Experiment No. 1B

Aim: Verification and interpretation of truth table for NAND and NOR gates.

Theory:

① NAND Gate:

This is a NOT-AND gate which is equal to an AND gate followed by a NOT gate. The outputs of all NAND gates are high if any of the inputs are low. The symbol is an AND gate with a small circle on the output. The small circle represents inversion.

A simple 2-input logic NAND gate can be constructed using RTL (Resistor-transistor-logic) switches connected together as shown below with the inputs connected directly to the transistor bases. Either transistor must be cut-off or "OFF" for an output at Q.

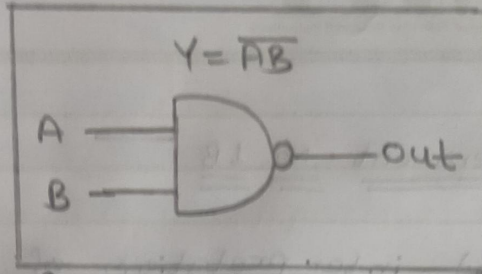


Figure: logic symbol of NAND gate

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

Figure: Truth table of NAND Gate

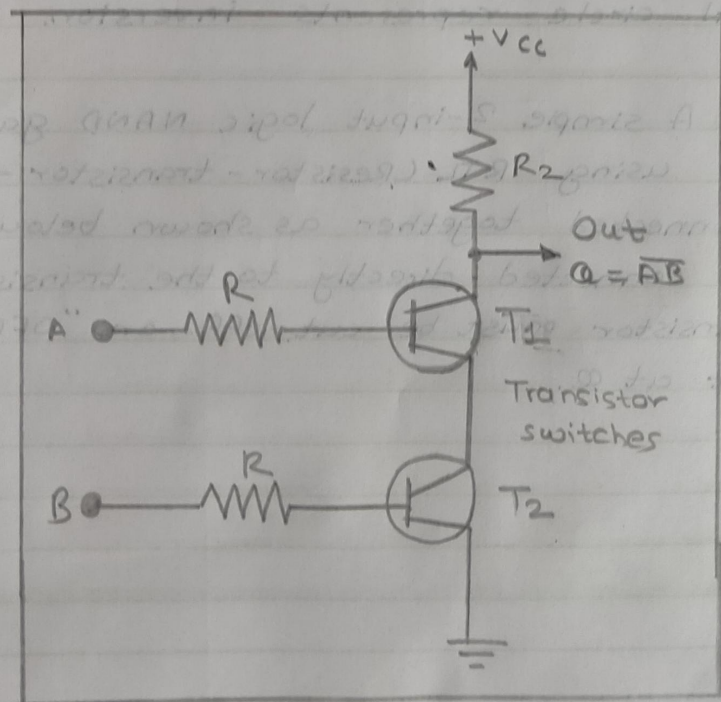


Figure: NAND gate through RTL logic.



Date : / / 20



2) NOR Gate :

This is a NOT-OR gate which is equal to an OR gate followed by a NOT gate. The outputs of all NOR gates are low if any of the inputs are high. The symbol is an OR gate with a small circle on the output. The small circle represents inversion.

A simple 2-input logic NOR gate can be constructed using RTL (Resistor-transistor-logic) switches connected together as shown below with the inputs connected directly to the transistor bases. Both transistors must be cut-off or "OFF" for an output at Q.

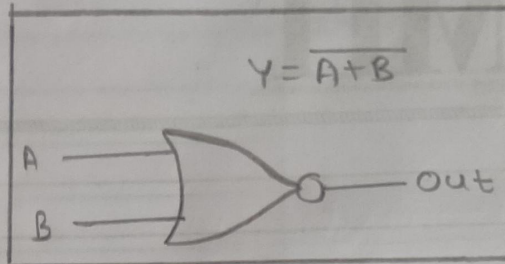


Figure: Symbol of NOR gate

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

Figure: Truth table of NOR gate

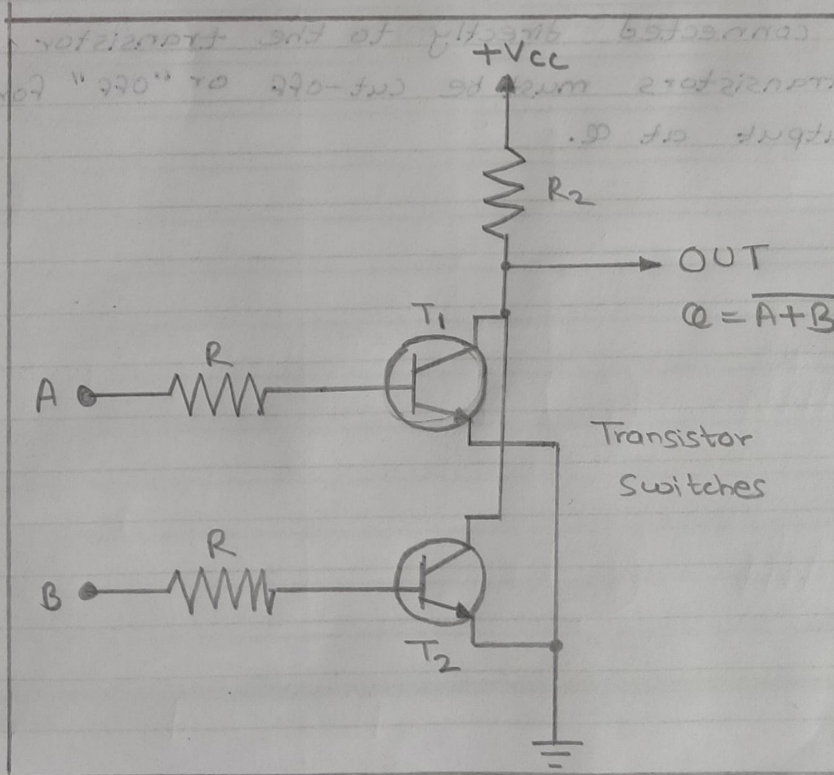


Figure: NOR gate through RTL Logic

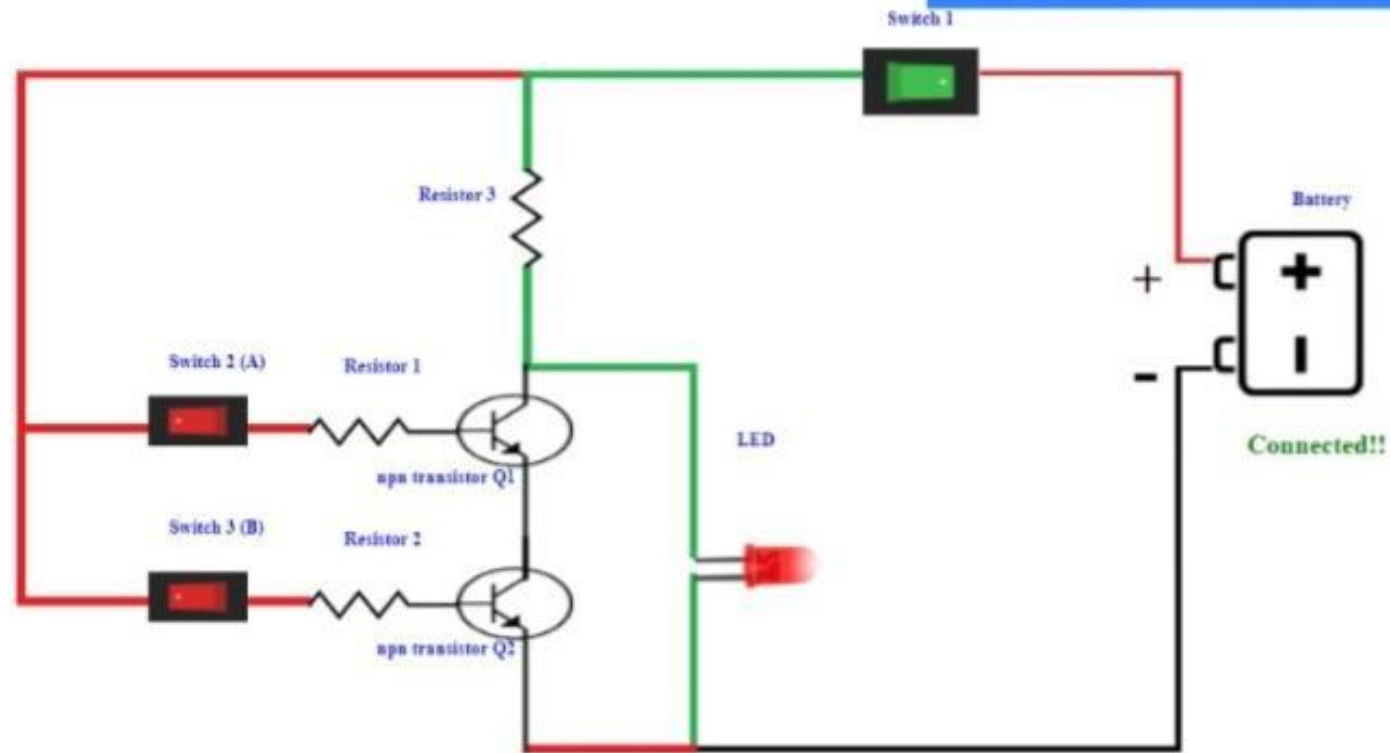


INSTRUCTIONS

S1-07-SND

Experiment to perform NAND gate on kit

NAND gate using Resistor-Transistor Logic (RTL)



Specifications:

1. Battery = 5V
2. Resistor R3 = 1 Kohm & R1 & R2 = 10 Kohm
3. Transistors Q1 & Q2 = NPN 2N3904

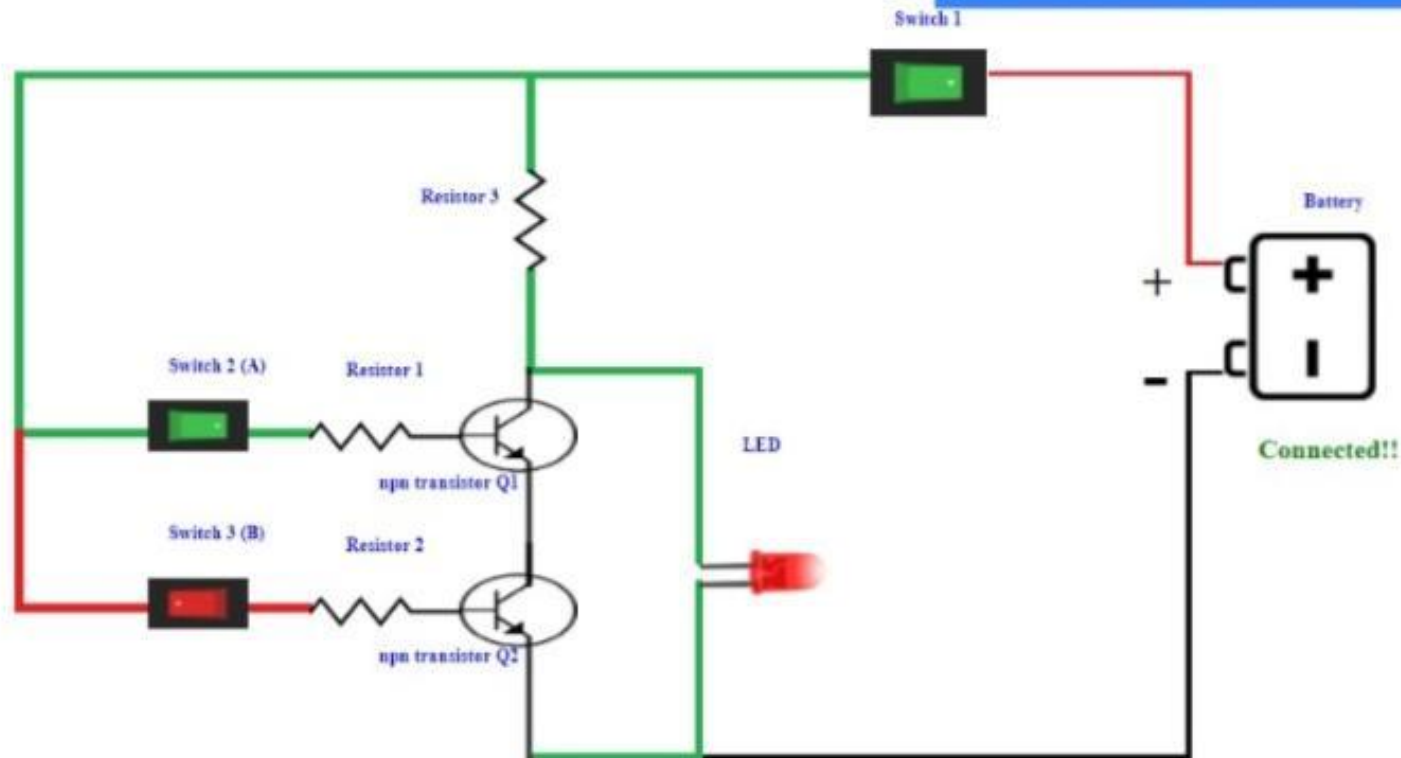


INSTRUCTIONS

S1-07-SND

Experiment to perform NAND gate on kit

NAND gate using Resistor-Transistor Logic (RTL)

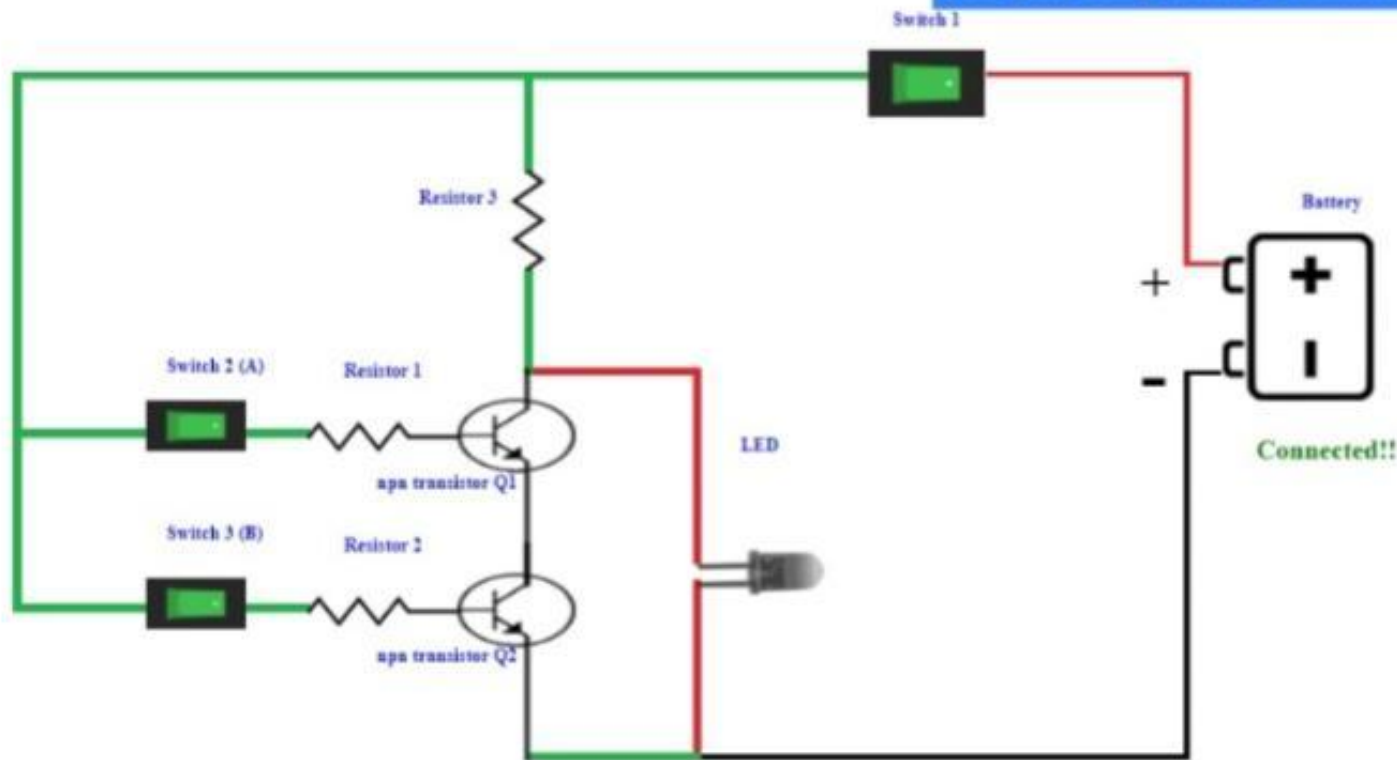


Specifications:

1. Battery = 5V
2. Resistor R3 = 1 Kohn & R1 & R2 = 10 Kohn
3. Transistors Q1 & Q2 = NPN 2N3904

Experiment to perform NAND gate on kit

NAND gate using Resistor-Transistor Logic (RTL)



Specifications:

1. Battery = 5V
2. Resistor R3 = 1 Kohn & R1 & R2 = 10 Kohn
3. Transistors Q1 & Q2 = NPN 2N3904

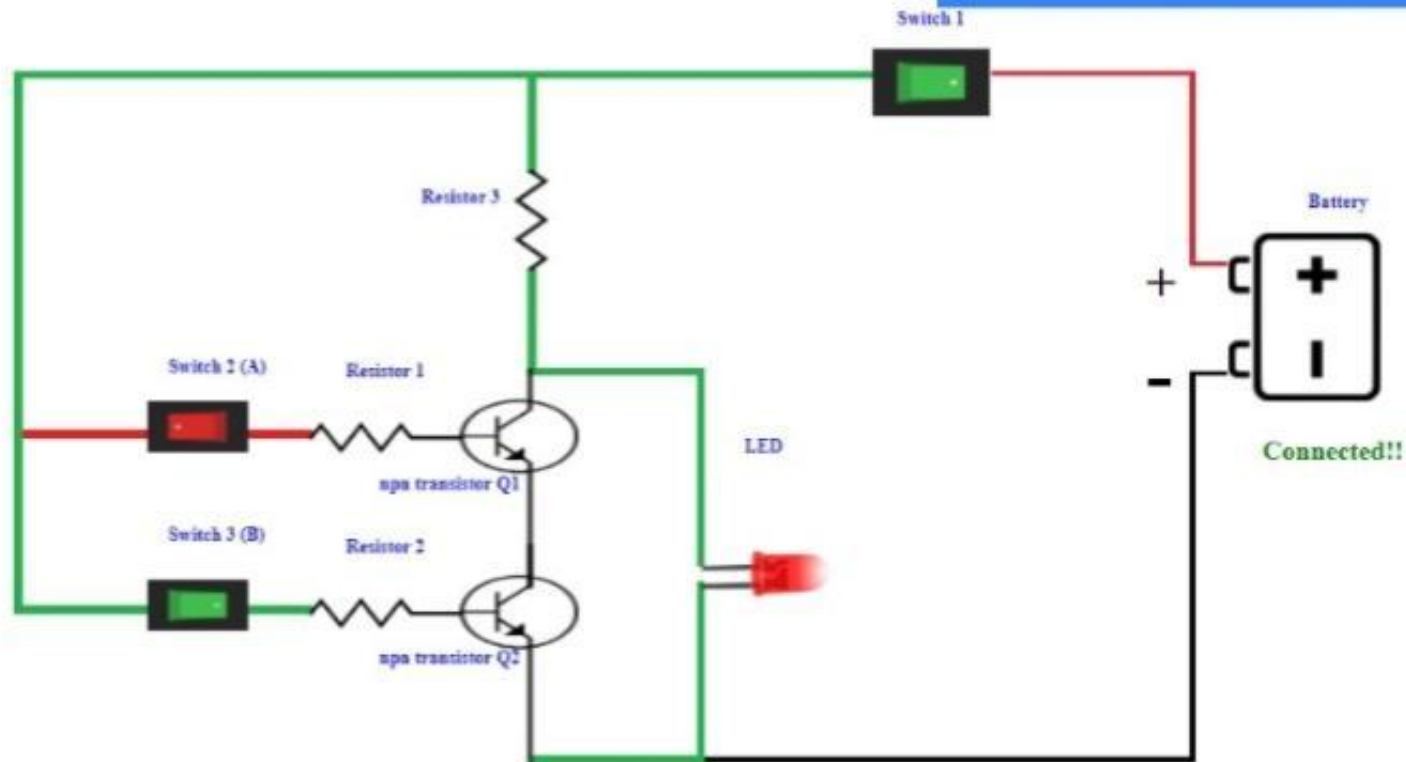


INSTRUCTIONS

S1-07-SND

Experiment to perform NAND gate on kit

NAND gate using Resistor-Transistor Logic (RTL)

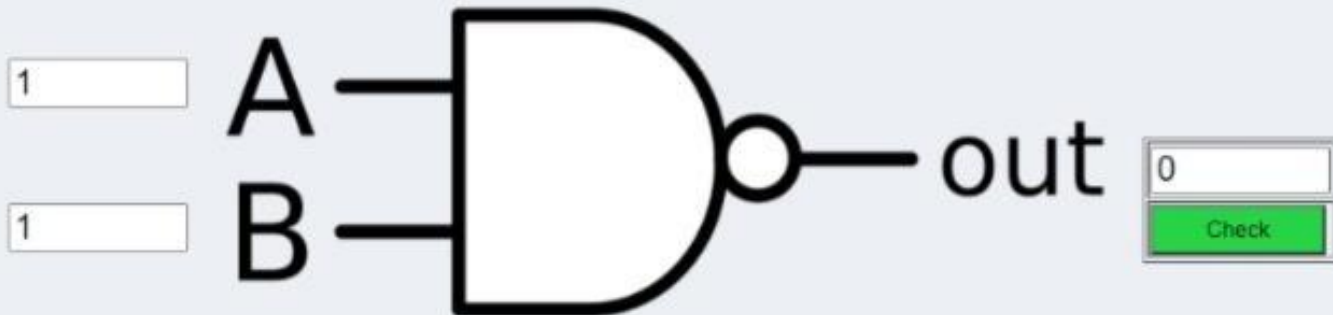


Specifications:

1. Battery = 5V
2. Resistor R3 = 1 Kohm & R1 & R2 = 10 Kohm
3. Transistors Q1 & Q2 = NPN 2N3904



Verification of truth table for NAND gate



TRUTH TABLE

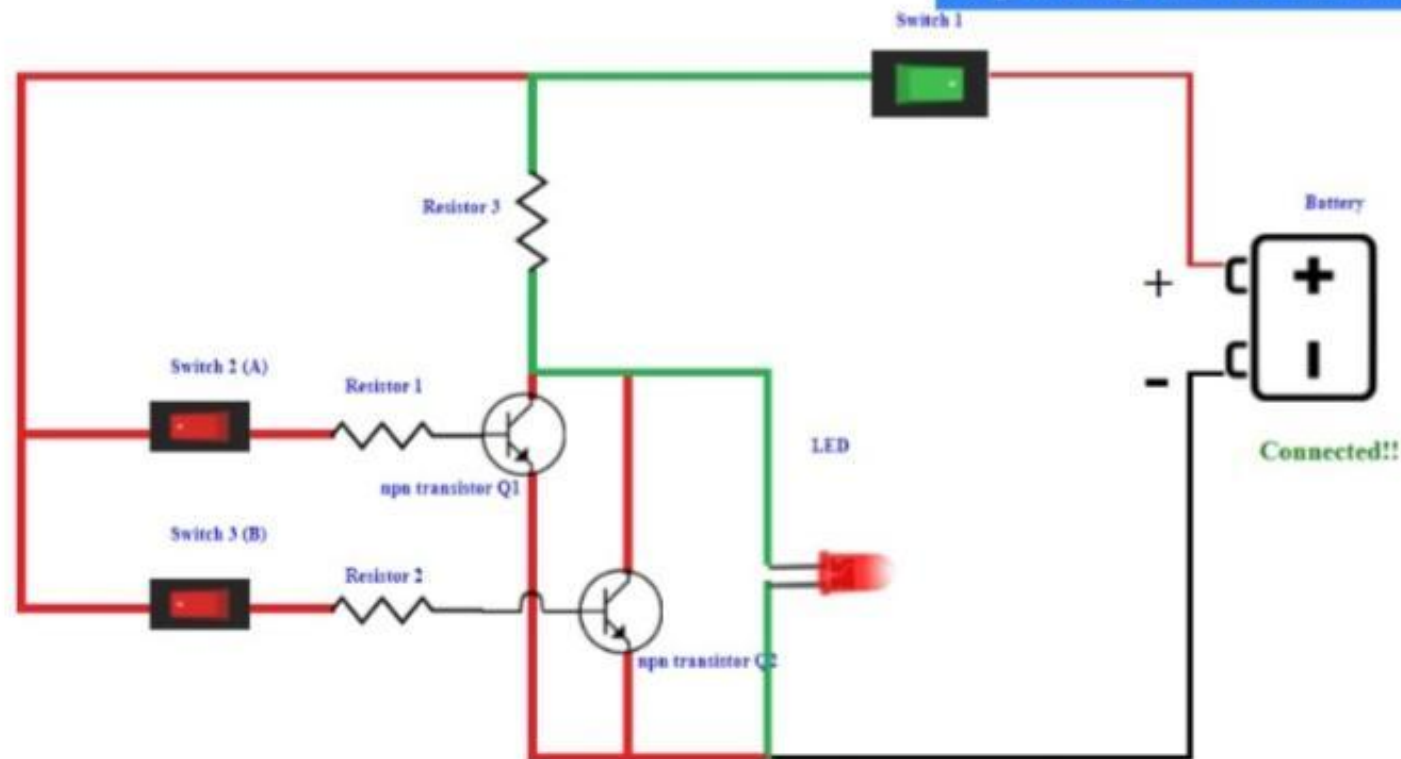
Print

Serial No.	A	B	Output	Remarks
1	0	0	1	Correct
2	0	1	1	Correct
3	1	0	1	Correct
4	1	1	0	Correct

Reset

Experiment to perform NOR gate on kit

NOR gate using Resistor-Transistor Logic (RTL)

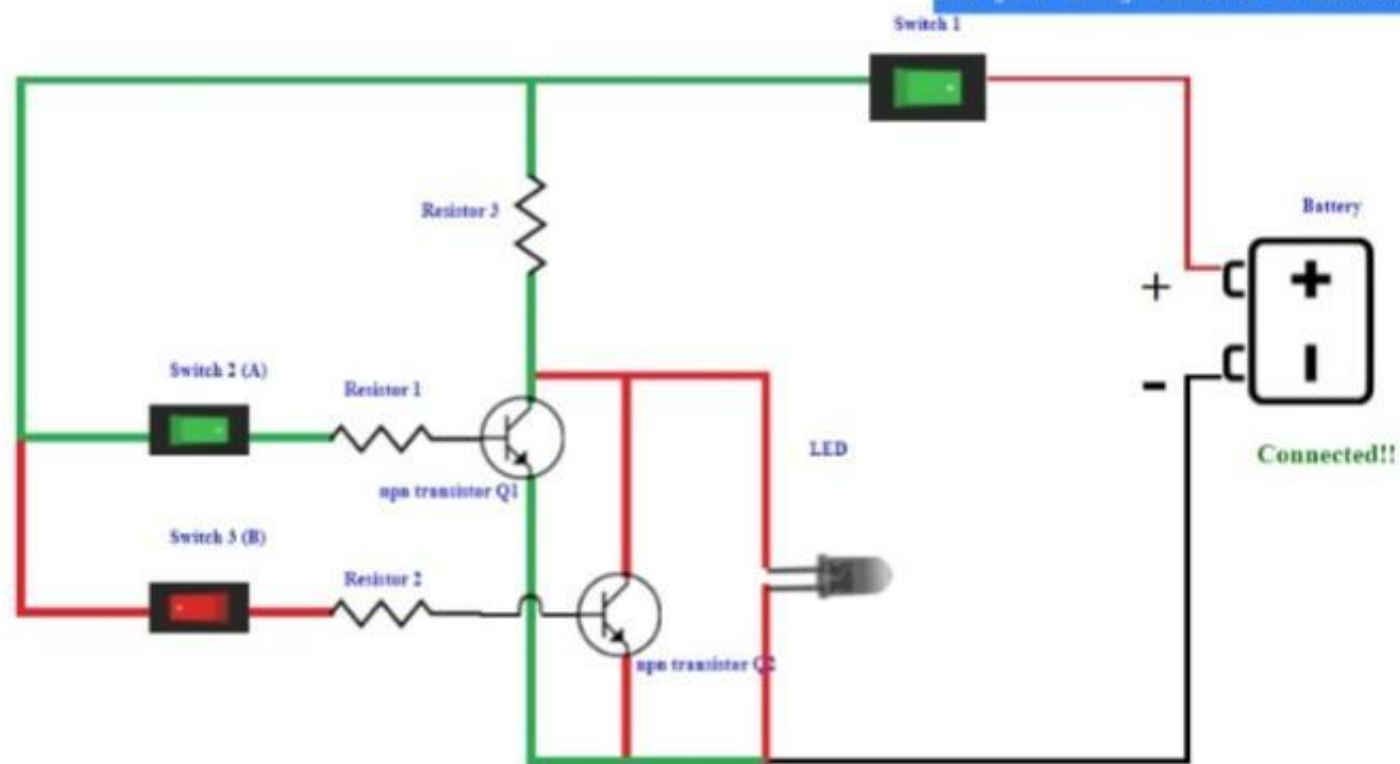


Specifications:

1. Battery = 5V
2. Resistor R3 = 1 K Ω & R1 & R2 = 10 K Ω
3. Transistors Q1 & Q2 = NPN 2N3904

Experiment to perform NOR gate on kit

NOR gate using Resistor-Transistor Logic (RTL)



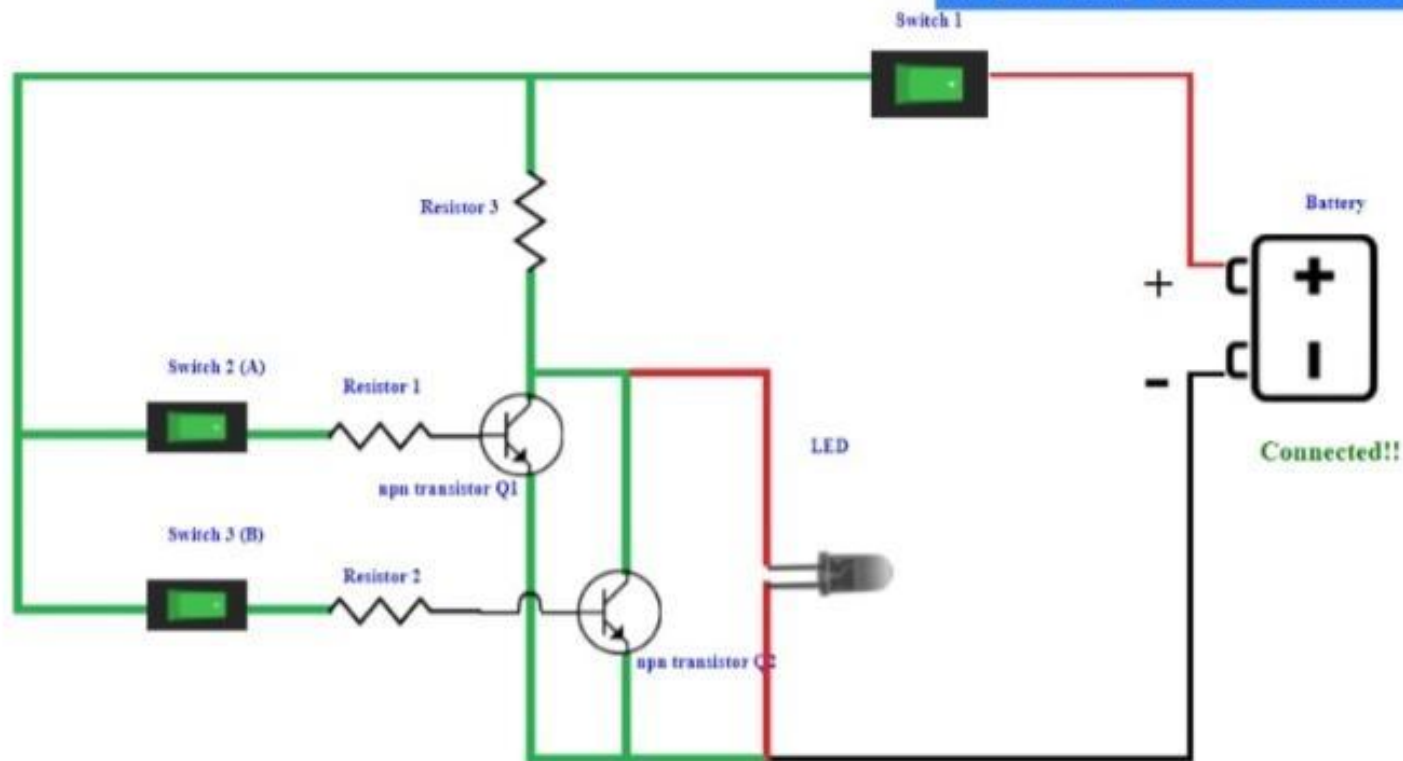
Specifications:

1. Battery = 5V
2. Resistor R3 = 1 K Ω & R1 & R2 = 10 K Ω
3. Transistors Q1 & Q2 = NPN 2N3904



Experiment to perform NOR gate on kit

NOR gate using Resistor-Transistor Logic (RTL)



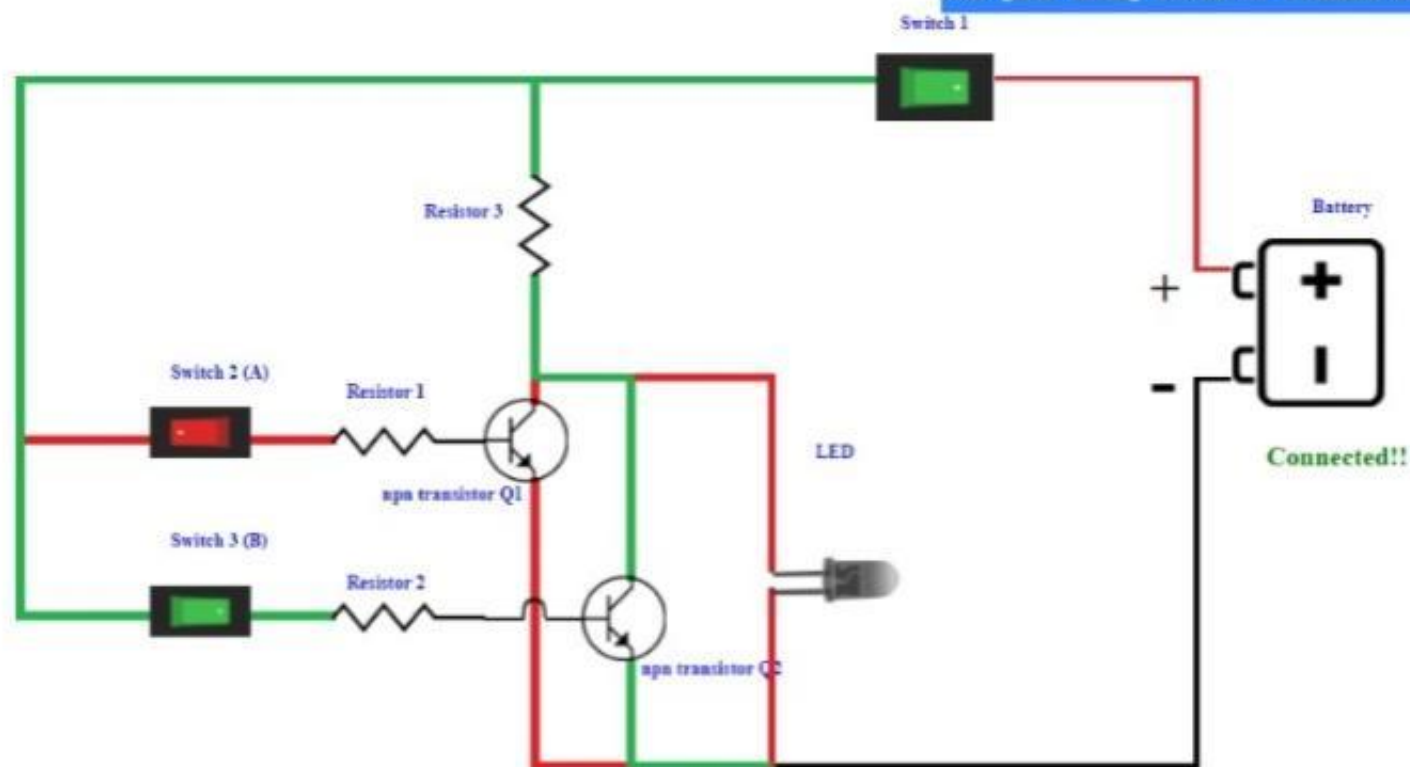
Specifications:

1. Battery = 5V
2. Resistor R3 = 1 Kohn & R1 & R2 = 10 Kohn
3. Transistors Q1 & Q2 = NPN 2N3904



Experiment to perform NOR gate on kit

NOR gate using Resistor-Transistor Logic (RTL)



Specifications:

1. Battery = 5V
2. Resistor R3 = 1 Kohn & R1 & R2 = 10 Kohn
3. Transistors Q1 & Q2 = MPN 2N3904



Verification of truth table for NOR gate



TRUTH TABLE

Print

Serial No.	A	B	Output	Remarks
1	0	0	1	Correct
2	0	1	0	Correct
3	1	0	0	Correct
4	1	1	0	Correct

Reset