

Derek Albosta

1) 1-bit alu

a)	Ainvert	Binvert	Carry	Op
	0	1	1	10

b)	Ainvert	Binvert	Carry	Op
	0	1	0	00

c)  $!((!a) \cdot b)? = (!b) + a$  (De Morgans law)

Ainvert	Binvert	Carry	Op
0	1	0	01

2) 32-bit alu

a) When B is inverted, it is not known until later if subtraction will be performed. The carry in needs to be taken into account when it is found out later that the operation is a subtraction.

b) Yes. If both inputs are negative and  $a < b$ , the subtraction will yield a negative and the significant bit will be 1. if  $a > b$ , the subtraction will yield a positive number and the significant bit will be 0.

c) 0011 will determine whether an output is positive or negative after addition is performed.