LABORATORY EXERCISE NO. 7: DON'T CARE CONDITION

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Objective/s:

After performing the exercises, the student should be able to:

1. understand the concepts Don't Care Condition; and
2. apply the concepts Don't Care Condition.

Discussion:

Don't Care Condition/Combinations

In certain digital systems, some input combinations never occur during the process of a normal operation because those input conditions are guaranteed never to occur. Such input combinations are called Don't Care Conditions. The functions are called incompletely specified functions. These input combinations can be plotted on the Karnaugh map for further simplification of the function. The don't care combinations are represented by d or x or Φ.

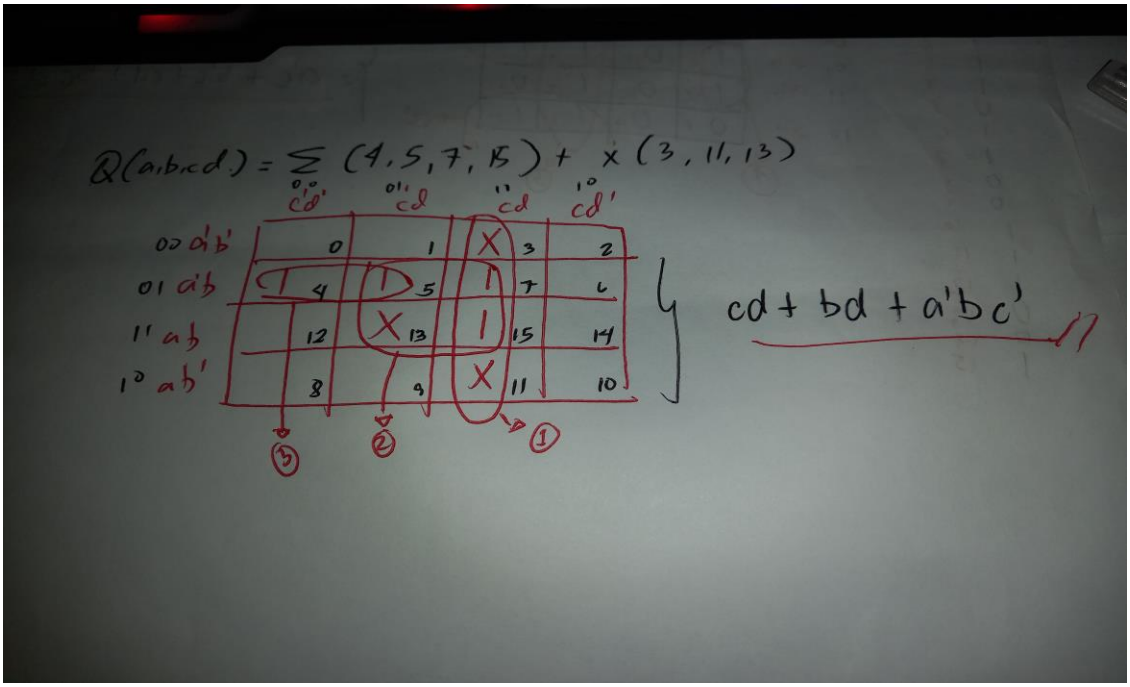
Note that all the prime implicants in the K-map should be in a group, but not in the case of Don't Care Conditions, not all the Don't Case Conditions should be in a group. You can include the Don't Care Condition in a group if it would be a help to further simplify the function, as long as it still follows the rules in K-mapping.

PROCEDURE

1. Get the simplified function of the following given:

$$Q_{(a,b,c,d)} = \Sigma\,(4,5,7,15) + x(3,11,13)$$

Solution:



2. Design the logic circuit of the simplified function.
3. Attach logic circuit diagram you designed.

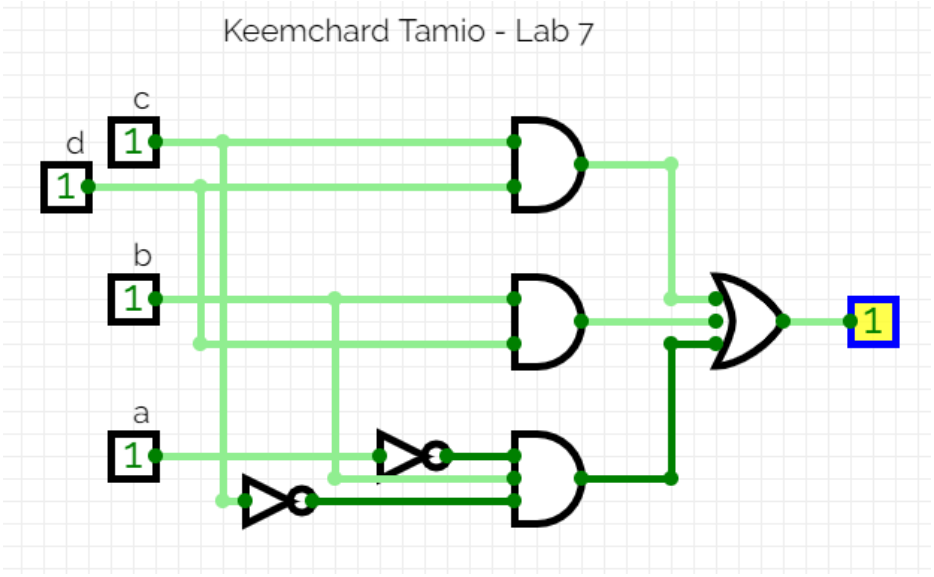


Figure 1. Logic circuit for the given function

4. Construct the circuit on www.tinkercad.com .
5. Attach the screen capture of the logic circuit.

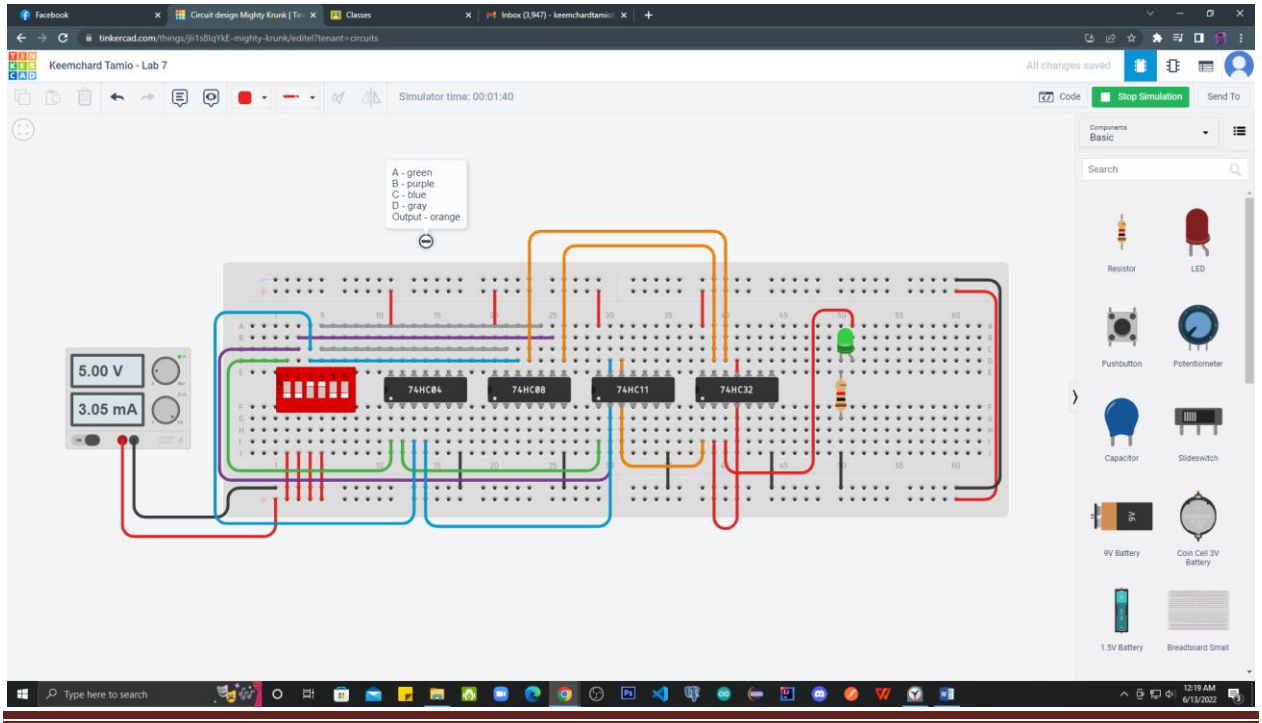


Figure 2. Circuit for the given function

6. Complete the table below by simulating the circuit of the given function:

Input				Output
a	b	c	d	Qs
0	0	0	0	**0**
0	0	0	1	**0**
0	0	1	0	**0**
0	0	1	1	**1**
0	1	0	0	**1**
0	1	0	1	**1**
0	1	1	0	**0**
0	1	1	1	**1**
1	0	0	0	**0**
1	0	0	1	**0**
1	0	1	0	**0**
1	0	1	1	**1**
1	1	0	0	**0**
1	1	0	1	**1**
1	1	1	0	**0**
1	1	1	1	**1**

Table 2. Truth Table for the simplified function

CONCLUSION

Make a conclusion of the exercises.

I was able to fulfill the objectives of this activity. I have understood and even apply the concept of the don't care condition, basically just like k-map but in here, we have don't care values along with the minterms to come up with a simplified function.