Lab Report No 2

Digital Logic Design

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Submitted to:

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Dated:

Week 01

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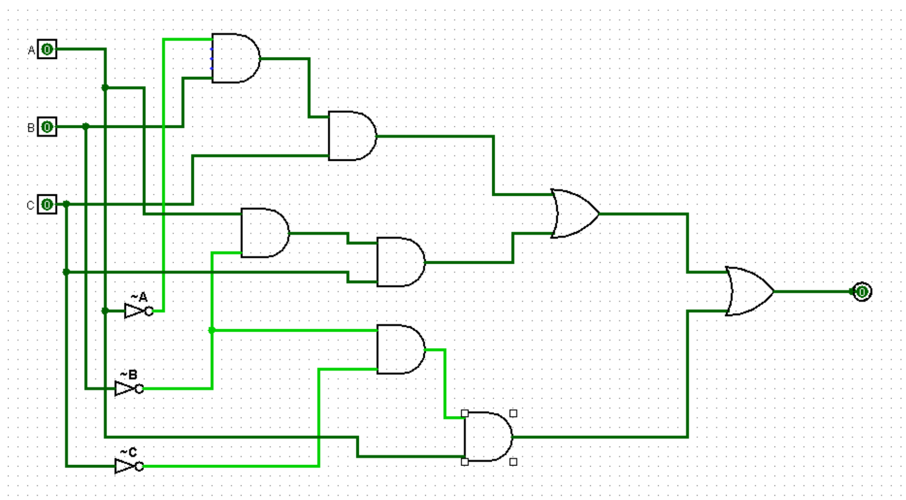
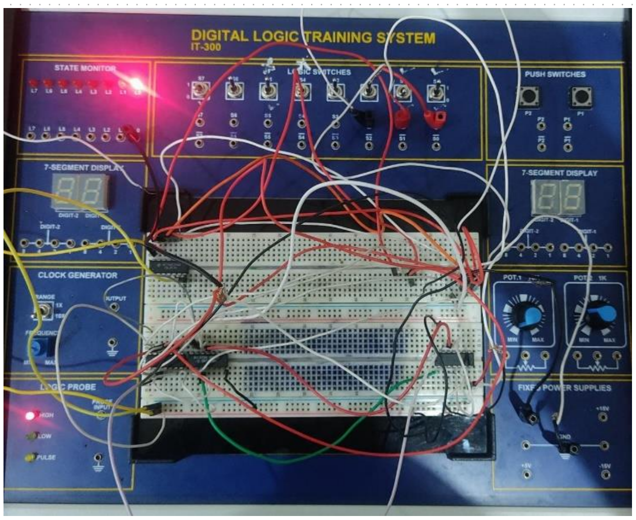
Task 1 – 1:

Solution:

The code





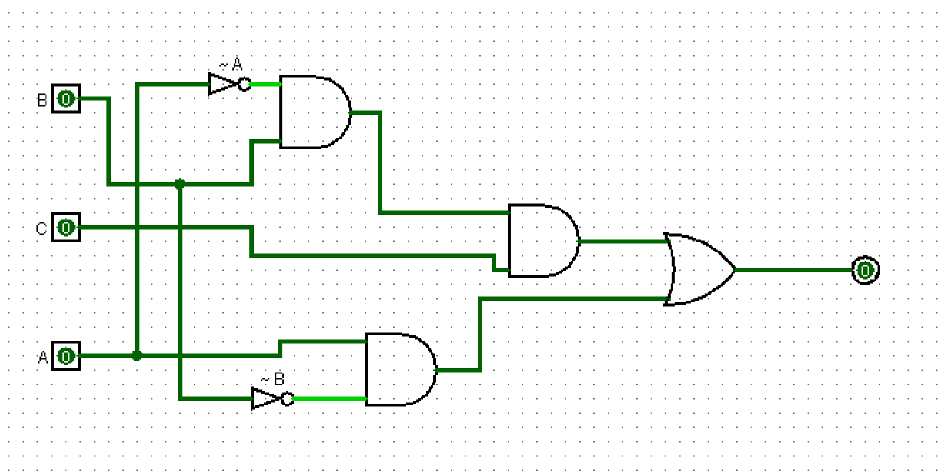
The results (Screenshot)

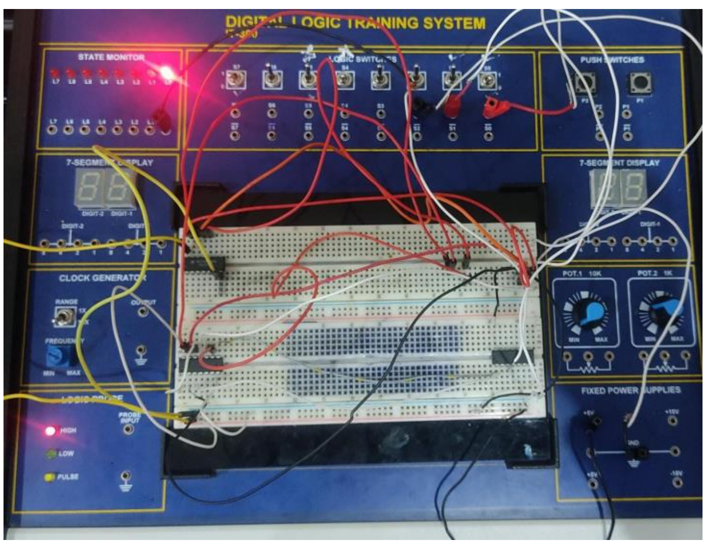
A	B	C	x
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

Task 1 – 2:

Solution:

The code





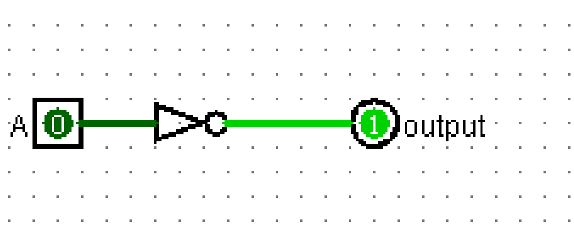
The results (Screenshot)

B	C	A	x
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	0

Task 2 – 1:

Solution:

Brief description (3-5 lines)
Simplification of: ~ (A and B) and (~A or B) and (~B or B)
The code
~ (A and B) and (~A or B) and (~B or B) ~ (A and B) can be simplified using De Morgan's law: ~ (A and B) = ~A or ~B So, the expression becomes: (~A or ~B) and (~A or B) and (~B or B) (~B or B) can be simplified using the identity law: ~B or B = 1 So, the expression becomes: (~A or ~B) and (~A or B) and 1 We can simplify this further using the distributive law: (~A or ~B) and (~A or B) = ~A Therefore, the final simplified expression is: ~A and 1 Which can be further simplified to: ~A
The results (Screenshot)



A	output
0	1
1	0

Task 2 – 2:

Solution:

Brief description (3-5 lines)

Simplification of:
(A or C) and ((A and D) or (A and ~D)) or (A and C) or C

The code

(A or C) and ((A and D) or (A and ~D)) or (A and C) or C

We can simplify this expression using the distributive law:
(A or C) and ((A and D) or (A and ~D)) = A or (C and ((A and D) or (A and ~D)))

So, the expression becomes:
A or (C and ((A and D) or (A and ~D))) or (A and C) or C

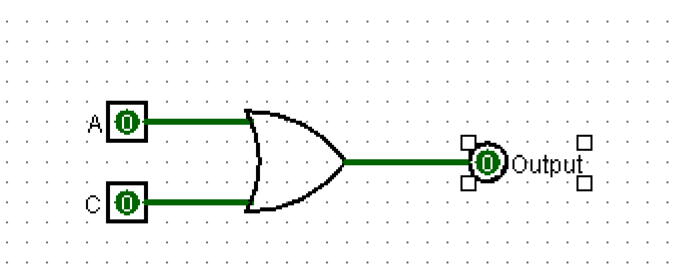
We can simplify further using the absorption law:
A or (A and C) = A

So, the expression becomes:
A or (C and ((A and D) or (A and ~D))) or C

We can simplify further using the distributive law again:
(C and ((A and D) or (A and ~D))) or C = C

So, the final simplified expression is:
A or C

The results (Screenshot)



A	C	Output
0	0	0
0	1	1
1	0	1
1	1	1

Task 2 – 3:

Solution:

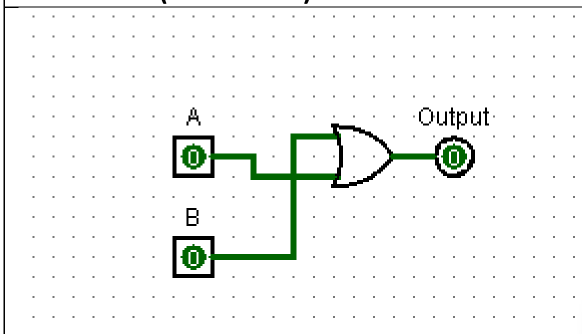
Brief description (3-5 lines)
Simplification of: ~A and (A or B) or (B or (A and A)) and (A or ~B)

The code

~A and (A or B) or (B or (A and A)) and (A or ~B)

= (~A and A) or (~A and B) or (B or A) and (B or A) and (A or ~B)
= contradiction or (~A and B) or (B or A) and (A or ~B)
= (~A and B) or (B or A) and (A or ~B)
= (B and ~A) or (A and ~B) or (A or B)
= (A or B)

The results (Screenshot)



A	B	Output
0	0	0
0	1	1
1	0	1
1	1	1