Hussein Elazhary
900211733

Lab Report [10 Pts]

(Deadline: Tuesday of next week 2:00pm) (Individual submission)

1. [1 Pts] Record the values from experiment 2 in table 1 below and answer the following questions.

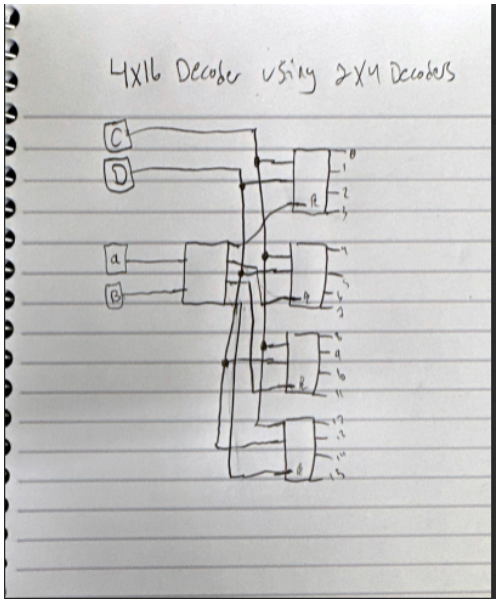
Table 1

Inputs			Output
a	b	s	
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

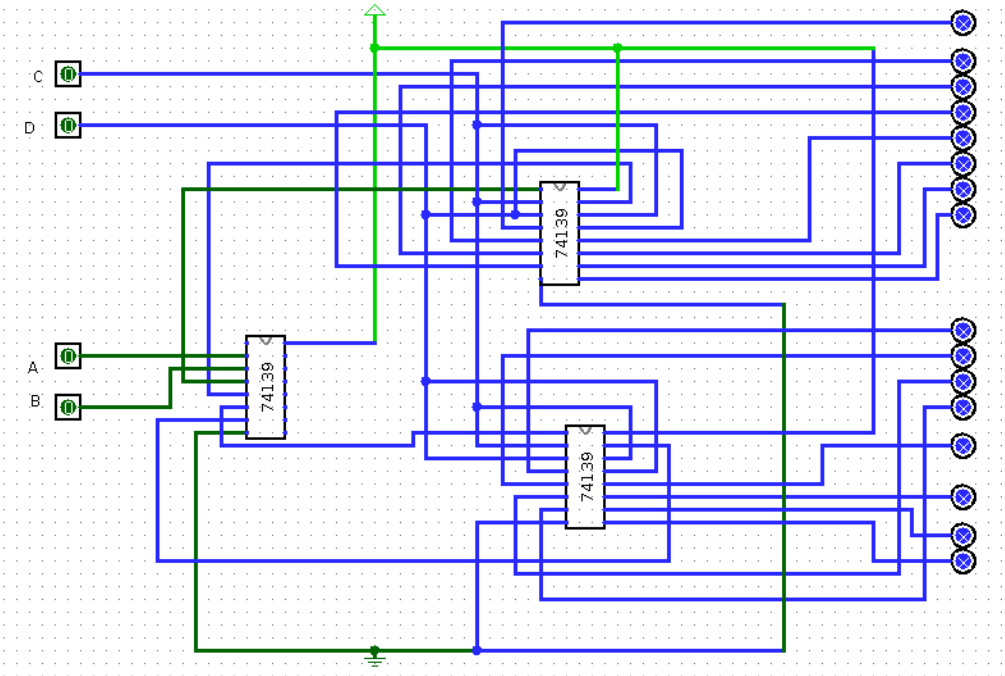
a. How many chips are used in Experiment1(d) and of what type? 2 chips (1 and and 1 decoder)
b. How many chips are used in Experiment2(b) and of what type? 1 nand
c. How many chips are used in Experiment3(d) and of what type? 2 (1 8:1 MUX and 1 nand)

2. [3 Pts] Show how to build a 4x16 decoder using 2x4 decoders
   a. Draw the logic diagram.
   b. Simulate the circuit on Logisim using 7400 chips only. Double click on the chip on Logisim to see the internal design.
   c. Have a screenshot of the circuit and attach your Logisim .circ file to the report.

a.



b.



3. [6 Pts] Research questions:
   a. List 2 known applications that use multiplexers in their circuits, describing its role in each.
   b. List 2 known applications that use decoders in their circuits, describing its role in each.
   c. Why do some chip designs use active low signals instead of active high?

a.
   i. **Data transmission systems:** Used for combining multiple data sources into a single data stream for efficient transmission over a shared communication channel.
   ii. **Digital displays:** Used in the 7-segment display, enabling the display of numbers, letters, or symbols.

b.
   i. **Memory systems:** Used in memory address decoding, where they select specific memory locations based on an input address to read or write data.
   ii. **Digital to Analog Converters**: Converts a binary input into analog signals, enabling precise voltage or current outputs.

c. Some chip designs use active low signals for noise prevention to eliminate potential errors