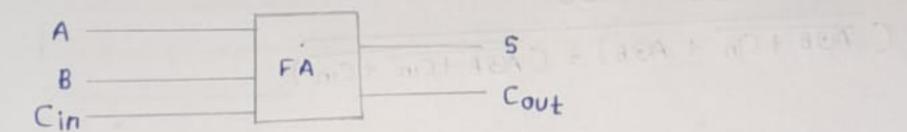
Name - D. Udari Nilushika Silva Reg. No - ASP/2022/089 Index - 5874

Design of a full adder using NOR gates.

There are three inputs [A, B (binary bits), Cin (carry in bit)] and two outputs [sum (s), Carry out bit (Cout)].



Truth table :-

Inputs			Outputs	
Α	В	Cin	5	Cout
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1.
1	0	0	1	0
1	0	- 1	0	1
1	1	0	a	1
1	1	1	1	1

Logical expressin for Sum, $S = \overline{ABC} + \overline{ABC}_{in} + \overline{ABC}_{in} + \overline{ABC}_{in} + \overline{ABC}_{in}$ $= C_{in} (\overline{AB} + \overline{AB}) + \overline{C}_{in} (\overline{AB} + \overline{AB})$ $= CA \bigcirc B) C_{in} + CA \bigcirc B) \overline{C}_{in}$ $= (\overline{A \bigcirc B}) . C_{in} + CA \bigcirc B) \overline{C}_{in}$ $= (\overline{A \bigcirc B}) . C_{in} + CA \bigcirc B) \overline{C}_{in}$ $= A \bigcirc B \bigcirc C_{in}$

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Logical expression for Carry out, $Cout = \overline{A}BCin + A\overline{B}Cin + AB\overline{C}_{in} + AB\overline{C}_{in}$ $= BCin (\overline{A} + A) + A\overline{B}C_{in} + AB\overline{C}_{in}$ $= BC_{in} + A\overline{B}C_{in} + AB\overline{C}_{in} (A + \overline{A}) = 1$ $= C_{in} (B + A\overline{B}) + AB\overline{C}_{in}$ $= Cin (A + B) + AB\overline{C}_{in} (\overline{A}B + A = B + A)$ $= Cin A + Cln B + AB\overline{C}_{in}$ $= Cin B + A (B\overline{C}_{in} + Cin)$

= CinB + AB + AC

= CB + A (B+c) (BEin+Cin=B+Cin)

Simplify for NOR gates. S = A + B + Cin ABB. Cin + ABB. Cin CATB. Cin + ADB) (AGBCin+Cin) (ATB+Cin+ ATB) (ATB+Cin+Cin) (ATB + Cin + ATB) + (ATB + Cin + Cin) : AHB = AOB = (AOB + Cin + AOB) + (AOB + Cin + Cin) Cout = AB + BCin + ACin = AB + AB + ACin + BCin = AB + AAB + ACin + BAB + BAB + BCin = (A+B) CAB + AB + Cin) = (A+B) ((AOB) +Cin) = (A+B) (LAOB+Cin) = CA+B + (AOB)+Cin) diagram Logic Logical expression for Carry and or an table to Tan tr A STATISTA TOTAL "CIA SAN SHAT GENDAL m 138 + 3 10 1840 LADENSE DAL BIED Cout (488 (2183) (316 A 13) DATAA + BITT