CS-2110 Quiz 3A

Alan Chiang

TOTAL POINTS

100 / 100

QUESTION 1

1 Completing Circuits 40 / 40

+ 0 Graded. Rubric items are ordered from top AND gate to bottom. Order does not matter within connections to the OR gate.
+ 5 The inputs to this gate can technically be anything.
+ 5 A: o B: o Cin: Connected
+ 5 A: o B: Connected Cin: o
+ 5 A: Connected B: o C: o
+ 5 A: o B: Connected C: Connected
+ 5 A: Connected B: o C: Connected
+ 5 A: Connected B: Connected C: o
+ 5 A: Connected B: Connected C: Connected

QUESTION 2

2 Daisy Chaining 20 / 20

+ 0 Graded
+ 20 Carry out of each one bit adder should be hooked up to the carry in of the next adder.

QUESTION 3

3 Multiplexer 10 / 10

+ 0 Graded
+ 5 A combinational logic circuit that takes in a number of different inputs and selects one of the inputs to output based on the values of the control bit.
+ 5 Ex. Picking an output for an ALU.

QUESTION 4

4 DeMorgan's 10 / 10

+ 0 Graded
+ 10 Using a NOR gate.
+ 5 Correctly identified ~(A|B) but did not draw/describe circuit.

QUESTION 5

5 Decoder Outputs 5 / 5

+ 0 Graded
+ 5 4

QUESTION 6

6 Multiplexer Outputs 5 / 5

+ 0 Graded
+ 5 1

QUESTION 7

7 Subtractor 10 / 10

+ 0 Graded
+ 5 Making one of the inputs negative by using a NOT and then adding one to it.
+ 5 Adding the negated input with another input.

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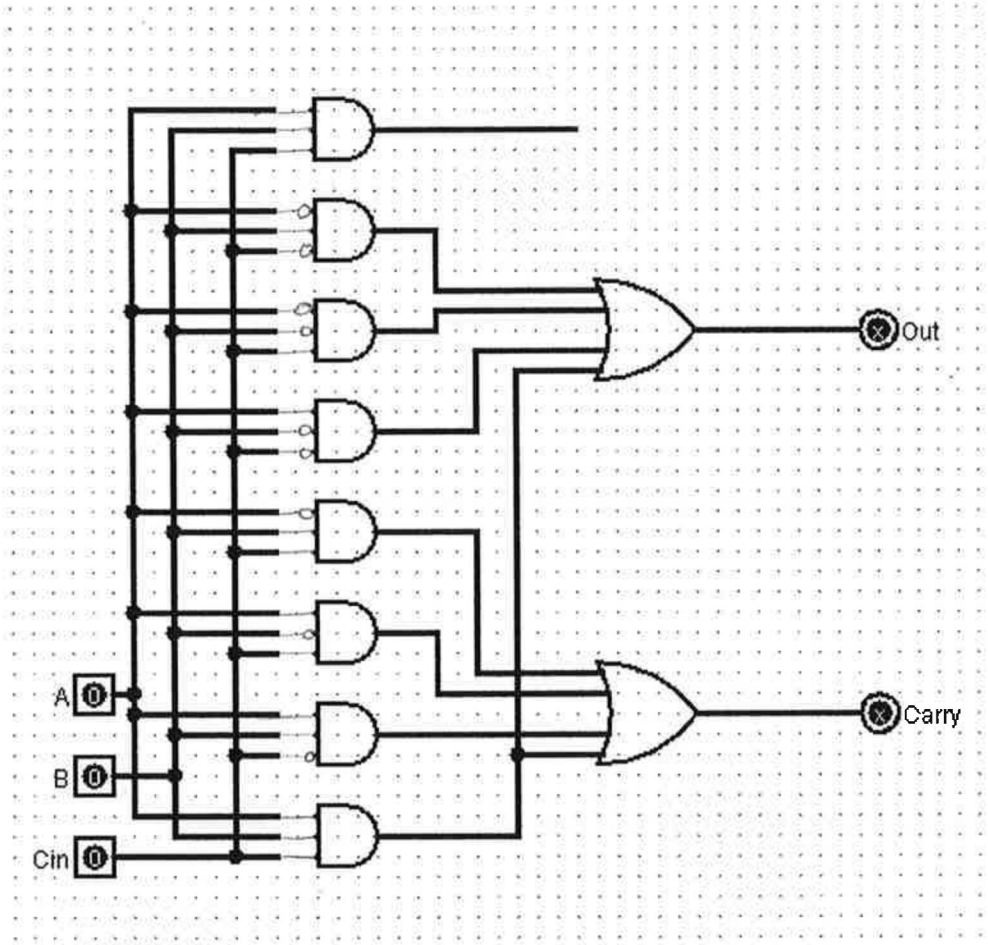
Name: Alan Chiang Section: _____

Completing Circuits: (____ / 60)

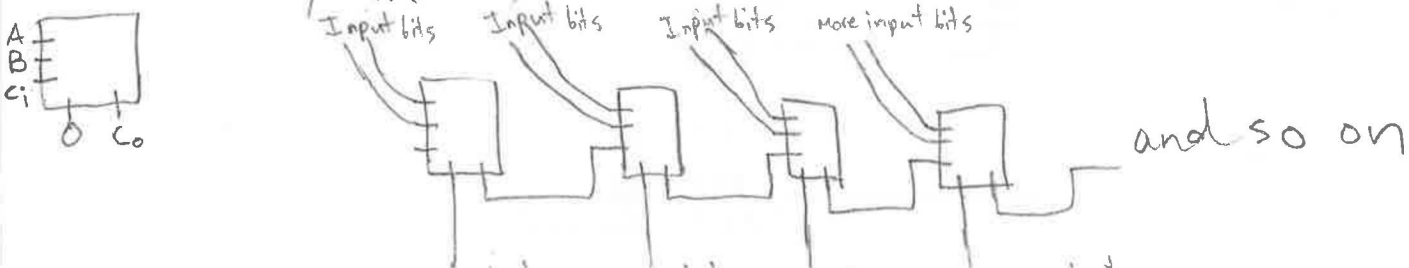
1. Given this unfinished **1 bit full adder**, complete the adder by connecting the wires between the inputs and the gates. You can either connect the wire directly or use a ○ to negate the connection between the and the AND gates. Order does not matter, as long as the outputs are correct for all combinations of inputs.



2. Explain the concept of **daisy chaining** with regards to creating multibit adders out of one bit full adders. You may use a drawing to help explain your answer.

Adder
A = A input
B = B input
C_i = Carry in
C_o = Carry out

Daisy chaining means linking multiple one-bit adders together such that the carry-out of a previous adder is the carry-in of the next one.



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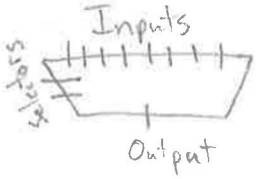
Name: Alan Chiang Section: _____

Short Answer: (___ / 40)
You may answer these questions by drawing a circuit diagram where applicable.

1. What is a **multiplexer**? Give an example of a situation in which you would use one.

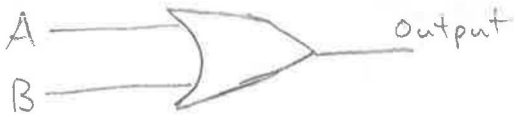
A device that uses n selector bits to select one of 2^n inputs to be the one output.



Multiplexors are used in ALUs to choose one of multiple operations, like addition, subtraction, isMultipleof4, multiplication etc

2. How can you evaluate ~A & ~B with a circuit **without** using an AND gate?

Use DeMorgan's Law, which says ~A & ~B is equivalent to A | B. Then just connect input A and input B thru an OR gate.



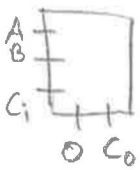
3. Given a **Decoder** with **2** select bits, how many outputs can the decoder have?

$2^2 = 4$ outputs

4. Given a **Multiplexer** with **2** select bits, how many outputs can the multiplexer have?

1 output

Adder
A = A input
B = B input
C_i = Carry in
C_o = Carry out



5. Create a **4 bit subtractor** using **full adders**, **gates**, and Logisim wiring components..