

When we have to subtract several columns of binary digits, we must take into account the borrowing. We will have to keep the track of the difference and borrow as shown in fig 3 below

$$\begin{array}{r}
 \begin{array}{cccccc}
 32s & 16s & 8s & 4s & 2s & 1s \\
 | & 0 & 0 & 1 & 0 & 1 & A & \text{Input} \\
 - & & & 1 & 0 & 1 & 0 & B & \text{output} \\
 \hline
 & & & 1 & 1 & 0 & 1 & 1 & \text{Diff.}
 \end{array}
 \end{array}$$

Fig - 3.

A truth Table I is given for full subtractor. Logic symbol is shown in figure 1 and basic block diagram is shown as in fig 2. Ex - line 5 of table I is the situation in the 1s column of fig 3. The 2s column equals the line 3, the 4s column line 6, the 8s column line 3, the 16s column line 2, and 32s column line 6 of the Table I.

The inputs A, B and Bin are on the left and outputs D<sub>2</sub> & B<sub>0</sub> are on the right. The logic circuit of Full Subtractor is shown in fig 4.

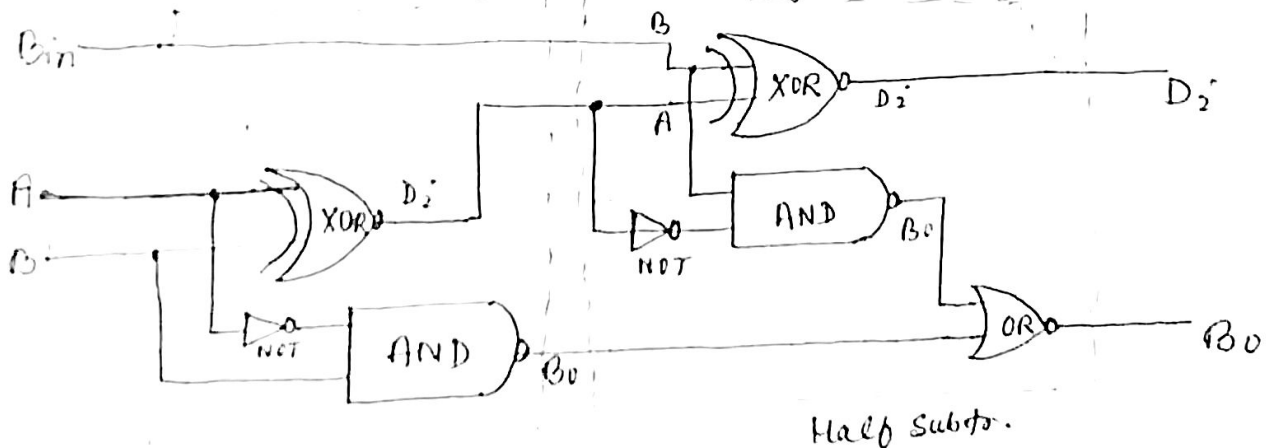


Fig - 4: Logic circuit of Full Subtractor with help of 2 Half Subtr. & 1 - OR gate.

Truth Table 1 for full subtractor

	Inputs			Outputs	
	A	B	Bin	Diff	Bo (Borrow)
1	0	0	0	0	0
2	0	0	1	1	1
3	0	1	0	1	1
4	0	1	1	0	1
5	1	0	0	1	0
6	1	0	1	0	0
7	1	1	0	0	0
8	1	1	1	1	1

A
-B
-Bin
Diff
Borrow out

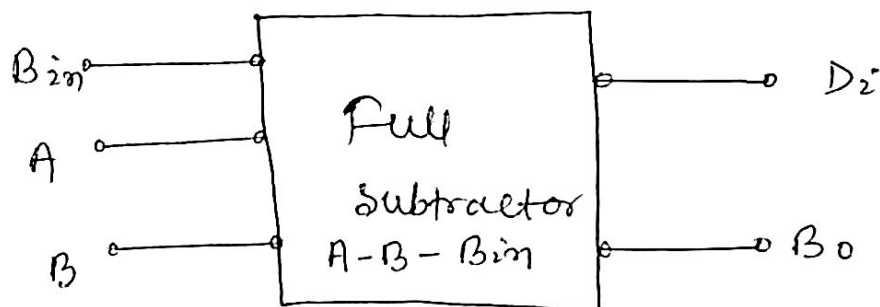


Fig. 1 Block Symbol for Full Subtractor.

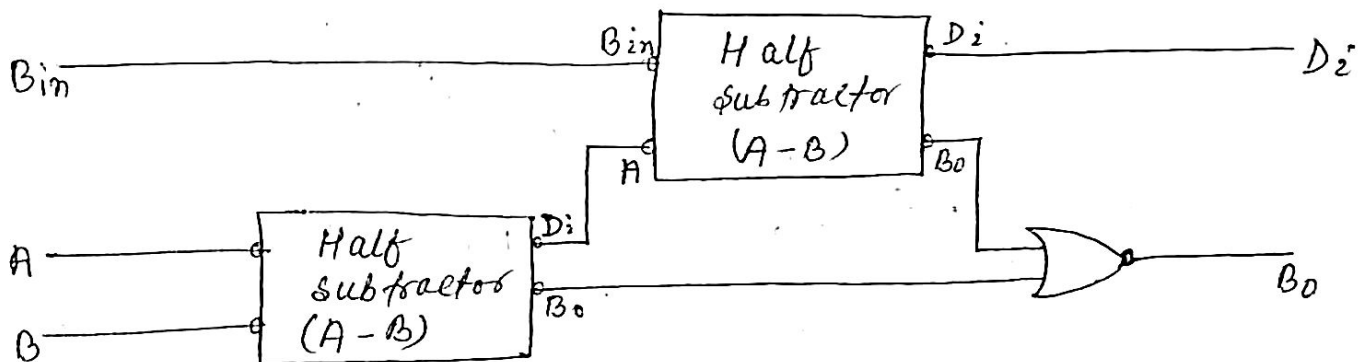


Fig-2. Full Subtractor with Half subtractor and OR-gate.

# FULL SUBTRACTOR.

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32s	16s	8s	4s	2s	1s	
		0	0			
1	0	0	1	0	1	A } input
-			1	0	1	-B } input
<hr/>						
	1	1	0	1	1	Difference } output