

ENGR 101

Engineering Technology

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Victoria University of Wellington

Victoria

UNIVERSITY OF WELLINGTON

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



CAPITAL CITY UNIVERSITY

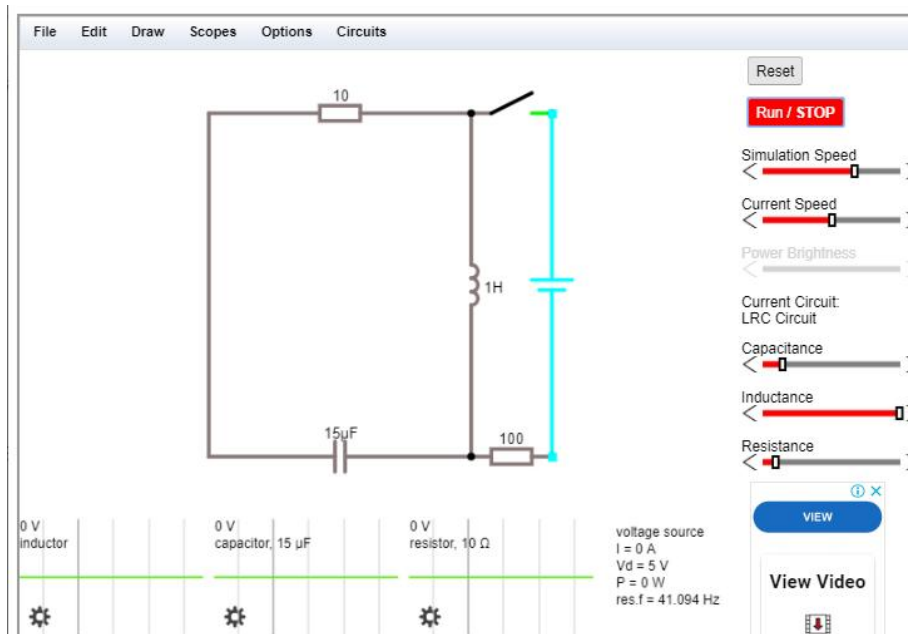
Simulator Address

- 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](#).

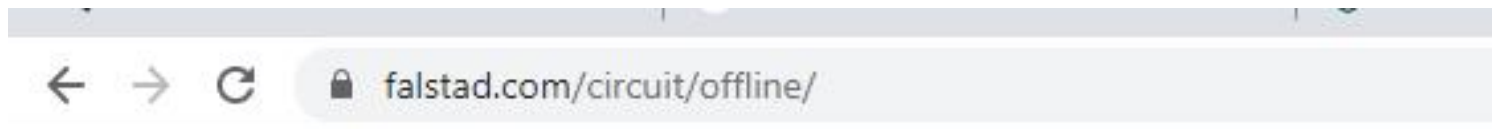
[Report a problem/feature request](#)

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

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

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 at the top, a 15 μF capacitor at the bottom, a 1H inductor on the right, and a 100 Ω resistor at the bottom right. A green battery symbol is connected to the right side of the circuit. A red 'Run / STOP' button is visible on the right. Below the circuit, 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, simulation parameters are listed: 't = 11.735 s', 'time step = 5 μs', and 'res.f = 41.094 Hz'. On the far right, a control panel includes a 'Reset' button, a 'Run / STOP' button, and sliders for 'Simulation Speed', 'Current Speed', 'Power Brightness', 'Capacitance', 'Inductance', and 'Resistance'. A 'VIEW' button and a 'View Video' button are also present.

Drawing Logic Circuits using on-line simulator

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

1. Click on the Circuits drop-down menu

2. Click on the Blank Circuit option

The screenshot shows the Falstad online circuit simulator interface. The 'Circuits' menu is open, and the 'Blank Circuit' option is highlighted. The main workspace shows a circuit diagram with a 15µF capacitor, a 100Ω resistor, and a 1H inductor. The bottom of the screen displays a waveform plot with three traces and simulation parameters.

941.672 µV inductor

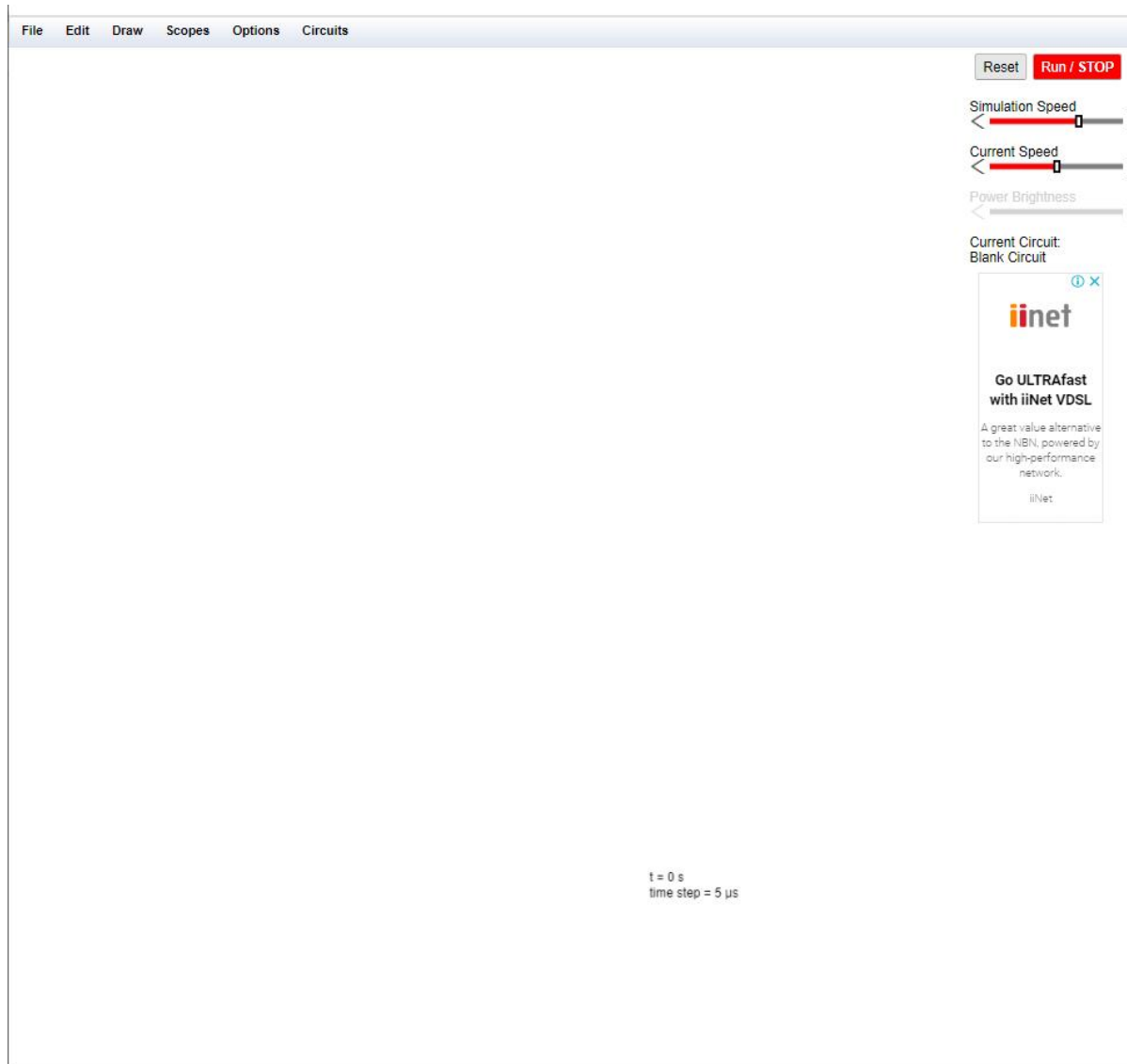
1000 µV capacitor, 15 µF

35.365 µV resistor, 10 Ω

t = 54.325 ms
time step = 5 µs
res.f = 41.094 Hz

Drawing Logic Circuits using on-line simulator

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



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

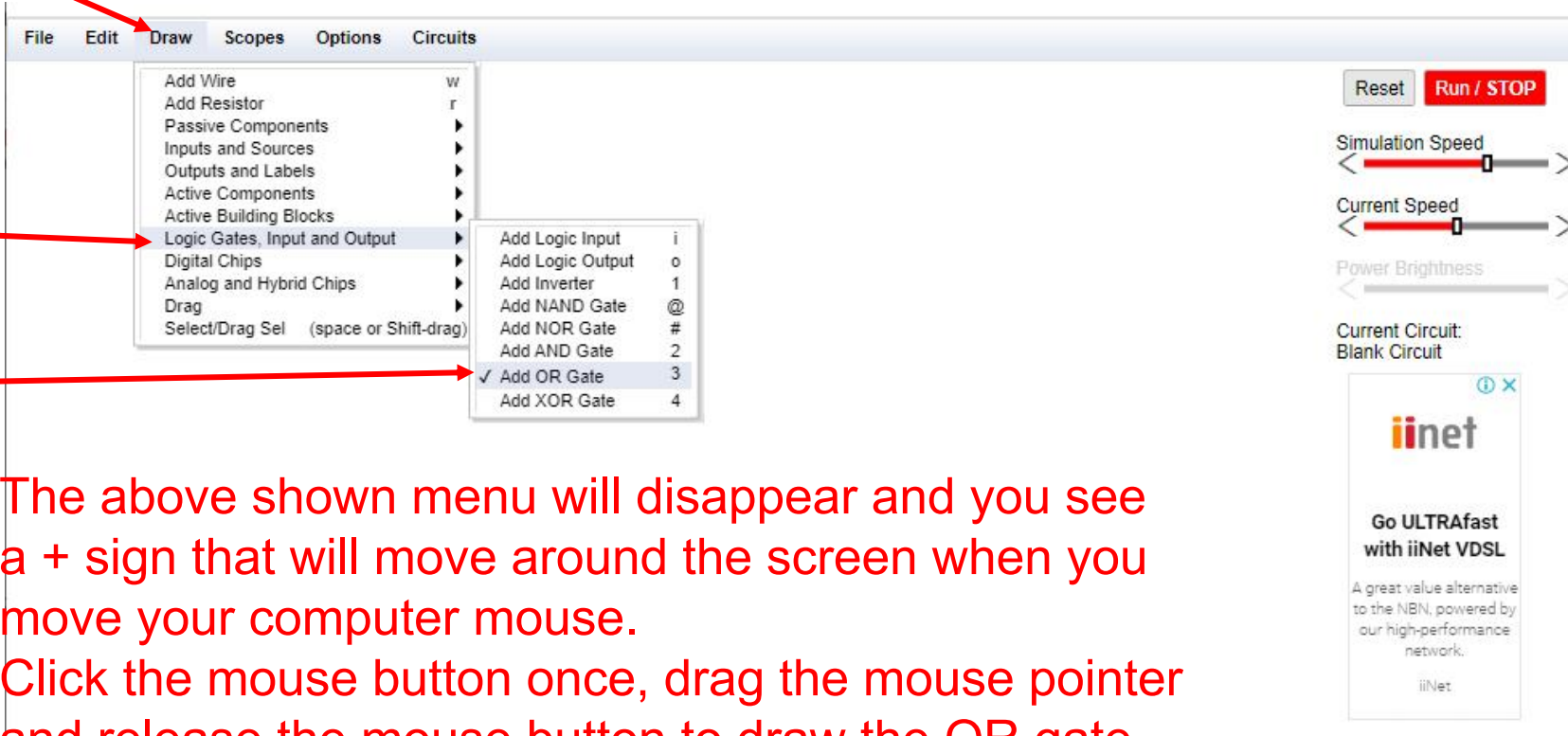
The screenshot shows the Falstad Circuit Simulator interface. The 'Draw' menu is open, and 'Add OR Gate' is selected. A red box highlights the 'Short-cut Keys' table. Red arrows point to the 'Draw' menu, the 'Add OR Gate' option, and the 'Short-cut Keys' table.

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



The screenshot shows the Falstad Circuit Simulator interface. The 'Draw' menu is open, and the 'Add OR Gate' option is selected. The menu items are as follows:

- Add Wire (w)
- Add Resistor (r)
- Passive Components
- Inputs and Sources
- Outputs and Labels
- Active Components
- Active Building Blocks
- Logic Gates, Input and Output
- Digital Chips
- Analog and Hybrid Chips
- Drag
- Select/Drag Sel (space or Shift-drag)

The 'Add OR Gate' option is highlighted with a checkmark. The right side of the interface shows simulation controls: 'Reset', 'Run / STOP', 'Simulation Speed', 'Current Speed', and 'Power Brightness'. The current circuit is 'Blank Circuit'. An advertisement for iiNet is visible in the bottom right corner.

2

3

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

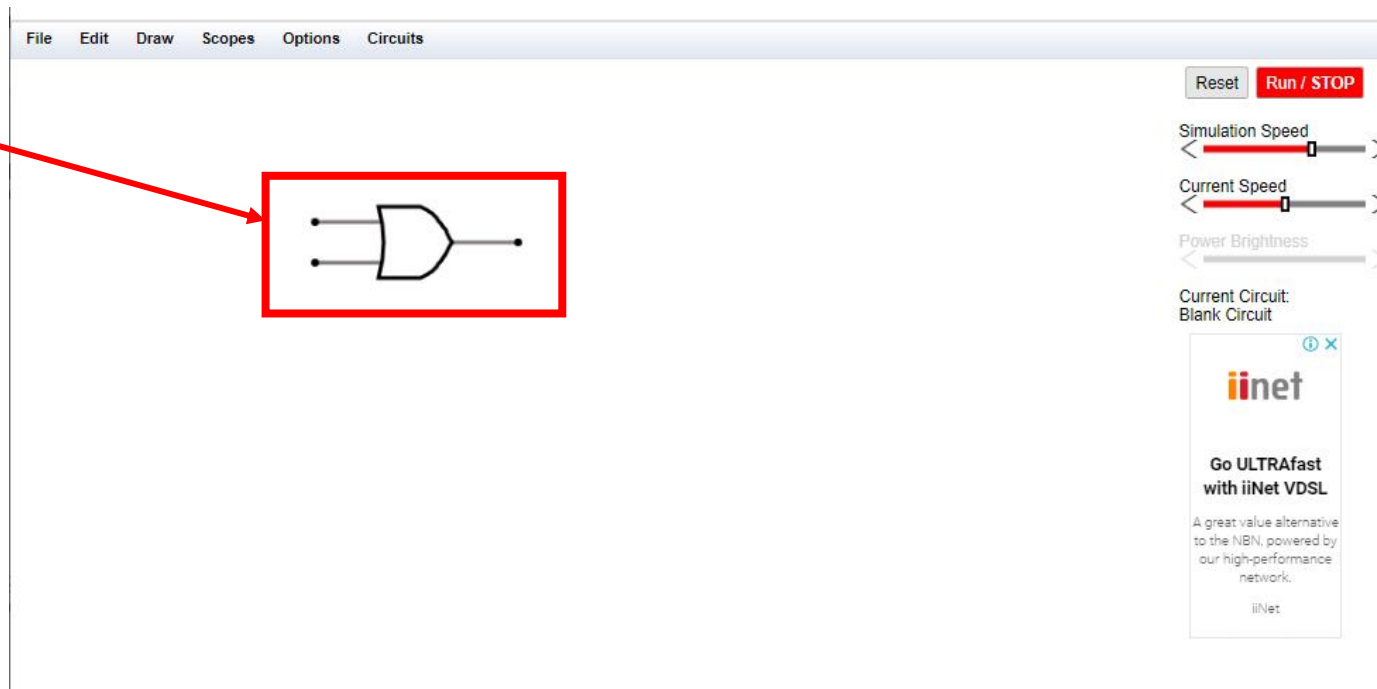
5. Click the mouse button once, drag the mouse pointer and release the mouse button to draw the OR gate

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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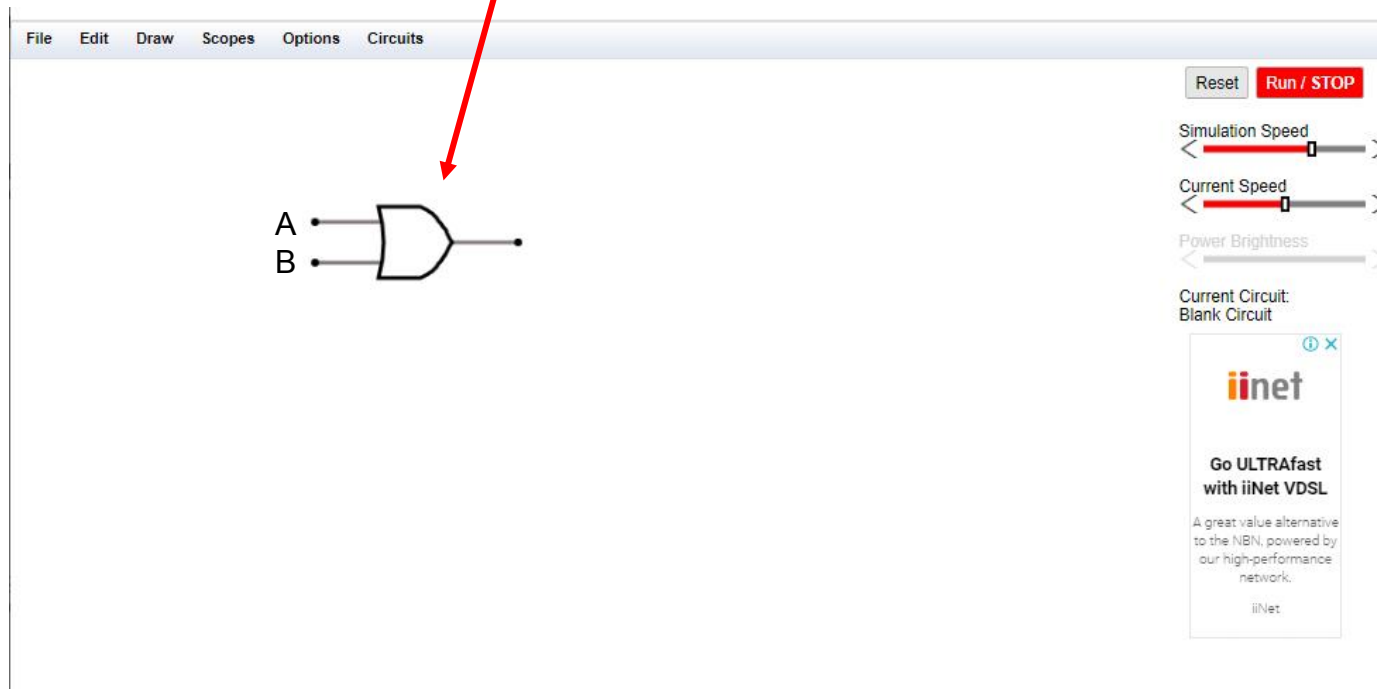
OR
gate



Drawing Logic Circuits using on-line simulator

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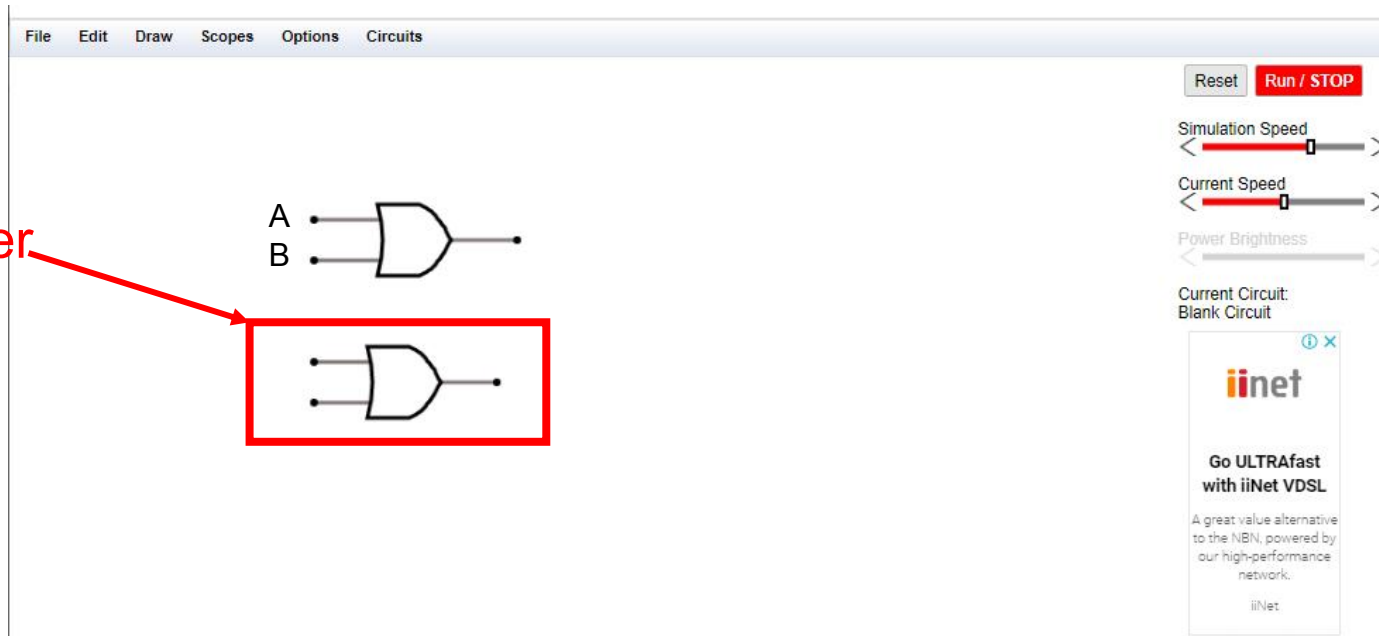


Drawing Logic Circuits using on-line simulator

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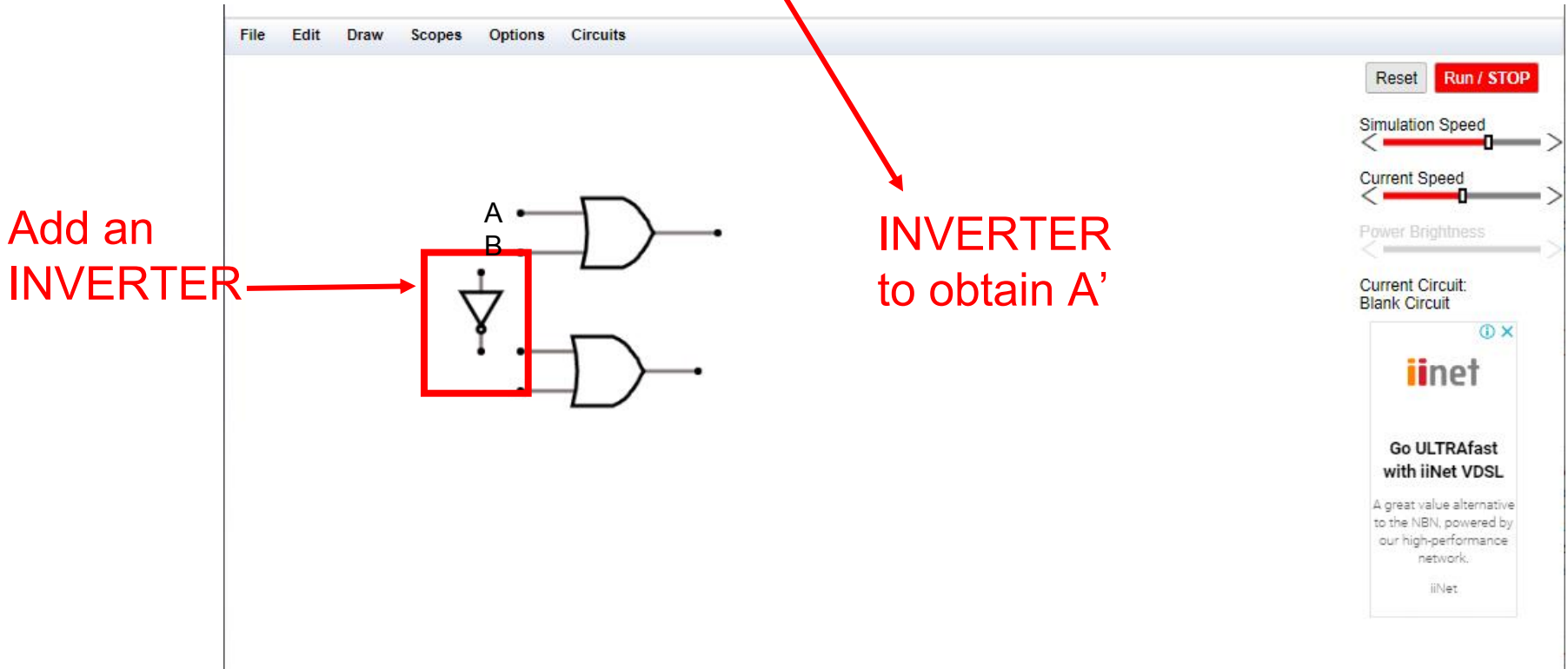
Add
another
OR
gate



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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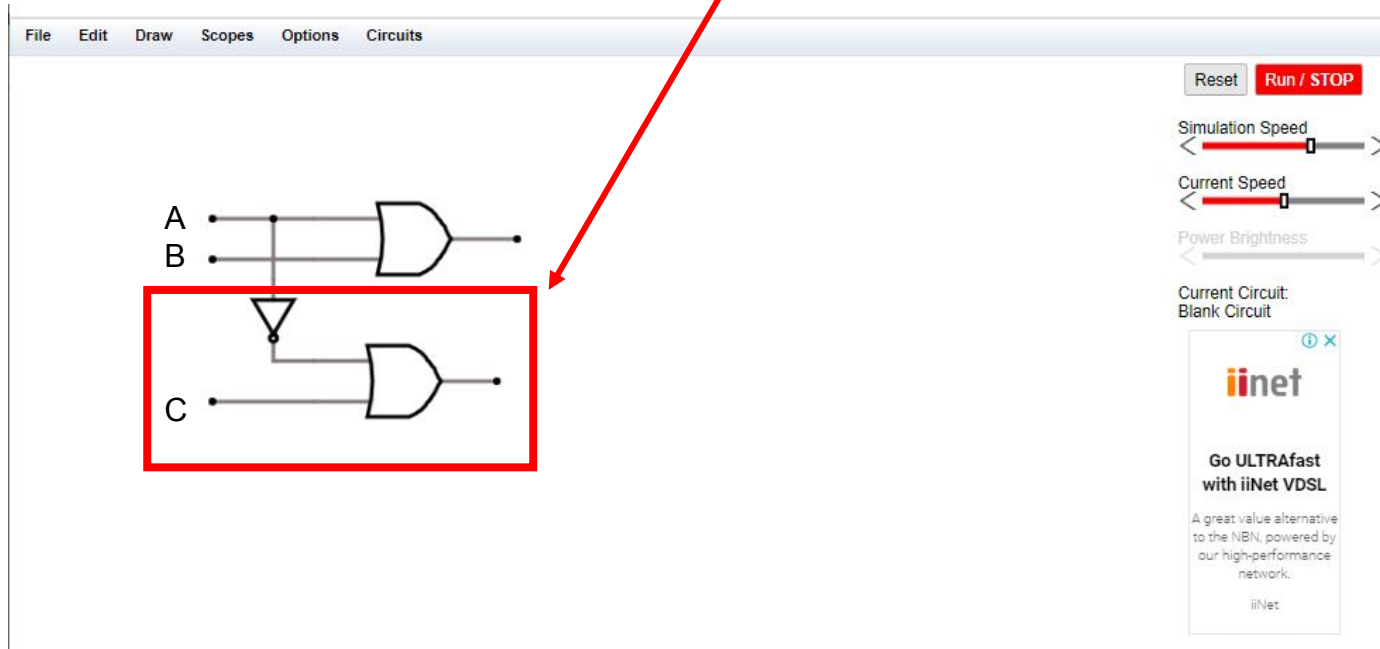
2

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

Drawing Logic Circuits using on-line simulator

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

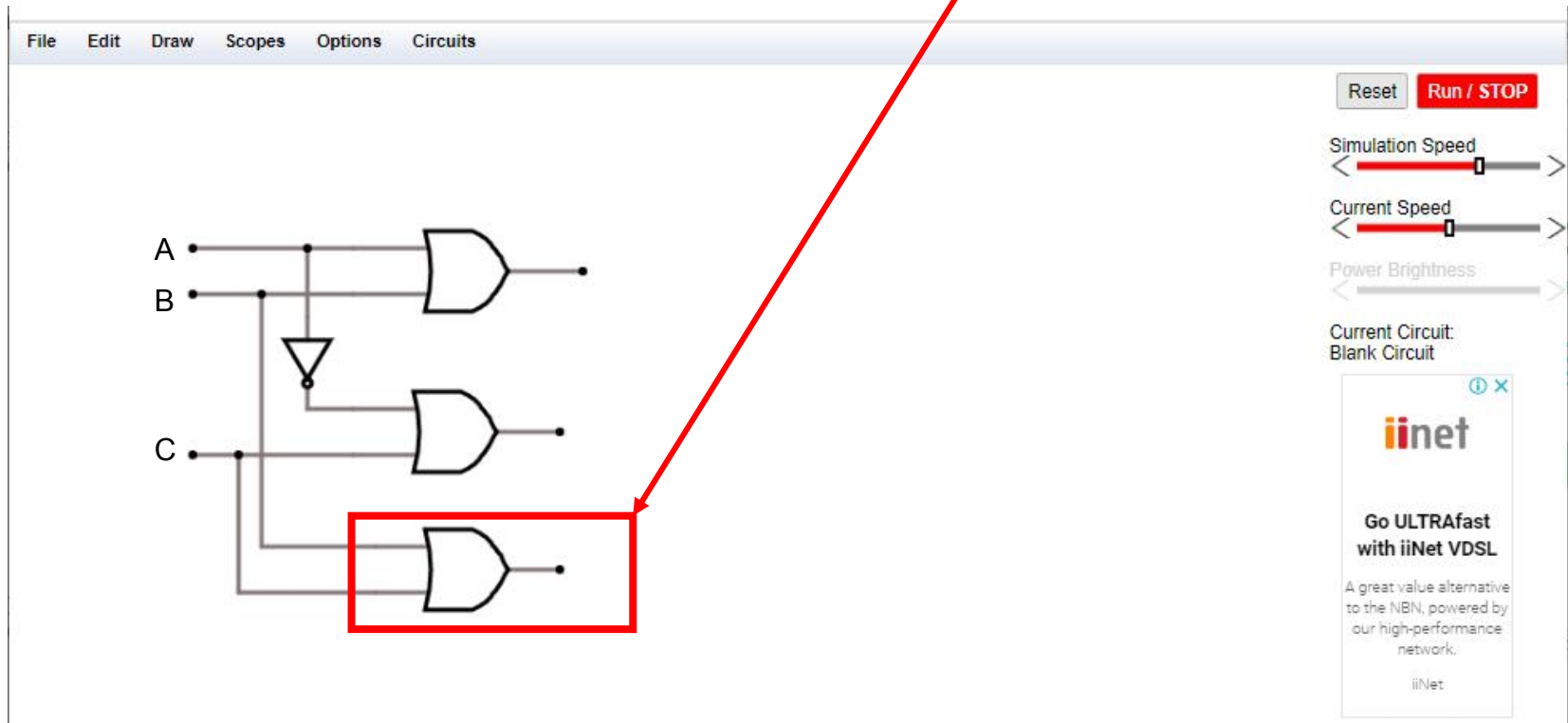
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1

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File Edit Draw Scopes Options Circuits

- Add Wire w
- Add Resistor r
- Passive Components
- Inputs and Sources
- Outputs and Labels
- Active Components
- Active Building Blocks
- Logic Gates, Input and Output
 - Add Logic Input i
 - Add Logic Output o
 - Add Inverter 1
 - Add NAND Gate @
 - Add NOR Gate #
 - Add AND Gate 2
 - Add OR Gate 3
 - Add XOR Gate 4
- Digital Chips
- Analog and Hybrid Chips
- Drag
- ✓ Select/Drag Sel (space or Shift-drag)

Reset Run / STOP

Simulation Speed

Current Speed

Power Brightness

Current Circuit:
Blank Circuit

iiNet

Go ULTRAfast
with iiNet VDSL

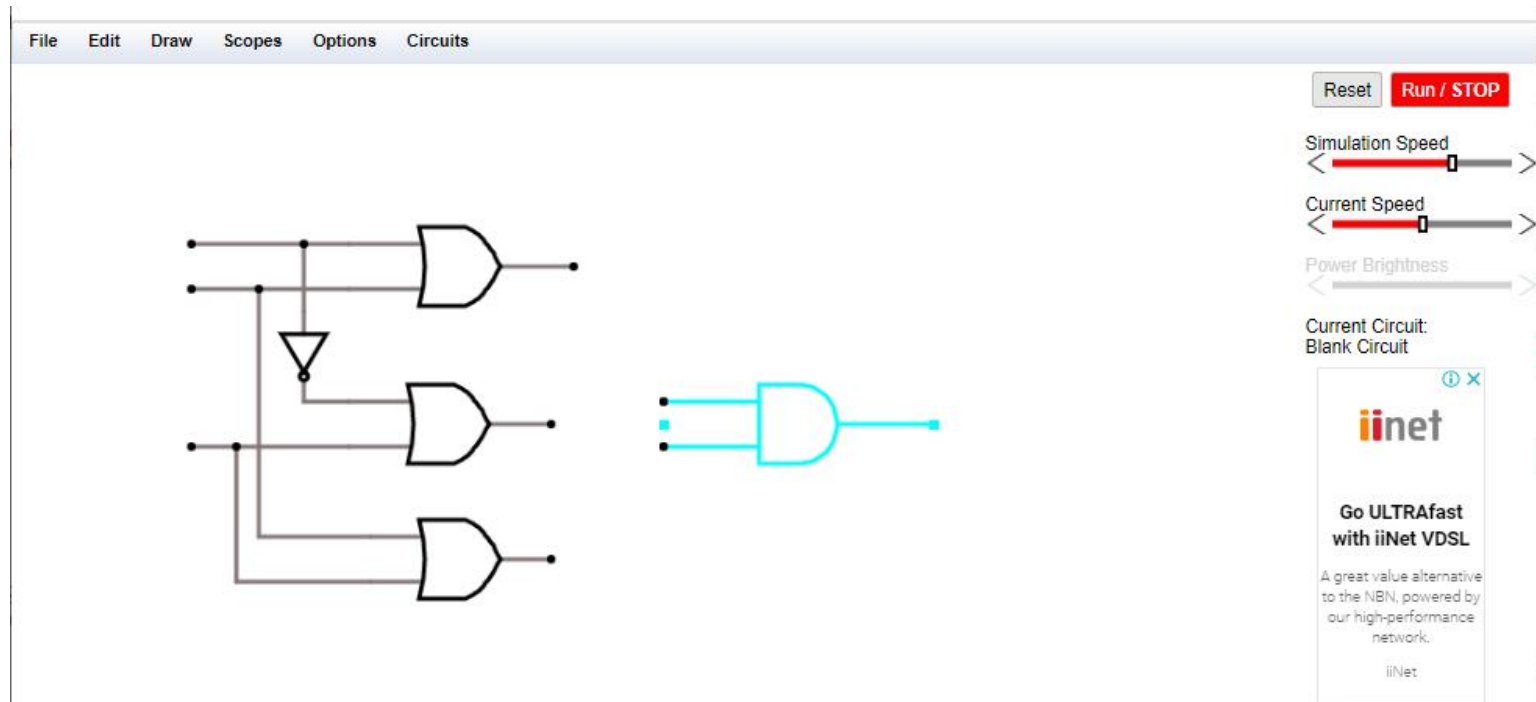
A great value alternative
to the NBN, powered by
our high-performance
network.

iiNet

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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The screenshot shows the Falstad online logic circuit simulator interface. The browser address bar displays the URL `falstad.com/circuit/circuitjs.html`. The main workspace contains a logic circuit with three AND gates. The top gate has inputs A and B. The middle gate has inputs A (inverted) and C. The bottom gate has inputs B and C. A context menu is open over the middle gate, with the `Edit...` option highlighted in a red box. The right sidebar contains simulation controls: `Reset`, `Run / STOP`, `Simulation Speed`, `Current Speed`, and `Power Brightness` sliders. Below these is an advertisement for `iinet` with the text `Go ULTRAFast with iNet VDSL`.

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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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. The 'Edit Component' dialog box is open, showing '# of Inputs' set to 2 and 'High Voltage (V)' set to 5. The 'Schmitt Inputs' checkbox is unchecked. The top menu bar includes 'File', 'Edit', 'Draw', 'Scopes', 'Options', and 'Circuits'. On the right, 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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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/>

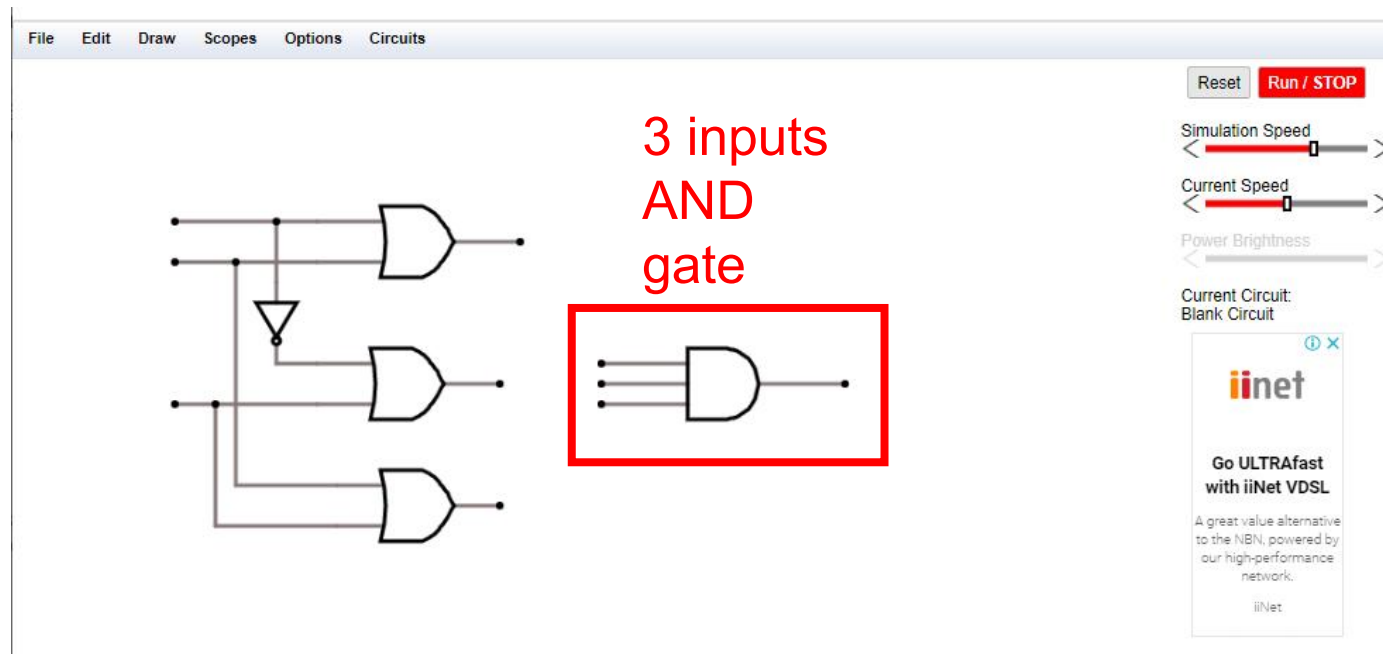
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The screenshot shows the Falstad online logic simulator interface. The main window displays a logic circuit with three 3-input AND gates. The top gate has inputs A, B, and C. The middle gate has inputs A, B, and the output of a NOT gate connected to input A. The bottom gate has inputs A, B, and C. To the right is a single 3-input AND gate. An 'Edit Component' dialog box is open, showing '# of Inputs' set to 3, 'High Voltage (V)' set to 5, and 'Schmitt Inputs' unchecked. The dialog has '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'. Below these is an advertisement for iinet.

Drawing Logic Circuits using on-line simulator

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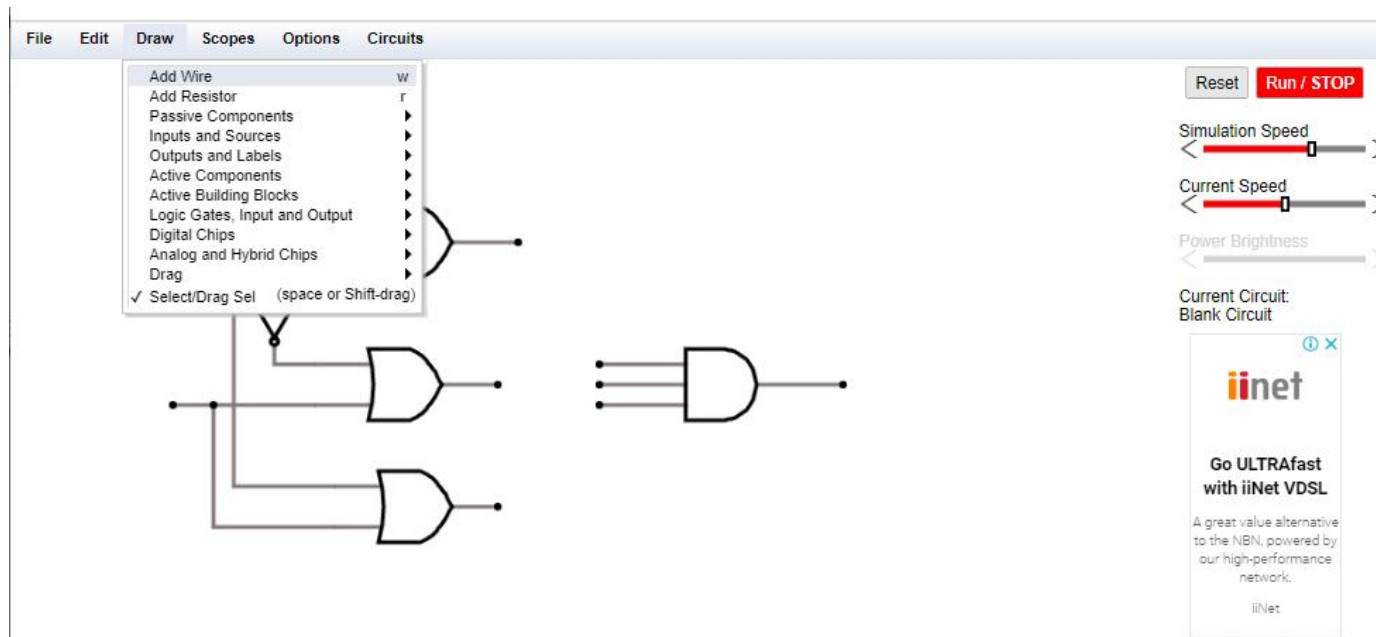
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Drawing Logic Circuits using on-line simulator

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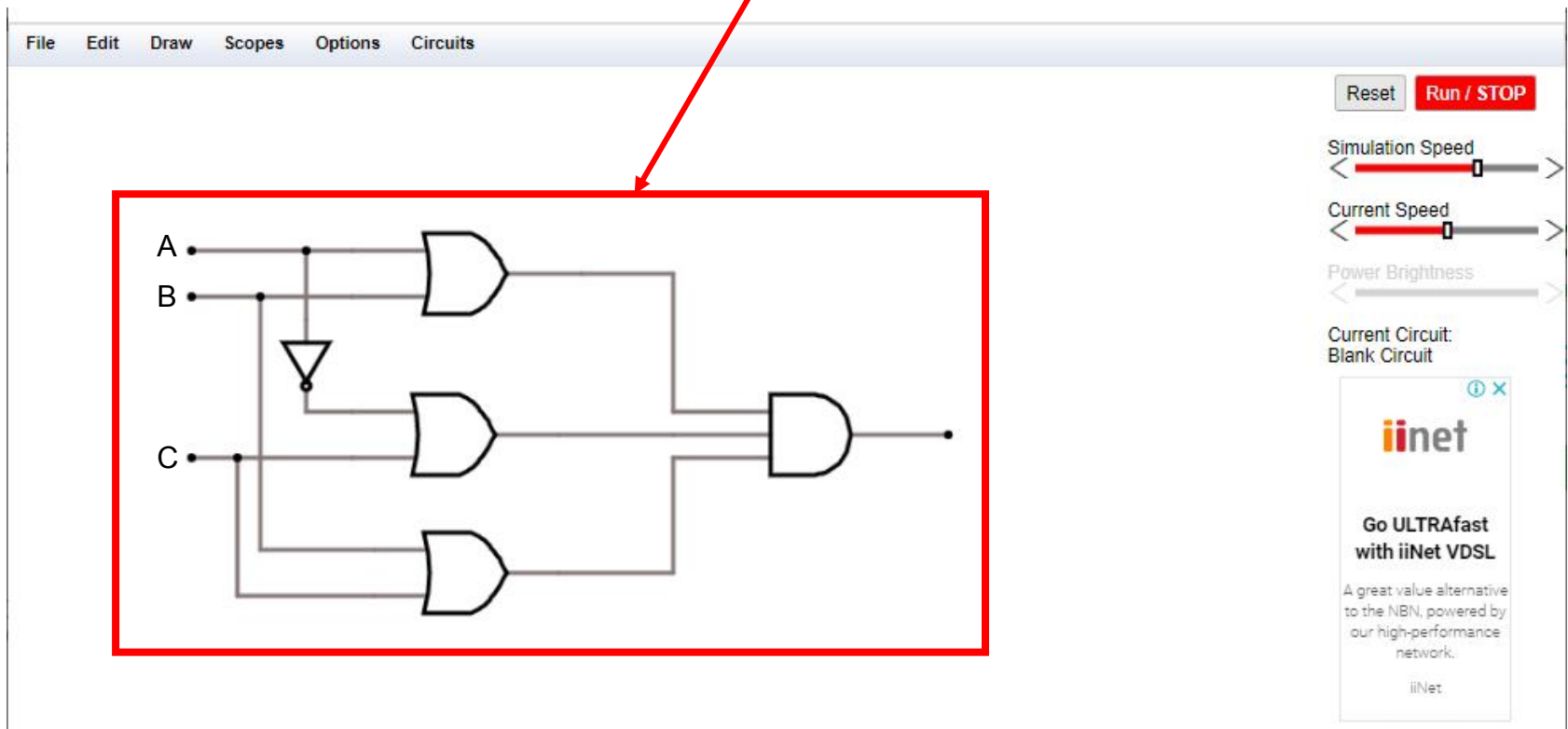
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Drawing Logic Circuits using on-line simulator

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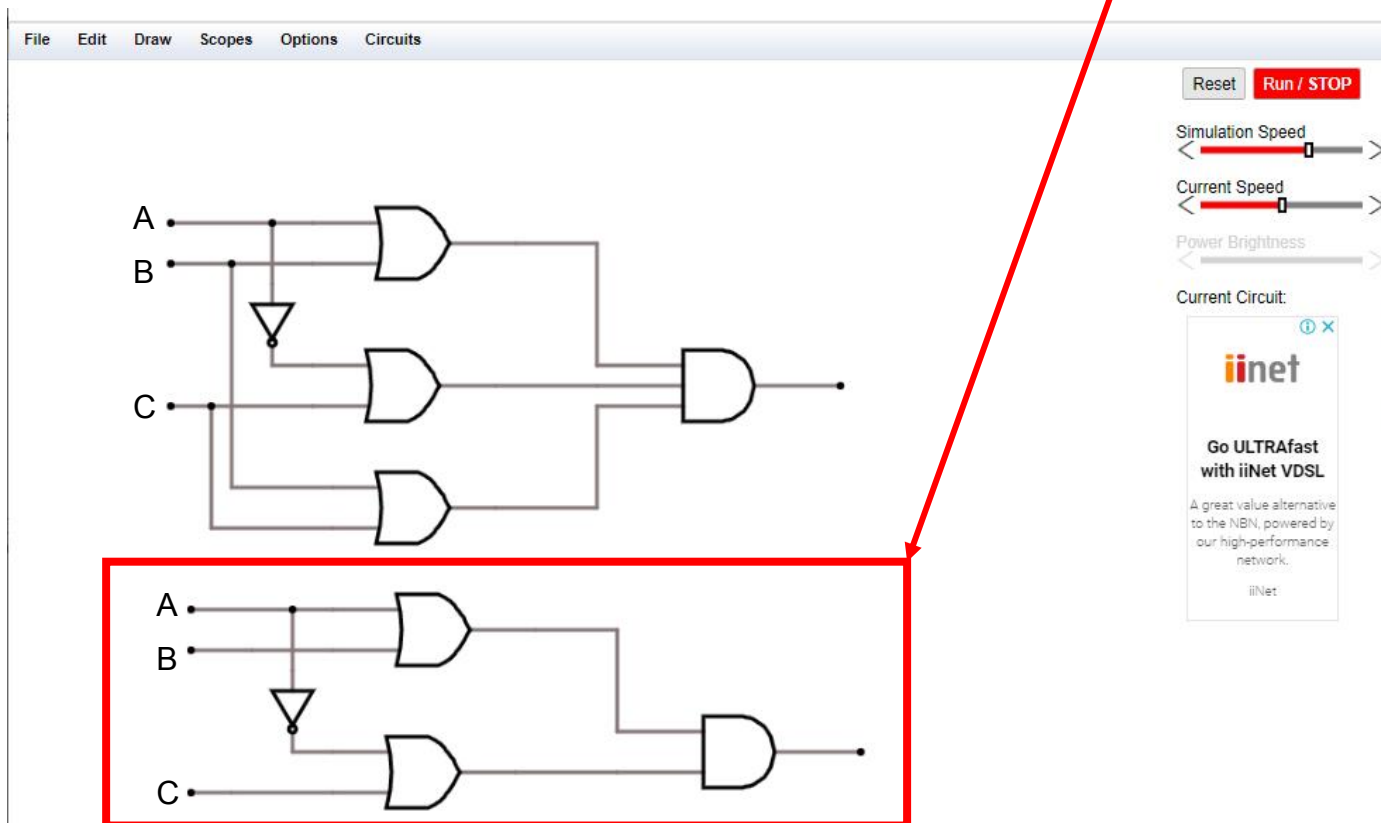


Drawing Logic Circuits using on-line simulator

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

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



Drawing Logic Circuits using on-line simulator

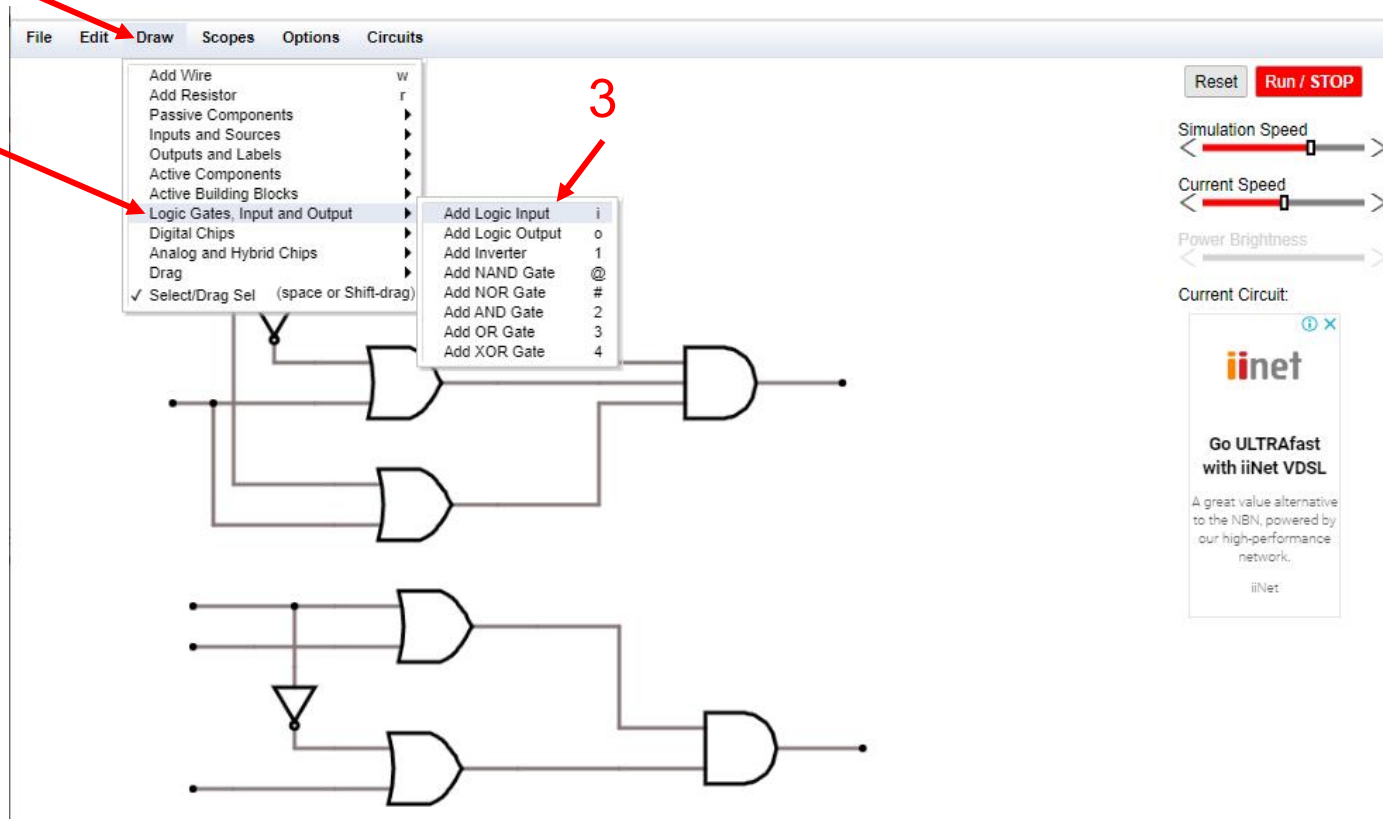
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1

2

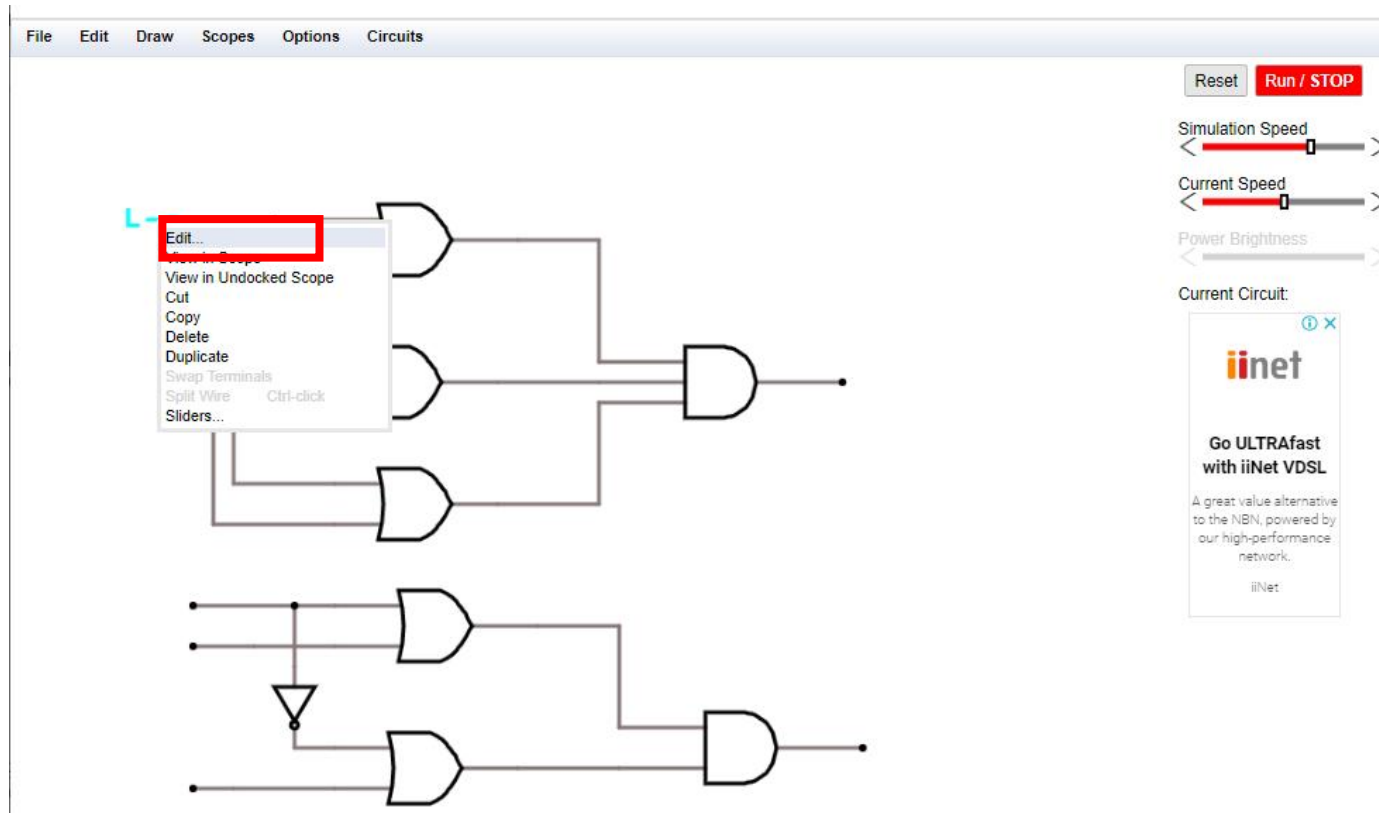
3



Drawing Logic Circuits using on-line simulator

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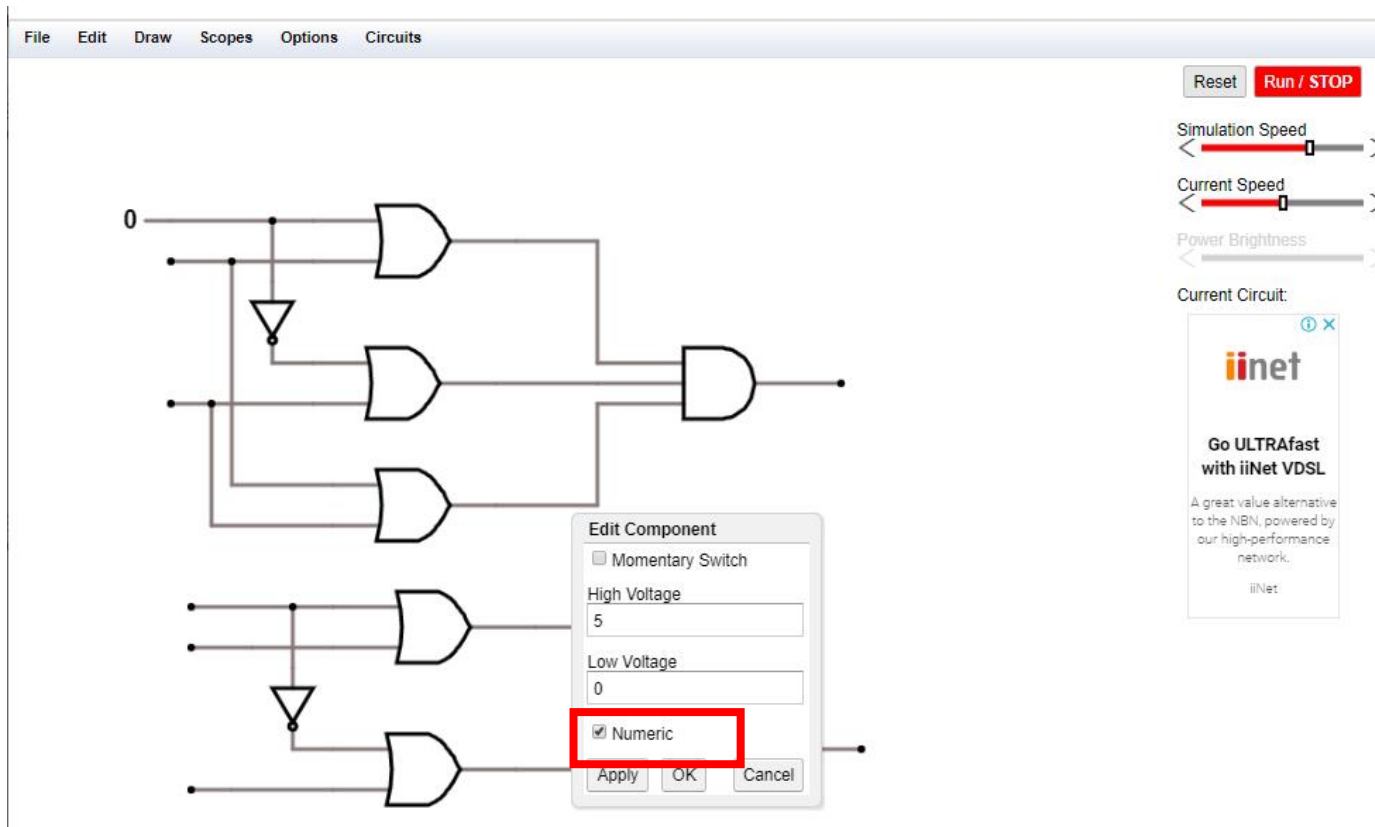
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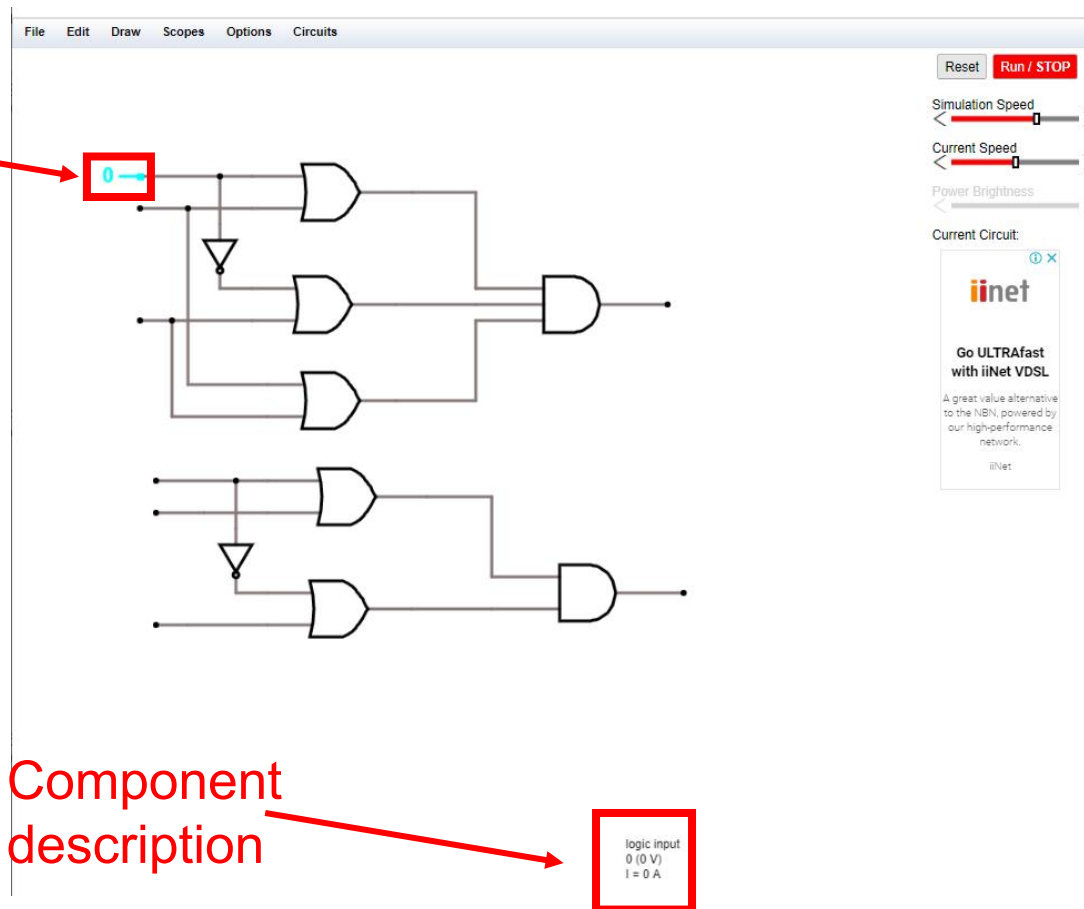


Drawing Logic Circuits using on-line simulator

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Click
on
component

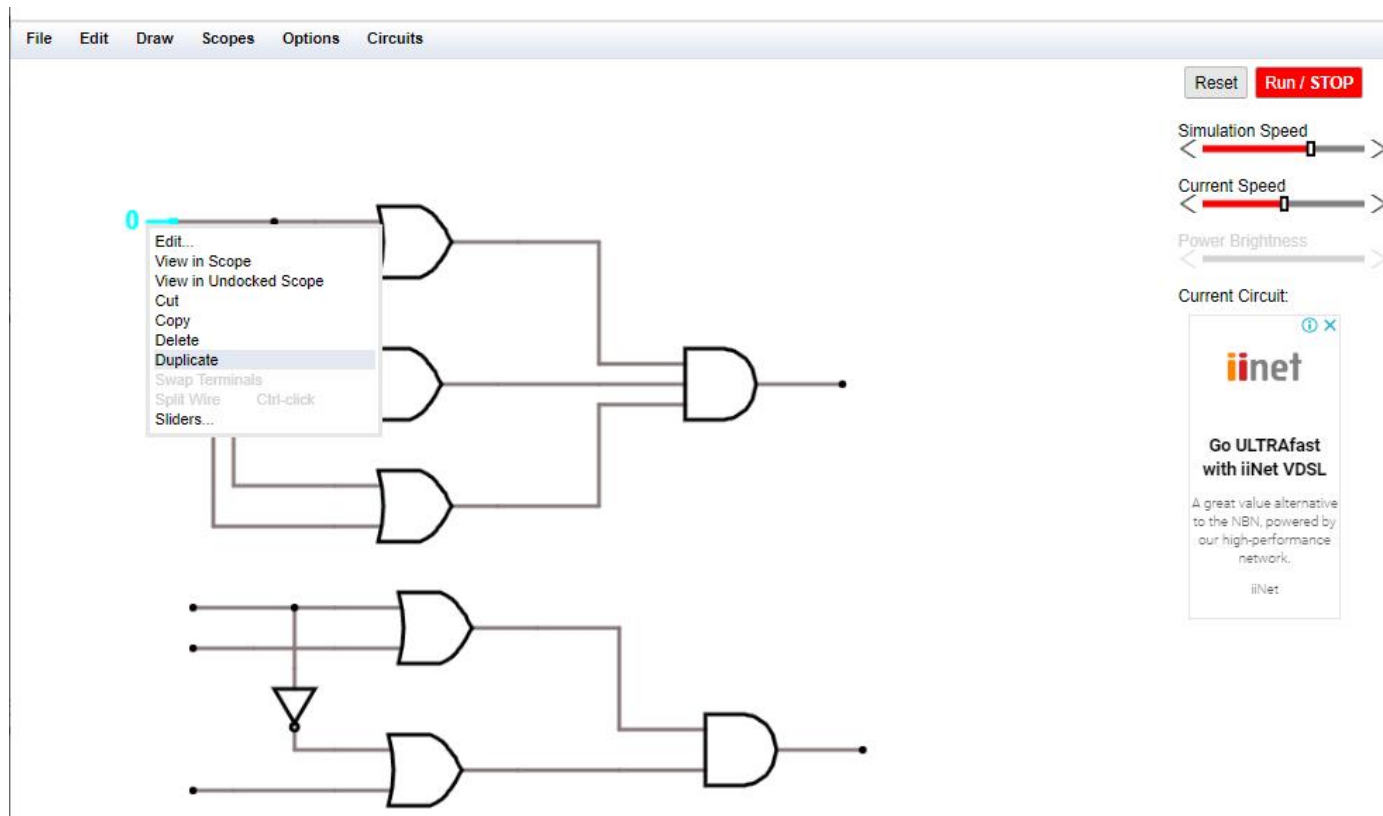


Component
description

Drawing Logic Circuits using on-line simulator

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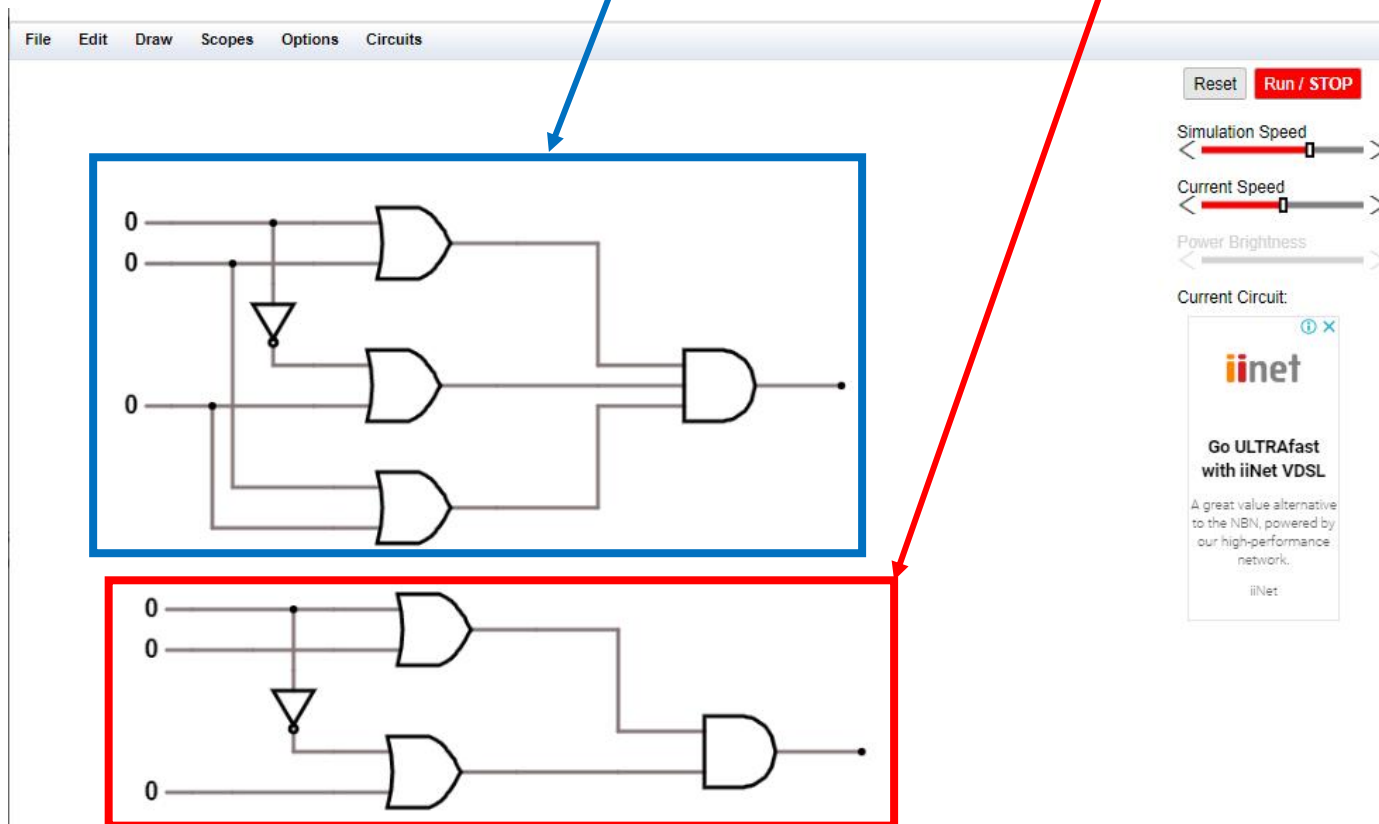


Drawing Logic Circuits using on-line simulator

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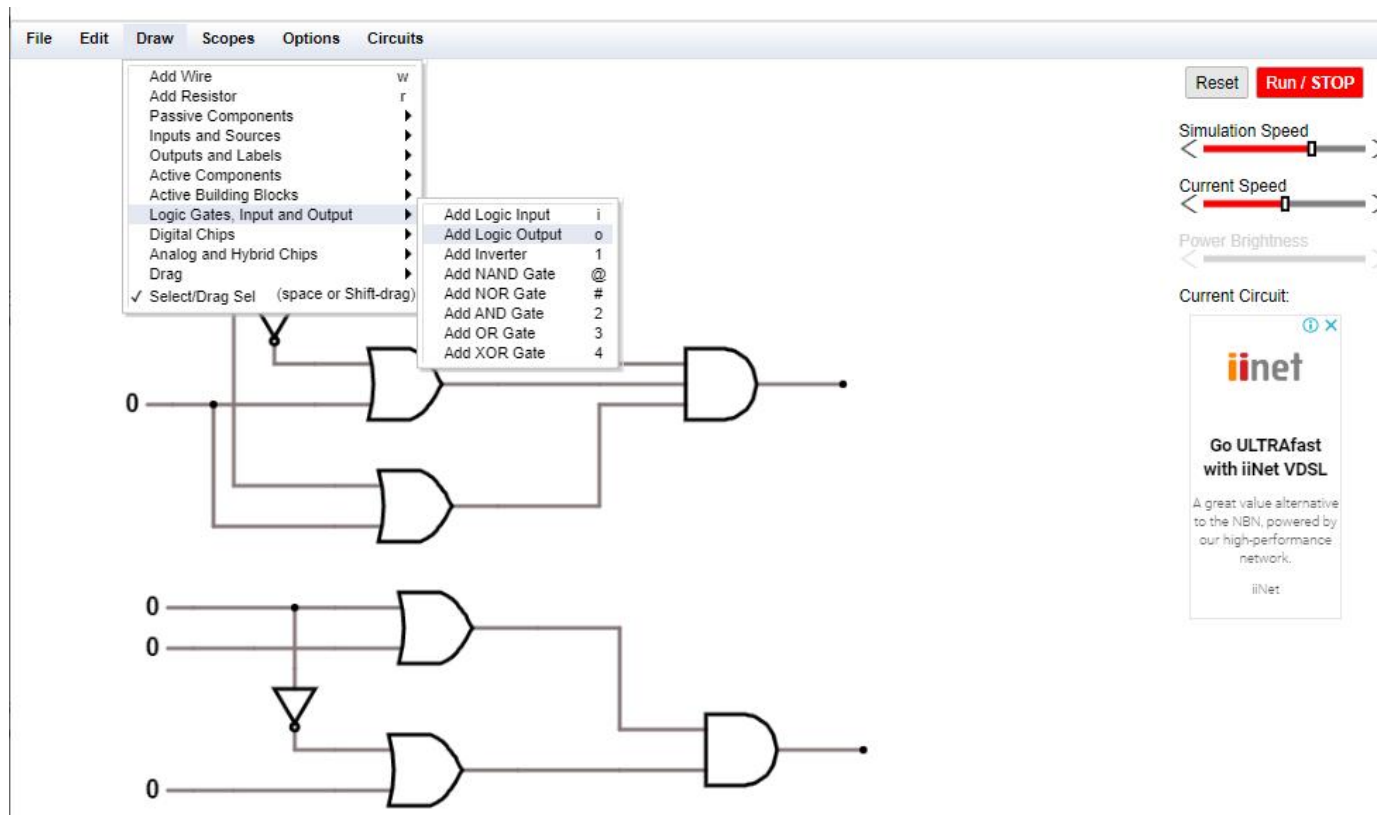
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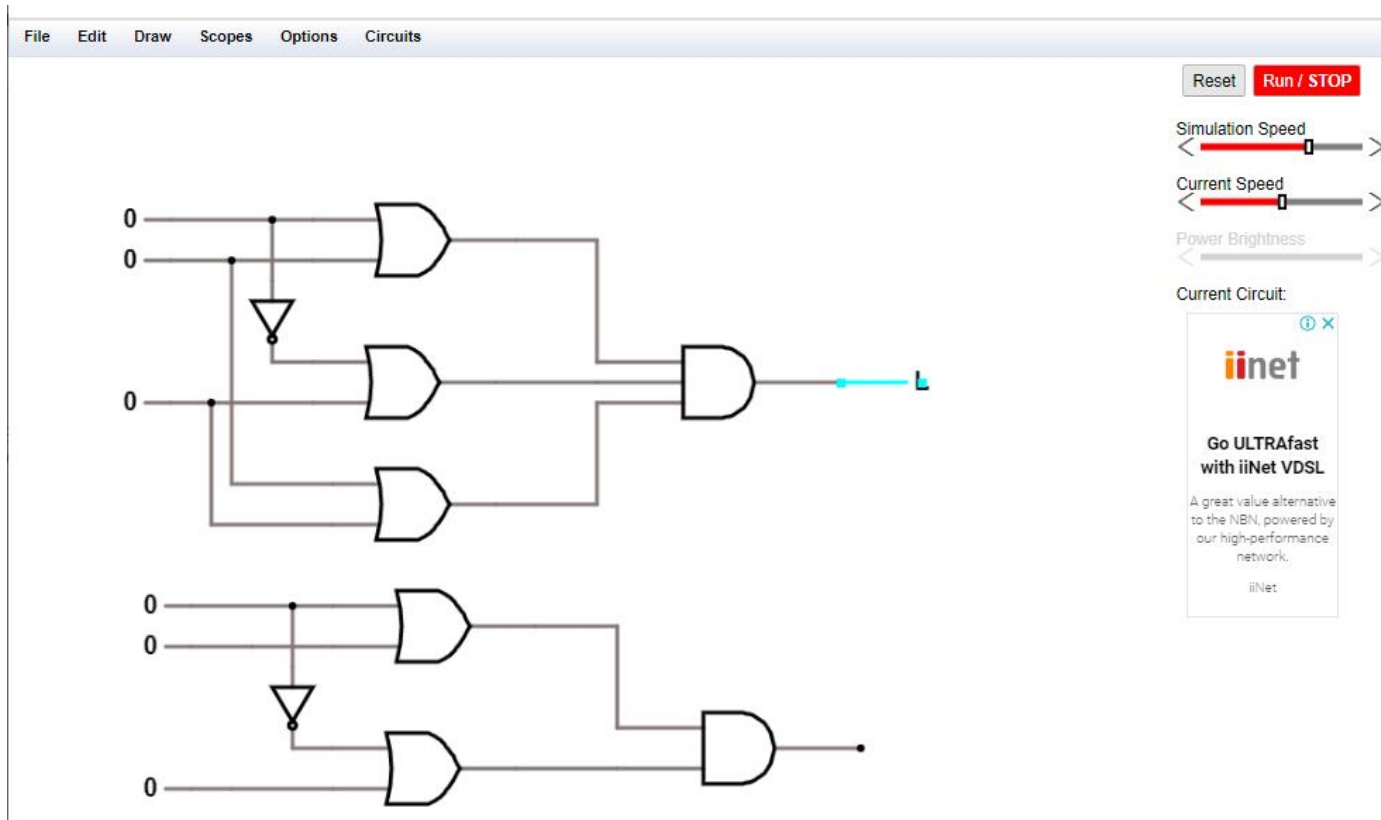
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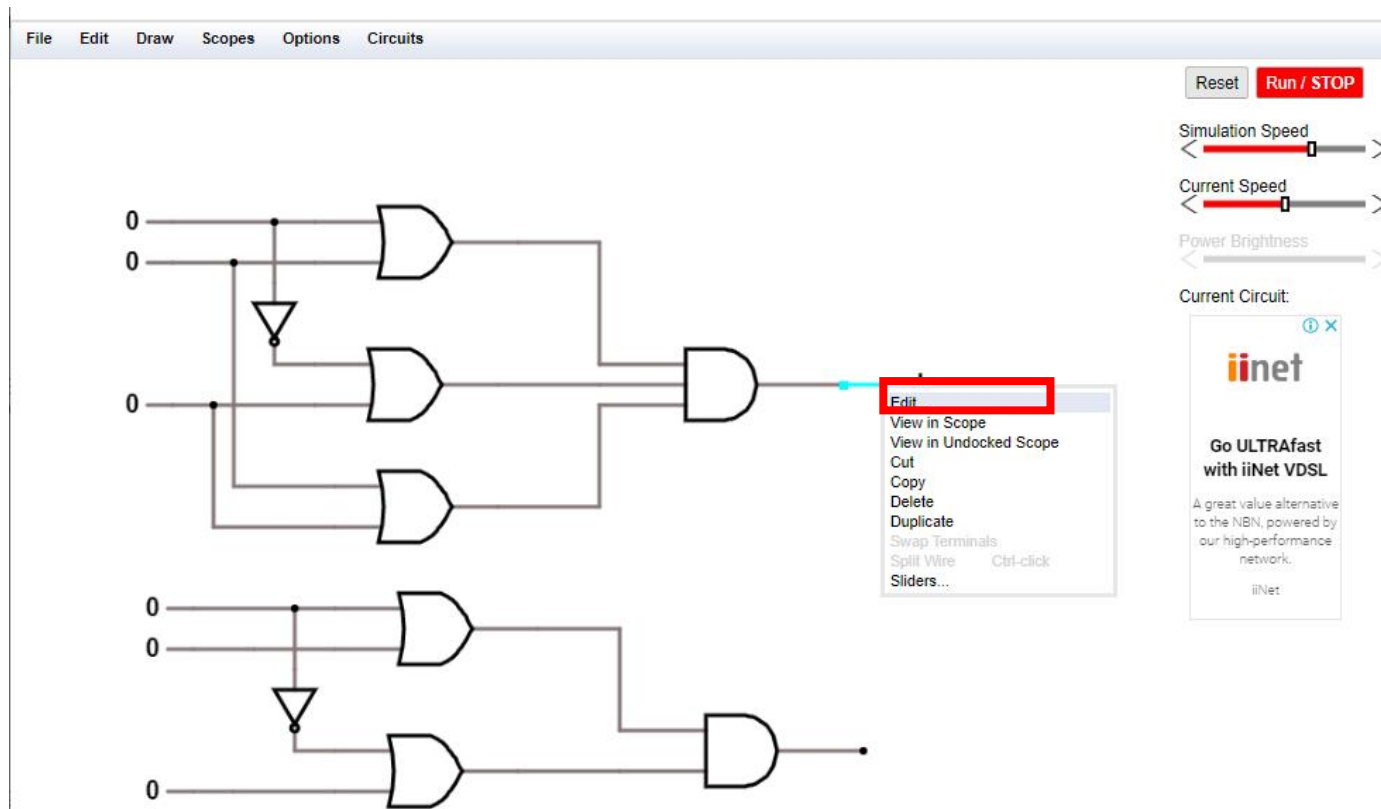
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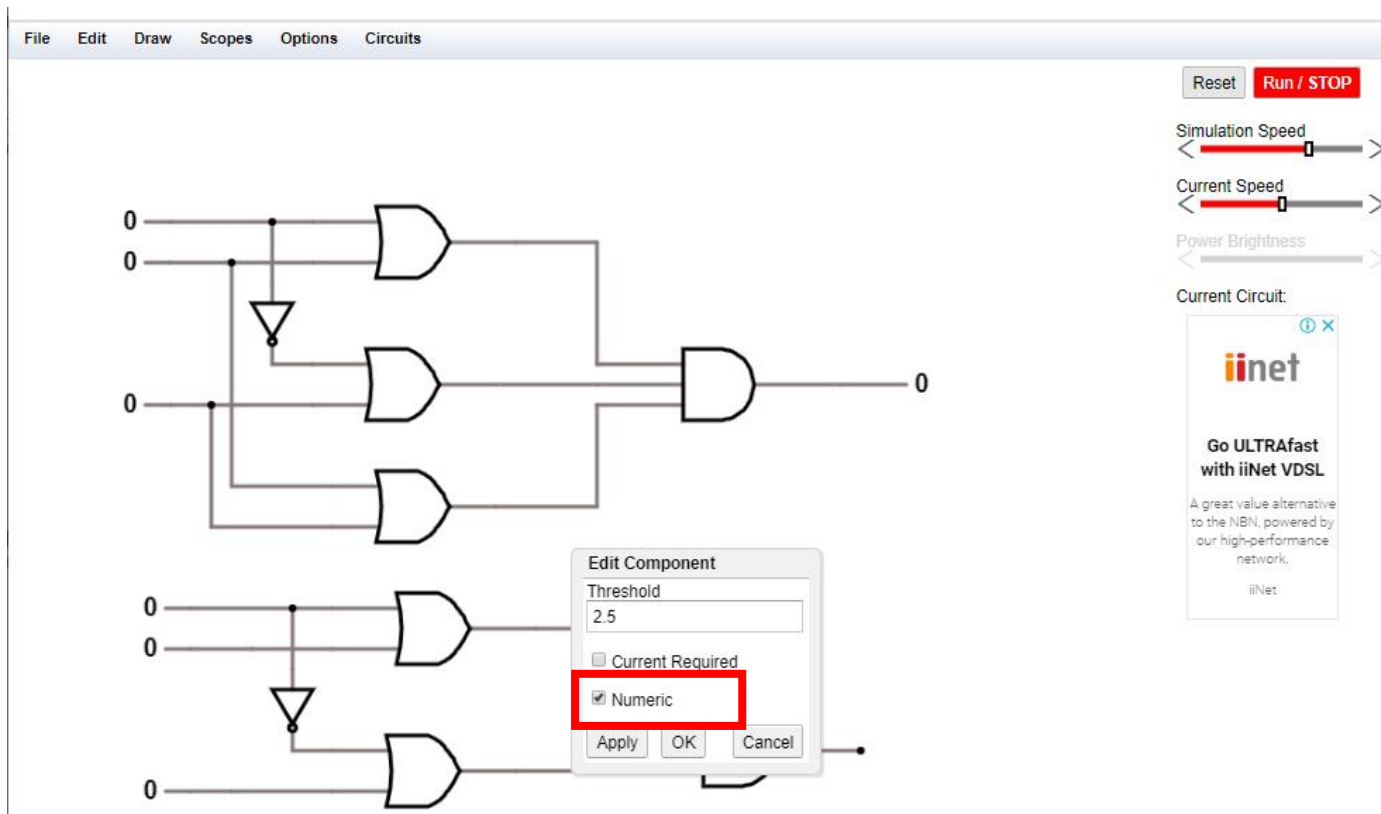
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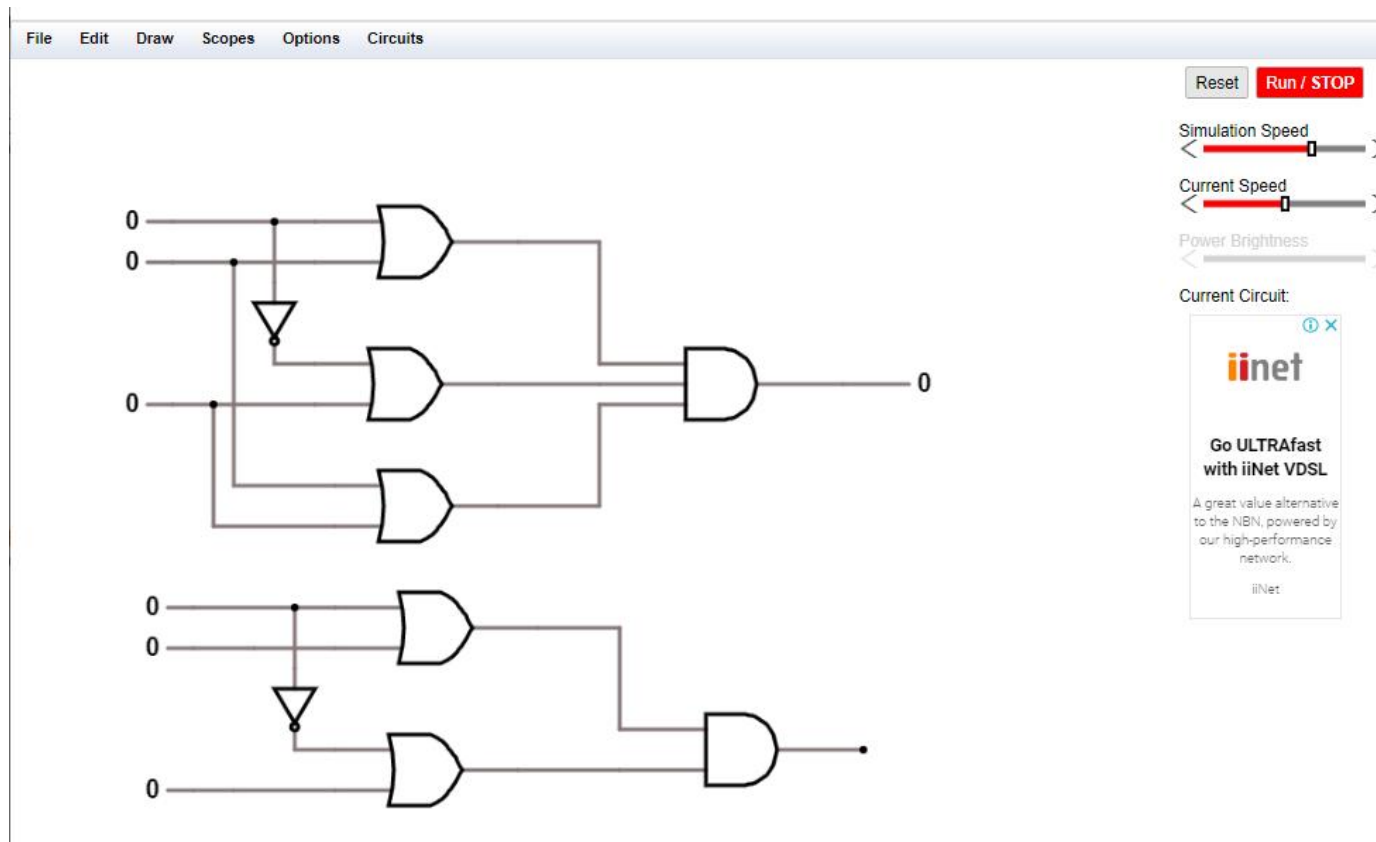
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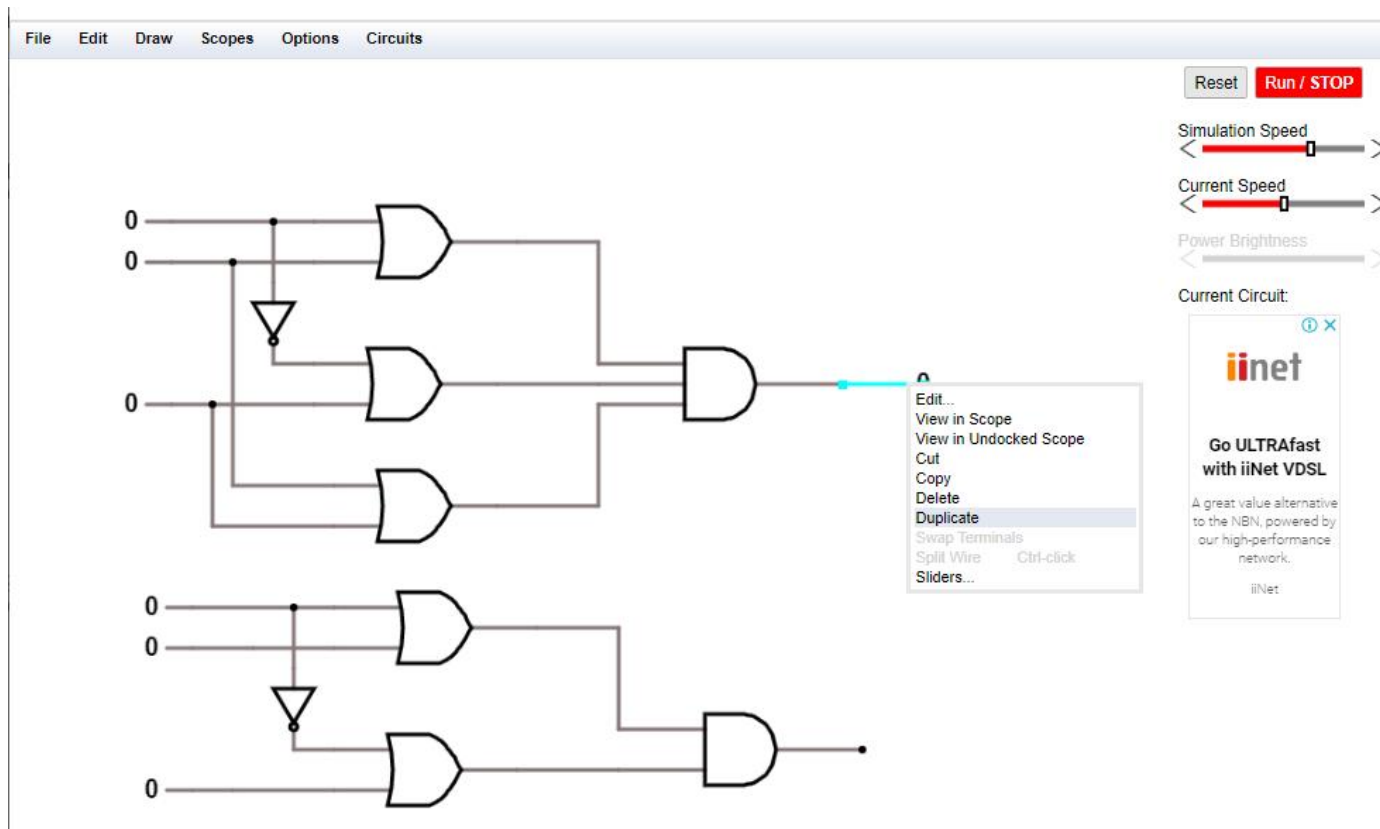
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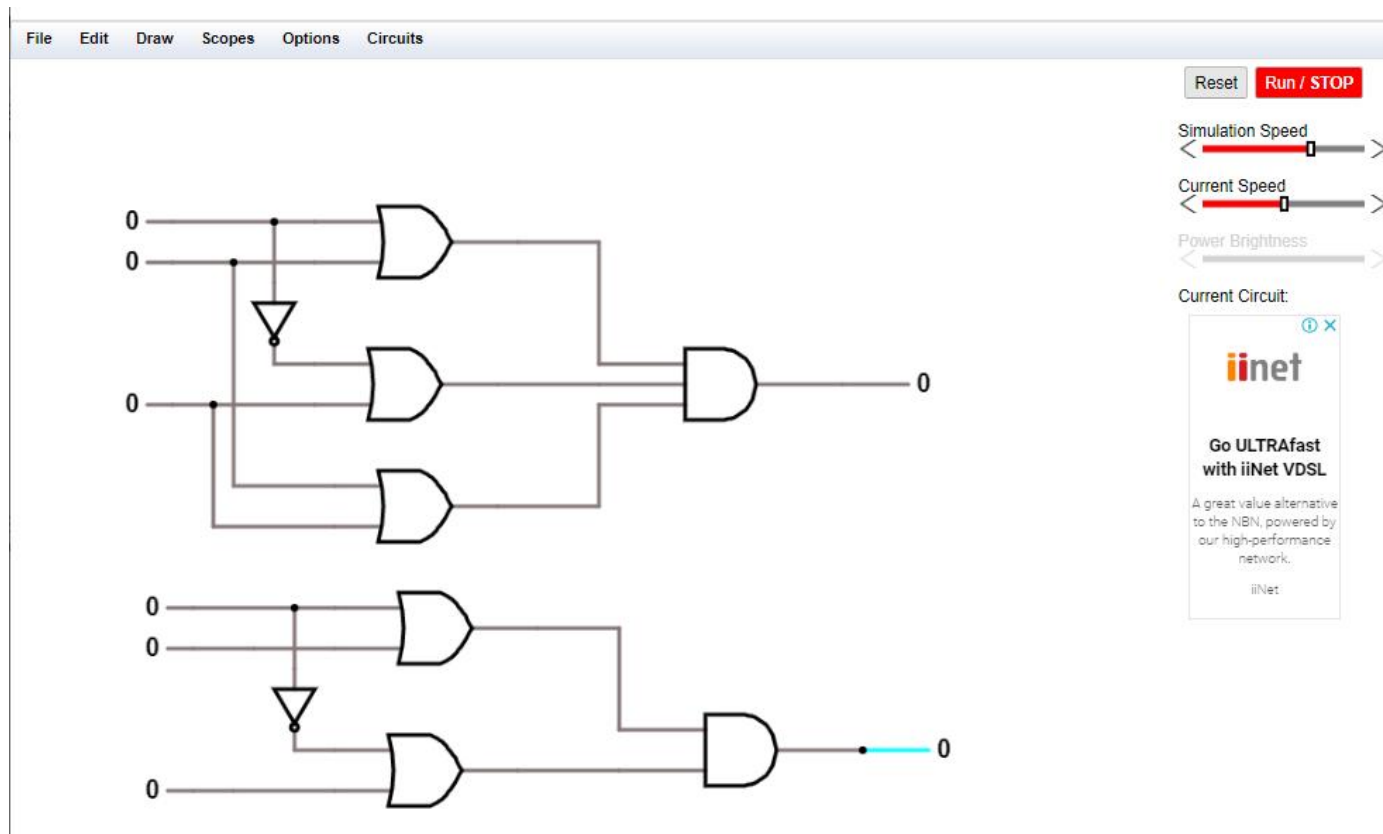
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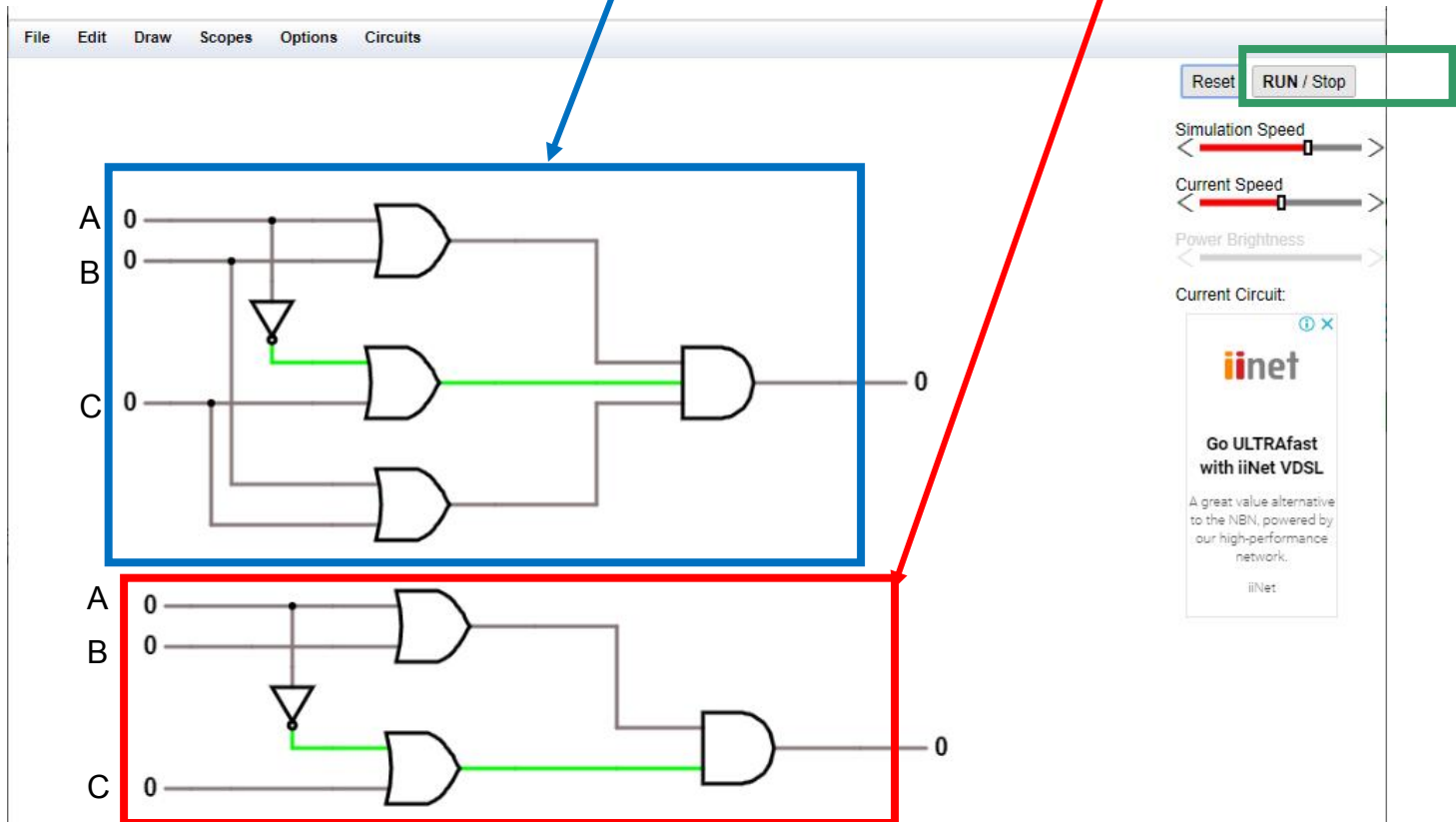


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Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$

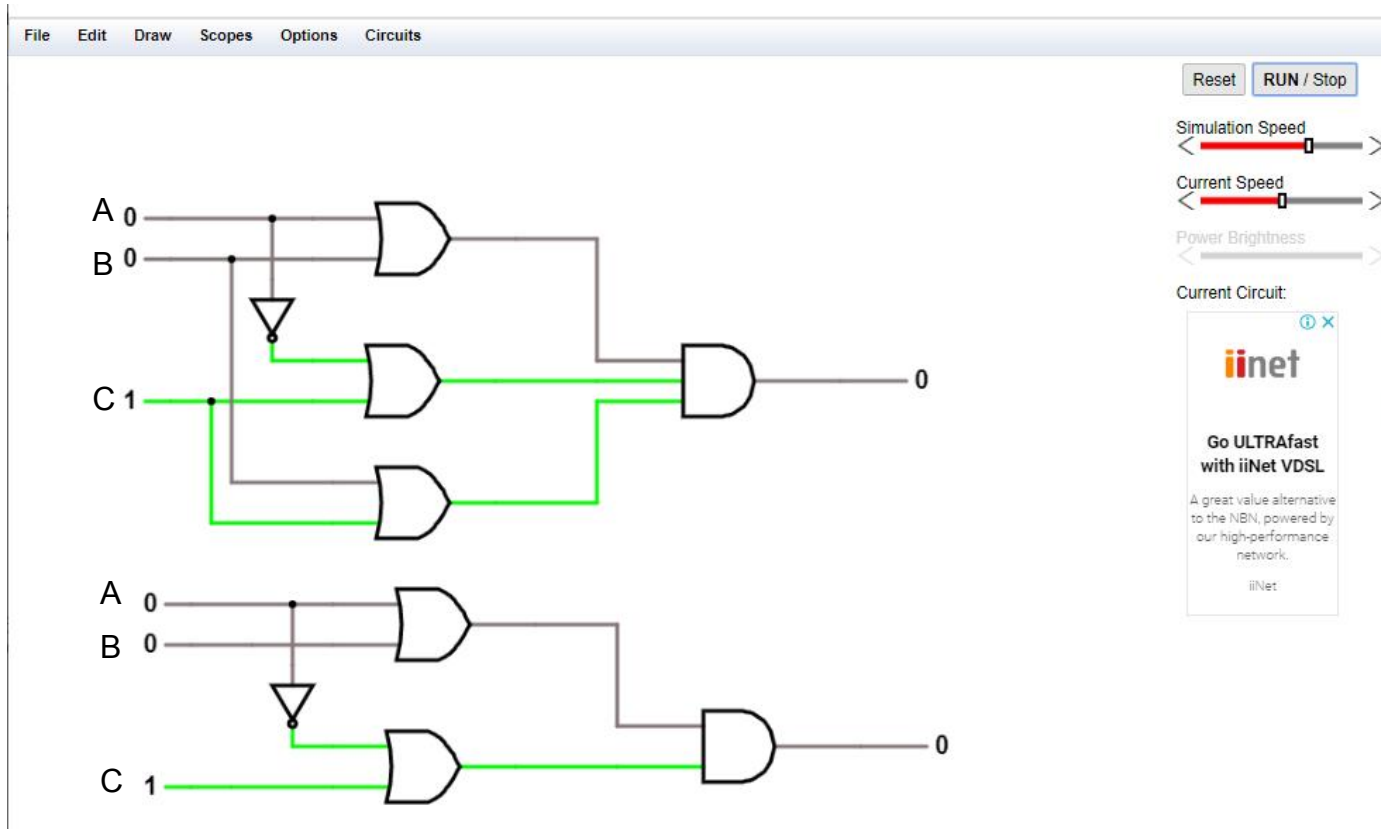
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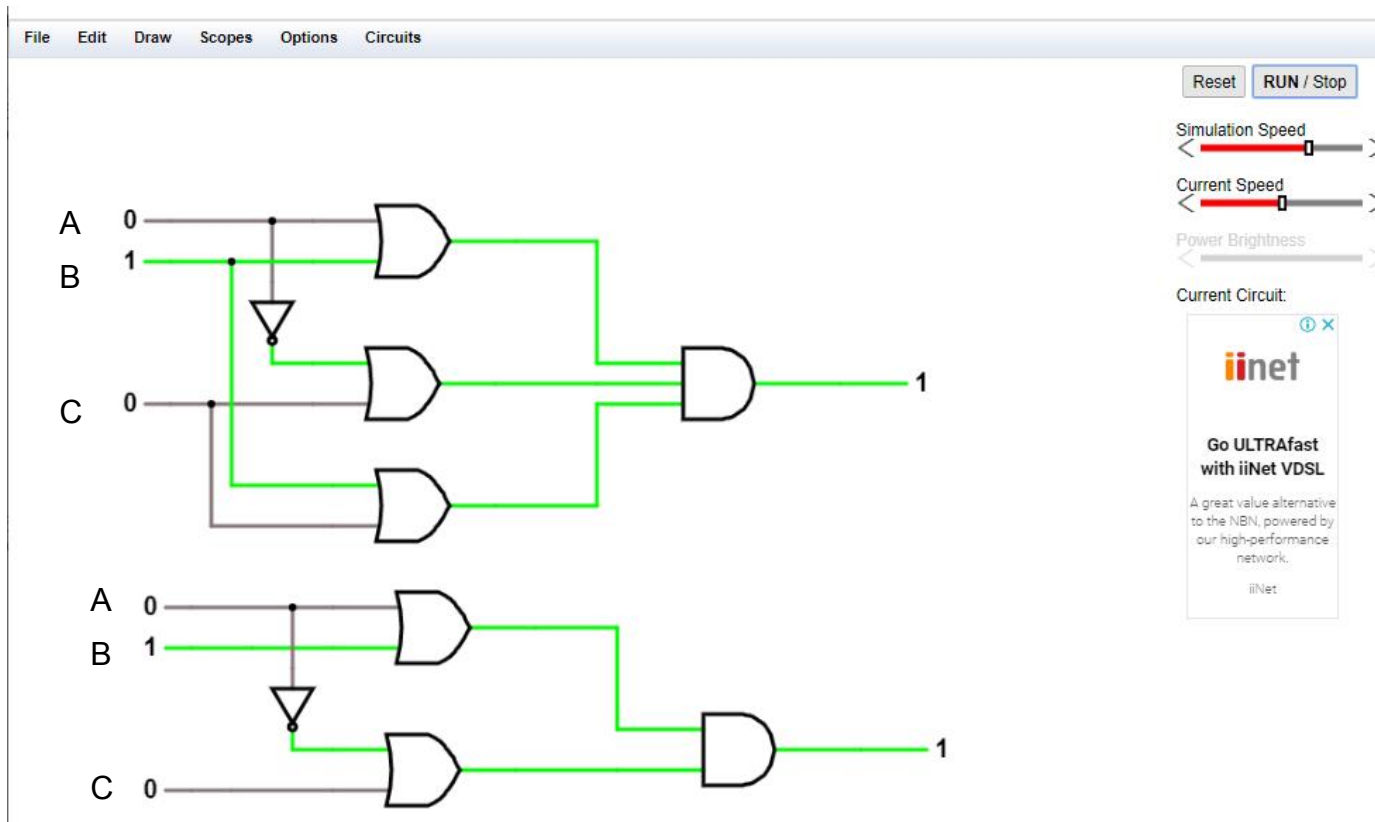
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Drawing Logic Circuits using on-line simulator

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

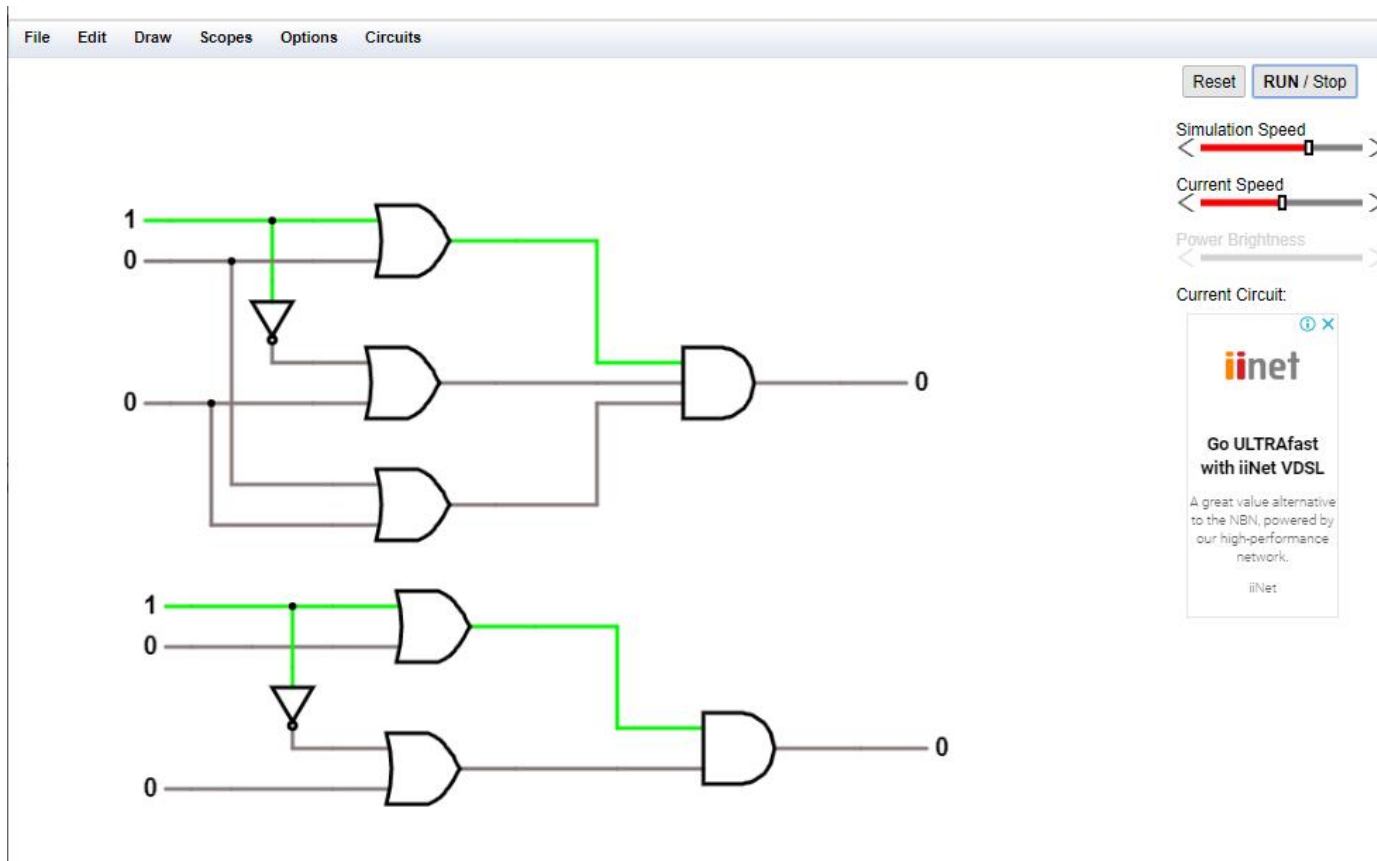
Exercise 6.1 (d): $(A+B)(\bar{A}+C)(B+C) = (A+B)(\bar{A}+C)$
 $(A+B)(A'+C)(B+C) = (A+B)(A'+C)$



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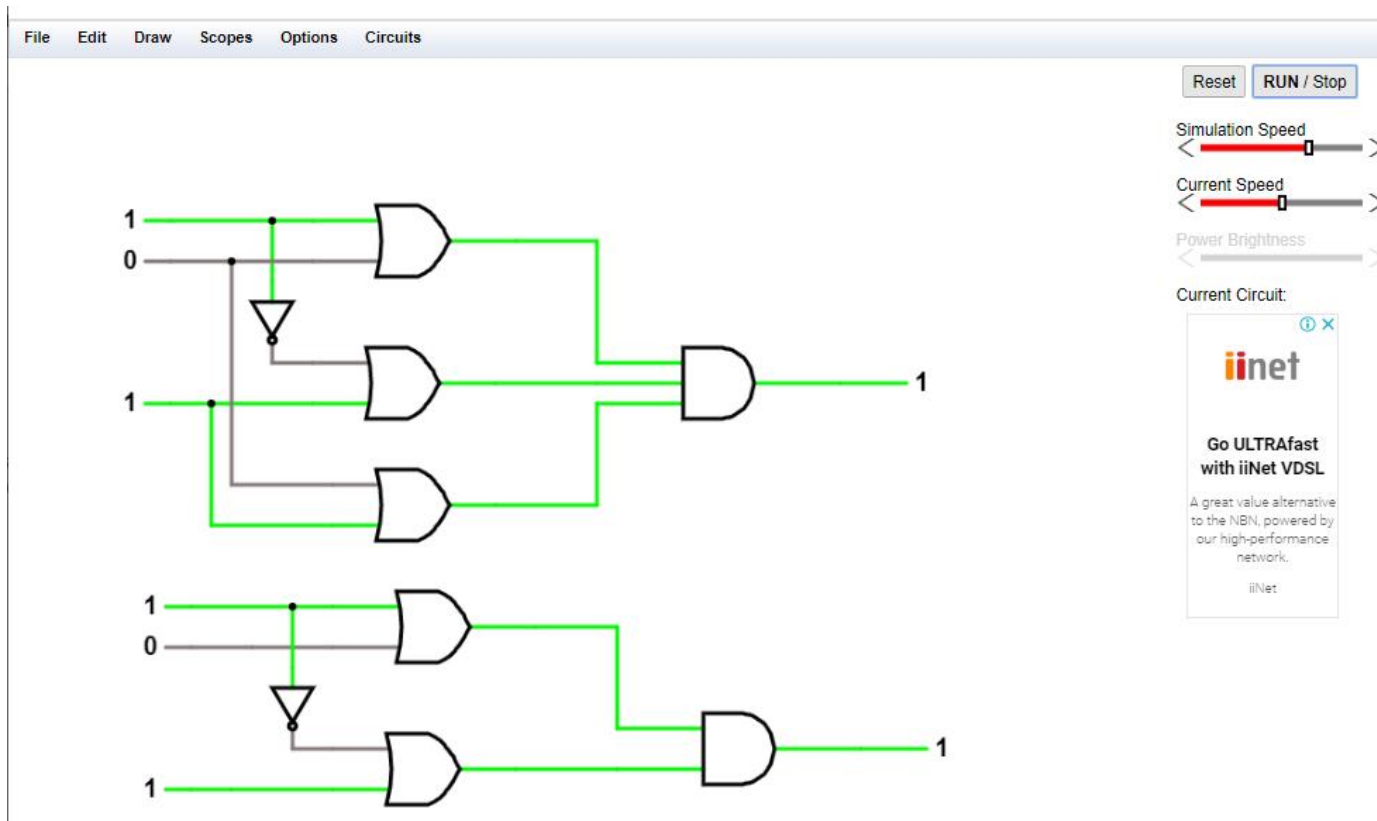
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Exercises: Simulator

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