CS.3650 Quiz 1

Design a combinational circuit that turns On the B(uzzer) whenever the D(oor) is Open OR when  
the K(ey) is in the Ignition AND the S(eat belt) is NOT Buckled. Please consider the following  
notations:  
0 : Seat Belt is NOT Buckled  
1 : Seat Belt is Buckled  
0 : Key is NOT in the Ignition  
1 : Key is in the Ignition  
0 : Door is NOT Open  
1 : Door is Open  
0 : Buzzer is OFF  
1 : Buzzer is ON  
Determine the following:  
• Truth Table  
• Simplify Boolean expression (K Map)  
• Logic Gates

Solution:

Buzzer = B; Door = D; Seatbelt = S; Key = K

Statement: B = 1 if D = 1 OR (K = 1 AND S = 0)

Truth Table

|  |  |  |  |
| --- | --- | --- | --- |
| D | K | S | B |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

K-Map

A grid of numbers and letters

Description automatically generated

Expression – D + KS’

A hand writing on a piece of paper

Description automatically generated