Lab 3 (Transistors)

Getting started
1) Open the lab03.sim file in logisim
2) Click the different sub-circuits in the top panel to switch between them

Transistor Rules and helpful hints
P-type transistors go on TOP of the diagram, connected to power (represented by constant 1)
P-type transistors are active low, switch will close when input = 0

N-type transistors go on BOTTOM of the diagram, connected to ground (represented by constant 0)
N-type transistors are active high, switch will close when input = 1

Not Gate
1) Switch to the sub-circuit "NOT"
2) Complete the "NOT" subcircuit with only transistors and wires
3) You can change the type of transistor by editing the "type" field

NAND & AND
1) Complete the NAND circuit using only transistors and wires
2) Complete the AND circuit using the previous 2 subcircuits of this assignment. (Think about how NAND is different from AND)

DeMorgan's
NOTE: You can use logic gates for this part (don't have to use transistors).

There is a property of Boolean logic called DeMorgan's Law that states

"The negation of a conjunction is the disjunction of the negations."

Or, simply put,

!(A&B) == (!A | !B)

For the first gate of this subcircuit, use an AND gate and invert the output (left side of the equation above)
For the second gate of this subcircuit, use an OR gate and invert the inputs (right side of the equation above)

You will notice the outputs for both gates are the same. This is DeMorgan's Law in action!

When you are finished with the circuits, show them to your TA's.