# LABORATORY 12

Multiplexers and Flip–Flops

In the first part of this lab, we will learn how to use the 74153 4–line to 1–line multiplexer chip. Besides serving as a data selector, we will see how to use the 74153 to implement the 3–input majority function and a serial–to–parallel converter. In the second part of the lab, we will investigate a simple and widely–used device that acts as a 1–bit memory, the S–R flip–flop. (The S–R flip–flop is the foundation of the D flip–flop.) You can read about both topics in Chapter 12 of Bobrow.

You can use switches and LEDs for your inputs and outputs, respectively.

Multiplexer

The 74153 contains two 4–line to 1–line multiplexers. A multiplexer is a device that connects one of four input lines (C0, C1, C2, C3) to a single output line (Y) as specified by two selector bits (B and A). There is also a "strobe" input (G) that must be set to "0" in order for the multiplexer to function properly. A pin diagram for the 74153 is shown below.
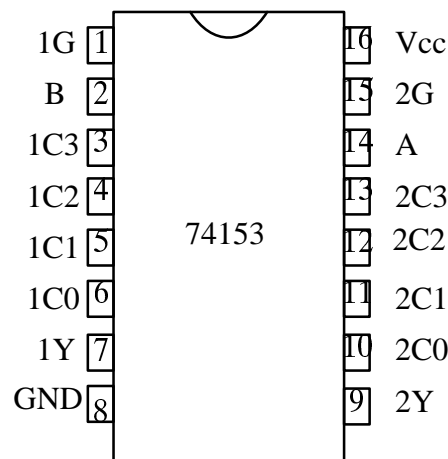
In your lab notebook, record the output Y that you measure for each input in the following truth table. The X means that the input is irrelevant to the output. Verify by inputting both "0" and "1" for some of the X's. Do you see how this chip functions as a multiplexer/data selector?

Select		Data Inputs				Strobe	Output
B	A	C0	C1	C2	C3	G	Y
X	X	X	X	X	X	1	
0	0	0	X	X	X	0	
0	0	1	X	X	X	0	
0	1	X	0	X	X	0	
0	1	X	1	X	X	0	
1	0	X	X	0	X	0	
1	0	X	X	1	X	0	
1	1	X	X	X	0	0	
1	1	X	X	X	1	0	