Problem 3 (4 points) Unsigned to decimal conversion
Convert the following two seven-bit *unsigned* numbers into decimal representation.

1001000 64 8 72	0101000 32 8 40

Problem 4 (8 points) Adding signed numbers
Add the following pairs of seven-bit *two's complement* numbers **and indicate which additions result in an overflow by writing one of "overflow" or "no overflow" in each box**. You must write either "overflow" or "no overflow" in each box in addition to the result of the addition.

0011111 + 0111001 1111000 Overflow	0110010 + 0010100 1000110 overflow
1100011 + 1100011 1000110 OK	1000010 + 1101111 10100001 overflow

Problem 5 (2 points)
Write the four characters of the string "`CS0!`" using ASCII encoding as eight hexadecimal digits. (The third character is the digit 0, not the letter O.)

Problem 6 (4 points)
What is the range of numbers that can be stored in an eight-bit two's complement number? In Java, a `byte` is stored in eight-bit two's complement.

Problem 7 (9 points) Multiplexers and gates

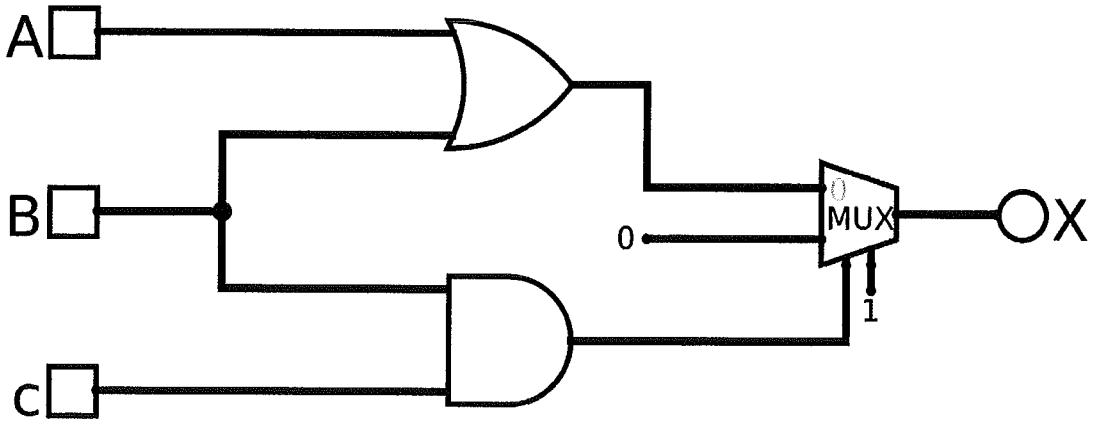
A logic circuit implemented with two gates and a multiplexer is shown below with three inputs on the left and a single output on the right. Complete the truth table so that it corresponds to this digital logic circuit.

According to Wikipedia:

> In electronics, a multiplexer (or mux) is a device that selects one of several analog or digital input signals and forwards the selected input into a single line.

According to Logisim:

> The digital input signals are on the left side of the MUX and the selector signal is on the bottom side.



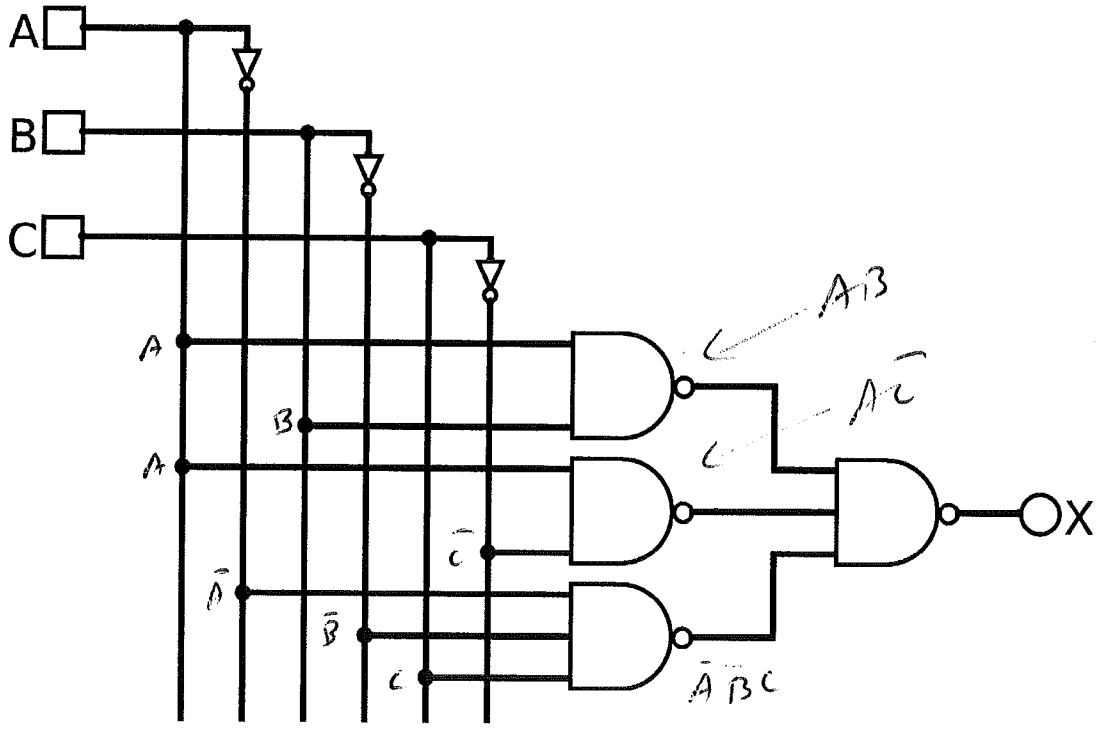
A	B	C	X
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	ϕ
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	ϕ

use ϕ

use A+B

Problem 14 (9 points) Digital logic to truth table – Again
A gate-level circuit is shown below with three inputs on the left and a single output on the right. Complete the truth table so that it corresponds to this digital logic circuit.

If you apply an important property of Boolean algebra, this is an easy problem!



A	B	C	X
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1