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Lab 9 – Latches and Memory

1. Describe, using your own words, a D latch. Illustrate how it is implemented below and confirm its operation using the simulator. Draw its truth table.

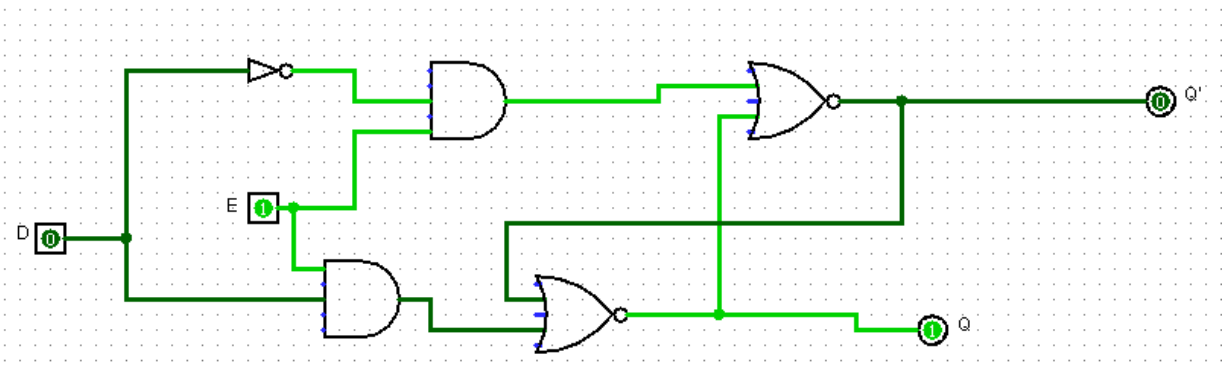
Description:

A D latch is used to store the logic which is on the data line when the clock input is high, when the data on the D line changes state while the clock pulse is high, the output, Q, will follow the input, D. When the input falls to logic 0, the last state of the D input is trapped and held in the latch.

Truth Table:

D	E	X	Y
0	0	X	X
0	1	X	X
1	0	0	1
1	1	1	0

Circuit:



2. Show a circuit which can be used to write to a 5x4 memory. Illustrate how it is implemented below and confirm its operation using the simulator. (You may use the blackbox decoder in Logisim).

Description:

There is a 10 inputs, which includes 6 E inputs. There is a 3-5 bit decoder which goes into 20 bits of memory which lead into controlled buffer. This all leads into 4 outputs to give the final output.

Circuit: