National University
Of Computer and Emerging Sciences

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CLASS: **BS CS 2A2**

SECTION: **2A2**

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LAB TASK KMAP

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Task # 1 :-

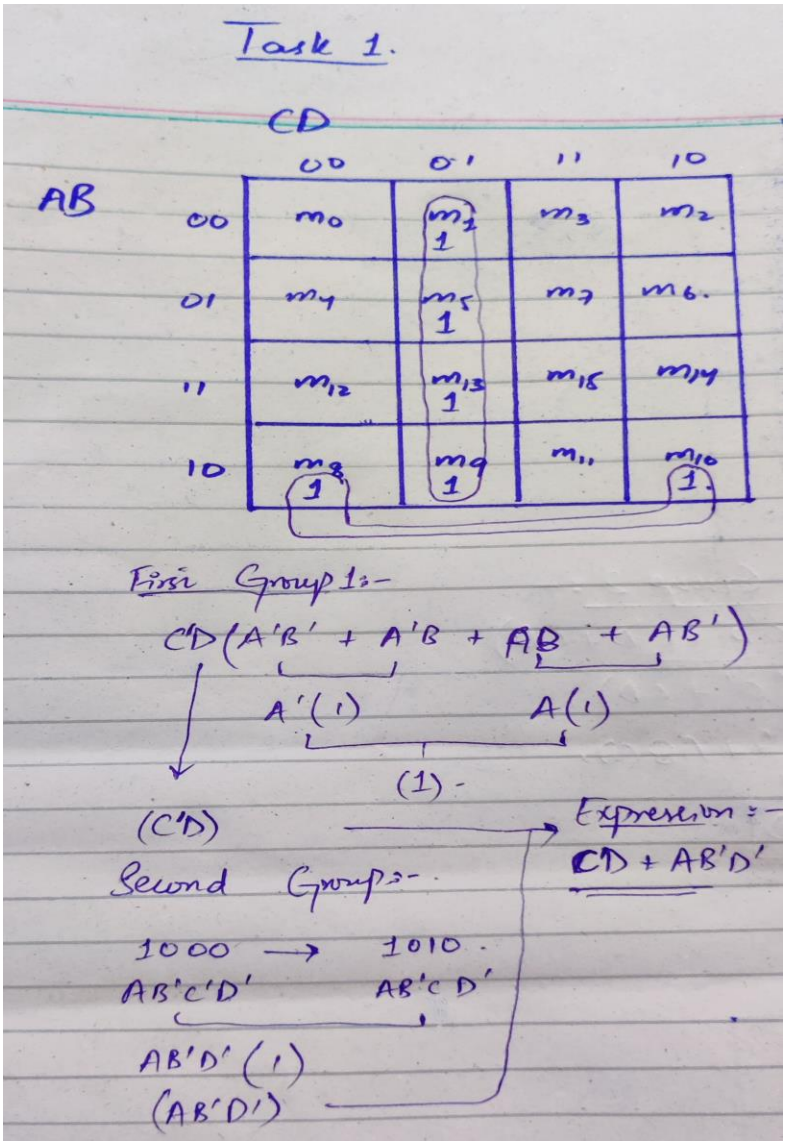
Find a reduced Boolean expression for the given K-Map.

Also, devise a truth table and simulate the circuit to verify your expression.

AB \ CD	00	01	11	10
00		1		
01		1		
11		1		
10	1	1		1

Solution :-

KMAP And Expression Finding IS On The Side :-



Reduced Expression For This Is

C'D + AB'D'

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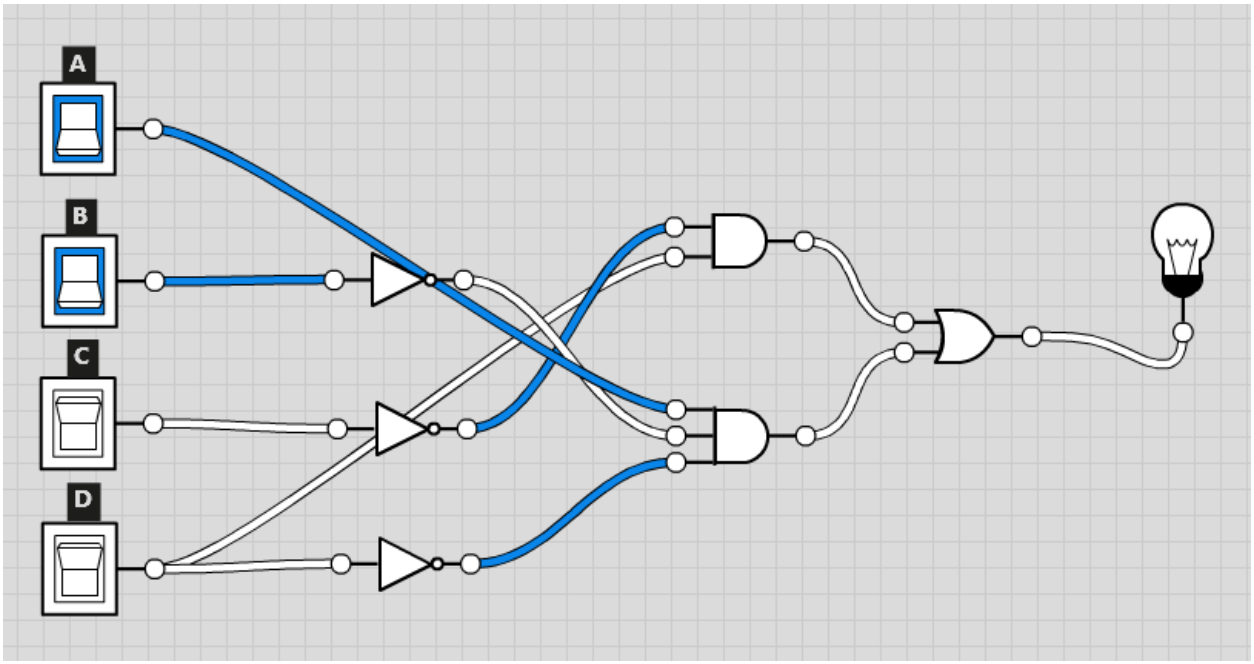
Circuit Simulation Is :-



Truth Table For Task 1 Is :-

A	B	C	D	F
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	0

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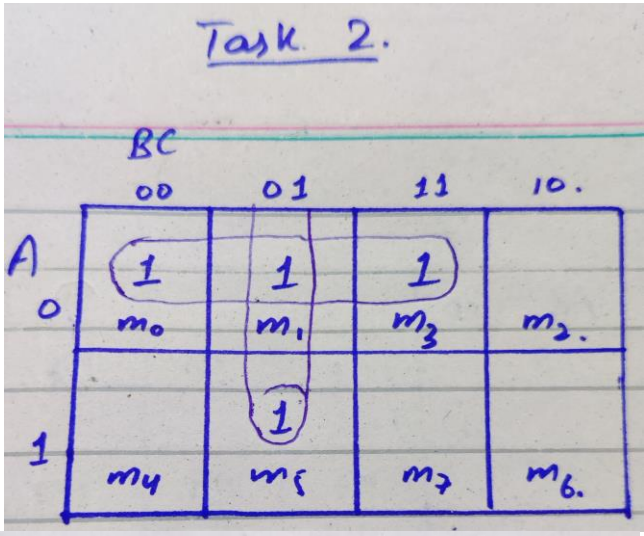
Task # 2 :-

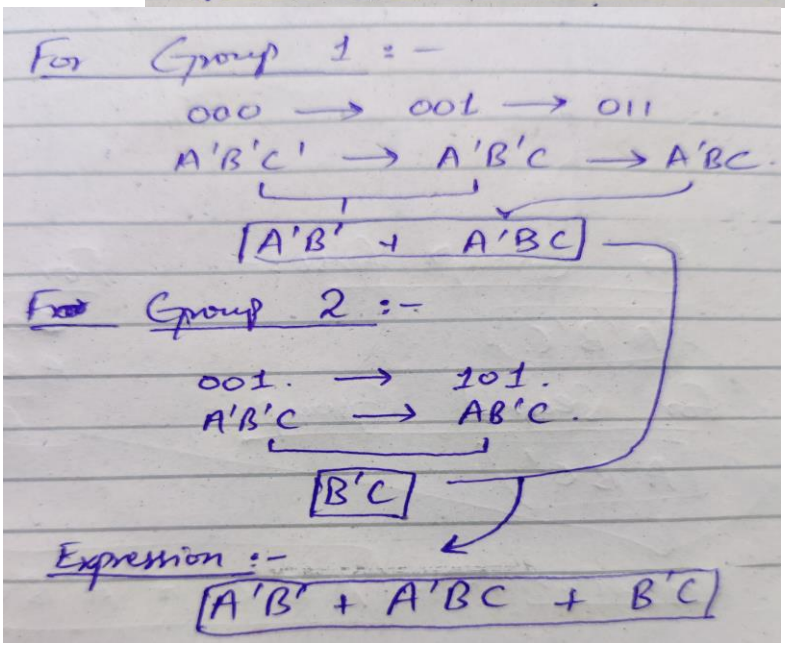
A	B	C	Out
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0

For the given truth table, write a reduced Boolean expression (SOP) using K-Map. Draw the circuit diagram for the reduced expression and simulate it to verify the truth table.

Solution:-

KMAP And Expression Finding IS On The Side :-





Reduced Expression Is

A’B’ + A’BC + B’C

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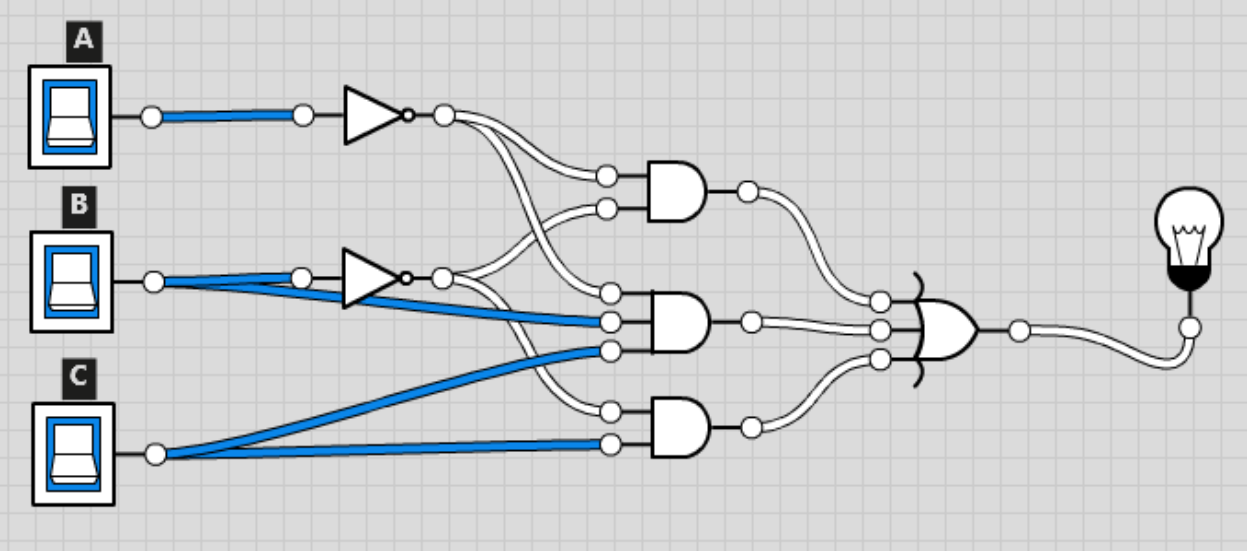
Circuit Diagram Is :-



Task # 3 :-

Minimize the following function using K-Map. Verify the output expression with the help of simulation.

F(a,b,c,d) = ∑m(3,7,11,12,13,14,15)

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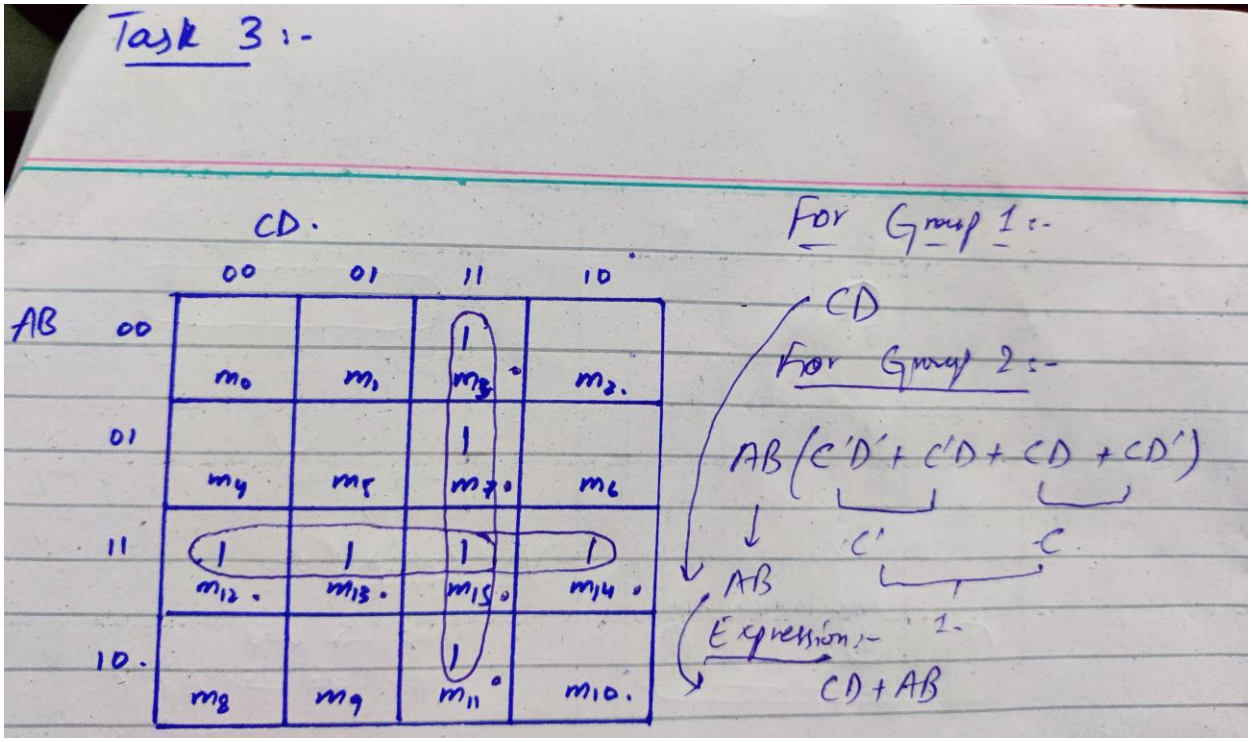
Solution:-

KMAP And Expression Finding IS On The Side :-



Minimized Expression Using K-Map Is:-

CD + AB

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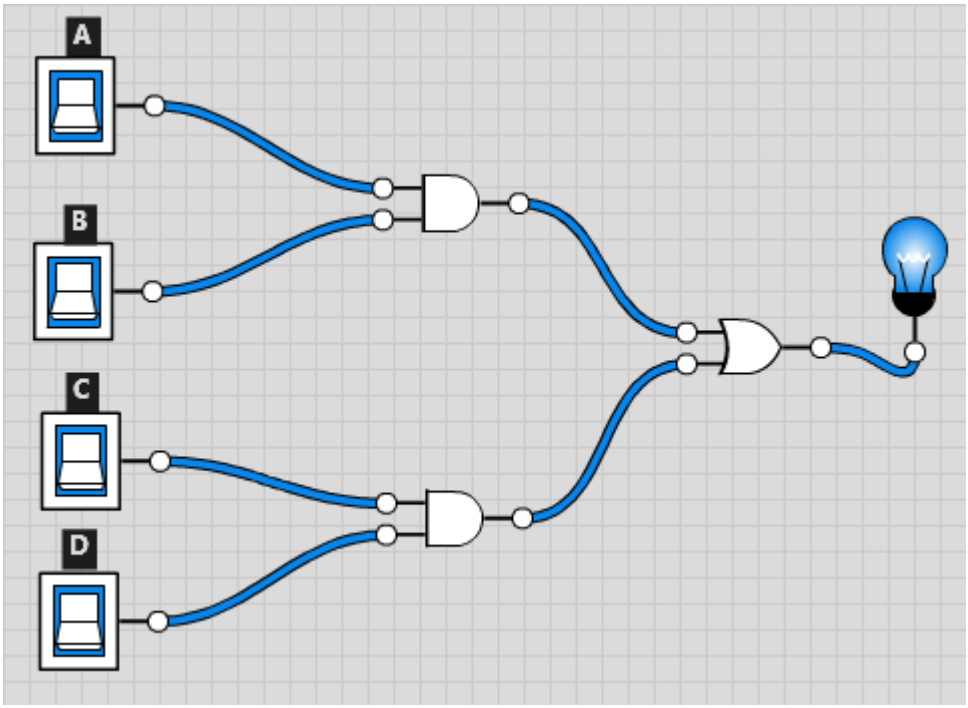
Circuit Diagram For This Task Is :-



Truth Table For Task 3 Is :-

A	B	C	D	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
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	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

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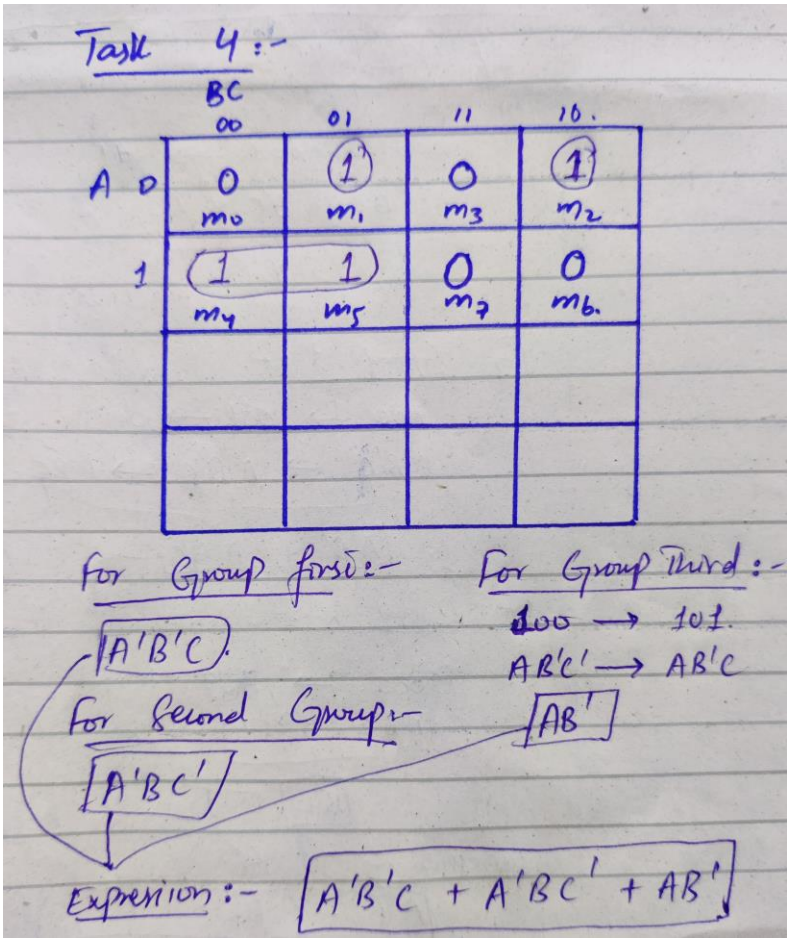
Task # 4 :-

For the function given below, write a reduced expression using K-Map reduction. Simulate the logic circuit for the expression devised after reduction. Also, fill in the truth table for the function.

F(A,B,C)=π(0,3,6,7)

Solution:-

KMAP And Expression



Finding IS On The Side :-

Reduced Expression Is :-

A’B’C + A’BC’ + AB’

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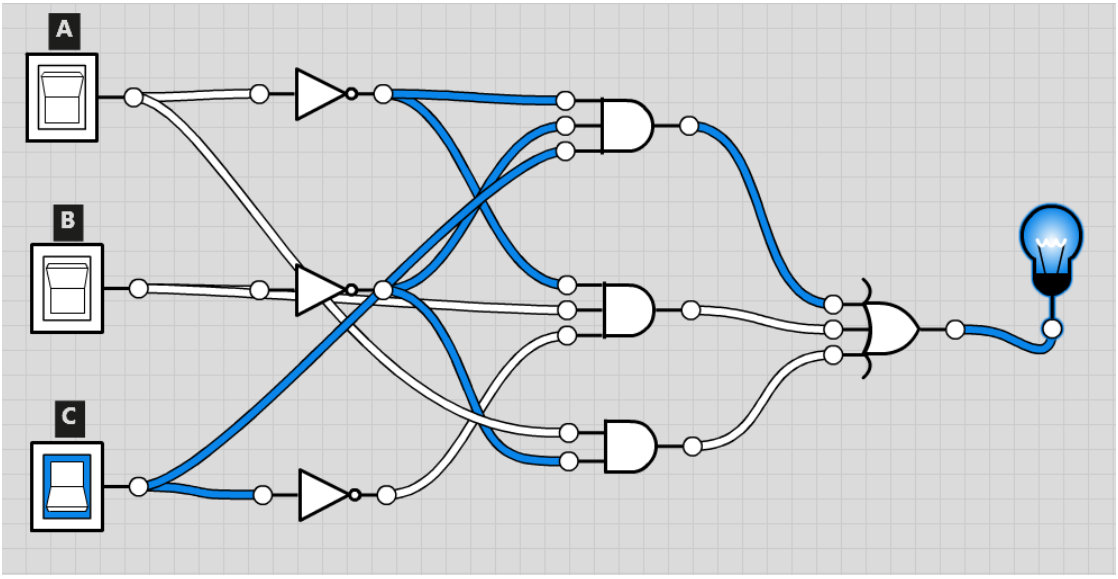
Circuit Diagram For This Task Is :-



Truth Table For This Task Is :-

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0