Lab 08 - Mux and Demux

In this lab, you've learned about how the physics of semiconductors and circuits induce delay in the outputs, and the consequences thereof. You have also implemented a circuit that has a lot of delay and seen its effects on the simulation.

Rubric

Item	Description	Value
Summary Answers	Your writings about what you learned in this lab.	25%
Question 1	Your answers to the question	25%
Question 2	Your answers to the question	25%
Question 3	Your answers to the question	25%

Lab Summary

In this lab we learned how the functionality of a multiplexer and demultiplexer work in coding implementation. We wrote logic for a multiplexer that can get 3 bits of input data as long as an enable switch and will output it to a location from 4 locations chosen by the multiplexer select switches. We then took that output from the multiplexer and sent it into a demultiplexer with select switches choosing where the data from the multiplexer output should go, our demultiplexer gave the user a choice of 4 different outputs. This gave us a great representation of how mux and demux circuits work.

Lab Questions

1 - In plain English describe the function and use of a multiplexer.

The function of a multiplexer is to choose from a single output when there are multiple inputs. For example if there are 4 inputs x1, x2, x3, and x4, by implementing a multiplexer circuit you can choose which input you want to receive a signal from. The use of this is basically to select data from a certain desired source.

2 - In plain English describe the function and use of a demultiplexer.

A demux does exactly the opposite of a multiplexer, what a demux does is get a single input and the data is outputted to one or multiple desired outputs. The example that I liked was the comparison to a car's air conditioning system. The air is all coming from the same place, but based on what you have flipped, it will come out of different places like the floor or the defroster, ect. The use of a demultiplexer is basically to select a certain output location for an input signal/ data.

3 - What other uses might these circuits have? (Think Shannon’s)

These circuits can be used to simplify circuits to use less logic. This lets the designer use less circuitry and make less complex circuits. They could also be useful for routing signals efficiently as the designer can choose the outputs of the mux. When using Shannons you can simplify complex logic statements to use simple multiplexers and less complex circuits.

Code Submission

Upload a .zip of all your code or a public repository on GitHub.