STEP:1

The Challenge  
Background: Safely Riding a Car

**Problem statement**

Need to create a logic to alert whenever the driver’s or the passenger’s seats are occupied, but seatbelts are not fastened. The active-HIGH signals DRIV and PASS indicate the presence of the driver and passenger, respectively, and are taken from pressure-actuated switches in the seats.

STEP:2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| symbol | | meaning | Type | Active logic |
| DRIV | | Driver is in the seat | Input | HIGH |
| PASS | | Passenger is in the seat | Input | HIGH |
| ING | | Ignition switch is ON | Input | HIGN |
| BELTD | | Passenger’s seatbelt unfastened | Input | LOW |
| BELTP | | Driver’s seatbelt unfastened | Input | LOW |
| ALARM | Alarm signal (active LOW=sounds when 0) | | Output | LOW |

STEP:3

Monitor ignition status: IGN must be high

check if driver is seated and driver’s belt is not fastened

DRIV=1 and BELTD=0

Check if passenger is seated and passenger’s belt is not fastened:

PASS=1 and BELTP=0

If either condition above is true or IGN=1, then output will be low

Otherwise, alarm remains HIGH (off)

STEP:4

Boolean Expression:

ALARM ON =1

ALARM=ing (driv.dbelt+pass.pbelt)

Step 4: word coding

Check ignition status

If ignition==1

{

If ((driv.dbelt+pass.pbelt)==0)

Do not trigger alert sound

Else

Trigger alert sound

}

Step 5: checking result

|  |  |  |  |
| --- | --- | --- | --- |
| S.N | Conditions | Expected output | Actual output |
| 1. | Ing=on, pass=1, driv=1, pbelt=1, dbelt | 0 | 0 |
| 2. | Ing=off, pass=1, driv=1, pbelt=1, dbelt=1 | 0 | 0 |
| 3. | Ing=on, pass=1, driv=1, pbelt=0, dbelt=1 | 1 | 1 |
| 4. | Ing=on, pass=1, driv=1, pbelt=1, dbelt=0 | 1 | 1 |