

An automobile circuit used to detect certain undesirable conditions. The three switches are in the figure used to indicate the status of the door by the driver's seat, the ignition and the headlights respectively. Design the logic circuit with these three switches as inputs so that the alarm will be activated whenever either of the following conditions exists:

- i) The headlights are on while the ignition is off.
- ii) The door is open while the ignition is on.

Solution:

The Alarm output will be a logic 1 for two cases whenever Door=0 and Ignition=1 because this indicates the door is OPEN and the Ignition is ON. Alarm will also be a 1 for the two cases where Lights are ON and Ignition is OFF.

1. Truth Table :

Inputs			Output
Door	Ignition	Lights	Alarm
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0

2. MAP :

Door \ IgnitionLights	00		01		11		10	
0			1		1		1	
1			1					

Fig: Map for Alarm

$$Alarm = (Door)' (Lights + Ignition) + (Ignition)' Lights$$

3. Circuit Diagram :

