

CS 210 Homework 3

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Download the latest version of Logisim from

<http://ozark.hendrix.edu/~burch/logisim/>

You will need Java in order to run Logisim. Once Logisim is running, you may access its documentation from the **Help** menu. A good place to start is **Help**→**Tutorial**.

Implement the circuits described below. For each circuit, you must turn in the following.

- (a) A clearly-labeled logic diagram (drawn in Logisim), including
- a name for the circuit
 - input name(s)
 - output name(s)

You will use the input/output names from your diagram in the next two parts.

- (b) The Boolean expression represented by the circuit.
- (c) A truth table showing input value assignments and output values.
1. Construct a circuit which implements a **NOT** gate using only **NAND** gates.
 2. Construct a circuit which implements a 2-input **AND** gate using only **NAND** gates.
 3. Construct a circuit which implements a 2-input **OR** gate using only **NAND** gates.
 4. Construct a circuit which implements a 2-input **NOR** gate using only **NAND** gates.
 5. Construct a circuit which implements a 2-input **XOR** gate using only **NAND** gates.