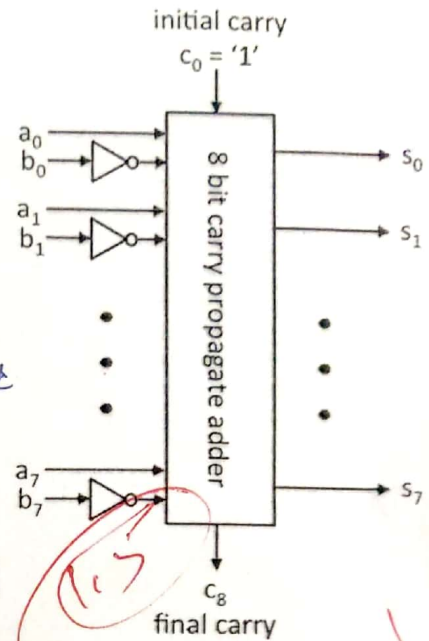


Left neighbour	Your Name	Your Entry No.	Right neighbour
Prakhar Gargesh	Arman Agarwal	2015CS10210	Romak Agarwal

COL215 Digital Logic and System Design Quiz 2 (Set A) 20.09.2016

Q 1. As shown in the figure, an 8-bit carry propagate adder takes two inputs $A = \langle a_7 \dots a_0 \rangle$ and $B = \langle b_7 \dots b_0 \rangle$ and produces an output $S = \langle s_7 \dots s_0 \rangle$. A, B and S are 8-bit signed integers represented in 2's complement form. B is connected to the adder through inverters. The initial carry input c_0 is wired to '1'. The final carry output is c_8 . Show the logic to determine if $A < B$. Note that you don't have access to the signals internal to the carry propagate adder.



The adder is effectively subtracting B from A so if $A < B$ then we say that there has been an overflow in the adder.

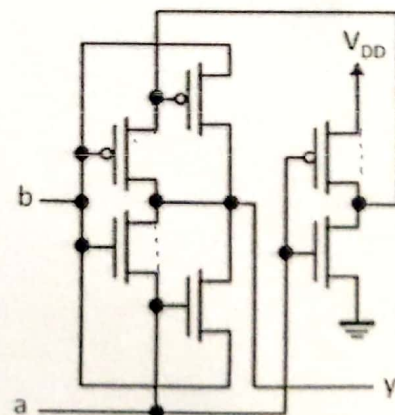
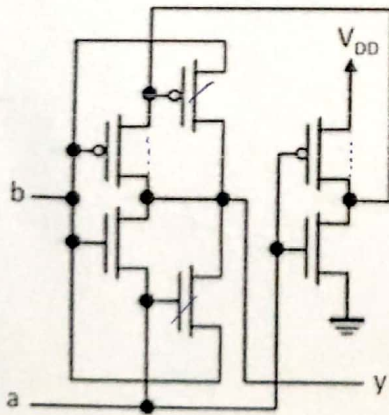
For the overflow we have $c_8 \neq c_7$

Now c_7 can be generated as $a_7 \oplus \bar{b}_7 \oplus s_7$

So $A < B$ if $c_8 \neq c_7 \Rightarrow (c_8 \oplus (a_7 \oplus \bar{b}_7 \oplus s_7))$
 $A < B \equiv (c_8 \oplus a_7 \oplus \bar{b}_7 \oplus s_7)$

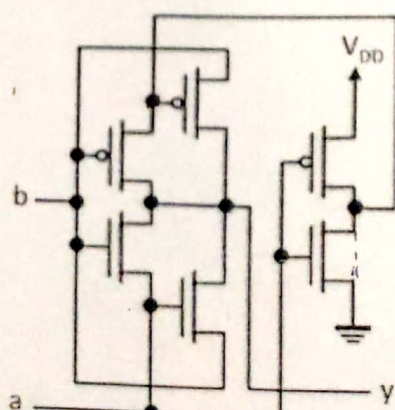
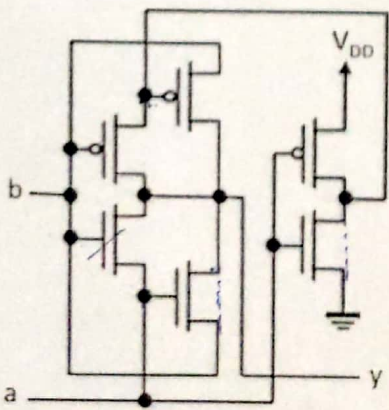
Q 2. Find out what does the circuit shown in the figure do. Does it produce good voltage levels for all values of 'a' and 'b'? Four copies of the circuit are shown to facilitate analysis for different values of 'a' and 'b'.

$a = 0, b = 0$
 $y = 1$



$a = 0, b = 1$
 $y = 0$

$a = 1, b = 0$
 $y = 0$



$a = 1, b = 1$
 $y = 1$

This circuit basically calculates the XNOR of a, b

Good / bad voltage?