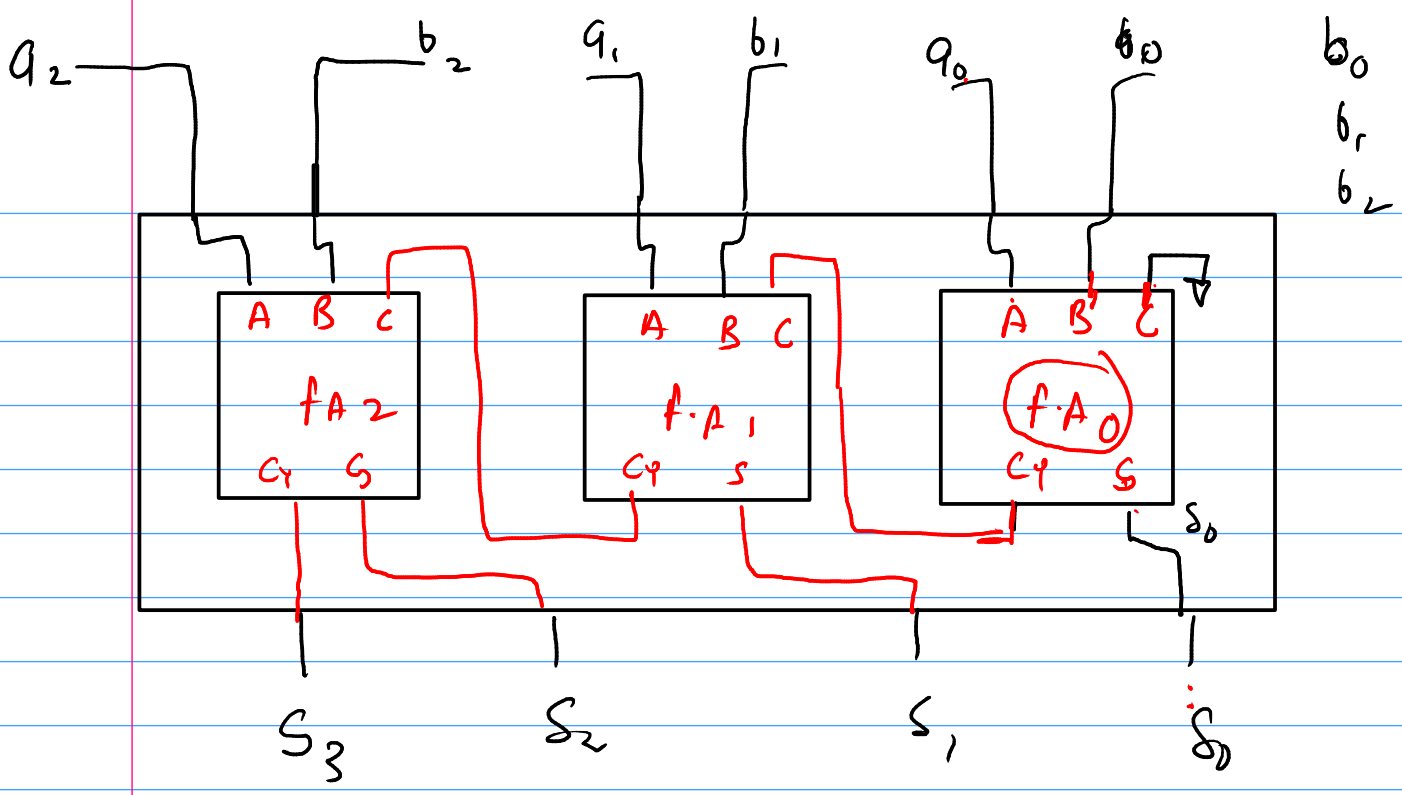
$Y = A \cdot B' + B \cdot B$

$AB' + A'B$

$A'B' + AB$

2

2:1 mux



Module (A , B , C , S , C_y)

$S = A \oplus B \oplus C$

$C_y = AB + BC + CA$

End module