

# ECE 1315 - Lab #1: Basic Gates + LogiScan

Insert three chips from the parts cabinet in the lab into the middle row of your breadboard. Position the chips so that the end notch is on the left of each chip, identifying pin #1 as the lower left pin.

74\_04 hex NOT gates  
 74\_08 quad 2-input AND gates  
 74\_32 quad 2-input OR gates

Leave a spot on your breadboard to insert the 24-pin plug from the LogiScan test instrument.

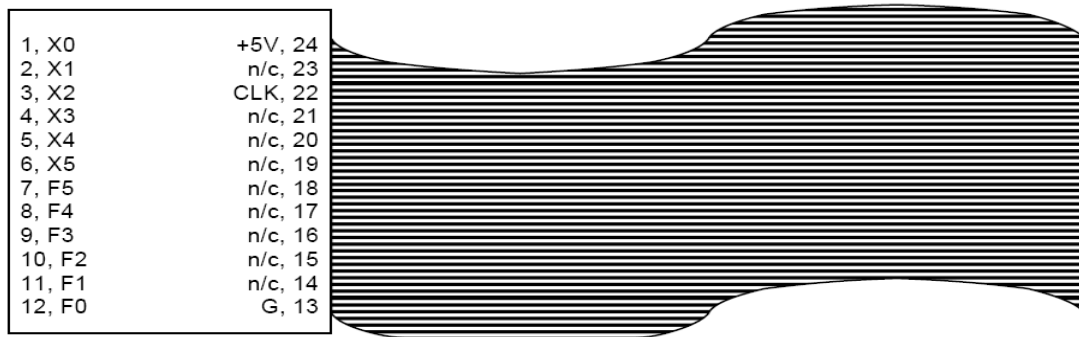
Using the pinouts of the 3 chips and the LogiScan plug, supply the reference voltages by connecting the +5 Volt power (1) from the LogiScan plug location to each of the 3 chips on pin 14, and connect the 0 Volt ground (0) signal from the LogiScan plug location to each of the 3 chips on pin 7.

Implement the following four functions of two variables  $x_1$  and  $x_0$  using a selection of gates from the 4 AND gates, 4 OR gates, and 6 NOT gates you have inserted on your breadboard. Minimize the total number of gates you use to implement the four functions.

$$\begin{aligned} f_0(x_1, x_0) &= 1 & \text{if} & & x_1=1 & \text{OR} & x_0=1, & & \text{else } f_0=0 \\ f_1(x_1, x_0) &= 1 & \text{if} & & x_1=1 & \text{AND} & x_0=1, & & \text{else } f_1=0 \\ f_2(x_1, x_0) &= 1 & \text{if} & & x_1=1 & \text{AND} & x_0=0, & & \text{else } f_2=0 \\ f_3(x_1, x_0) &= 1 & \text{if} & & x_1 = x_0, & & & & \text{else } f_3=0 \end{aligned}$$

Using the LogiScan...

Turn on the PC (left side of room as you enter) and log on. The username is "ece" and the password is "student" for these systems. Start up LogiScan (if it has not started automatically). Connect the 24-pin plug to your breadboard, being sure to get the orientation right. Click on the boxes to select  $x_1$ ,  $x_0$ ,  $f_3$ ,  $f_2$ ,  $f_1$ ,  $f_0$  and then click "Run Truth Table" to show your results.



Wire your circuit to connect the gates as required by your design. Inputs  $x_1$  and  $x_0$  come from the LogiScan plug, and your four functions go to the LogiScan plug for display on the PC.

Test your circuit with the LogiScan instrument. Record the results, answer the questions below (to your lab instructor—you can include your answers in your lab report, but you do not need to), and get your lab instructor's signature—attach this sheet to your report.

Q#1: What voltage represents a logical '1'? a logical '0'?

Q#2: How can you tell where pin #1 on a chip is?

Number of Gates Used \_\_\_\_\_

Signature: \_\_\_\_\_