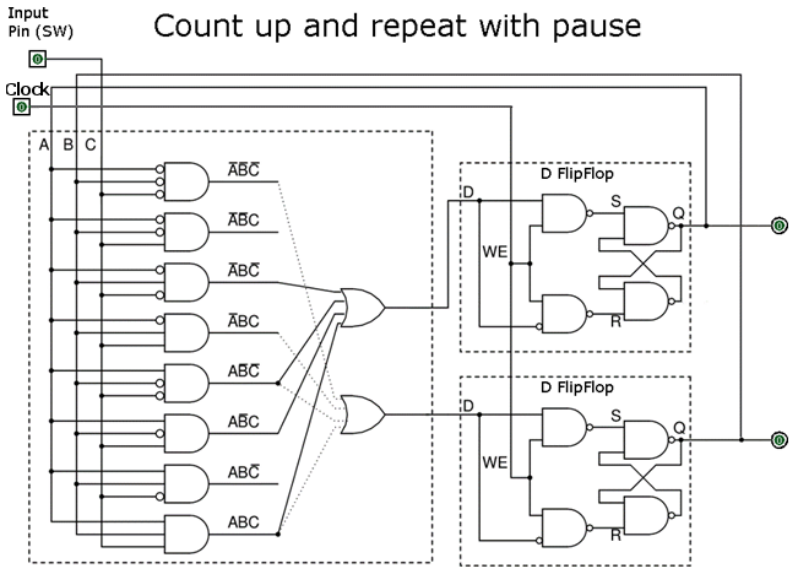
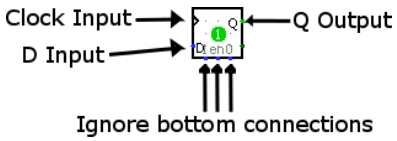
State Machine Assignment.

Create three different state machines as described below and upload to Web-CAT.



1. Create the circuit above in Logisim.
    a. Name the file ***count_up_with_pause.circ***.
    b. Use only pins, or-gates, splitters, decoders, and D-Latches (D-Flipflops). USE THE BUILT IN DECODER AND D-FLIPFLOP (LATCH). You MUST use the built-in decoder. Do not create your own. **You ARE NOT allowed to use your own AND gates or INVERTERS.**
    c. Note that all input pins must be east facing and be in the order shown top to bottom. SW and the Clock are both inputs.
    d. Note that all output pins must be west facing (Q1 and Q0) and be in the order shown top to bottom.
    e. Leave the circuit name as main.
    f. The clock input (write enable) to a D-Latch looks like a greater than symbol (>).



    g. Create, test, and submit to Web-CAT as Part 1 of this assignment.

2. Create another state machine that counts up and stops at 11 if the switch value is 1 and counts down and stops at 00 if the switch value is 0.
    a. Name the file ***count_up_stop_count_down_stop.circ***.
    b. Note that you only really have to change the connections between the decoder and the or-gates.
    c. Create, test, and submit to Web-CAT as Part 2 of this assignment.

3. Create another state machine that counts down and stops at 00 if the switch value is 0 and resets to 11 if the switch is in 1. That is all states should lead to the 11 state if the switch is in the 1 position.
    a. Name the file ***count_down_stop_reset.circ***.
    b. Note that you only really have to change the connections between the decoder and the or-gates.
    c. Create, test, and submit to Web-CAT as Part 3 of this assignment.

THINGS TO CHECK IF YOUR CIRCUIT IT ISN'T WORKING

Test your circuit before submitting. For part 1, make sure your circuit counts up and repeats when SW is zero like this: 00, 01,10, 11, 00, 01, ...

When in state 00, change SW to 1 and click the clock several times. The state should remain 00. Change SW back to zero. Click the clock twice. It should change to state 01. Change SW back to 1 and click the clock several times. The circuit should stay in state 01. Test ALL four states.

Test part 2 and part 3 just as thoroughly. You should KNOW your circuit is doing the correct thing before submitting. If you don't know what that thing is then that will be a problem.

The position and direction of the pins are vitally important for fitting your circuit into my test circuit. Make sure the Clock pin is below the SW pin.

The connection of Q1, Q0, and SW to the decoder is very important. Make sure you have those connected correctly to the splitter.