EXPERIMENT - 1

Switching Theory and Logic Design (STLD)

Aim

Realize all gates by verifying their truth tables.

Syeda Reeha Quasar
14114802719
3C7

EXPERIMENT – 1

AIM: **Realize all gates by verifying their truth tables.**

HARDWARE REQUIRED: **Power supply/ Voltage supply, Bread Board, Resistors, LEDs, Connecting Wires, Integrated Chips ICs (7404, 7408, 7432, 7486, 7400, 7402, 74266)**

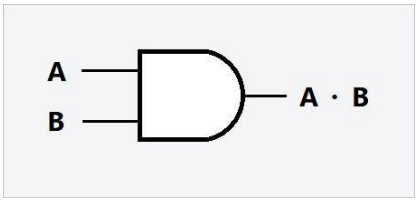
SOFTWARE REQUIRED:

Software stimulator (MULTISIM) – www.multisim.com (free software)
Stimulating schematic models of desired circuits

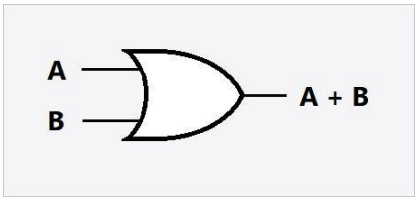
Components used – Source (Clock Voltage), Passive elements (resistor), Digital components (AND, OR, NAND, NOR, XOR, XNOR, Inverter), Probe for Analysis and annotation (Digital), Schematic connectors (Ground)

CIRCUIT:

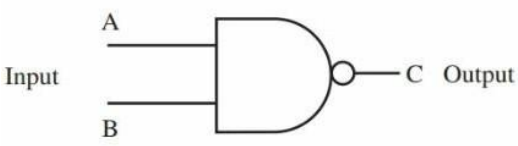
AND GATE



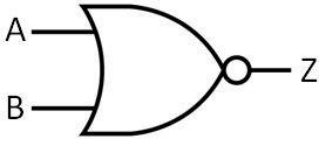
OR GATE



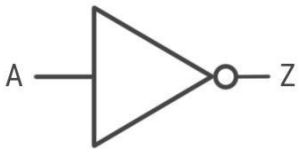
NAND GATE

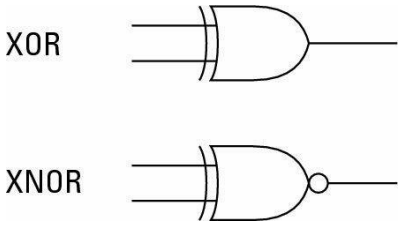


NOR GATE



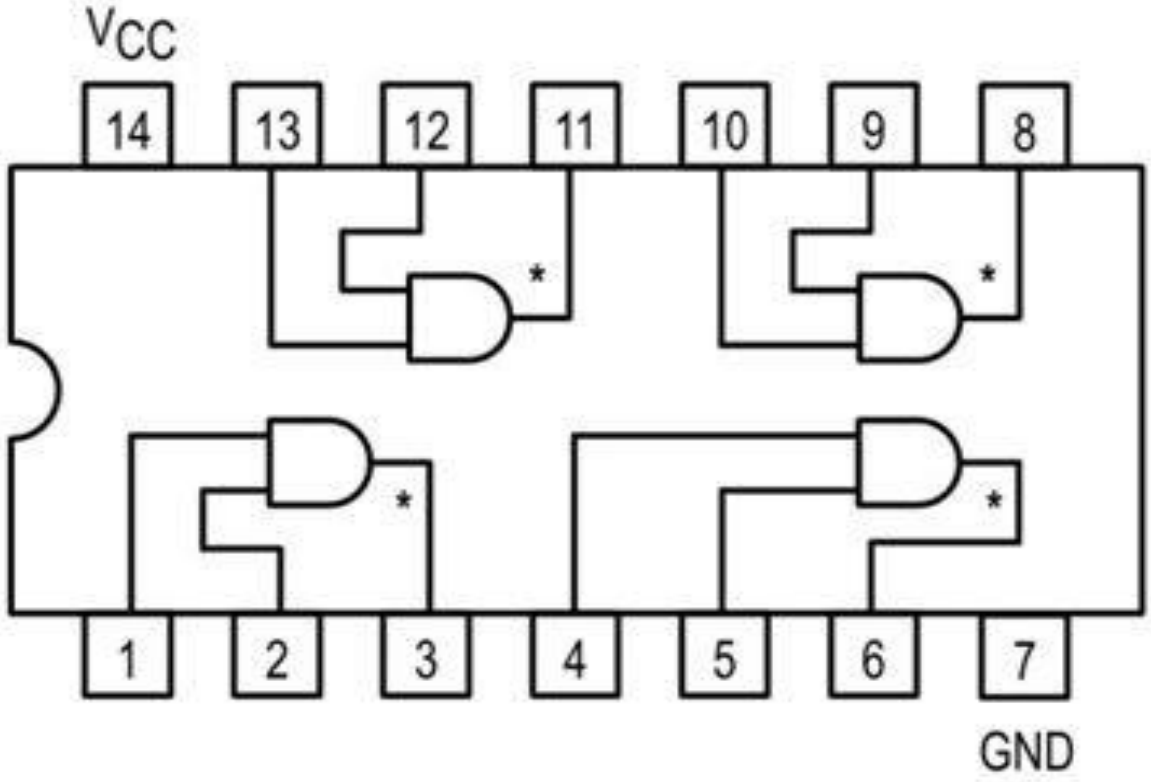
NOT GATE



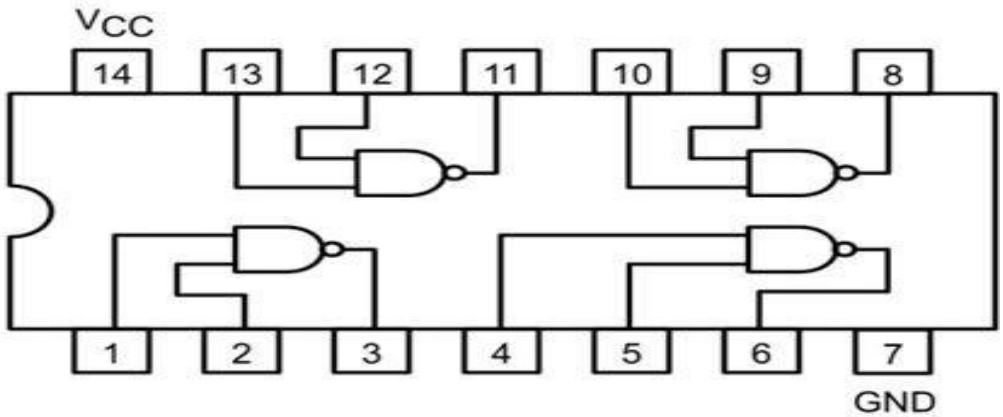


PIN – DIAGRAM:

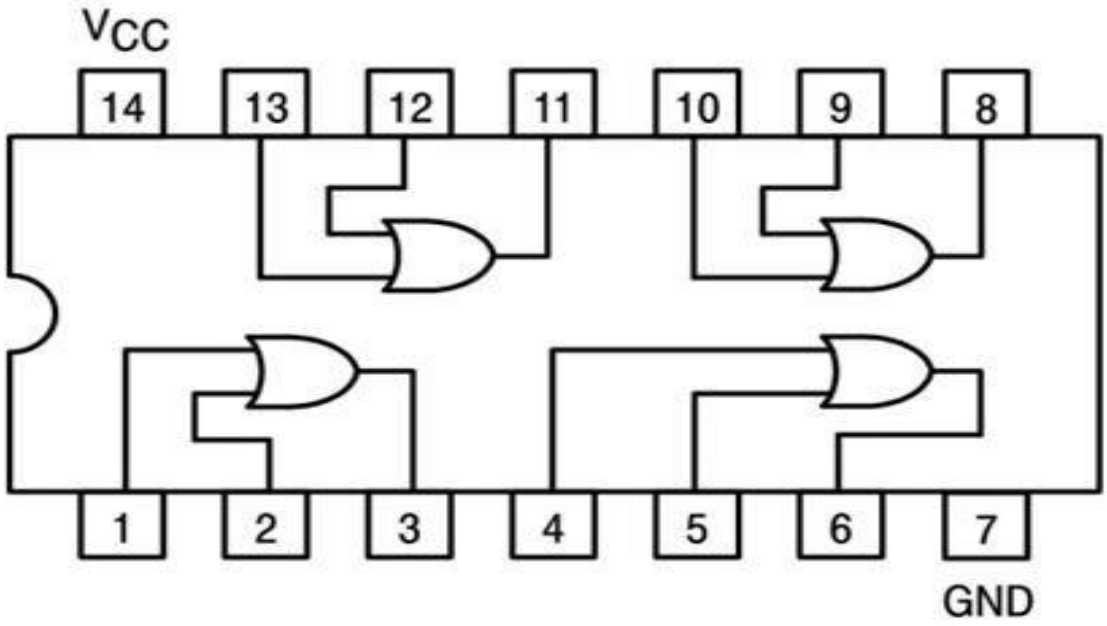
AND GATE



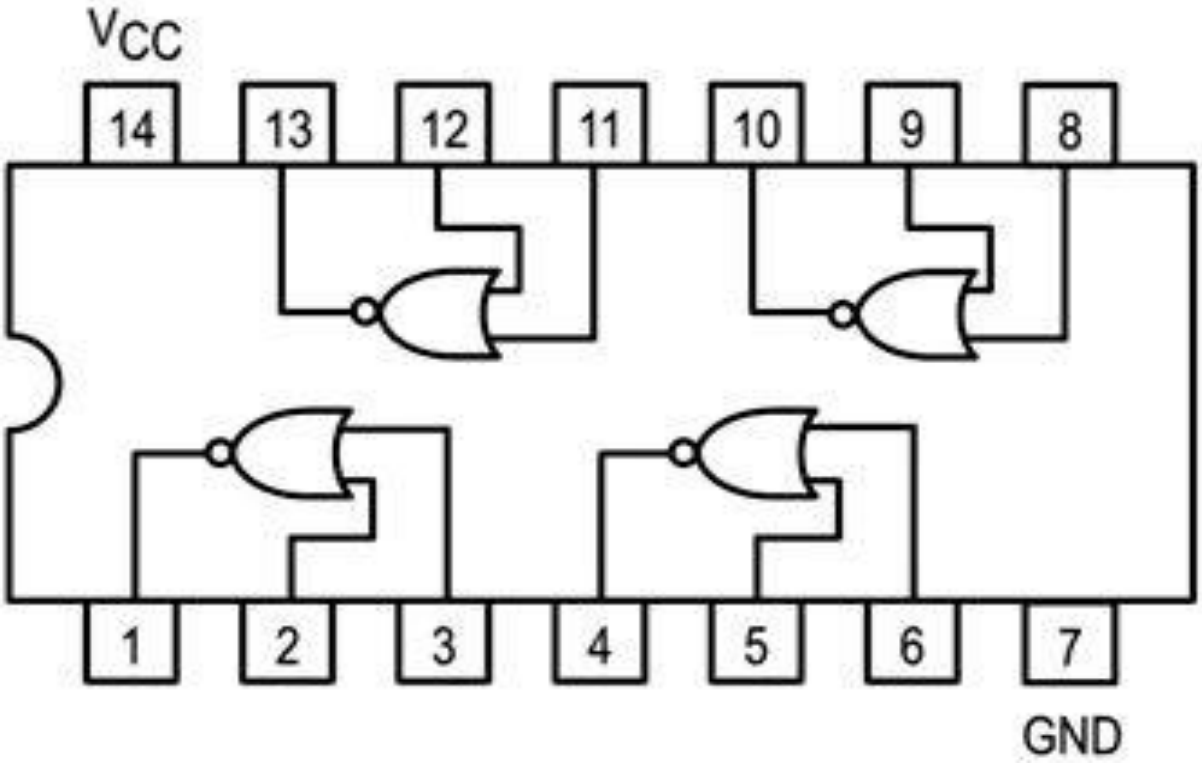
NAND GATE



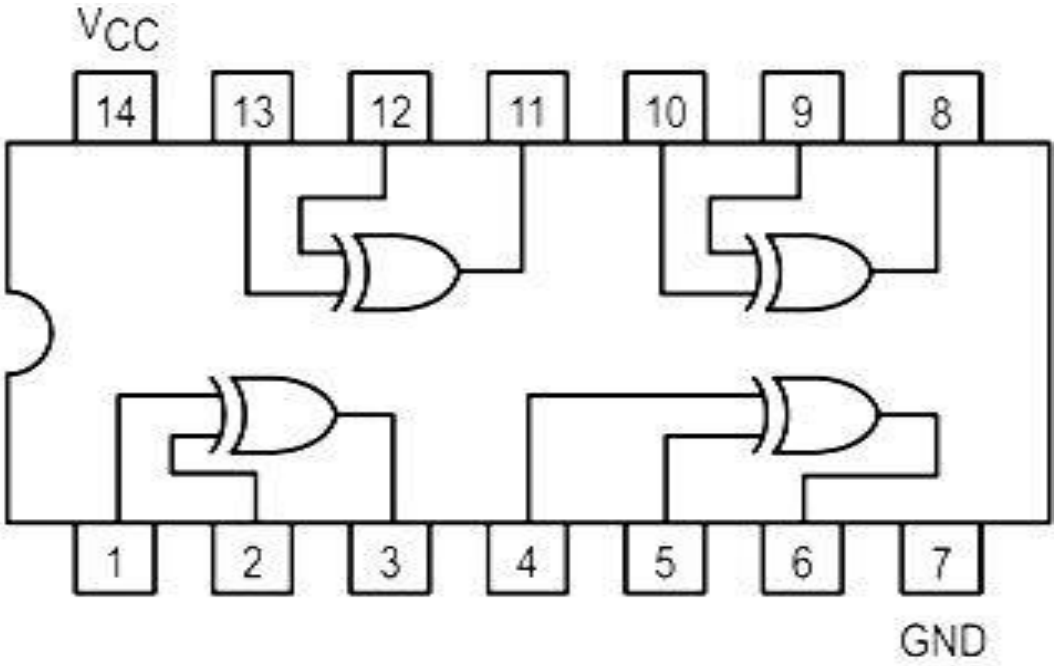
OR GATE



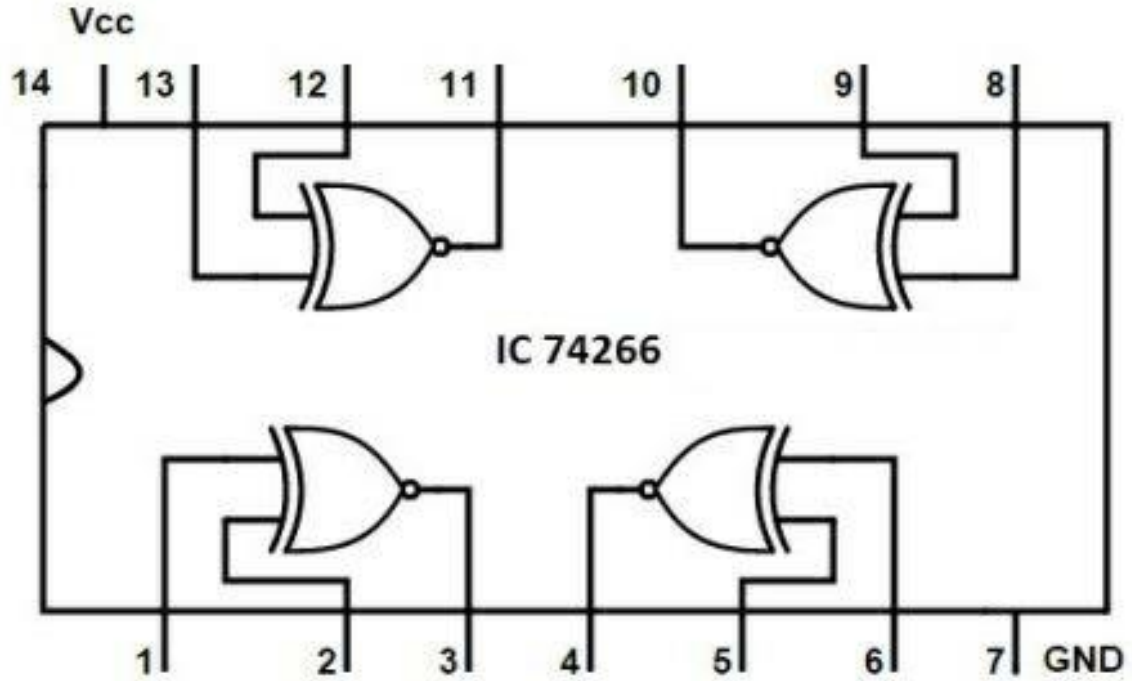
NOR GATE



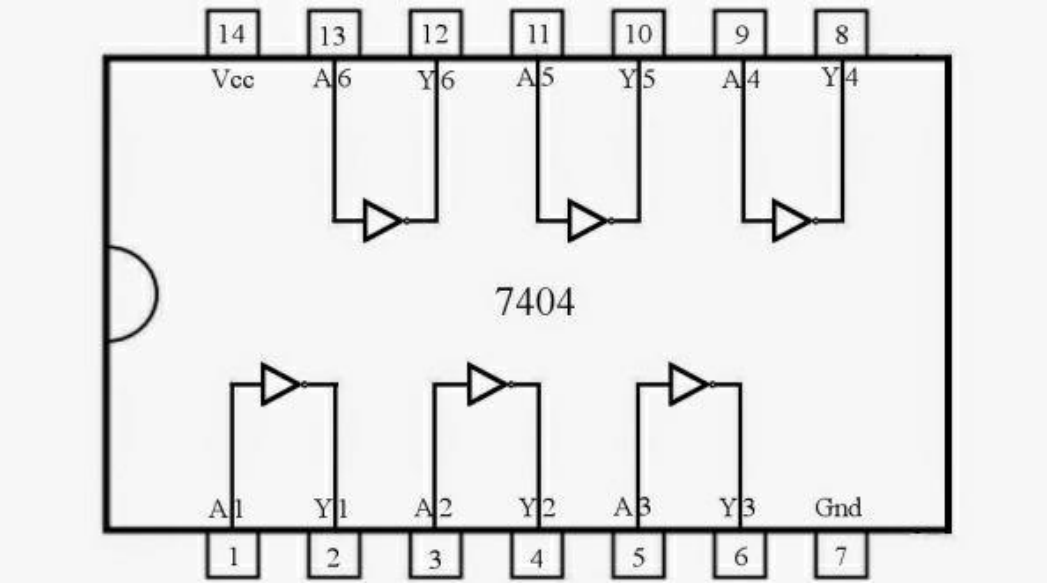
XOR GATE



XNOR GATE



NOT GATE



TRUTH TABLES

AND Truth Table		
A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1

NAND Truth Table		
A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

NOR Truth Table		
A	B	Q
0	0	1
0	1	0
1	0	0
1	1	0

NOT Truth Table	
A	Q
0	1
1	0

XOR Truth Table		
A	B	Q
0	0	0
0	1	1
1	0	1
1	1	0

XNOR Truth Table		
A	B	Q
0	0	1
0	1	0
1	0	0
1	1	1

Or Truth Table		
A	B	Q
0	0	0
0	1	1
1	0	1
1	1	1

THEORY: Logic gates are electronic circuits which perform logical operations on one or more inputs to produce a signal output. There are 7 logic gates. These include the AND, NAND, OR, NOR, XOR, XNOR and NOT.

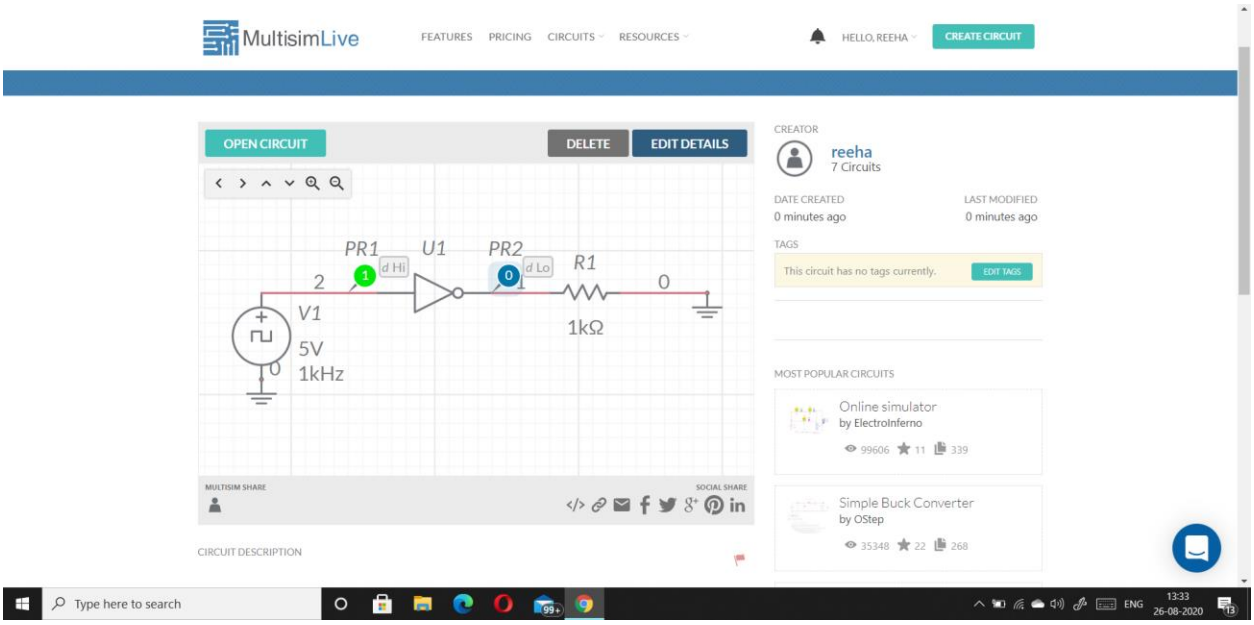
PROCEDURE (MULTISIM):

- Make the circuits shown as shown in the figures.
- Select the required components (gates, resistor, voltage sources (Clock Voltage) and ground symbols from the tool bar on the left.
- Ground both the voltage sources (clock Voltages) and then connect them to the input terminal of the gate.
- Connect the output terminal to 1 k ohm resistor and ground it.

Precautions:

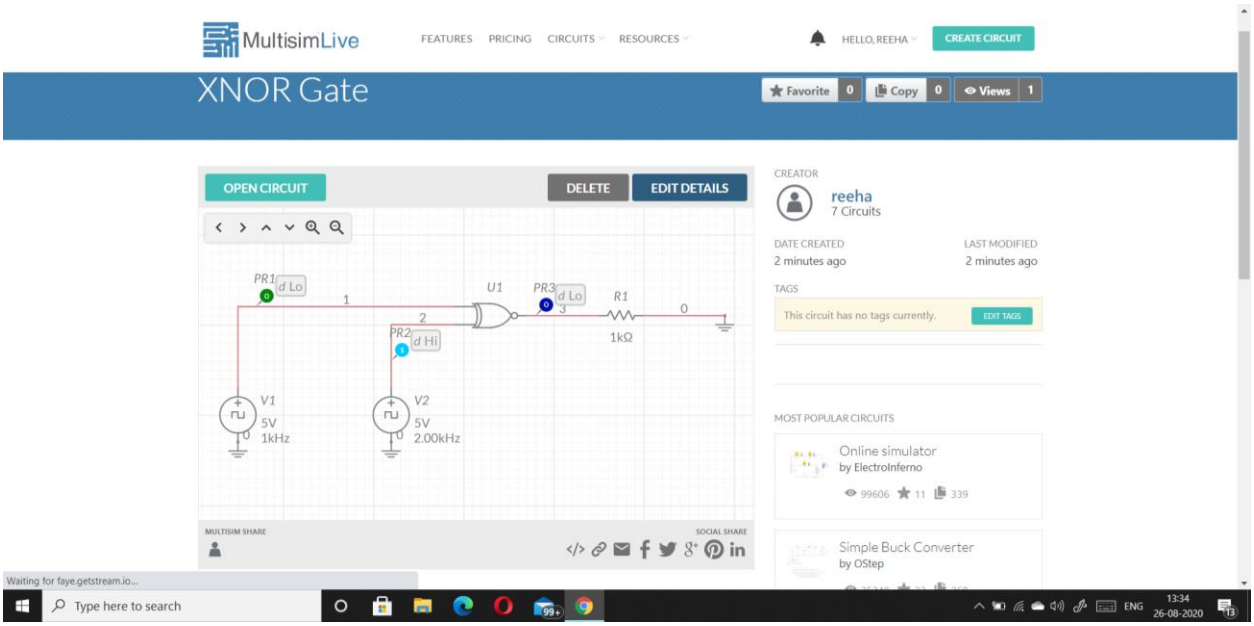
- Power supply should not exceed 5V.
- All the connections should be tight.
- Components should be tested before the practical.

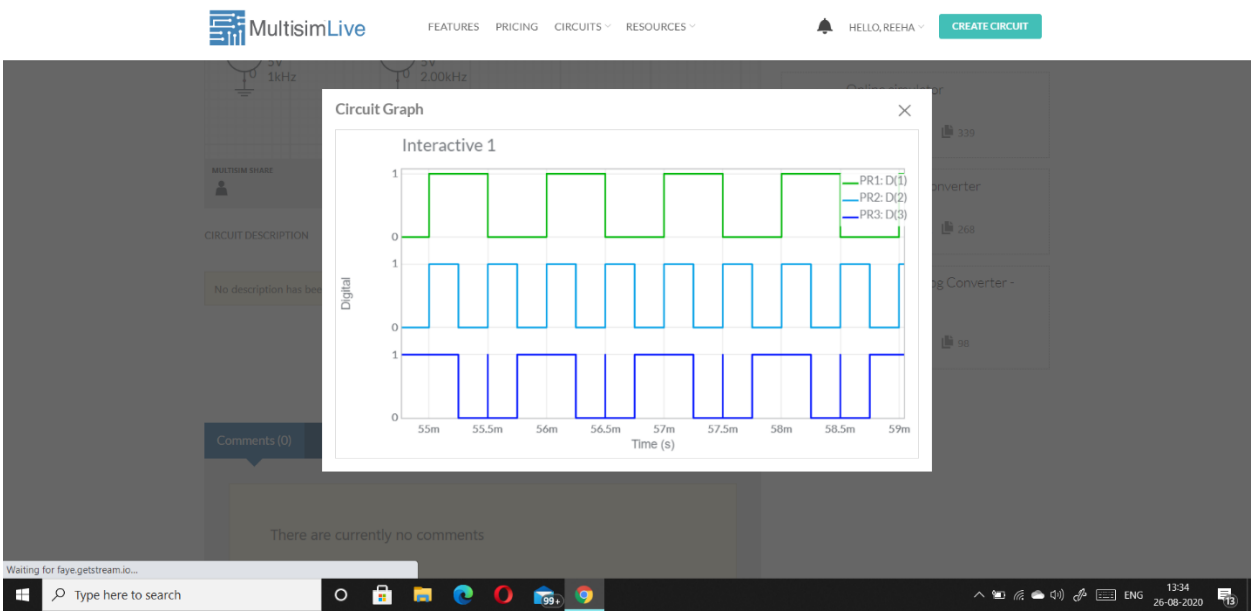
NOT GATE


MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
OPEN CIRCUIT
DELETE
EDIT DETAILS
PR1
U1
PR2
R1
d Hi
d Lo
2
1
0
1
0
V1
5V
1kHz
1kΩ
CREATOR
reeha
7 Circuits
DATE CREATED
0 minutes ago
LAST MODIFIED
0 minutes ago
TAGS
This circuit has no tags currently.
EDIT TAGS
MOST POPULAR CIRCUITS
Online simulator
by ElectroInferno
99606 11 339
Simple Buck Converter
by OStep
35348 22 268
MULTISIM SHARE
SOCIAL SHARE
CIRCUIT DESCRIPTION
Type here to search
ENG
13:33
26-08-2020

MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
Circuit Graph
Interactive 1
PR1: D(2)
PR2: D(1)
Digital
1
0
1
0
62m
62.5m
63m
63.5m
64m
64.5m
65m
65.5m
66m
66.5m
Time (s)
LAST MODIFIED
0 minutes ago
CIRCUIT DESCRIPTION
No description has been provided for this circuit.
EDIT DESCRIPTION
Digital to Analog Converter - DAC
by SILRing
24061 31 98
Type here to search
ENG
13:33
26-08-2020

XNOR GATE


MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
XNOR Gate
Favorite 0
Copy 0
Views 1
OPEN CIRCUIT
DELETE
EDIT DETAILS
PR1
d Lo
U1
PR3
d Lo
R1
1kΩ
PR2
d Hi
V1
5V
1kHz
V2
5V
2.00kHz
CREATOR
reeha
7 Circuits
DATE CREATED
2 minutes ago
LAST MODIFIED
2 minutes ago
TAGS
This circuit has no tags currently.
EDIT TAGS
MOST POPULAR CIRCUITS
Online simulator
by ElectroInferno
Simple Buck Converter
by OStep
MULTISIM SHARE
SOCIAL SHARE
Waiting for faye.getstream.io...
Type here to search
ENG
13:34
26-08-2020


MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
Circuit Graph
Interactive 1
PR1: D(1)
PR2: D(2)
PR3: D(3)
Digital
Time (s)
55m
55.5m
56m
56.5m
57m
57.5m
58m
58.5m
59m
CIRCUIT DESCRIPTION
Comments (0)
There are currently no comments
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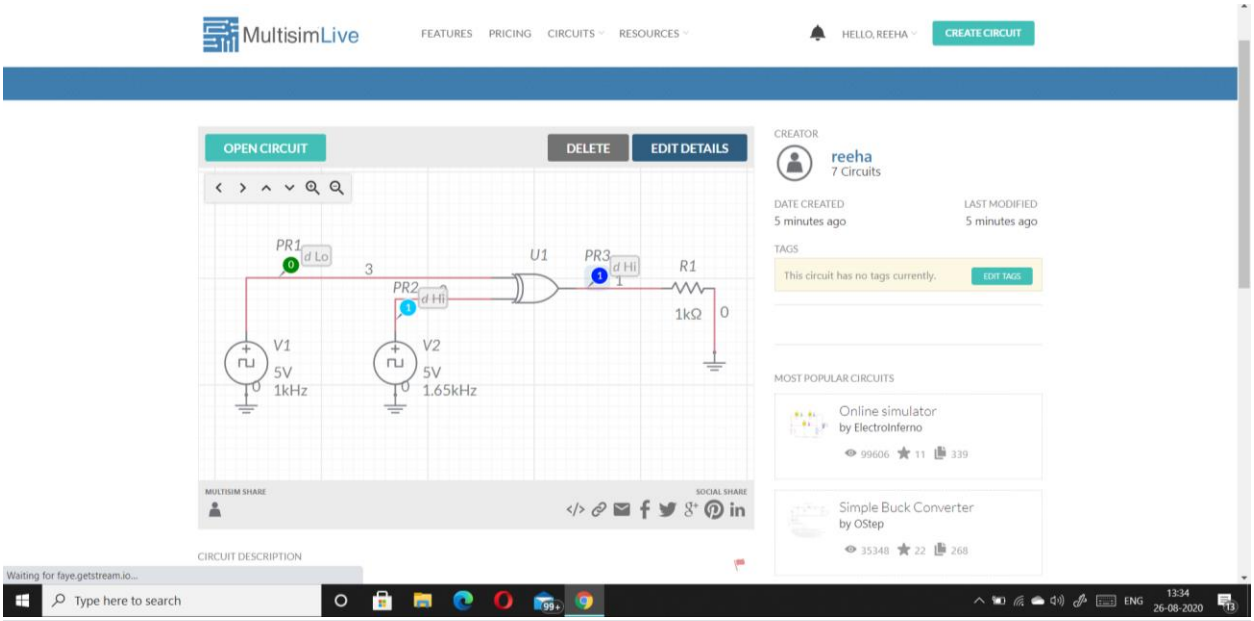
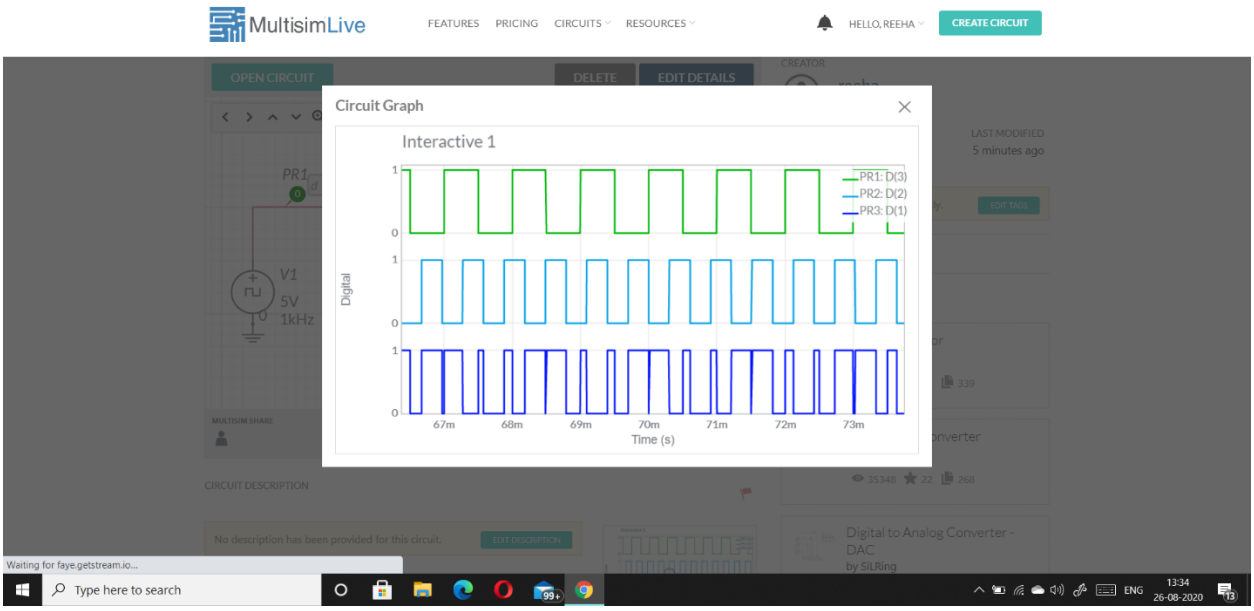
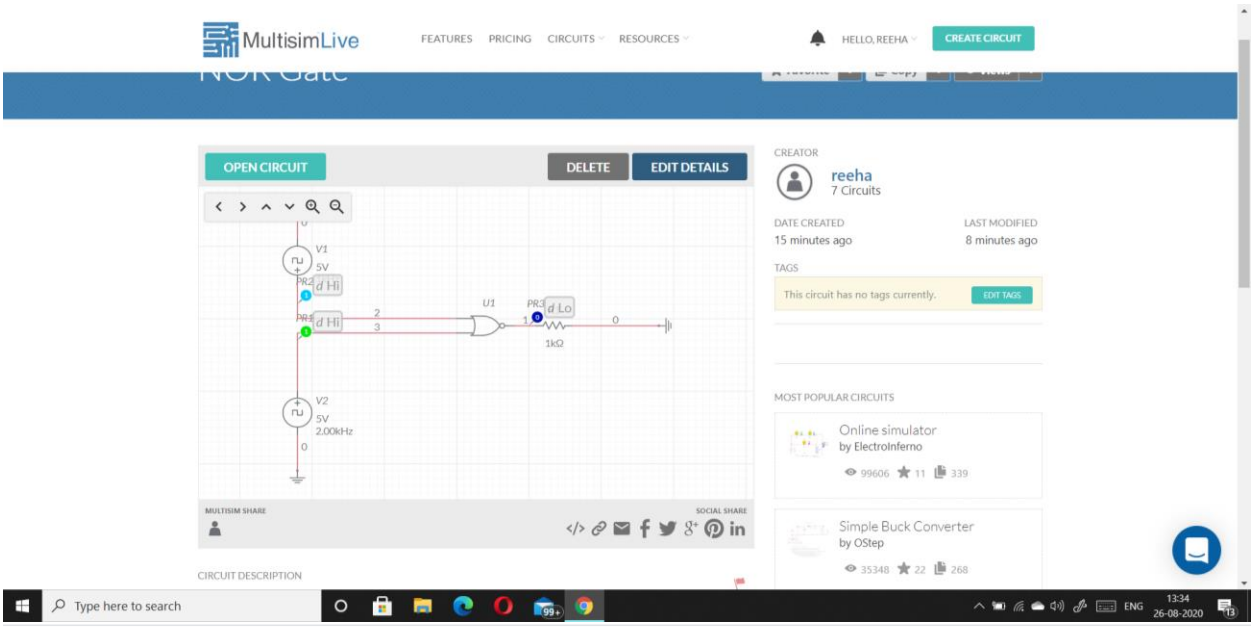
ENG
13:34
26-08-2020

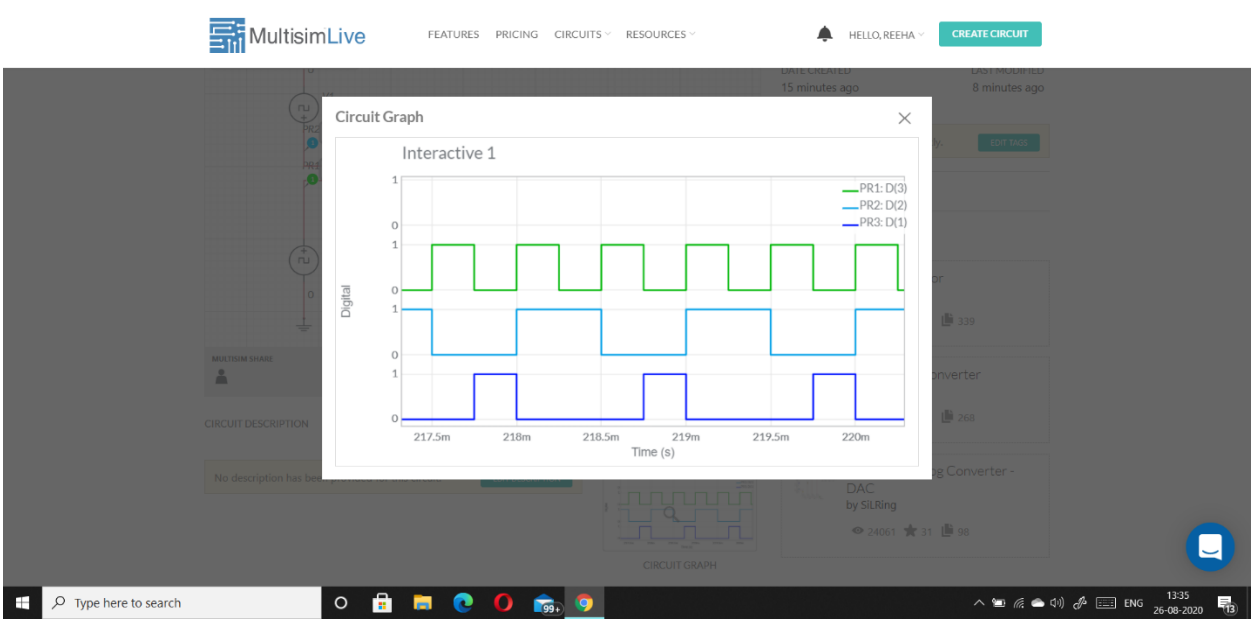
XOR GATE


MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
OPEN CIRCUIT
DELETE
EDIT DETAILS
PR1
d Lo
PR2
d Hi
PR3
d Hi
U1
R1
1kΩ
V1
5V
1kHz
V2
5V
1.65kHz
CREATOR
reeha
7 Circuits
DATE CREATED
5 minutes ago
LAST MODIFIED
5 minutes ago
TAGS
This circuit has no tags currently.
EDIT TAGS
MOST POPULAR CIRCUITS
Online simulator
by ElectroInferno
Simple Buck Converter
by OStep
MULTISIM SHARE
SOCIAL SHARE
CIRCUIT DESCRIPTION
Waiting for faye.getstream.io...
Type here to search
ENG
13:34
26-08-2020

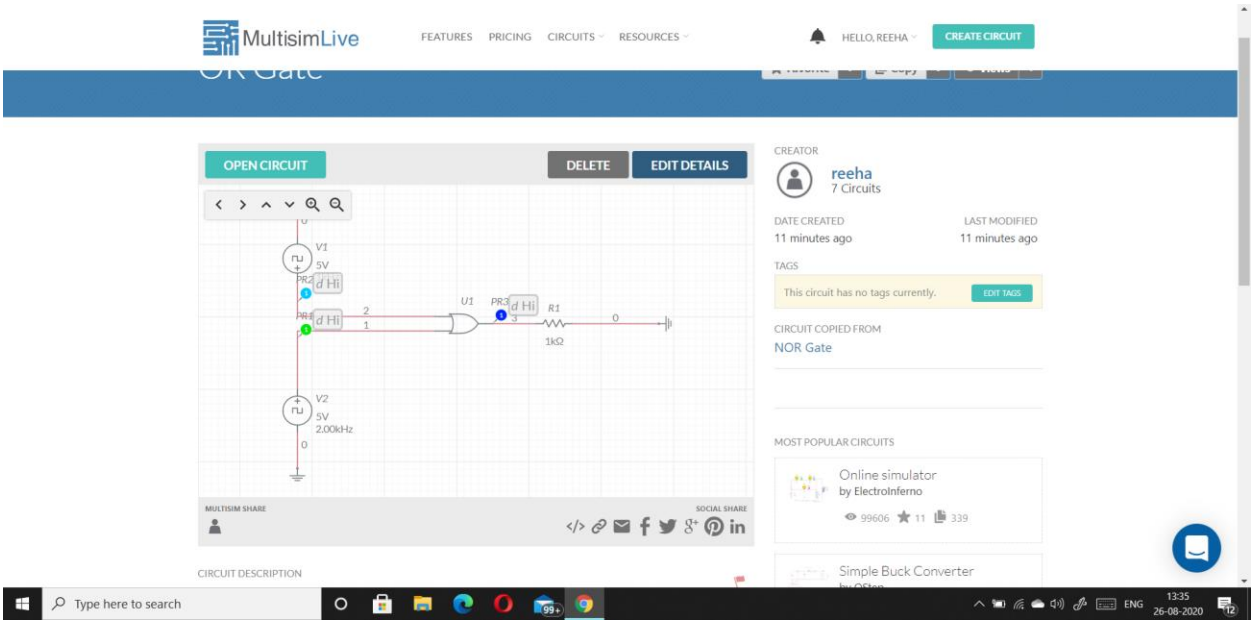

MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
Circuit Graph
Interactive 1
PR1: D(3)
PR2: D(2)
PR3: D(1)
Digital
Time (s)
67m
68m
69m
70m
71m
72m
73m
No description has been provided for this circuit.
EDIT DESCRIPTION
Digital to Analog Converter - DAC
by SILRing
Waiting for faye.getstream.io...
Type here to search
ENG
13:34
26-08-2020

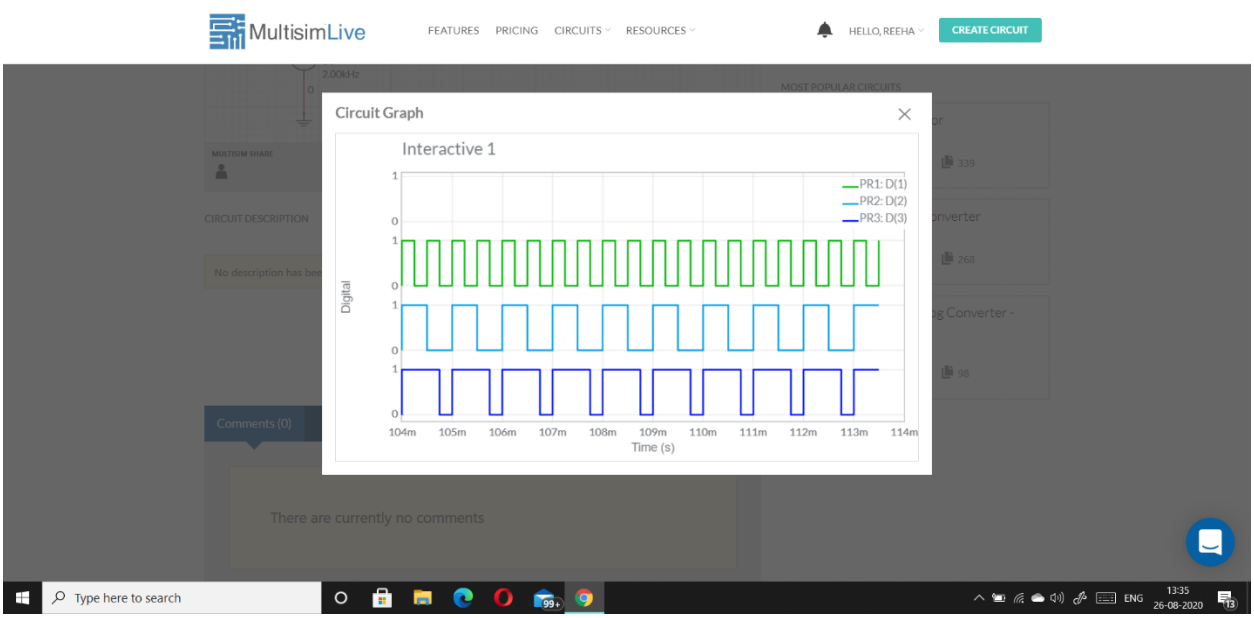
NOR GATE


MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
NOR Gate
OPEN CIRCUIT
DELETE
EDIT DETAILS
V1
5V
d Hi
d Hi
U1
d Lo
1kΩ
V2
5V
2.00kHz
CREATOR
reeha
7 Circuits
DATE CREATED
15 minutes ago
LAST MODIFIED
8 minutes ago
TAGS
This circuit has no tags currently.
EDIT TAGS
MOST POPULAR CIRCUITS
Online simulator
by ElectroInferno
Simple Buck Converter
by OStep
MULTISIM SHARE
SOCIAL SHARE
CIRCUIT DESCRIPTION
Type here to search
ENG
13:34
26-08-2020


MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
Circuit Graph
Interactive 1
PR1: D(3)
PR2: D(2)
PR3: D(1)
Digital
Time (s)
217.5m
218m
218.5m
219m
219.5m
220m
CIRCUIT GRAPH
DAC
by SILRing
Type here to search
ENG
13:35
26-08-2020

OR GATE


MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
OR Gate
OPEN CIRCUIT
DELETE
EDIT DETAILS
V1
5V
V2
5V
2.00kHz
U1
R1
1kΩ
CREATOR
reeha
7 Circuits
DATE CREATED
11 minutes ago
LAST MODIFIED
11 minutes ago
TAGS
This circuit has no tags currently.
EDIT TAGS
CIRCUIT COPIED FROM
NOR Gate
MOST POPULAR CIRCUITS
Online simulator
by ElectroInferno
99606
11
339
Simple Buck Converter
MULTISIM SHARE
SOCIAL SHARE
CIRCUIT DESCRIPTION
Type here to search
ENG
13:35
26-08-2020


MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
Circuit Graph
Interactive 1
PR1: D(1)
PR2: D(2)
PR3: D(3)
Digital
Time (s)
104m
105m
106m
107m
108m
109m
110m
111m
112m
113m
114m
MOST POPULAR CIRCUITS
CIRCUIT DESCRIPTION
Comments (0)
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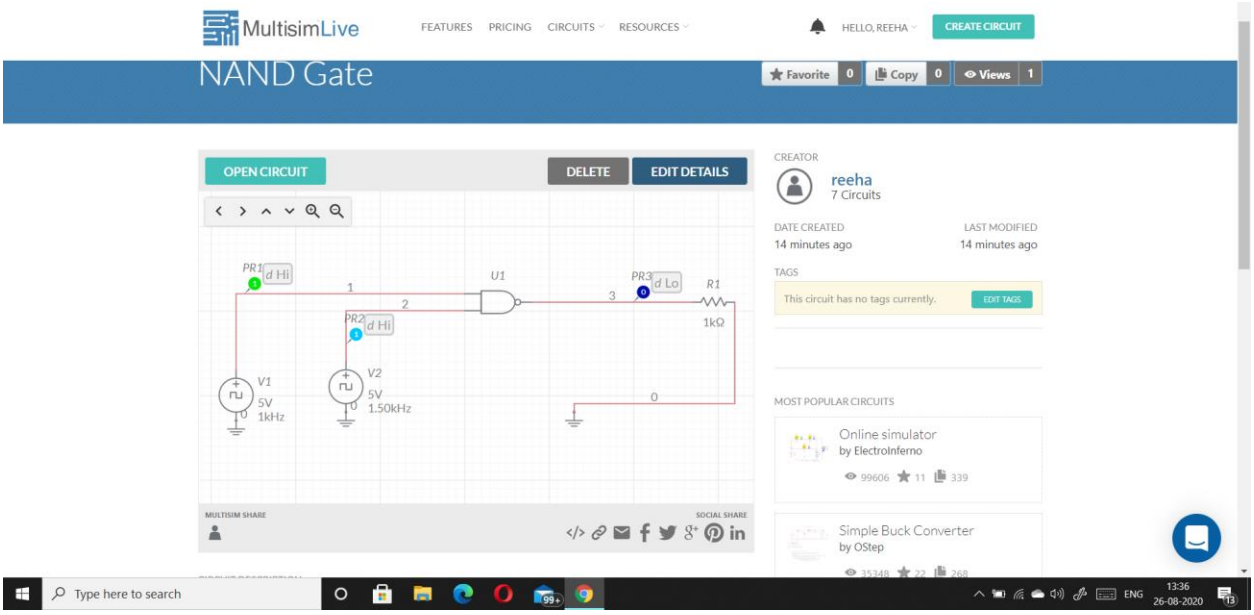
Type here to search
ENG
13:35
26-08-2020

NAND GATE


MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
NAND Gate
Favorite 0
Copy 0
Views 1
OPEN CIRCUIT
DELETE
EDIT DETAILS
PR1
d Hi
PR2
d Hi
U1
PR3
d Lo
R1
1kΩ
V1
5V
1kHz
V2
5V
1.50kHz
CREATOR
reeha
7 Circuits
DATE CREATED
14 minutes ago
LAST MODIFIED
14 minutes ago
TAGS
This circuit has no tags currently.
EDIT TAGS
MOST POPULAR CIRCUITS
Online simulator
by ElectroInferno
Simple Buck Converter
by OStep
MULTISIM SHARE
SOCIAL SHARE
Type here to search
ENG
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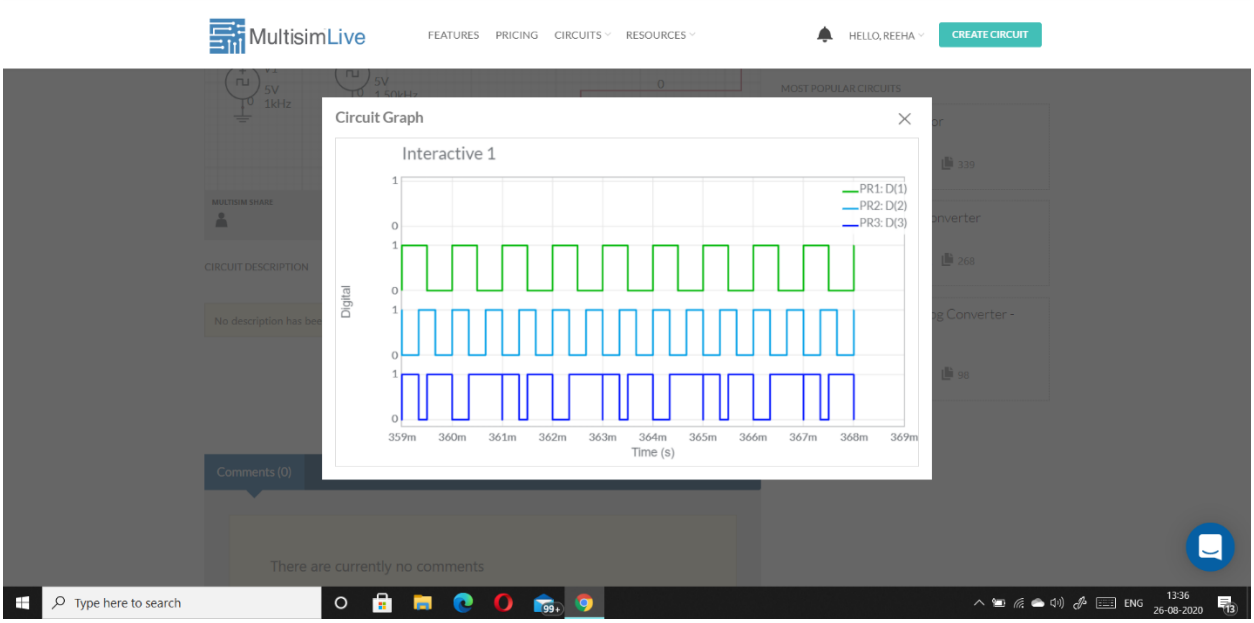
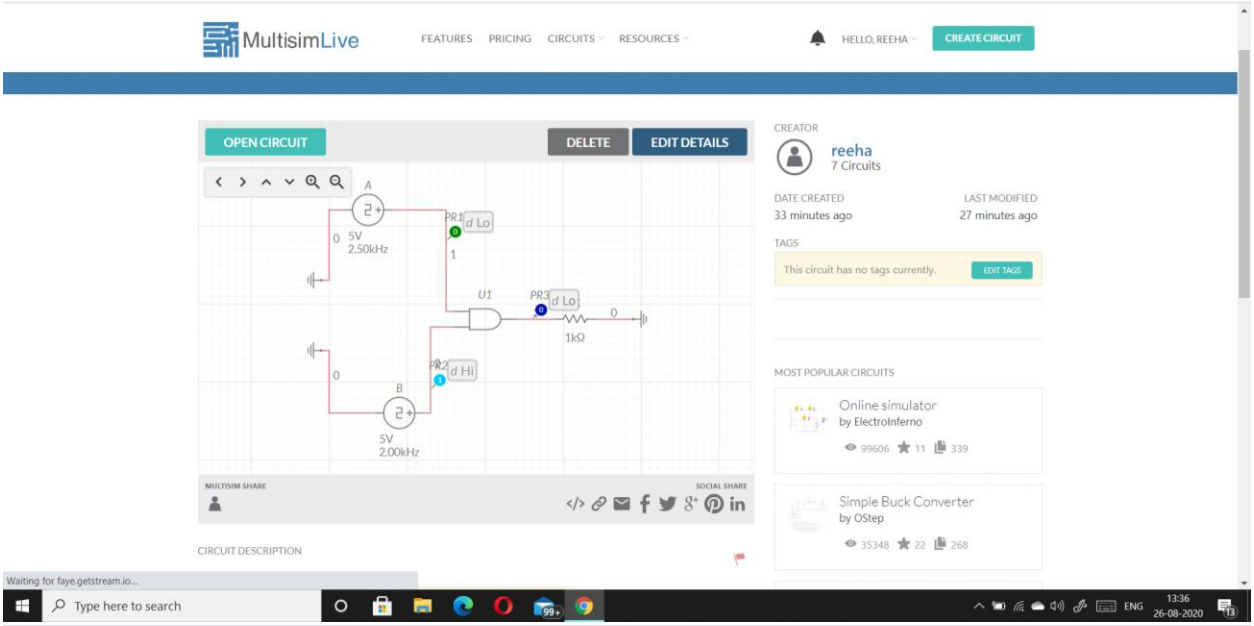
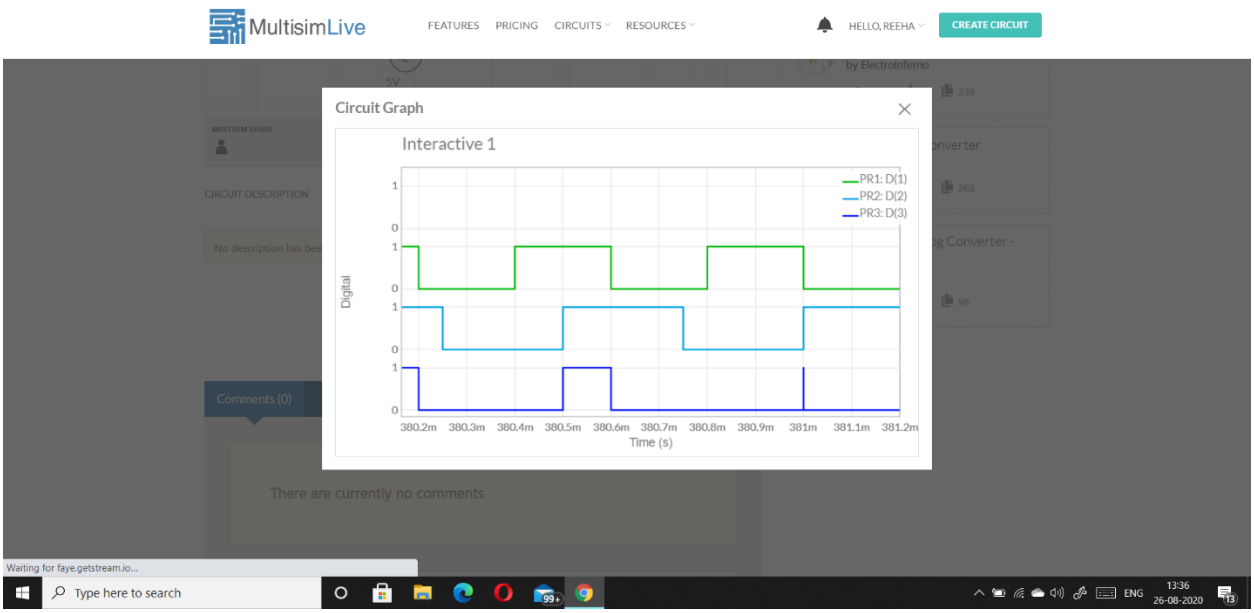
26-08-2020


MultisimLive
FEATURES
PRICING
CIRCUITS
RESOURCES
HELLO, REEHA
CREATE CIRCUIT
Circuit Graph
Interactive 1
PR1: D(1)
PR2: D(2)
PR3: D(3)
Digital
Time (s)
359m
360m
361m
362m
363m
364m
365m
366m
367m
368m
369m
Comments (0)
There are currently no comments
Type here to search
ENG
13:36
26-08-2020

AND GATE





Result:

All Gates has been realized.

VIVA VOCE

Q1. Explain what is Boolean Algebra?

Boolean algebra is a mathematic system of logic in which truth functions are expresses as symbols and then these symbols are manipulated to arrive at conclusion.

Q2. Explain what are the basic logic elements?

Basic logic elements are NOT gate, AND gate, OR gate and the flip-flop.

Q3. Explain what is a truth table?

Truth table is a table that gives outputs for all possible combinations of inputs to a logic circuit.

Q4. Define positive logic and negative logic.

If the higher of the two voltages represents a 1 and the lower voltage represents a 0, then the logic is called a positive logic. On the other hand, if the lower voltage represents a 1 and the higher voltage a 0, we have a negative logic.

Q5. Explain what is pulse logic system?

A logic system in which a bit is recognized by the presence or absence of a pulse is called a pulse or dynamic logic system.