2280 A2 Solutions

1) The instruction BRz DONE is using the condition codes of

ADD R3, R3, R3

instead of

ADD R2, R2, #-1

Switching the 2 instructions fixes the problem.

2)

Symbol	Address
Test	x301F
Finish	x3026
Save3	x3028
Save2	x3029

3) a) $X = 0 \Rightarrow S = A + B$ (or viceversa)

$X = 1 \Rightarrow S = A + C$

b) The circuit stays the same, we just change the inputs to perform 2's comp for subtraction

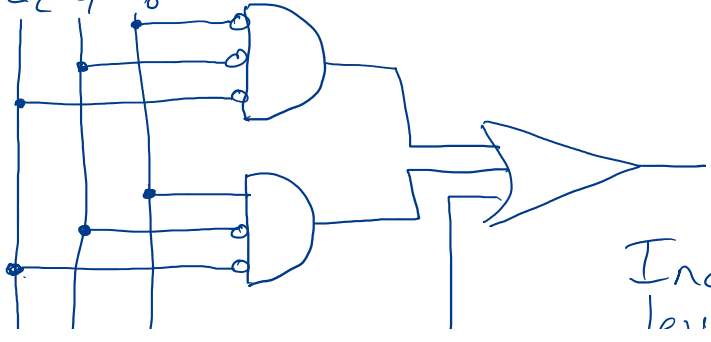
So:

C = NOT(B) (given (a) above)

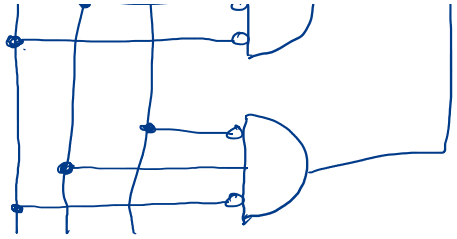
Carry-in = X

↳ if X is 1 we add 1 as part of the algorithm to negate (invert w/ C and add 1)

4) $L_2 L_1 L_0$



Indicate Low if our level is 0, 1, or 2



Indicate Low if our level is 0, 1, or 2.

5) time event 1: when A=B=C=1, Q is held (R=S=1). Q can be 0 or 1 (your choice)
time event 2: C → 0, Q is held.
time event 3: A, B → 0, C → 1
reset Q (R=0, S=1)
time event 4: A → 1, C → 0
set Q (R=1, S=0)

timing diagram: (assuming Q=1 to start)