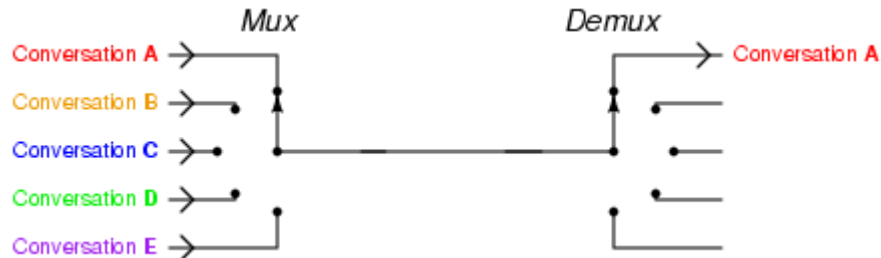# Lab #5 – Design of a Multiplexer/Demultiplexer

Click [here](#) for a demonstration.

In this lab, you will design a 4×1 multiplexer and 1×4 de-multiplexer and verify their operations. A 4×1 multiplexer functions as a switch, connecting one of the four inputs, which is selected, to the output. A 1×4 de-multiplexer operates in reverse, connecting the input to the selected output.
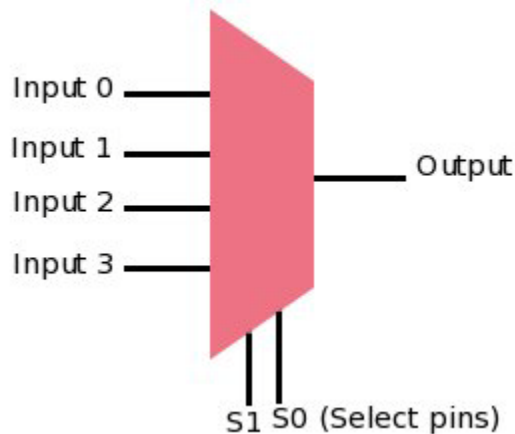
Figure 1: A 4×1 multiplexer

1. Using Electronic WorkBench, design and implement a 4×1 multiplexer using NAND gates and verify its operation.
2. Using Electronic WorkBench, design and implement a 1×4 de-multiplexer using NAND gates and verify its operation.
3. Connect the 4×1 multiplexer to the 1×4 de-multiplexer, and verify sending a selected input to the selected output.
4. Implement the design on the breadboard and verify its operation.
5. Have T/A or instructor verify your circuit.

In preparation for this lab, design a multiplexer and de-multiplexer in your notebook.