Combinational Logic III

Logic Structures

Multiplexors

2 -1 Multiplexor

Multiplexors are used to select one of many inputs.

The _____ determines which output to select.

Draw the symbol for a 2-1 multiplexor	Finish the simplified truth table	
	S	**Out**
	0	
	1	

Draw the logic diagram for a 2-1 multiplexor

4-1 Multiplexor

A 4-1 multiplexor has _____ inputs, so there are _____ select lines.

Draw the symbol for a 4-1 multiplexor			Finish the simplified truth table		
					Out

Draw a logic diagram for a 4-1 multiplexor

Decoder

inputs: _____ # outputs:_____

Example: 1-2 Decoder

Draw a 1-2 decoder	Complete the truth table

Complete the truth table

in	out_1	out_0

Example: 2-4 Decoder

Draw a 2-4 decoder

Complete the truth table

in_1	in_0	out_3	out_2	out_1	out_0

Addition

Example: perform addition and label digits for sum, carry out, and carry in

Perform decimal addition	Perform binary addition
9 9 9 8 + 5 0 2 1	1 1 0 1 + 1 0 0 1

Half-Adder

2 inputs: _____   2 outputs: _____

Draw the schematic here:	Complete the truth table:

A	B		

Generate the product of sums solutions for the outputs.

Full Adder

3 inputs: _____   2 outputs: _____

Draw the schematic here:	Complete the truth table:

Complete the truth table:

	A	B		

Generate the product of sums solutions for the outputs.

Four-Bit Ripple Carry Adder

Draw the schematic for a 4-bit ripple carry adder:

Draw this adder as a black box

Draw this adder as an ALU