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Lab-6

→ Design Procedure, Truth Table, and logic diagram

- Given variables: HS(headlights), D(door), IS(ignition), A(Alarm)
  [CLOSED/OFF = 0, OPEN/ON = 1]

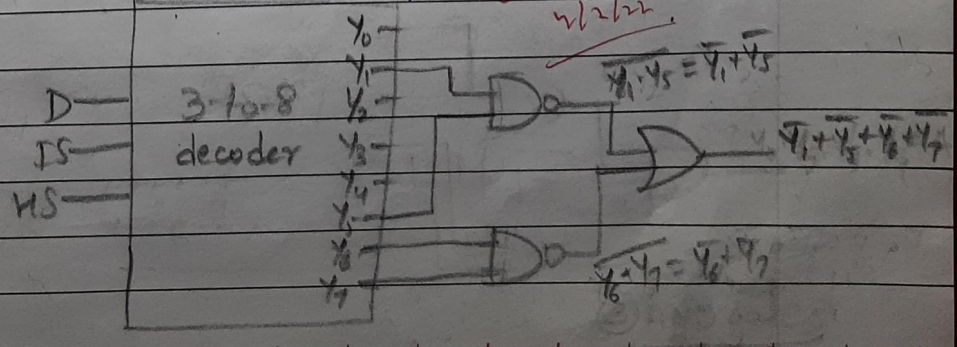
- Based on conditions given for alarm ON:-
  condition1: $HS \cdot \overline{IS}$ } $\Rightarrow A = HS \cdot \overline{IS} + D \cdot IS$
  condition2: $D \cdot IS$ }

- Truth table: (Enable = 1) For the negative logic 3-to-8 decoder.

D	IS	HS	A
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

$Y_0 = D + IS + HS$
$Y_1 = D + IS + \overline{HS}$
$Y_2 = D + \overline{IS} + HS$
$Y_3 = D + \overline{IS} + \overline{HS}$
$Y_4 = \overline{D} + IS + HS$
$Y_5 = \overline{D} + IS + \overline{HS}$
$Y_6 = \overline{D} + \overline{IS} + HS$
$Y_7 = \overline{D} + \overline{IS} + \overline{HS}$

- Using a 3:8 decoder,
  $A = \overline{Y_1} + \overline{Y_5} + \overline{Y_6} + \overline{Y_7}$



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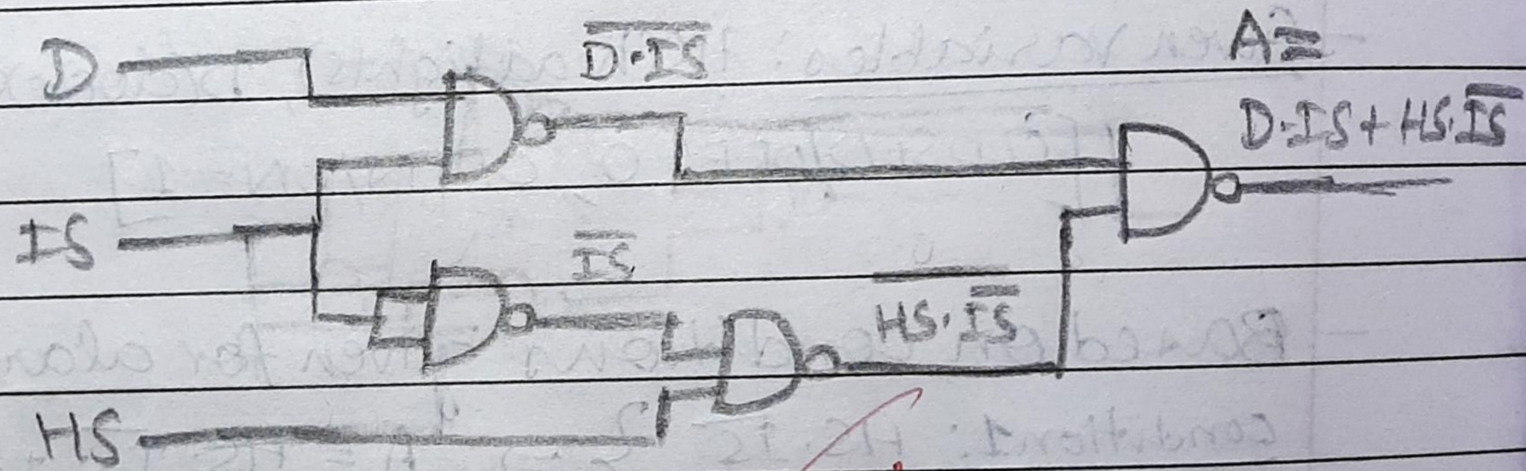
- using only 2-input NAND gates:



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