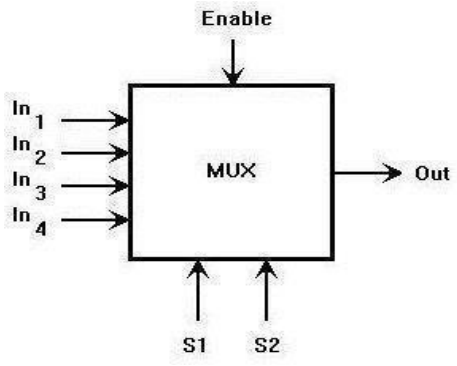
CENG 3331: Lab for Telecom & networks – Lab 8 Multiplexing & Demultiplexing

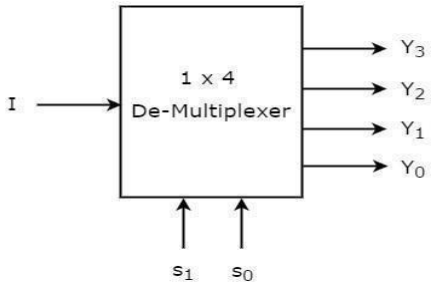
Goals: To understand the concept of multiplexing and demultiplexing.

1. Introduction:

In this lab you will learn the concepts of multiplexing and demultiplexing. Study the diagram below.

Read through the entire lab and scan any supplied files before starting work. Note, before running a simulation, you should always have a general understanding of how your circuit works.





2. Task 1:

1. What is the difference between multiplexing and de-multiplexing?
2. Explain different types of multiplexing techniques with at least two applications each?
3. Give three real-life uses of both multiplexing and de-multiplexing?

3. Task2:Multiplexing

Using Multisim follow the following steps to build a 4-input multiplexer

1. Place a 74151N 4-input digital multiplexer.
2. Attach two interact-digital constants to A, and B pins of the multiplexer.
3. Attach the G pin of 74151N to the ground.
4. Attach 4 digital constants D0 to D3 pins as inputs of multiplexer and label names.
5. Attach two probs (select any color light) to the x1 and x2 outputs.
6. Repeat the following connections for another 74151N IC and connect to common selection lines.
7. Save your work.

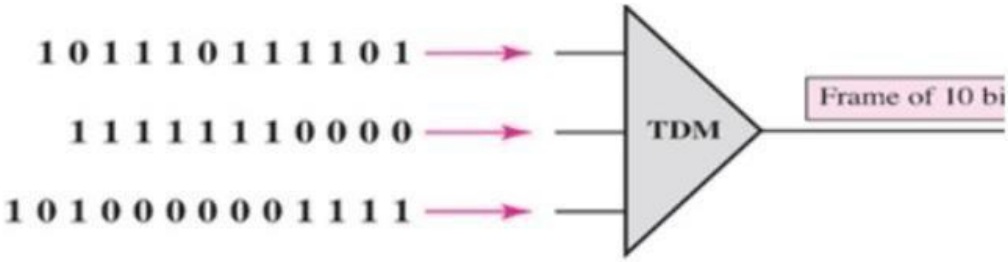
Questions:

1. Write down the truth table based on your circuit outputs?

Mux Truth Table

C	B	A	D0	D1	D2	D3	D4	D5	D6	D7	X1
0	0	0									
0	0	1									
0	1	0									
0	1	1									
1	0	0									
1	0	1									
1	1	0									
1	1	1									

2. Consider four inputs given to the multiplexer 110 0110, 111 0101, 110 1110 and 111 1110. Find outputs in ASCII characters?
3. 4 signal sources are multiplexed using synchronous TDM. Each source produces 64 characters per second. Each output slot carries 2 bits from each digital source, but one extra bit is added to each framefor synchronization. What are the size of an output frame in bits and the output data rate?
4. Figure shows a multiplexer in a synchronous TD slot is only 10 bits long (3 bits taken from each input plus is the output stream? The bits arrive at the multiplexer arrows.



4. Task 3: Demultiplexing

1. Place a VCC and connect it with VCC (pin 16) of 74LS156N and ground to pin 8.
2. Attach two interact-digital constants to A, and B (pins 3, 13).
3. Attach four probs (select any color light) to the pin 4, pin 5, pin 6, and pin 7 outputs and label names.
4. Attach the G pin to the ground.
5. Attach a constant 1C pin as an input of de-multiplexer and label names.

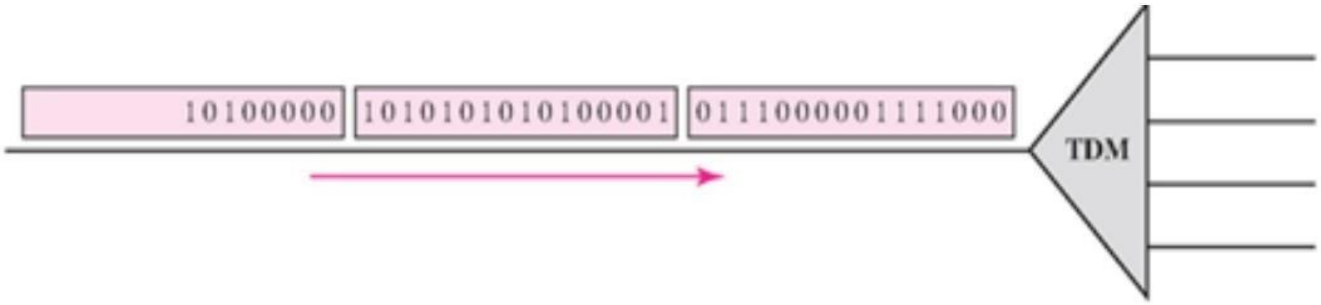
6. Repeat the following connections for another 74LS156N IC and connect to common selection lines.

Questions:

1. Write down the truth table based on your circuit outputs?

SELECT LINES		INPUT	OUTPUTS			
B	A	1C	1Y0	1Y1	1Y2	1Y3
0	0	1				
0	1	1				
1	0	1				
1	1	1				

2. Consider three inputs given to the de-multiplexer is 11011110, 10111111, and 11011011. Find outputs inASCII characters?
3. Given below a demultiplexer in a synchronous TDM. If the input slot is 16 bits long (no framing bits), what is the bit stream in each output?



4. Include your schematic and results in lab book.

5. Lab Report

In no later than 7 days from the starting time your lab section, provide the TA a hard copy of a lab report following the CENG 3311 Lab report Template given on the Black Board. You can write it down to the lab book or include your report in lab book. Each student will submit one lab report to the TA. Your report should have the reporting requirements needed for all tasks. The TA will take off a significant number of points if your does not follow the lab template.

6. GRADING POLICY

1. Completion of Task 1 with results included in lab report (15%)
2. Completion of Task 2 with results included in lab report (25%)
3. Completion of Task 3 with results included in lab report (25%)
4. Completion of Task 4 with results included in lab report (25%)