$a < b \rightarrow \quad a - b < 0 \rightarrow$ use sign bit.

$a[N-1] == b[N-1] \rightarrow$ use sign bit of a-b

$a[N-1] != b[N-1] \rightarrow$ use sign of a

final logic:

a[N-1]	b[N-1]	a-b	out
0	0	x	a-b[N-1]
0	1	x	0
1	0	x	1
1	1	x	a-b[N-1]

$\rightarrow$ ~~1'b1~~ $(a[N-1] \hat{} b[N-1]) \& a[N-1]$

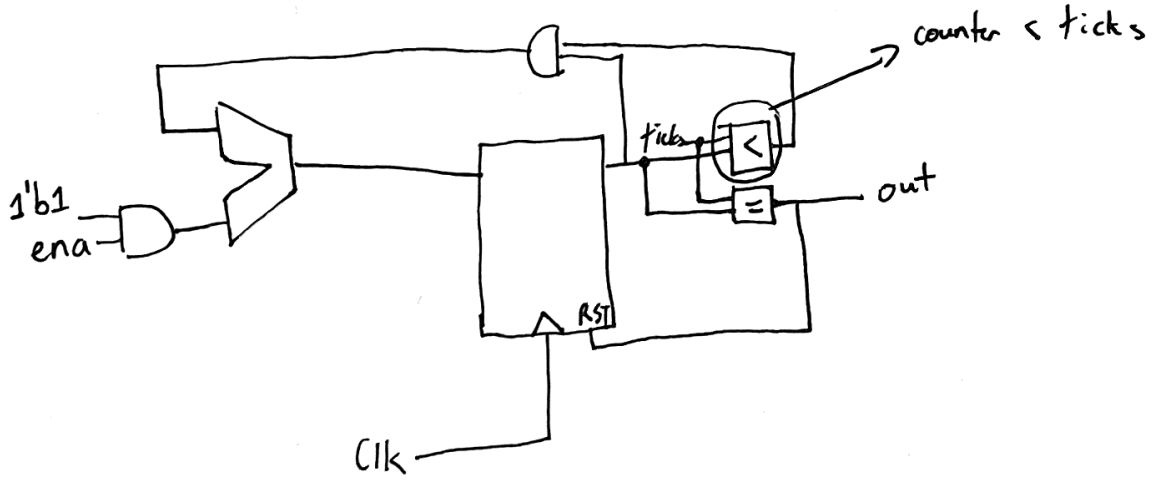
$(a[N-1] \sim\hat{} b[N-1]) \& sum[N-1]$

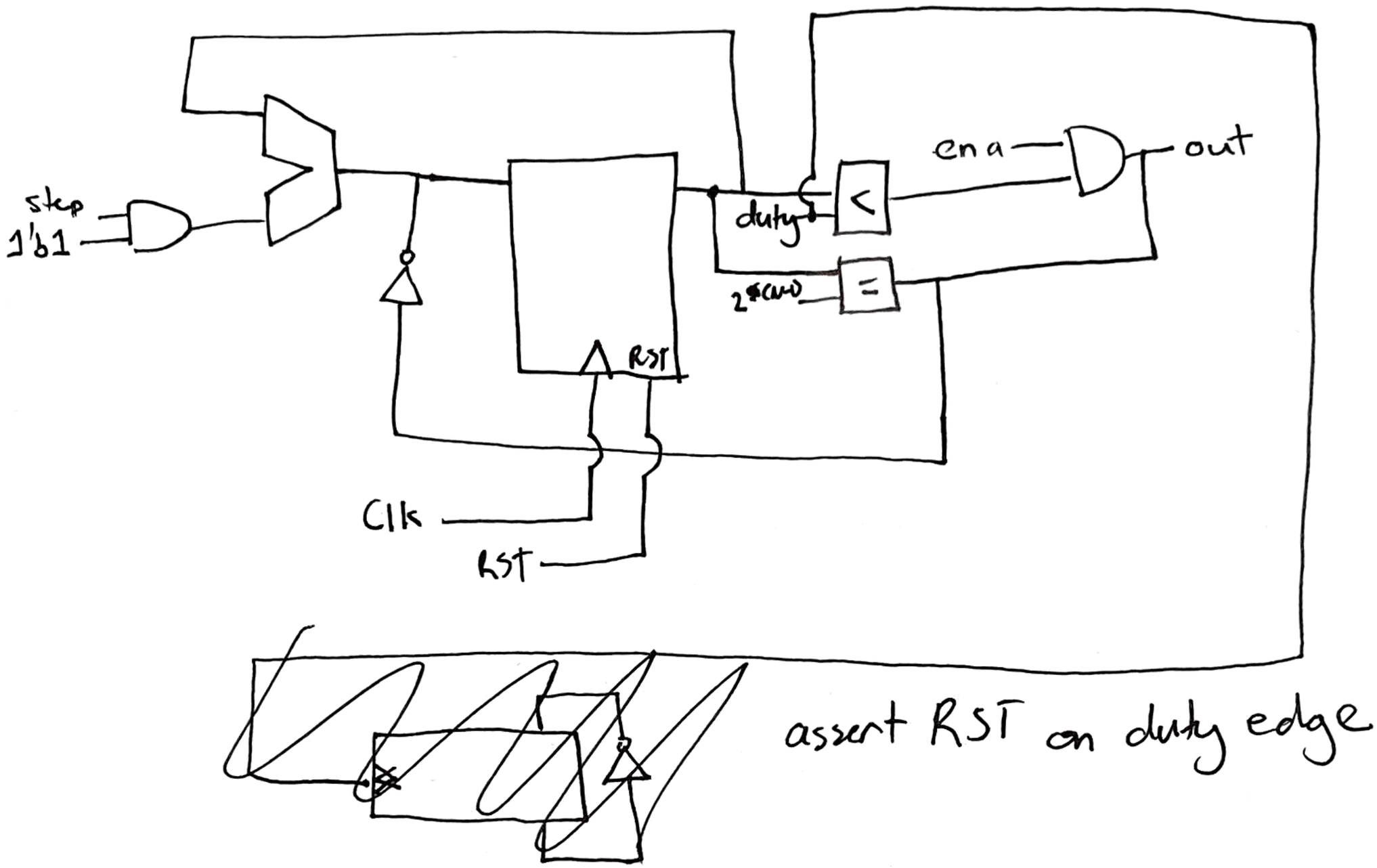
↑ difference, but using adder

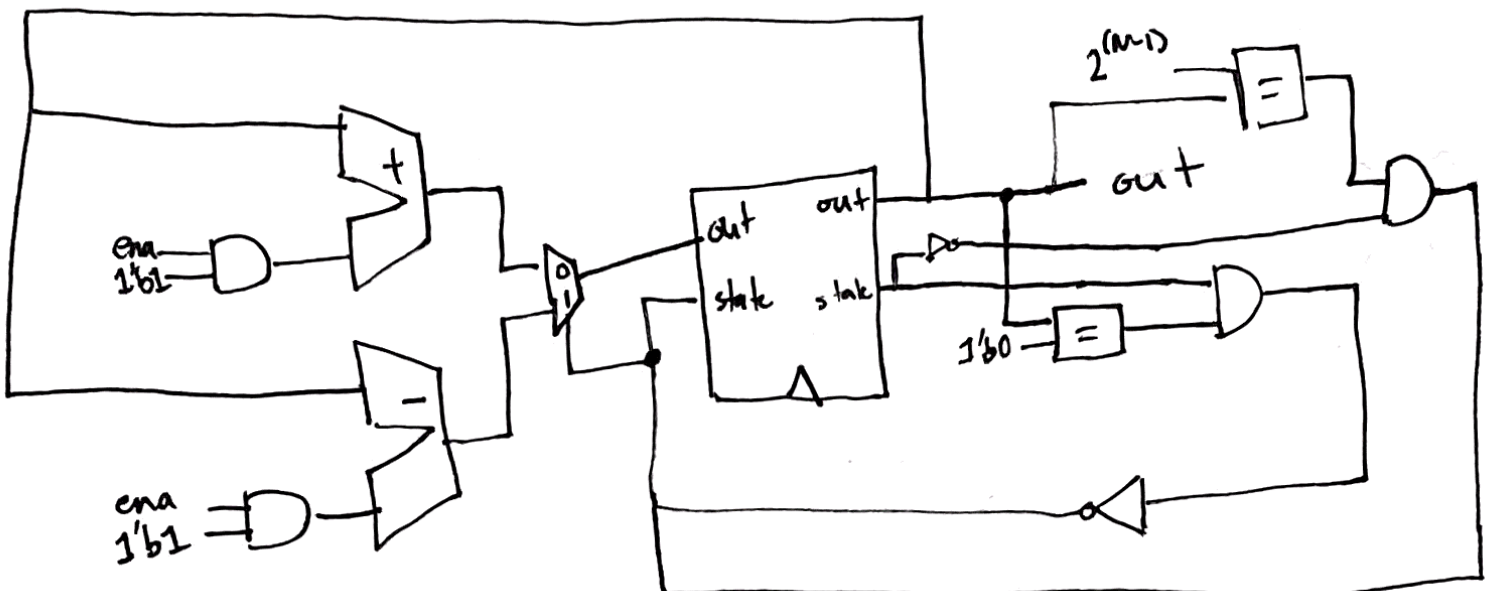
adder(a, b, c_in, c_out, sum)

To subtract, invert one input and set carry in high.

$\rightarrow$ adder(a, ~b, 1'b1, c_out, sum)




step
1'b1
duty
<
ena
out
2*CNT
=
RST
Clk
RST
assert RST on duty edge


+
ena
1'b1
-
ena
1'b1
0
1
out
state
out
state
2^(N-1)
=
out
1'b0
=