

ENGR 101

Engineering Technology

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School of Engineering and Computer Science
Victoria University of Wellington

Victoria
UNIVERSITY OF WELLINGTON

*Te Whare Wānanga
o te Ūpoko o te Ika a Māui*



CAPITAL CITY UNIVERSITY

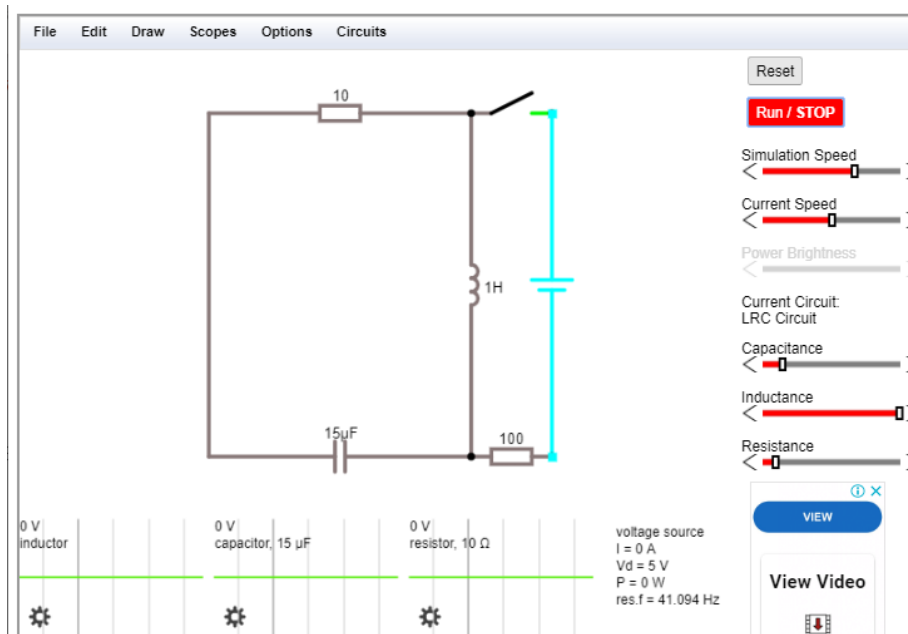
Week 15

- Circuit simulator

<https://www.falstad.com/circuit/>

Drawing Logic Circuits using on-line simulator

<https://www.falstad.com/circuit/>



This is an electronic circuit simulator. When the applet starts up you will see an animated schematic of a simple LRC circuit. The green color indicates positive voltage. The gray color indicates ground. A red color indicates negative voltage. The moving yellow dots indicate current.

To turn a switch on or off, just click on it. If you move the mouse over any component of the circuit, you will see a short description of that component and its current state in the lower right corner of the window. To modify a component, move the mouse over it, click the right mouse button (or control-click if you have a Mac) and select "Edit".

The "Circuits" menu contains a lot of sample circuits for you to try.

[Full Screen version.](#)

[Directions.](#)

[Standalone \(offline\) version for Mac, and for Windows.](#)

[Index of Circuit Examples. \(Polish version\)](#)

[More applets.](#)

Javascript version. [Latest changes here](#), including [subcircuits](#).

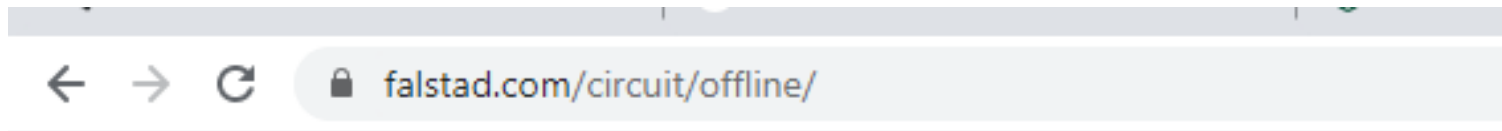
[Report a problem/feature request](#)

Huge thanks to [Jain Sharp](#) for the Javascript port. You can still use the [original Java version](#). More acknowledgements in the about box.

Standalone
version



<https://www.falstad.com/circuit/>



Index of /circuit/offline

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
 Parent Directory		-	
 CircuitJS1-mac.dmg	2021-03-09 17:05	89M	
 circuitjs1-linux64.tgz	2021-03-09 17:07	83M	
 circuitjs1-win.zip	2021-03-09 17:08	76M	

Standalone versions

Drawing Logic Circuits using on-line simulator

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The screenshot displays the Falstad Circuit Simulator interface. At the top, a menu bar includes 'File', 'Edit', 'Draw', 'Scopes', 'Options', and 'Circuits'. The central workspace shows a circuit diagram with a 10 Ω resistor, a 15 μF capacitor, a 1 H inductor, and a 100 Ω resistor. A green wire is connected to the top of the 1 H inductor, and a battery symbol is connected to the bottom of the 100 Ω resistor. To the right of the circuit are several control panels: a 'Reset' button, a red 'Run / STOP' button, and sliders for 'Simulation Speed', 'Current Speed', 'Power Brightness', 'Capacitance', 'Inductance', and 'Resistance'. Below the circuit diagram, a status bar shows '0 V inductor', '0 V capacitor, 15 μF', and '0 V resistor, 10 Ω'. To the right of the status bar, the simulation time is 't = 11.735 s', the time step is 'time step = 5 μs', and the resolution is 'res.f = 41.094 Hz'. At the bottom right, there is a 'VIEW' button and a 'View Video' button with a download icon.

Drawing Logic Circuits using on-line simulator

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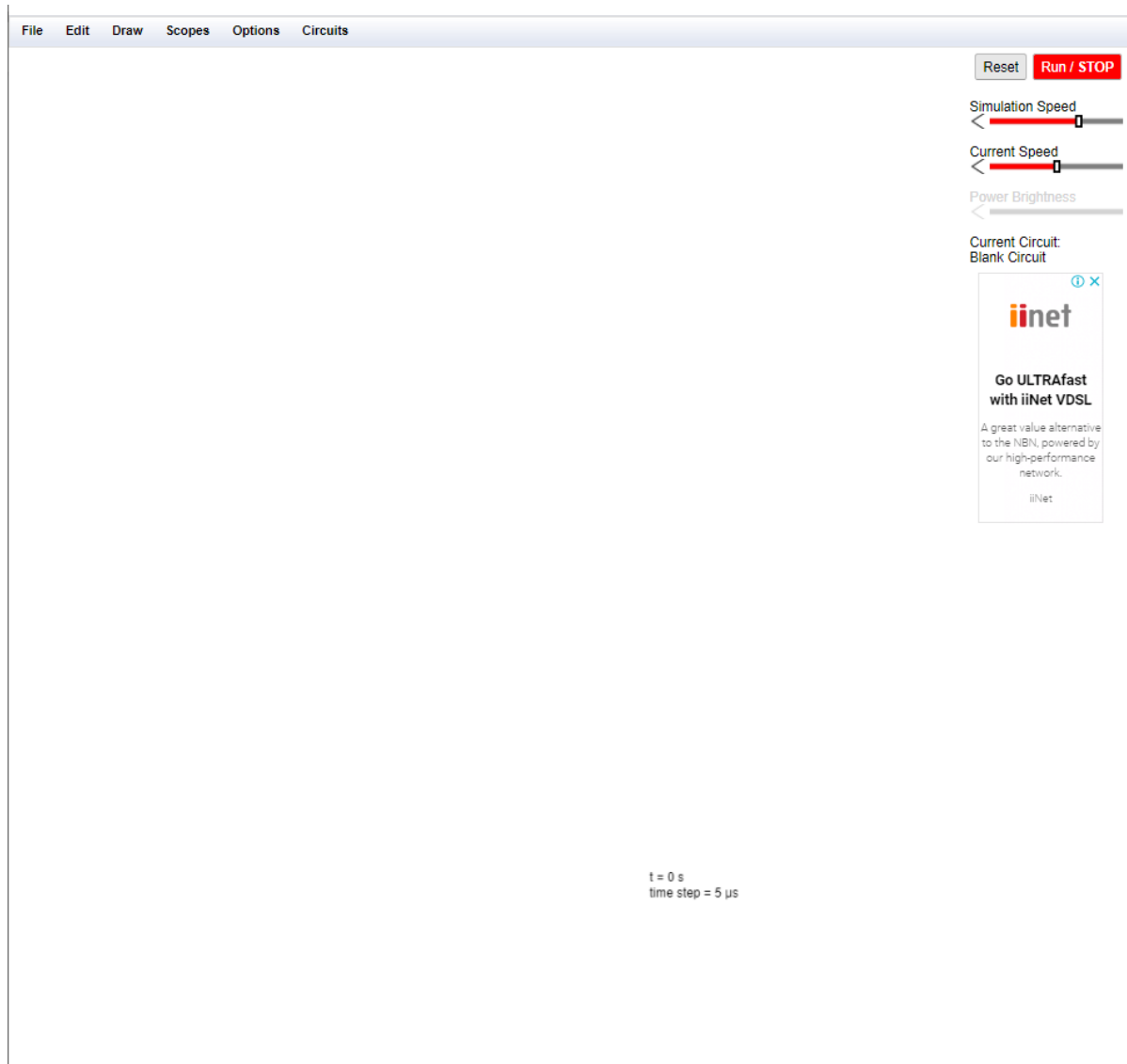
1. Click on the Circuits drop-down menu

2. Click on the Blank Circuit option

The screenshot displays the Falstad Circuit Simulator interface. At the top, the menu bar includes File, Edit, Draw, Scopes, Options, and Circuits. The 'Circuits' menu is open, showing a list of options: Basics, A/C Circuits, Passive Filters, Other Passive Circuits, Diodes, Op-Amps, Transistors, MOSFETs, 555 Timer Chip, Active Filters, Logic Families, Combinational Logic, Sequential Logic, Analog/Digital, Phase-Locked Loops, Transmission Lines, Misc Devices, and Blank Circuit. A red box highlights the 'Circuits' menu, and a red arrow points to the 'Blank Circuit' option. The main workspace shows a circuit diagram with a 15µF capacitor, a 100Ω resistor, and a 1H inductor. The waveform viewer at the bottom shows three waveforms: a 941.672 µV inductor waveform, a 1000 µV capacitor, 15 µF waveform, and a 35.365 µV resistor, 10 Ω waveform. The simulation parameters are t = 54.325 ms, time step = 5 µs, and res.f = 41.094 Hz.

Drawing Logic Circuits using on-line simulator

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Drawing Logic Circuits using on-line simulator

Esc (Escape)
button



Drawing Logic Circuits using on-line simulator

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Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
 $(A+B)(A'+C)(B+C) = (A+B)(A'+C)$

1

2

3

Short-cut Keys:

Inverter	1
AND gate	2
OR gate	3

Reset Run / STOP

Simulation Speed

Current Speed

Power Brightness

Current Circuit:
Blank Circuit

iiNet

Go ULTRAfast
with iiNet VDSL

A great value alternative
to the NBN, powered by
our high-performance
network.

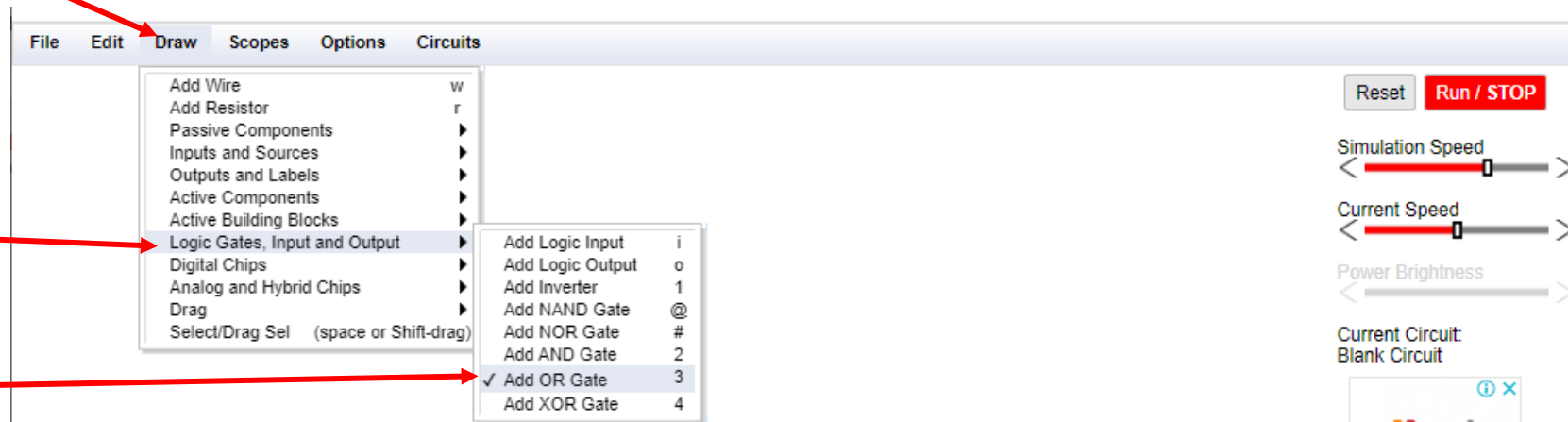
iiNet

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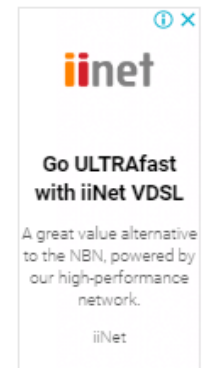
Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
 $(A+B)(A'+C)(B+C) = (A+B)(A'+C)$

1



4. The above shown menu will disappear and you see a + sign that will move around the screen when you move your computer mouse.

5. Click the mouse button once, drag the mouse pointer and release the mouse button to draw the OR gate

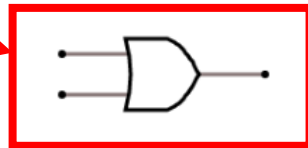


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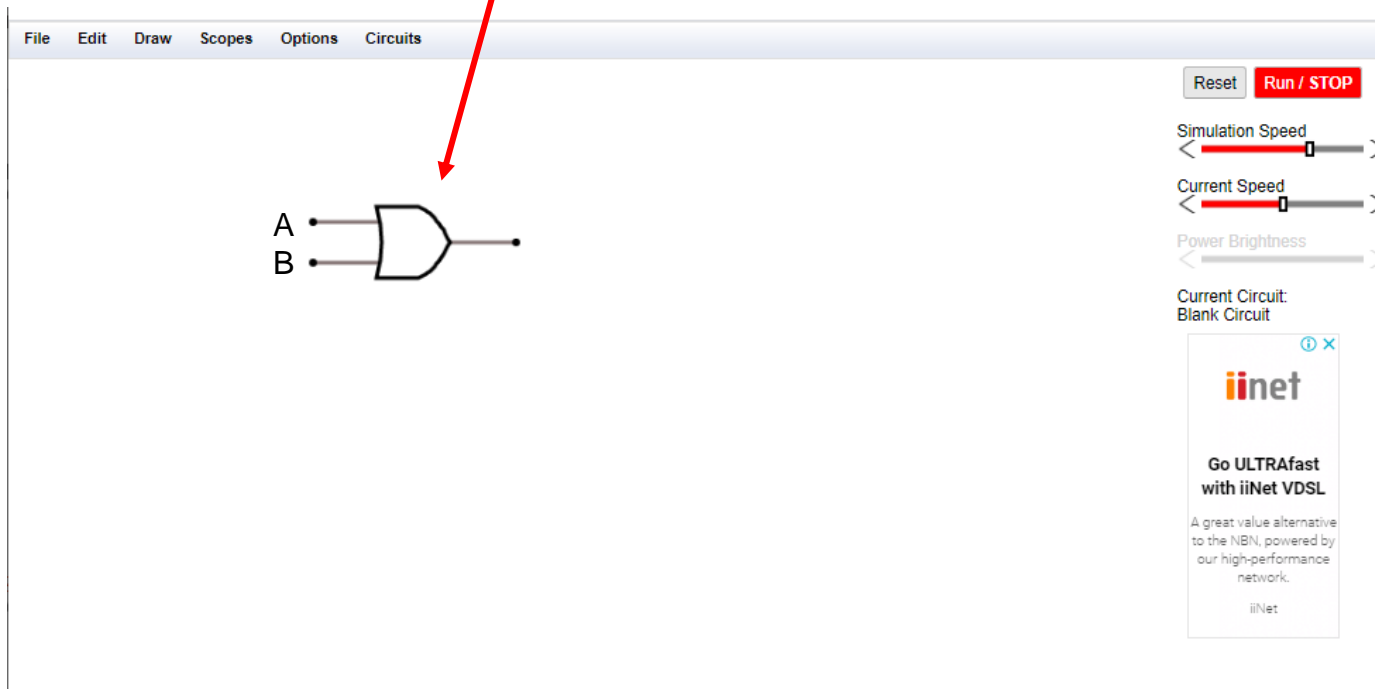
OR
gate



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 $(A+B)(A'+C)(B+C) = (A+B)(A'+C)$

Add
another
OR
gate

The screenshot shows the Falstad online logic circuit simulator interface. The main workspace contains two OR gates. The top OR gate has two inputs labeled 'A' and 'B'. The bottom OR gate is highlighted with a red rectangular box. A red arrow points from the text 'Add another OR gate' to this box. The simulator's control panel on the right includes buttons for 'Reset' and 'Run / STOP', and sliders for 'Simulation Speed', 'Current Speed', and 'Power Brightness'. A small advertisement for 'iinet' is visible in the bottom right corner.

Drawing Logic Circuits using on-line simulator

<https://www.falstad.com/circuit/>

Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
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Add an INVERTER

INVERTER to obtain A'

Drawing Logic Circuits using on-line simulator

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Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
 $(A+B)(A'+C)(B+C) = (A+B)(A'+C)$

1

2

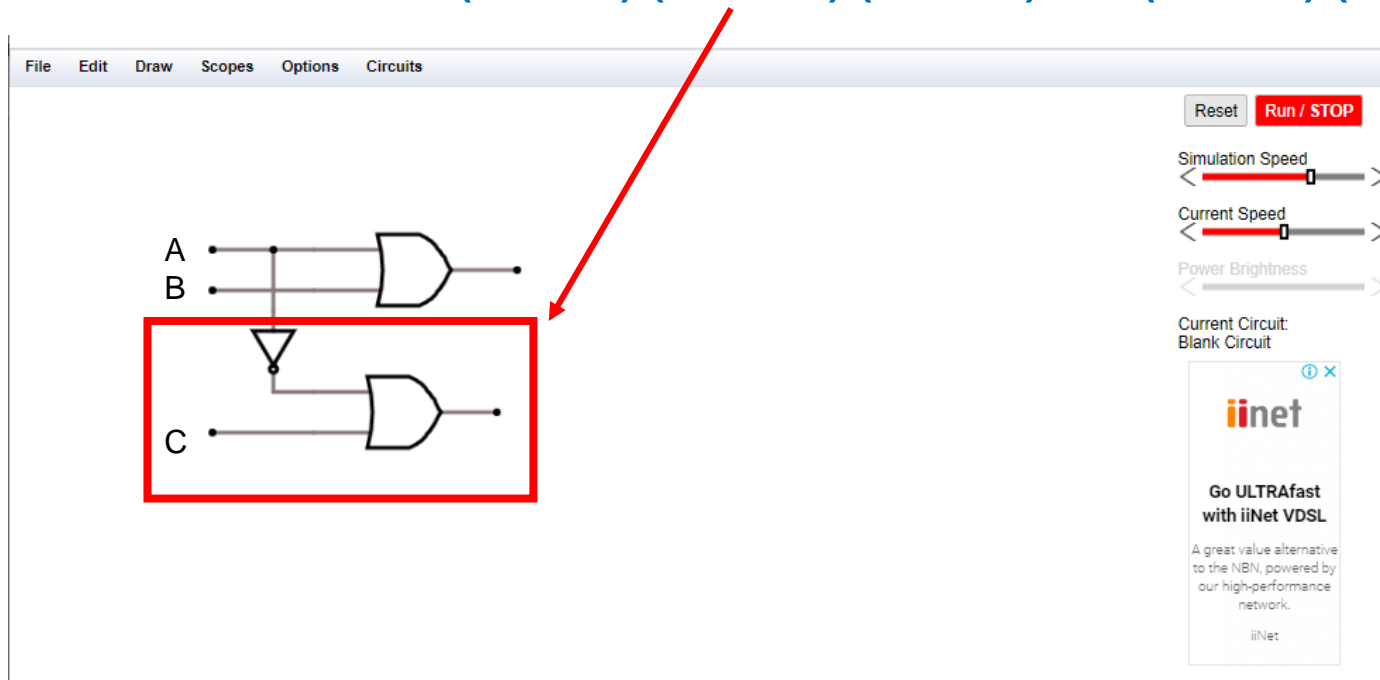
The screenshot shows the Falstad Circuit Simulator interface. The 'Draw' menu is open, and 'Add Wire' is selected. A red arrow labeled '1' points to the 'Draw' menu, and another red arrow labeled '2' points to 'Add Wire'. A third red arrow points to the 'w' shortcut key next to 'Add Wire'. The interface includes a menu bar (File, Edit, Draw, Scopes, Options, Circuits), a toolbar with 'Reset' and 'Run / STOP' buttons, and sliders for 'Simulation Speed', 'Current Speed', and 'Power Brightness'. A small advertisement for 'iinet' is visible in the bottom right corner.

Short-cut Key:
Add Wire **w**

Drawing Logic Circuits using on-line simulator

<https://www.falstad.com/circuit/>

Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
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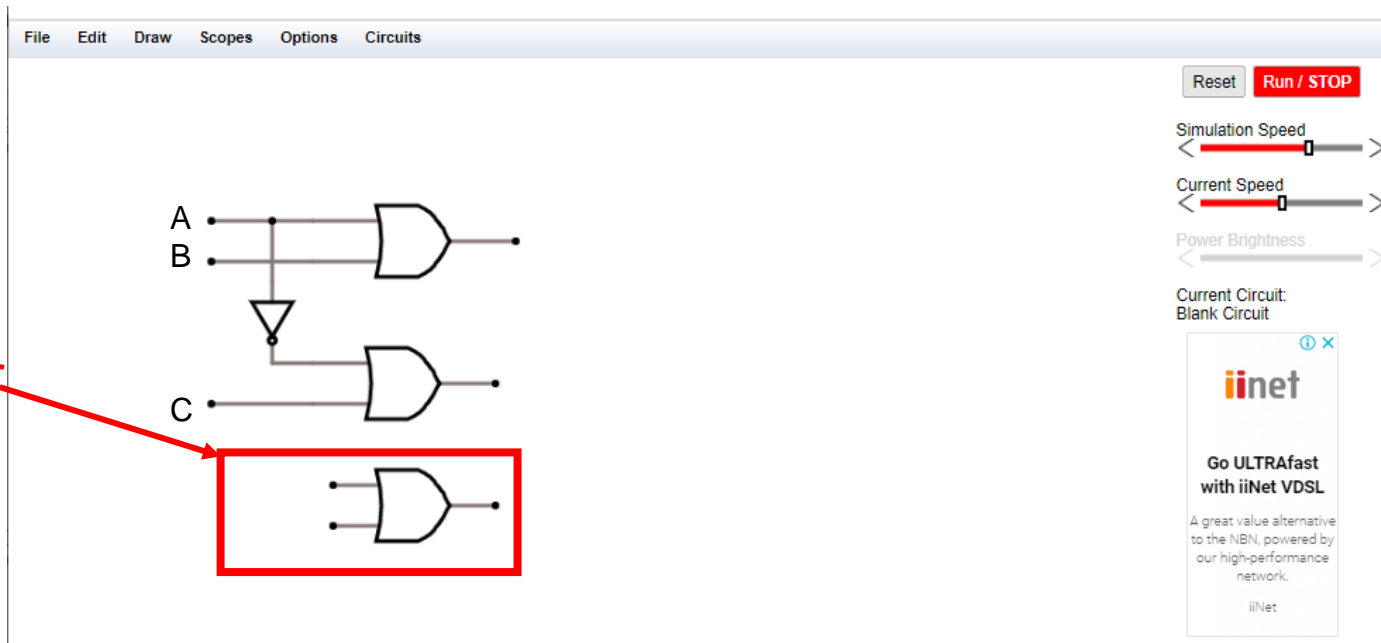


Drawing Logic Circuits using on-line simulator

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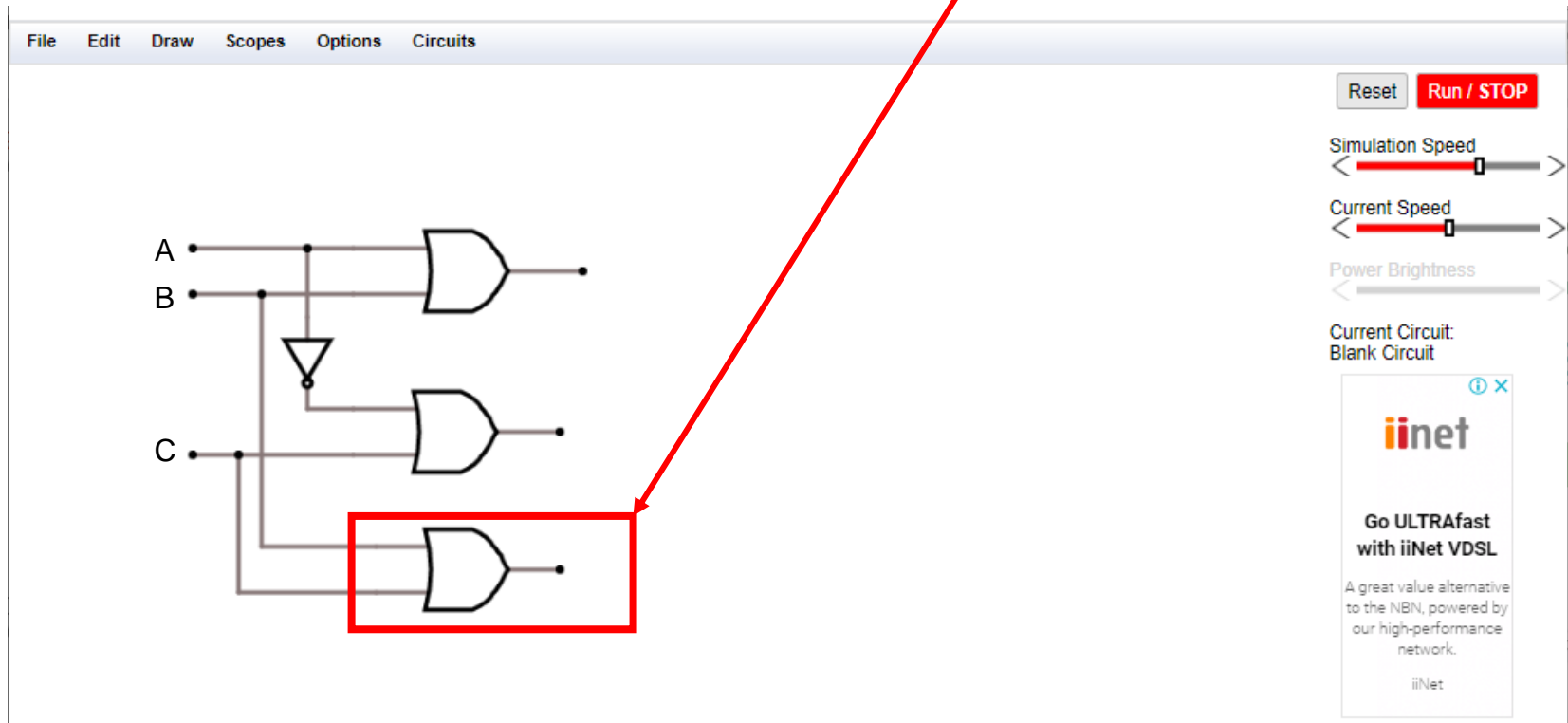
Add
another
OR
gate



Drawing Logic Circuits using on-line simulator

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Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
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1

2

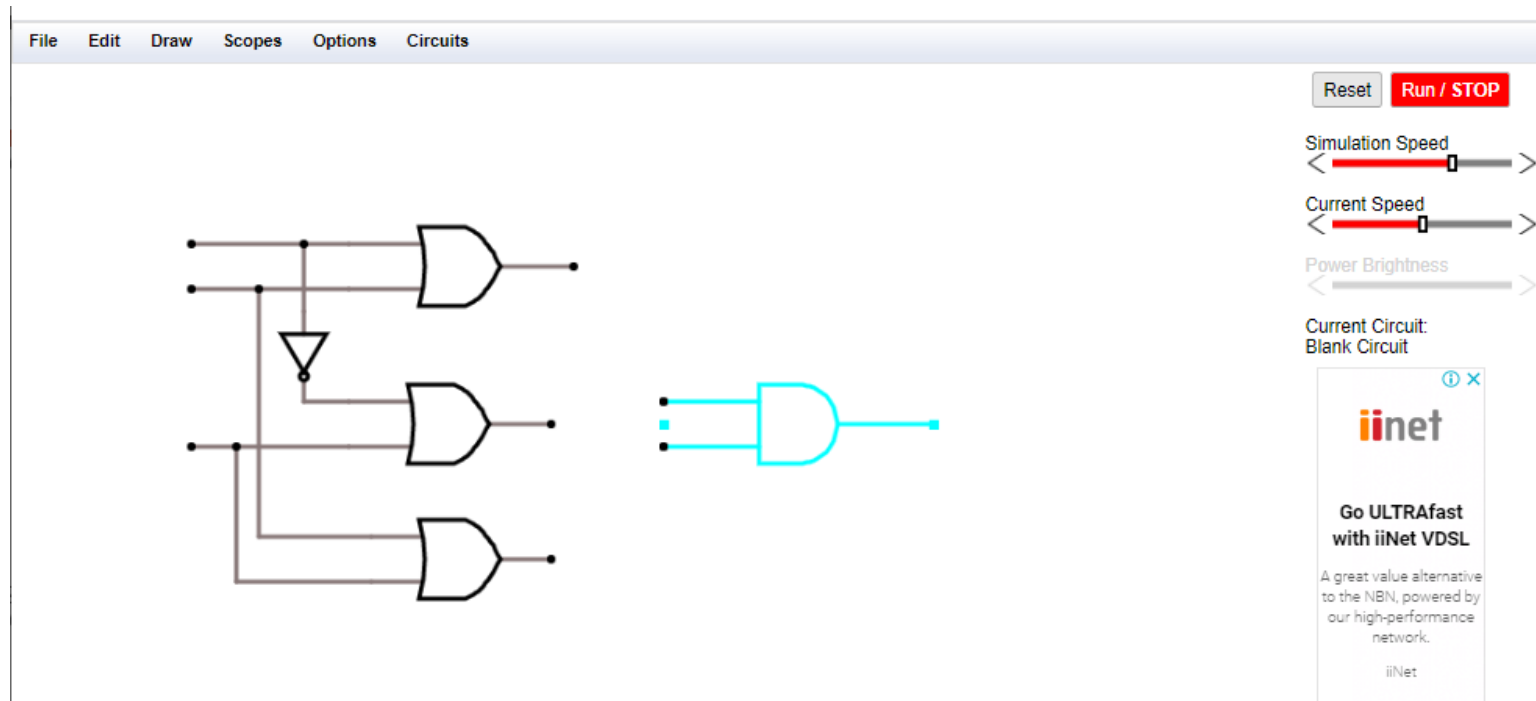
3

The screenshot shows the Falstad online logic simulator interface. The 'Draw' menu is open, displaying various components and gates. The 'Add AND Gate' option is highlighted. The circuit diagram shows two AND gates connected to two inputs. The right side of the interface shows simulation controls like 'Reset', 'Run / STOP', 'Simulation Speed', 'Current Speed', and 'Power Brightness'. An advertisement for iiNet is visible at the bottom right.

Drawing Logic Circuits using on-line simulator

<https://www.falstad.com/circuit/>

Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
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Drawing Logic Circuits using on-line simulator

<https://www.falstad.com/circuit/>

Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
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← → ↻ falstad.com/circuit/circuitjs.html 🔍 ☆ ☰ 👤 ⋮

📱 Apps 🌐 Courses/COMP101_... 📅 Lecture Schedule -... 🌐 Roundcube Webma... 📺 Setup | ExpressVPN 📧 Mail - Kerese.Manu... ⋮

File Edit Draw Scopes Options Circuits

Reset Run / STOP

Simulation Speed < [Slider] >

Current Speed < [Slider] >

Power Brightness < [Slider] >

Current Circuit:
Blank Circuit

iinet

Go ULTRAFast
with iNet VDSL

A great value alternative
to the NBN, powered by
our high-performance
network.

iNet

Edit...
View in Scope
View in Undocked Scope
Cut
Copy
Delete
Duplicate
Swap Terminals
Split Wire Ctrl-click
Sliders...

Drawing Logic Circuits using on-line simulator

<https://www.falstad.com/circuit/>

Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
 $(A+B)(A'+C)(B+C) = (A+B)(A'+C)$

The screenshot shows the Falstad online logic simulator interface. The main window displays a logic circuit with three 2-input AND gates. The top gate has inputs A and B. The middle gate has inputs A and NOT A. The bottom gate has inputs B and C. To the right of the circuit is a single 2-input AND gate component. Below the circuit is an 'Edit Component' dialog box with the following fields and options:

- # of Inputs: 2
- High Voltage (V): 5
- Schmitt Inputs
- Buttons: Apply, OK, Cancel

On the right side of the simulator, there are simulation controls:

- Reset button
- Run / STOP button
- Simulation Speed slider
- Current Speed slider
- Power Brightness slider
- Current Circuit: Blank Circuit
- iinet advertisement: Go ULTRAfast with iinet VDSL. A great value alternative to the NBN, powered by our high-performance network. iinet

Drawing Logic Circuits using on-line simulator

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Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
 $(A+B)(A'+C)(B+C) = (A+B)(A'+C)$

The screenshot displays the Falstad online logic simulator interface. The main window shows a logic circuit with three 2-input AND gates. The top gate has inputs A and B. The middle gate has inputs A and NOT A. The bottom gate has inputs B and C. A separate 2-input AND gate is shown to the right. An 'Edit Component' dialog box is open, showing the '# of Inputs' field set to 2, which is highlighted with a red box. The 'High Voltage (V)' field is set to 5. There is a 'Schmitt Inputs' checkbox and 'Apply', 'OK', and 'Cancel' buttons. On the right side of the simulator, there are controls for 'Reset', 'Run / STOP', 'Simulation Speed', 'Current Speed', and 'Power Brightness'. A small advertisement for 'iinet' is visible in the bottom right corner.

Drawing Logic Circuits using on-line simulator

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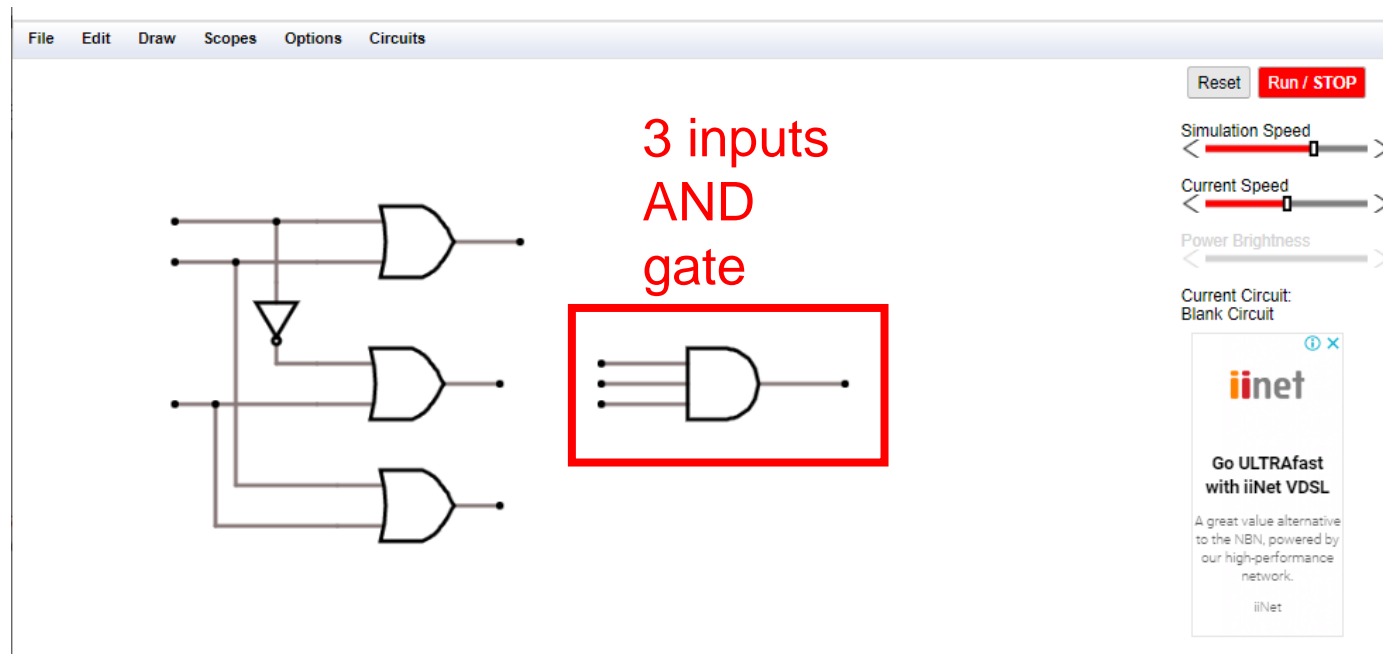
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 $(A+B)(A'+C)(B+C) = (A+B)(A'+C)$

The screenshot displays the Falstad online logic simulator interface. The main workspace shows a logic circuit with three 3-input AND gates. The top gate has inputs A, B, and C. The middle gate has inputs A, B, and the output of a NOT gate connected to input A. The bottom gate has inputs A, B, and C. A fourth 3-input AND gate is shown to the right. An 'Edit Component' dialog box is open, showing the '# of Inputs' field set to 3, which is highlighted with a red box. The 'High Voltage (V)' field is set to 5. The 'Schmitt Inputs' checkbox is unchecked. The 'Apply', 'OK', and 'Cancel' buttons are visible at the bottom of the dialog. On the right side of the simulator, there are controls for 'Reset', 'Run / STOP', 'Simulation Speed', 'Current Speed', and 'Power Brightness'. A small advertisement for 'iinet' is also visible.

Drawing Logic Circuits using on-line simulator

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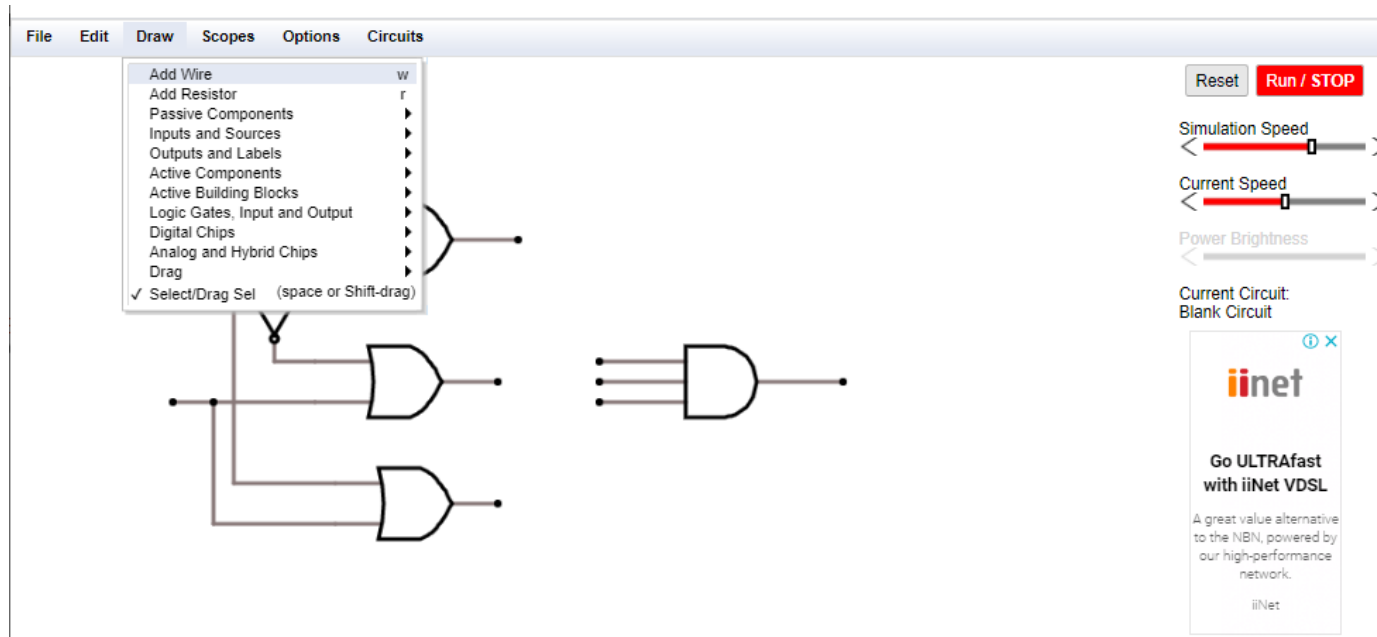
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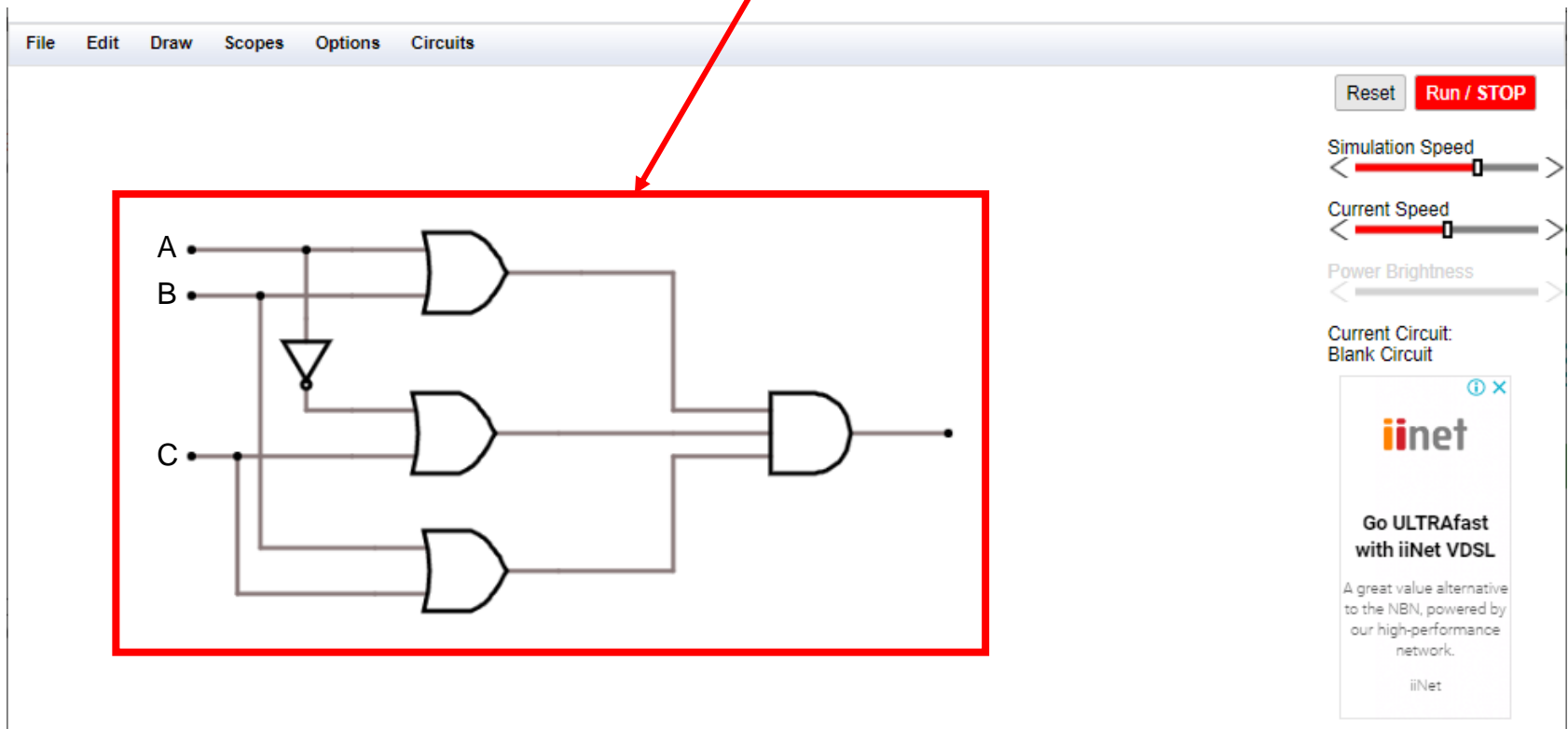
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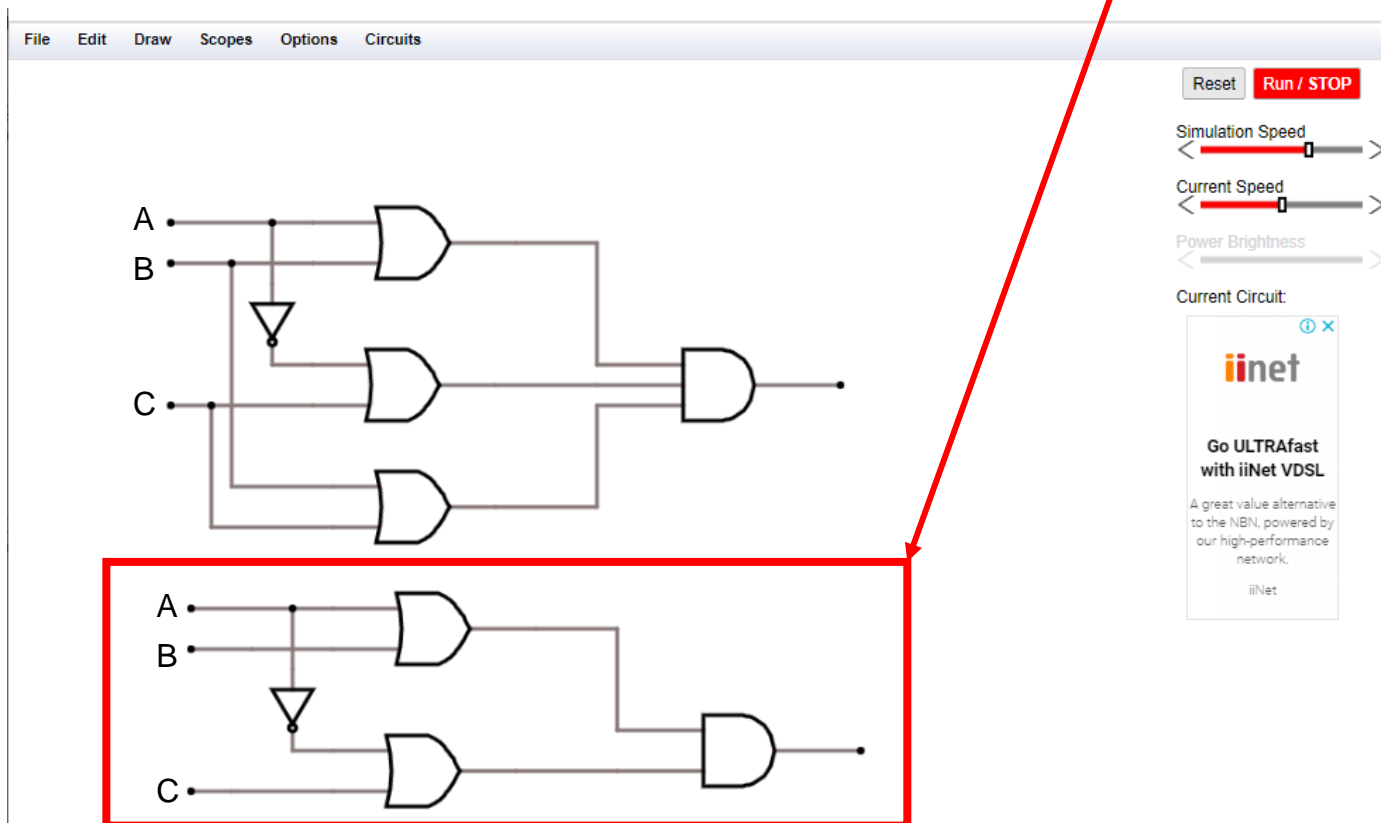
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Drawing Logic Circuits using on-line simulator

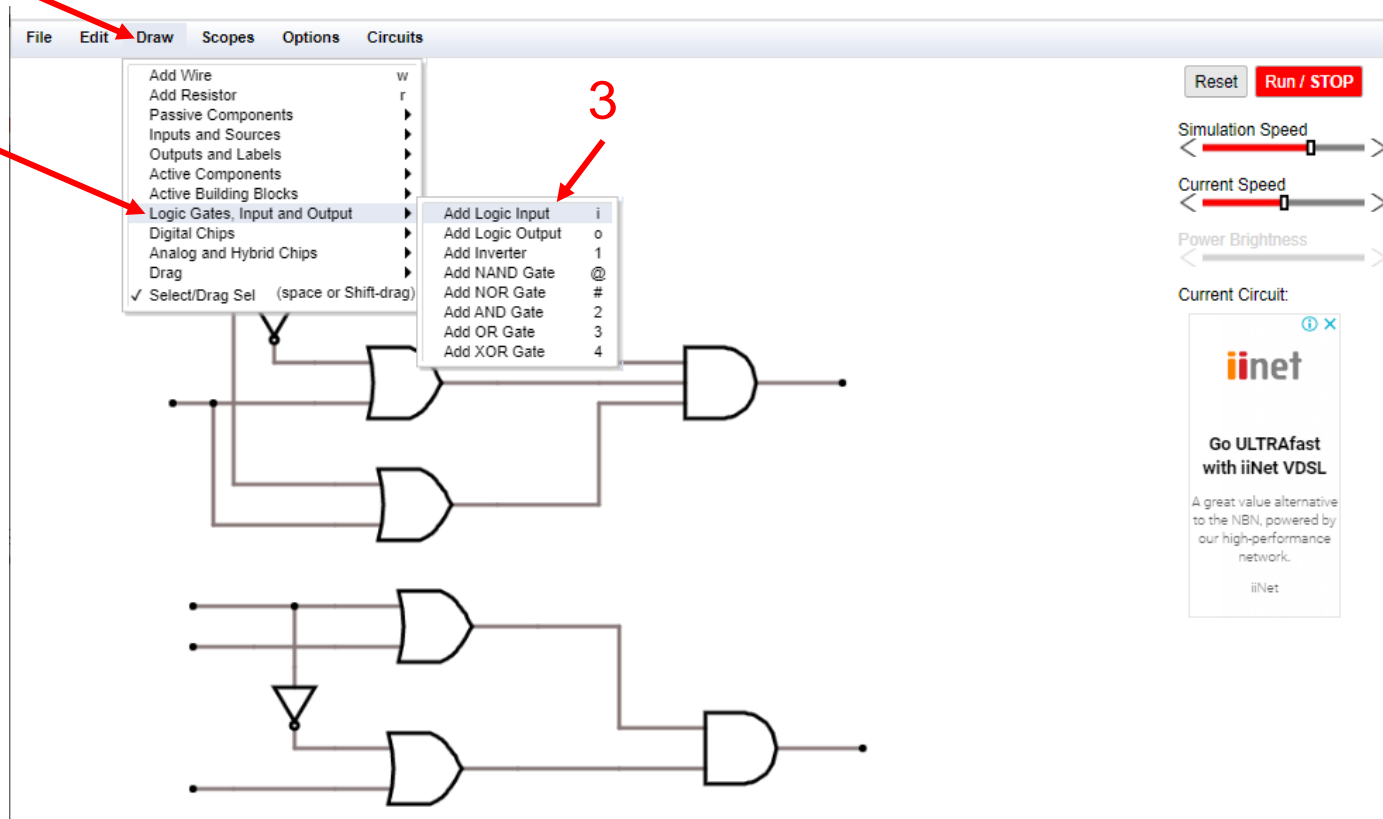
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 $(A+B)(A'+C)(B+C) = (A+B)(A'+C)$

1

2

3



Reset Run / STOP

Simulation Speed

Current Speed

Power Brightness

Current Circuit:

iinet

Go ULTRAFast
with iiNet VDSL

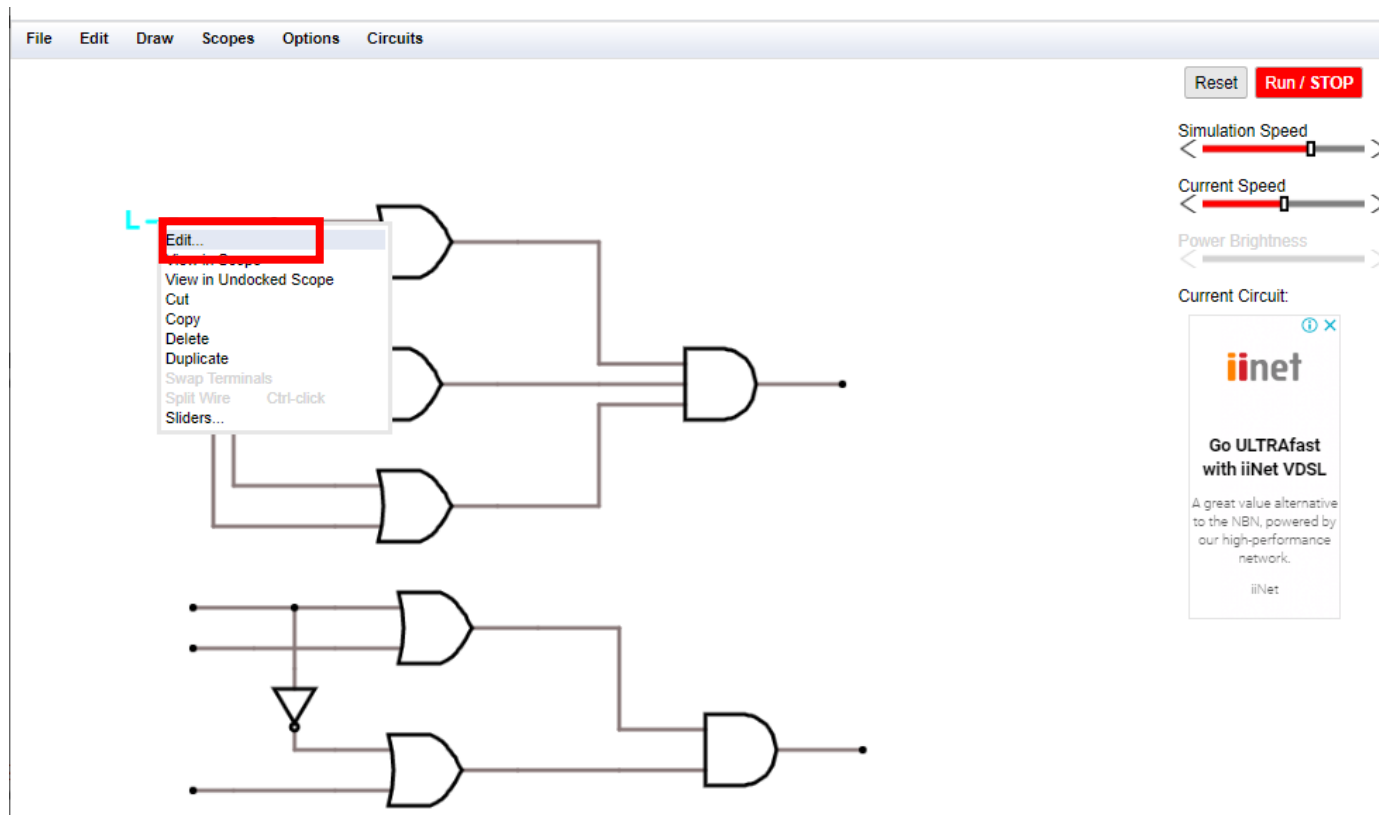
A great value alternative
to the NBN, powered by
our high-performance
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iiNet

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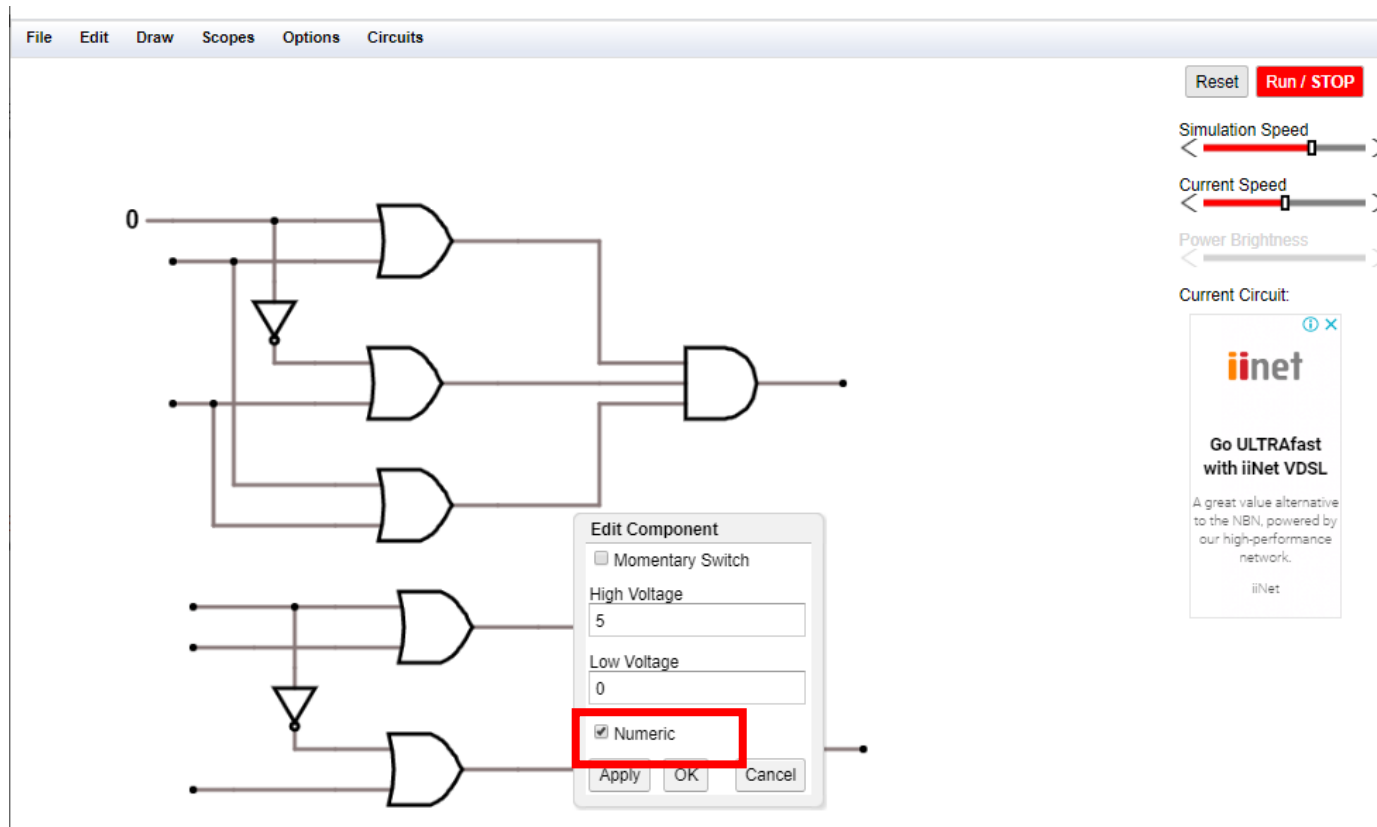
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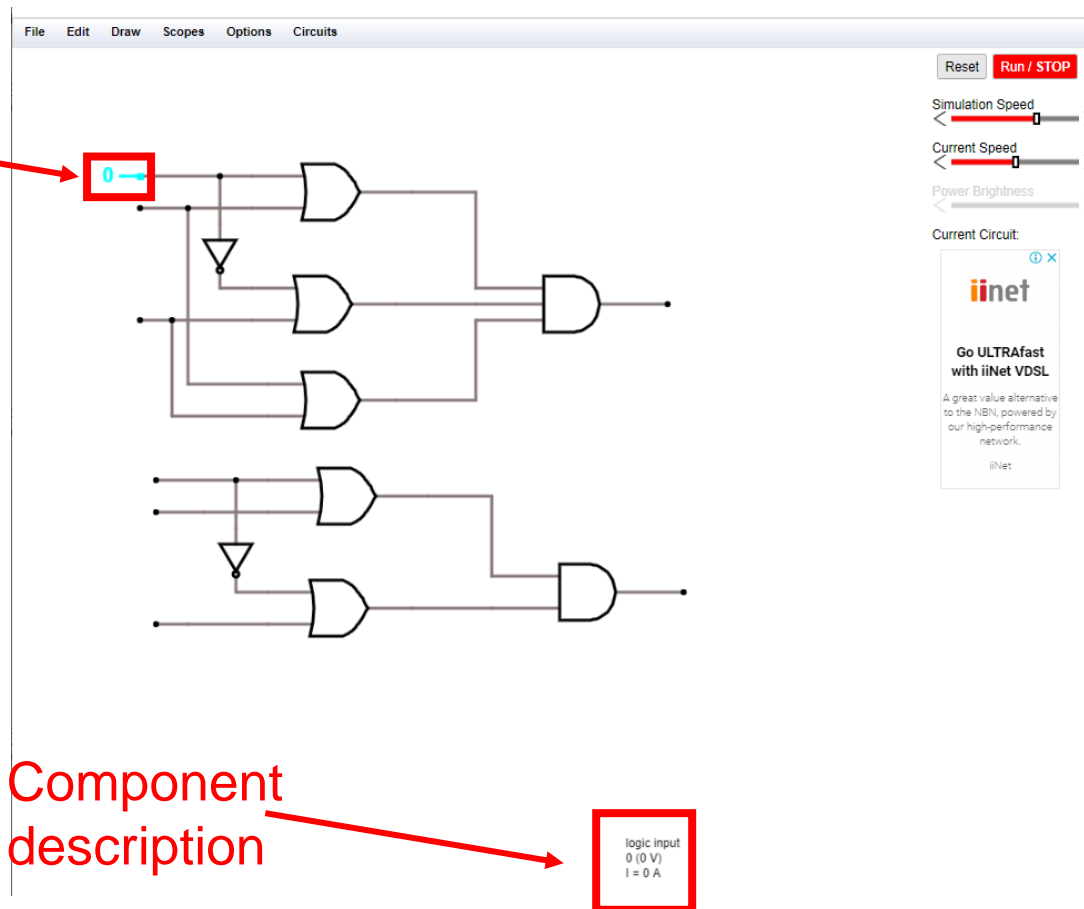


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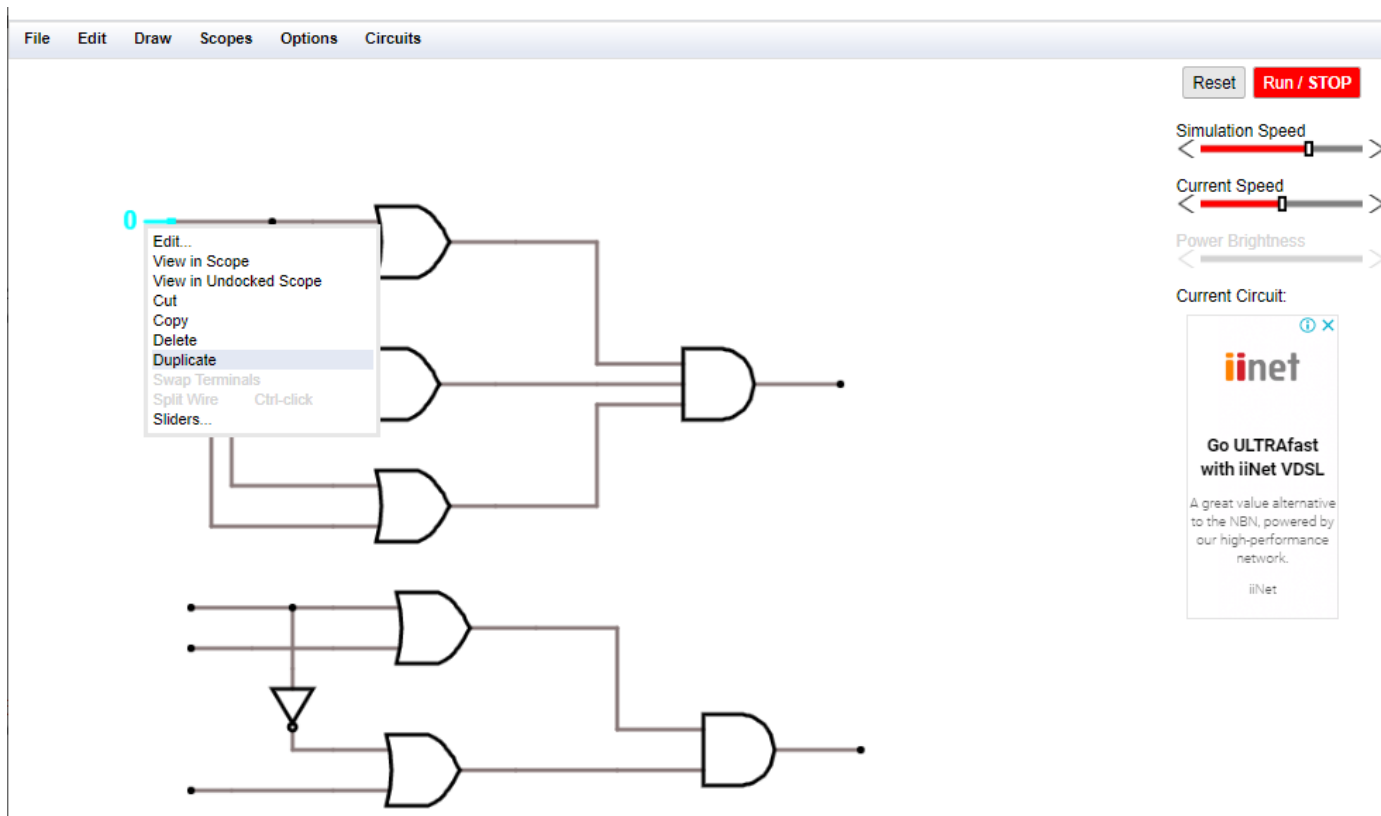
Click
on
component



Drawing Logic Circuits using on-line simulator

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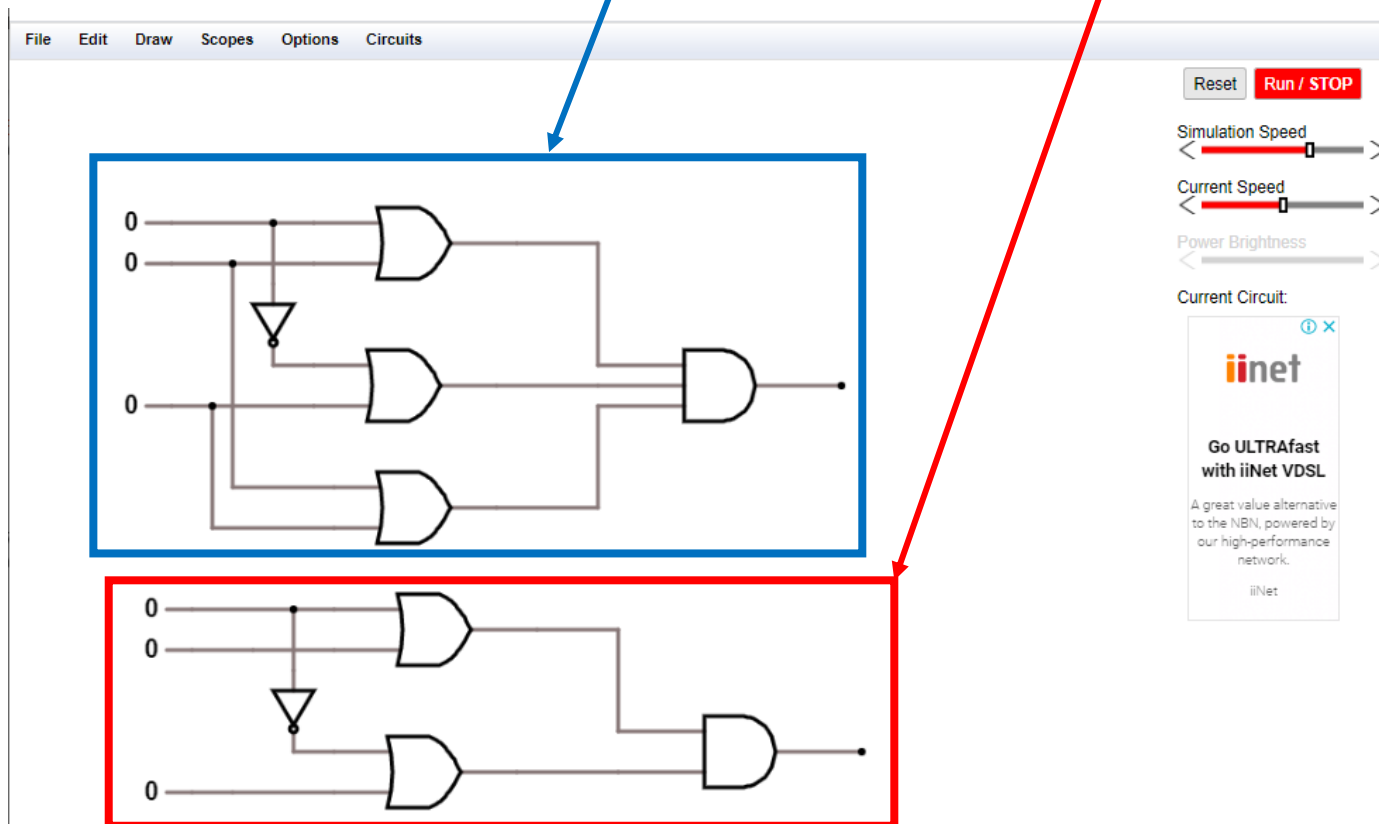
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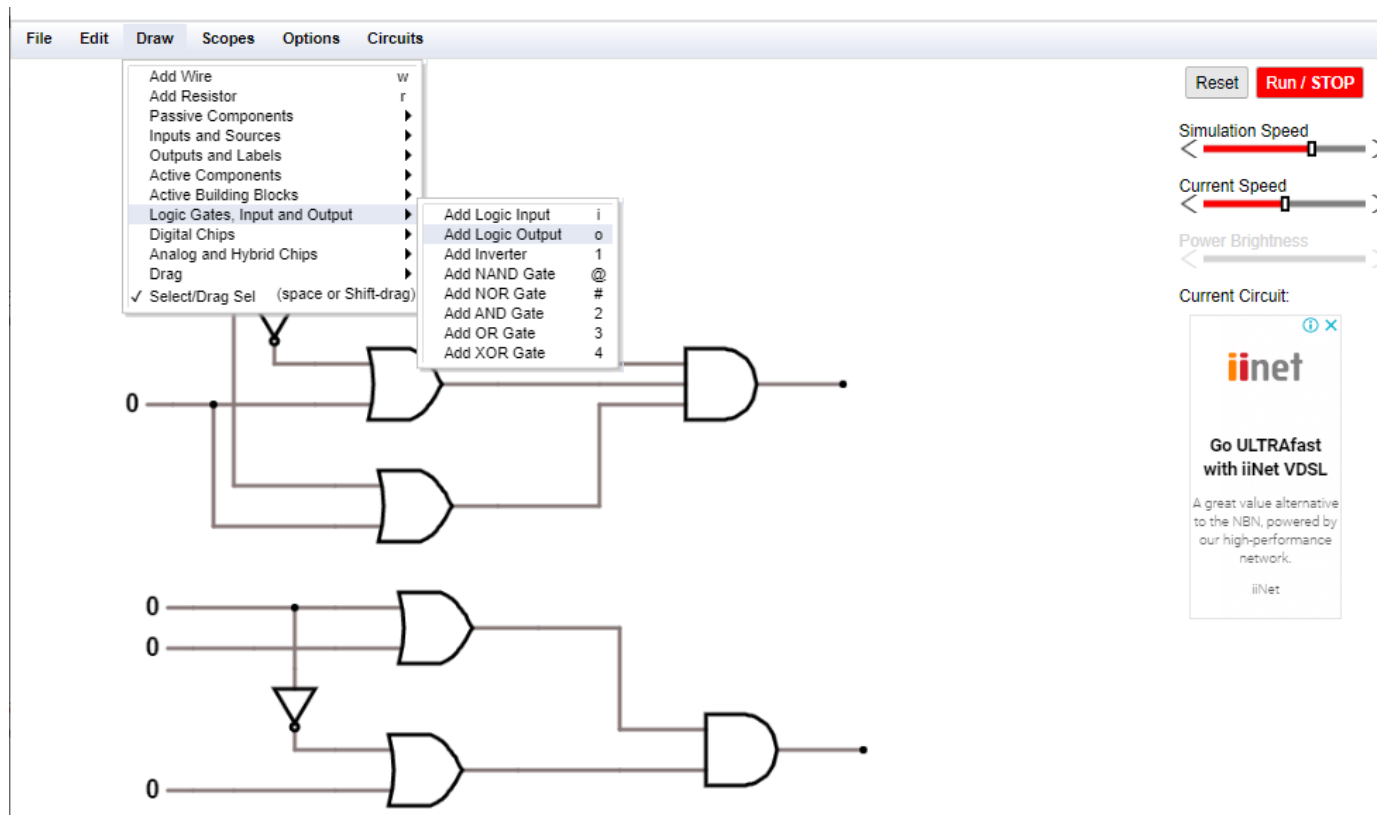
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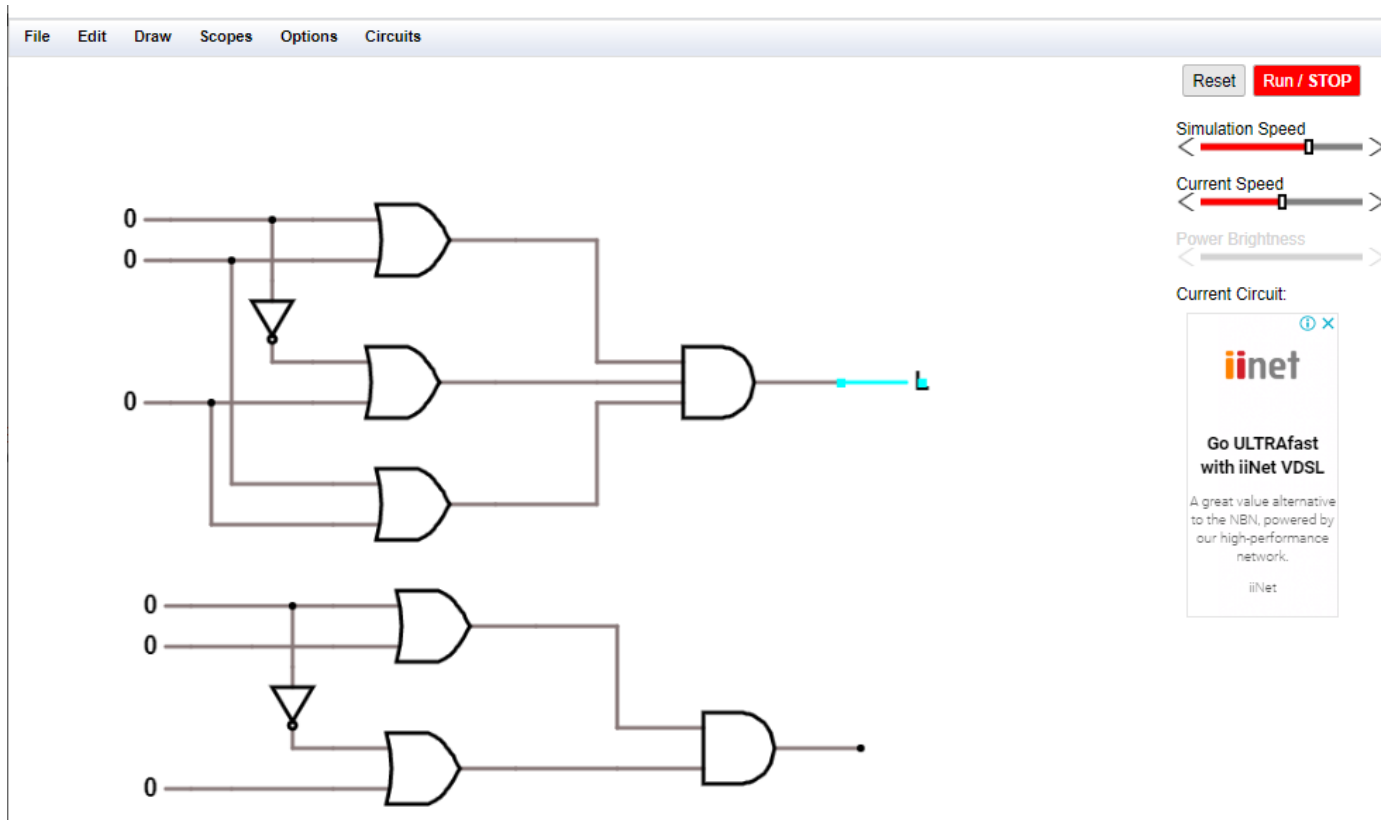
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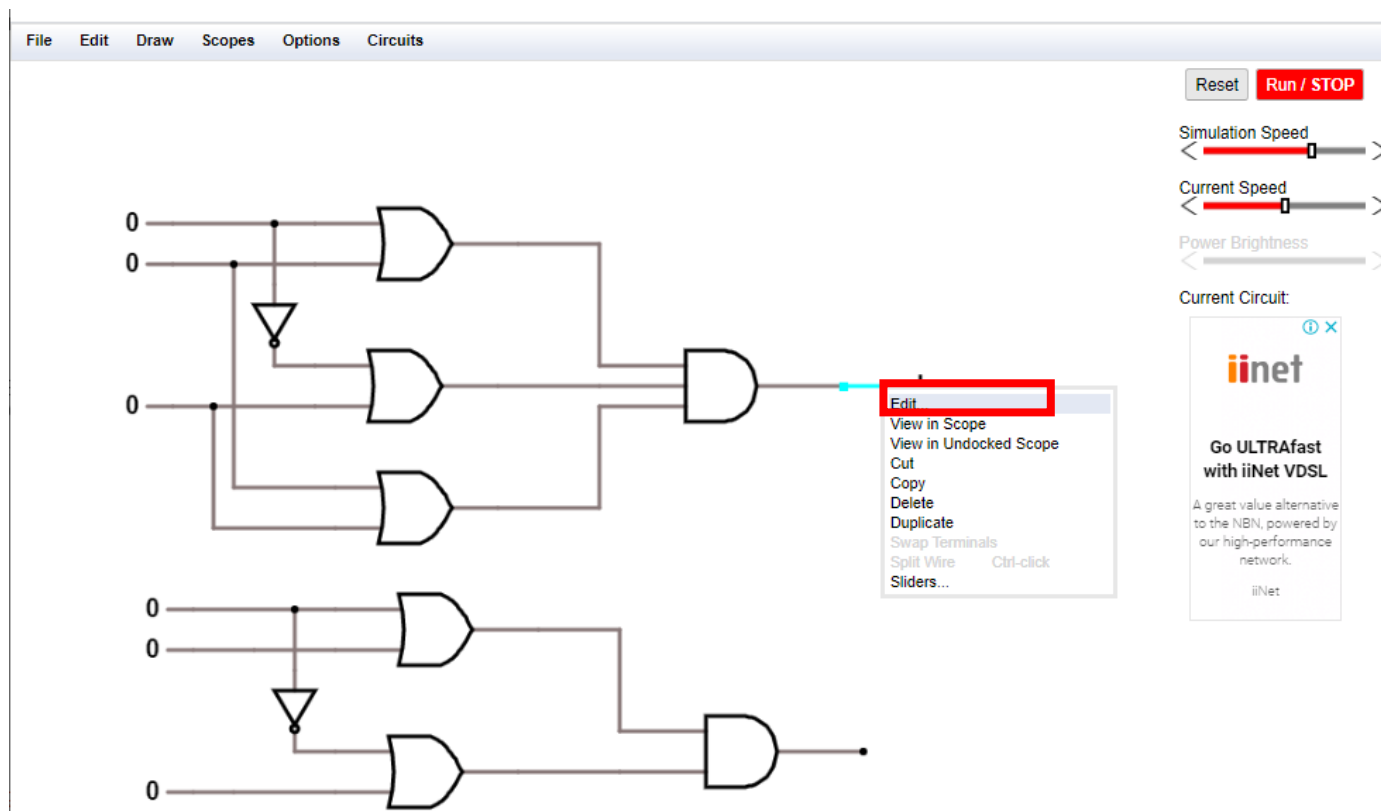
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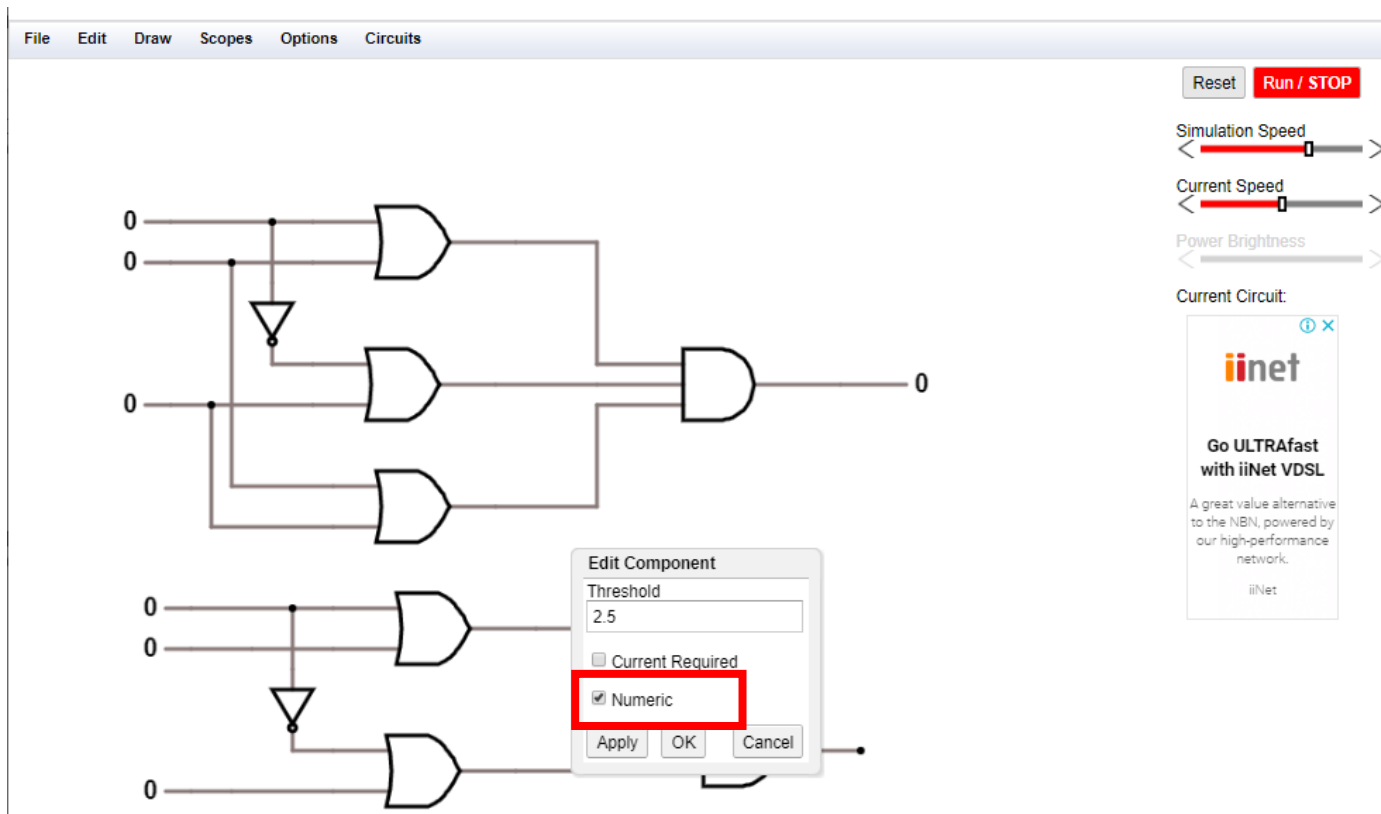
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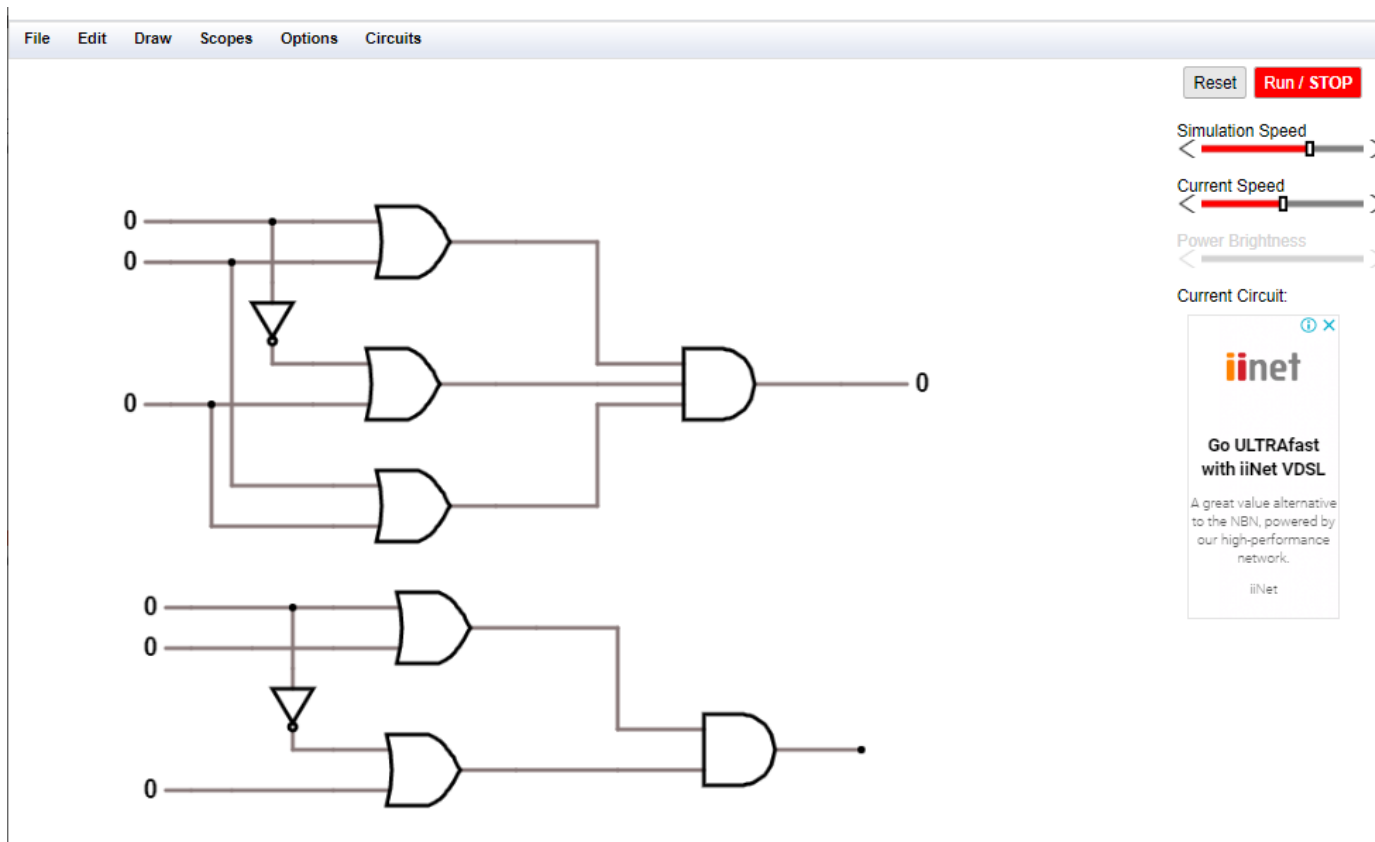
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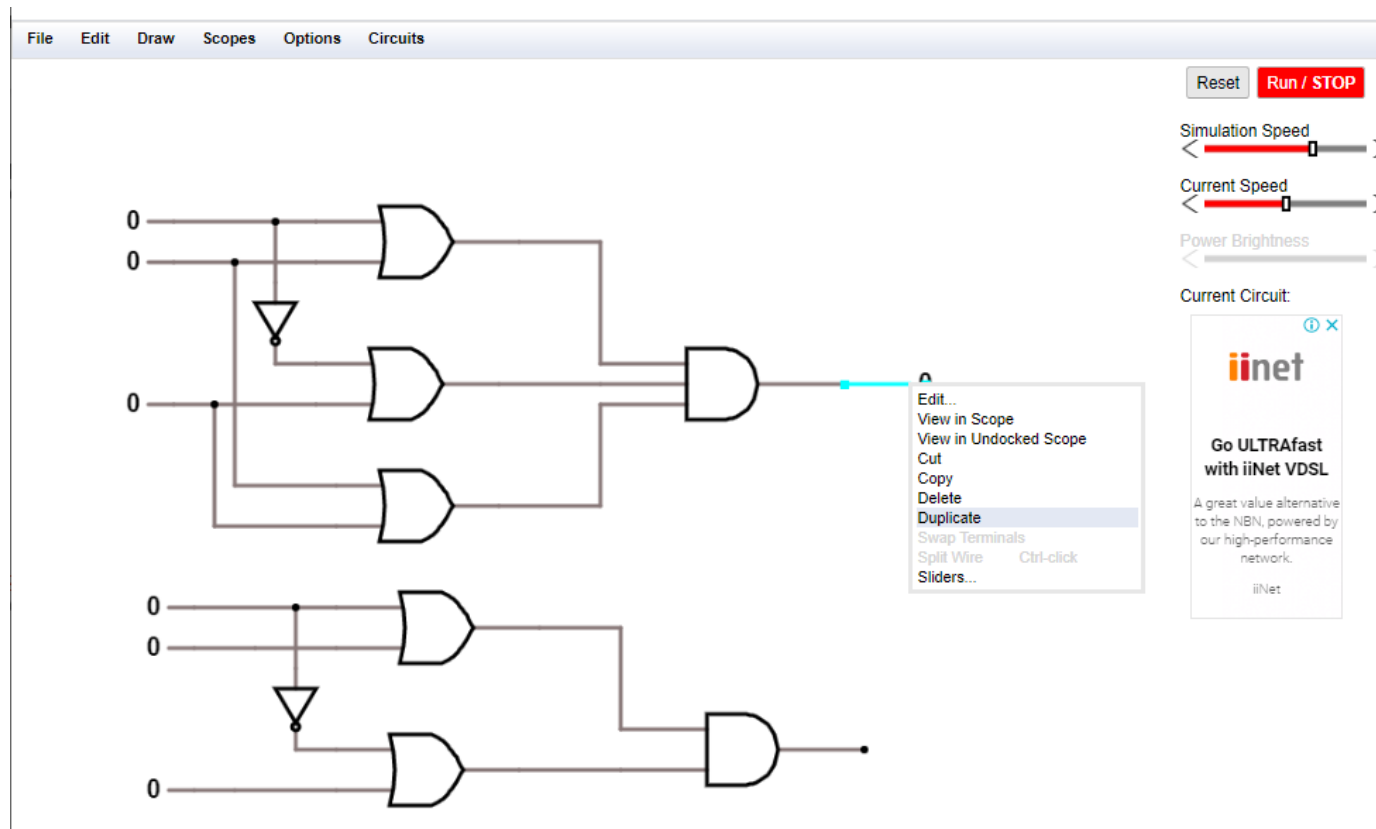
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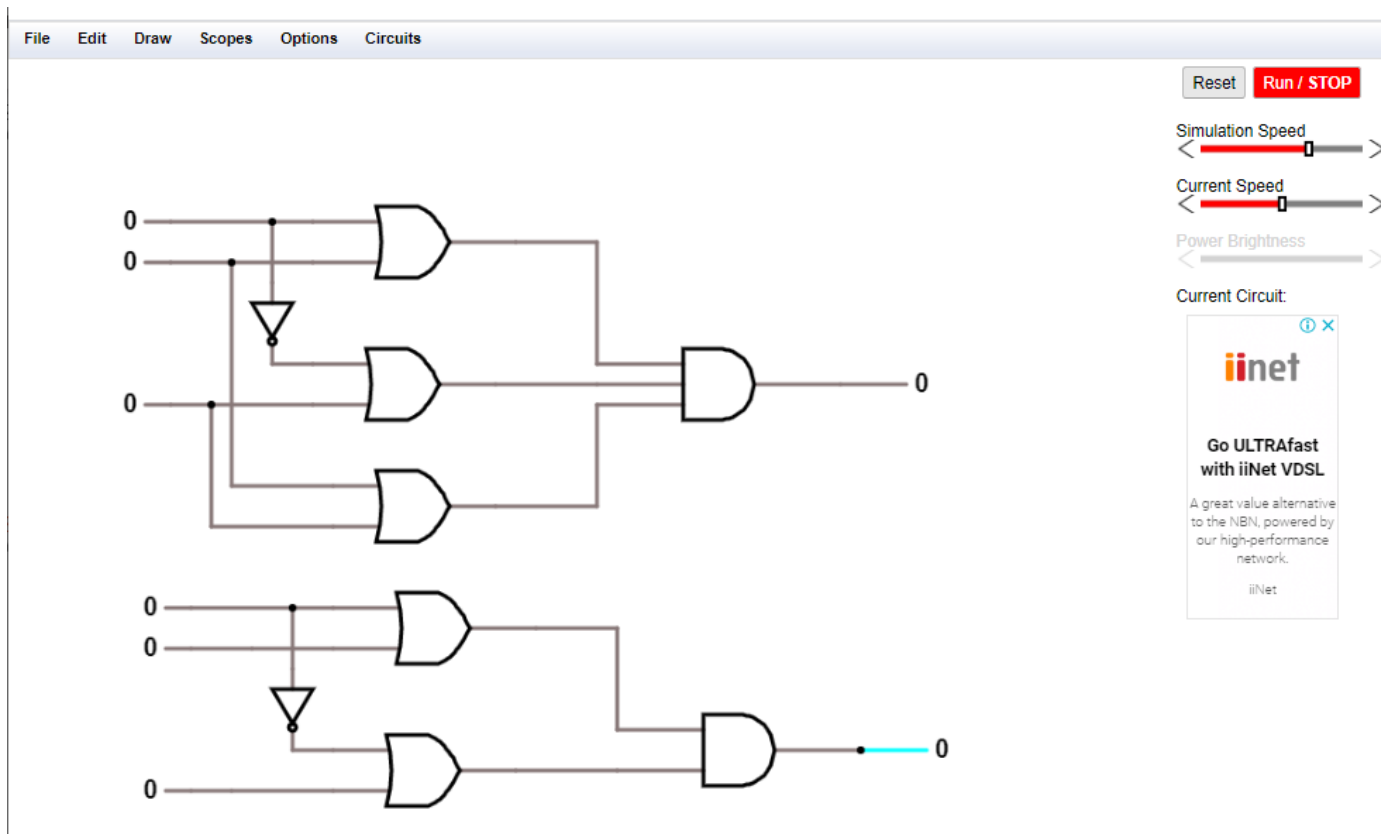
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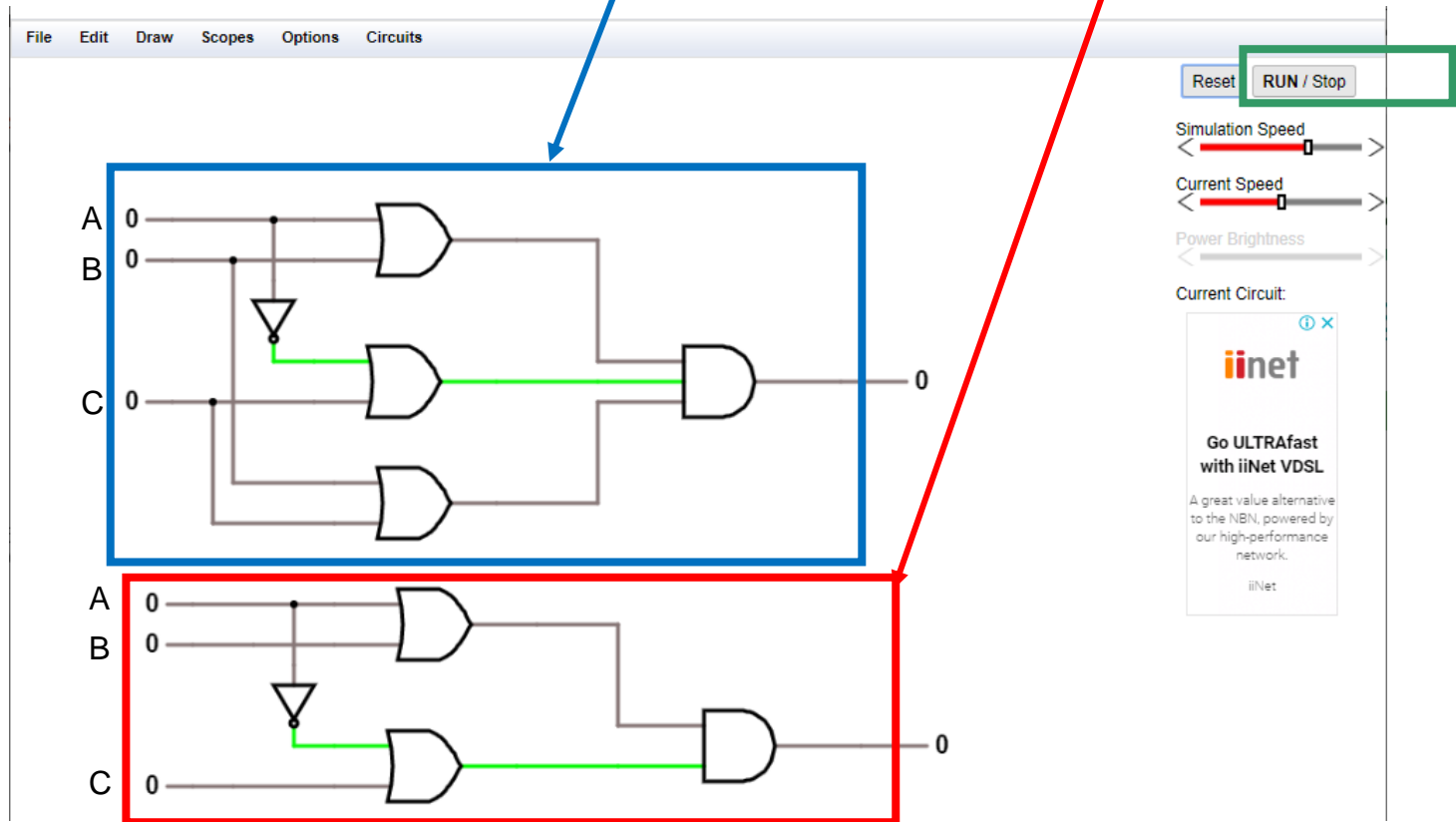
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Drawing Logic Circuits using on-line simulator

<https://www.falstad.com/circuit/>

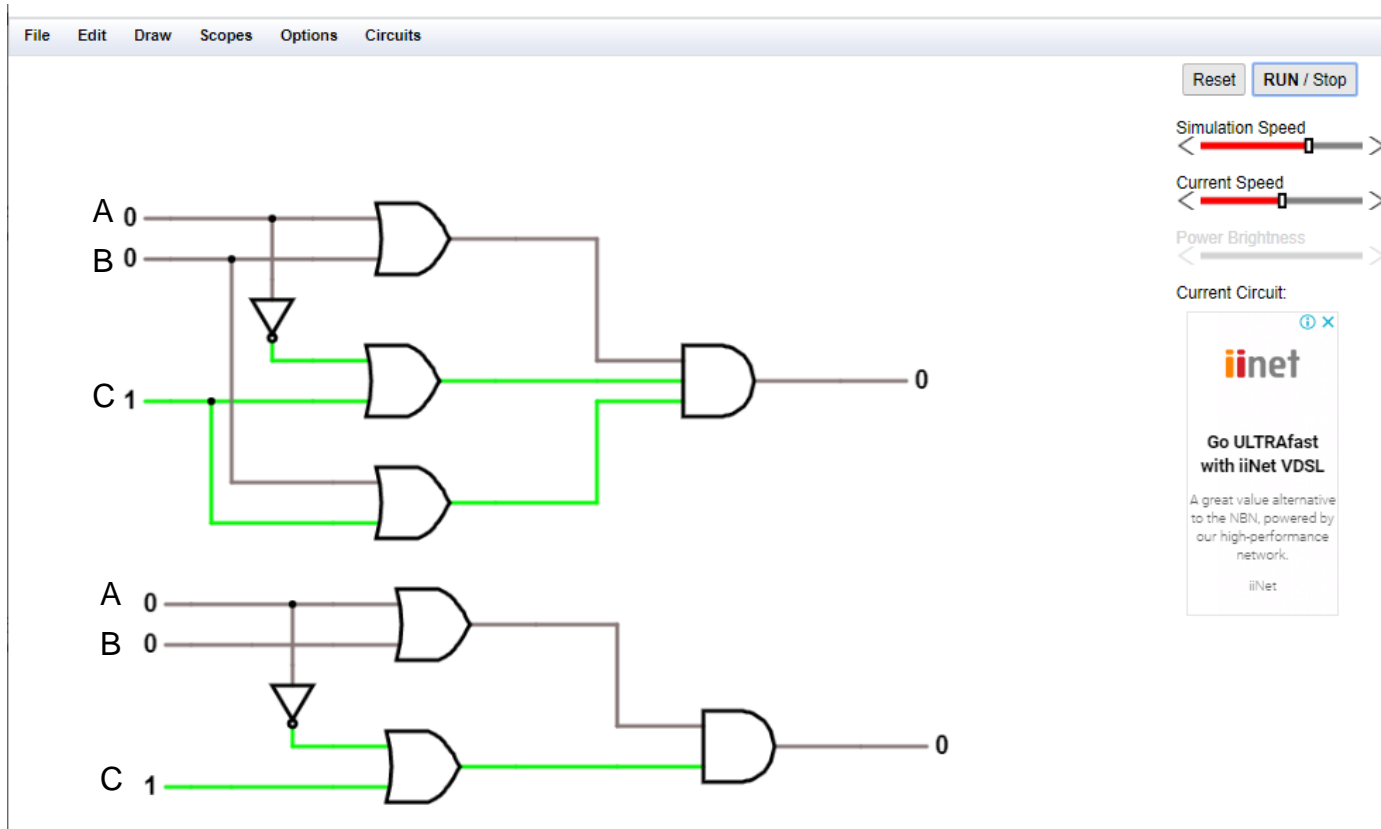
Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
 $(A+B)(A'+C)(B+C) = (A+B)(A'+C)$



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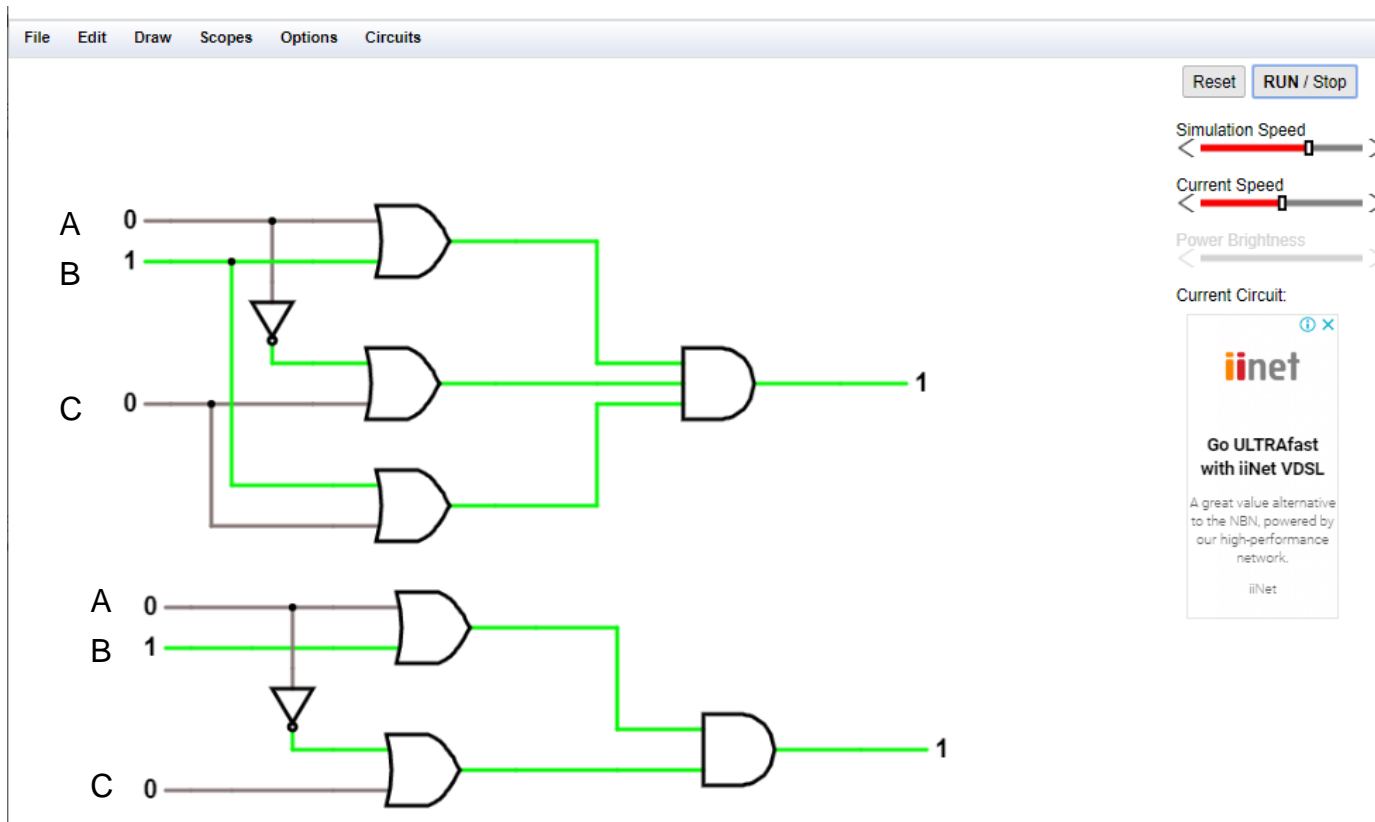
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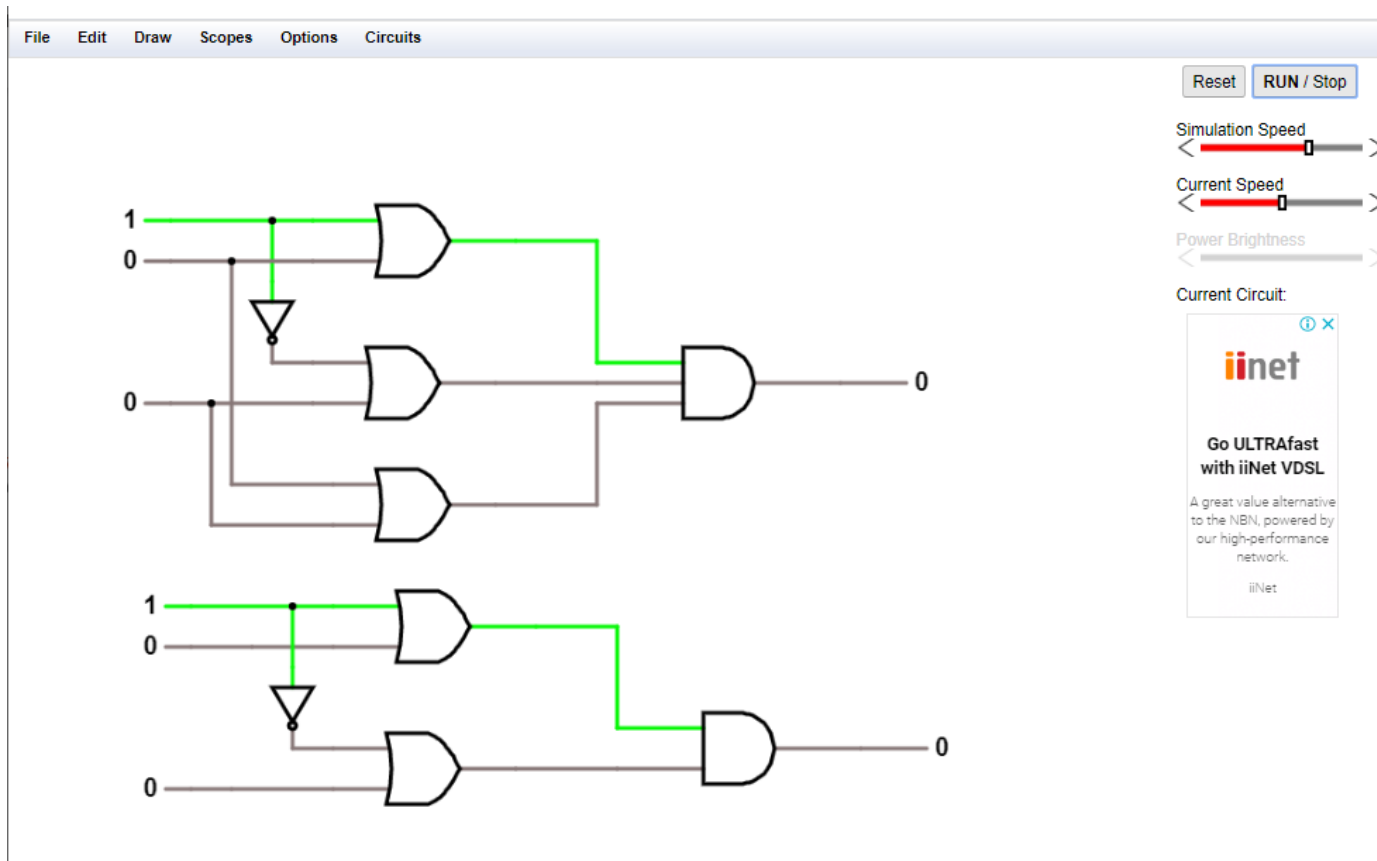
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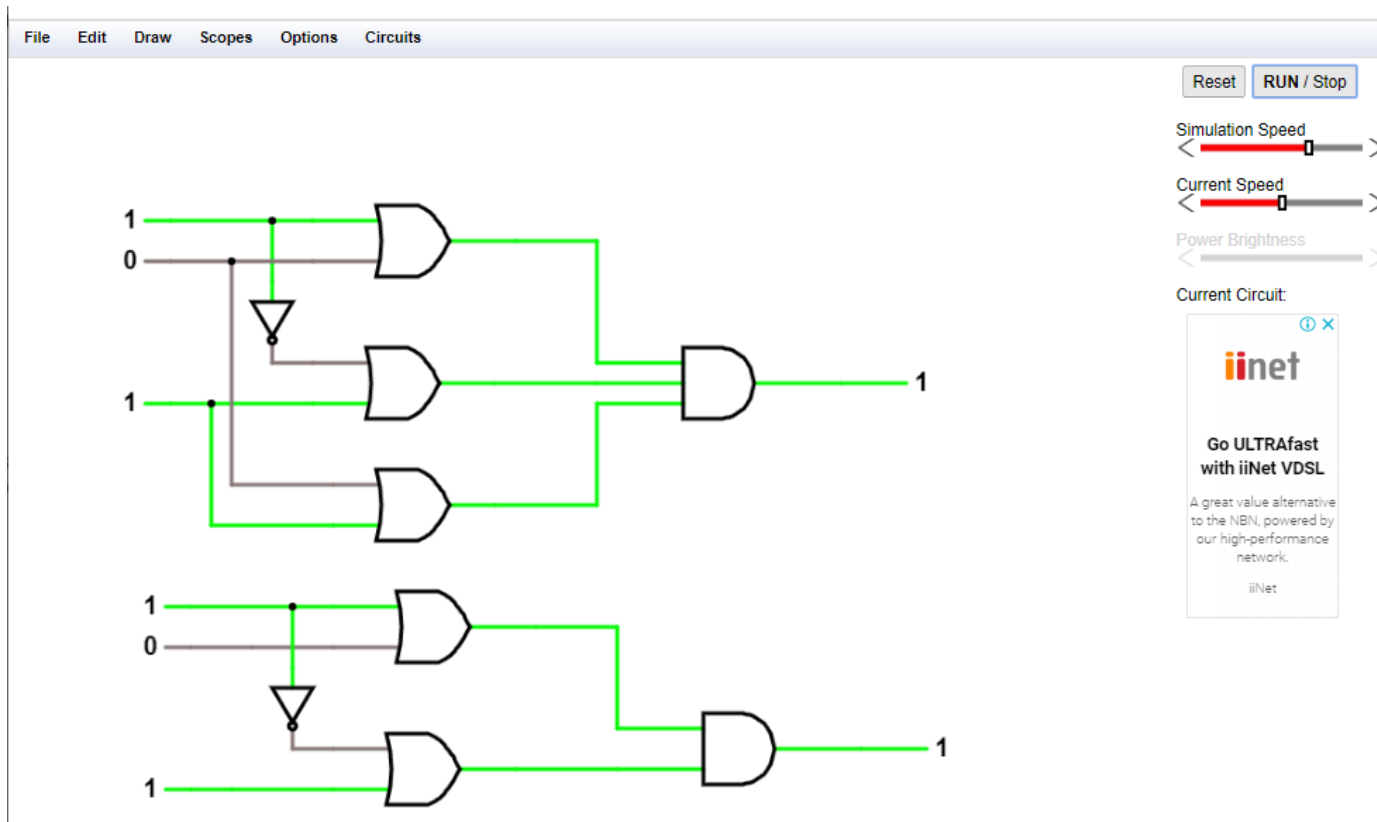
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Exercises: Simulator

- $C + (BC)'$
- $(AB)'(A' + B)(B' + B) = ? = A'$
- $AB + A'C + BC = ? = AB + A'$
- 3 bit Parity Generator Circuit

Week 15

- Circuit simulator

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