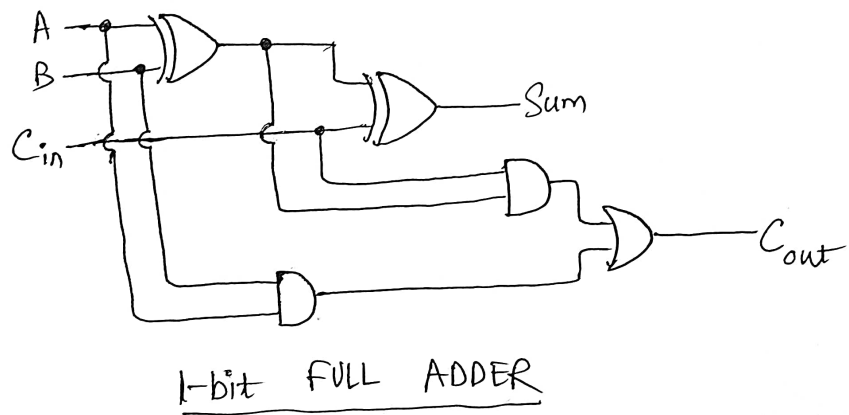
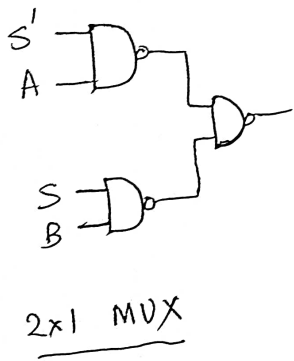


- ① Design an adder-subtractor 8-bit circuit, using any 2-input gates, and count the number of gates required and the delay of the circuit (in 2's complement format)

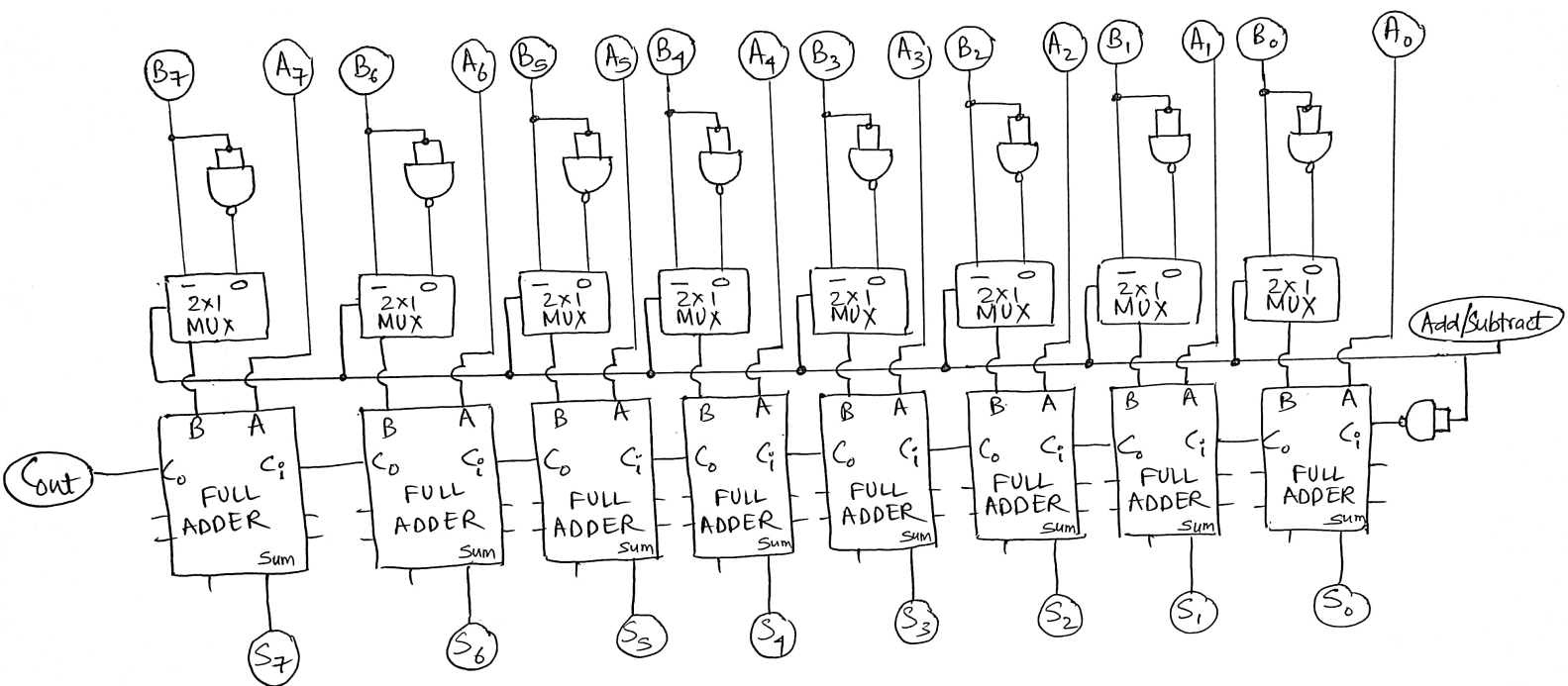


No. of gates in a 2x1 MUX = 3

No. of gates in a 1-bit FULL ADDER = 5

Delay in a 2x1 MUX = 2td

Delay in a 1-bit FULL ADDER = 3td

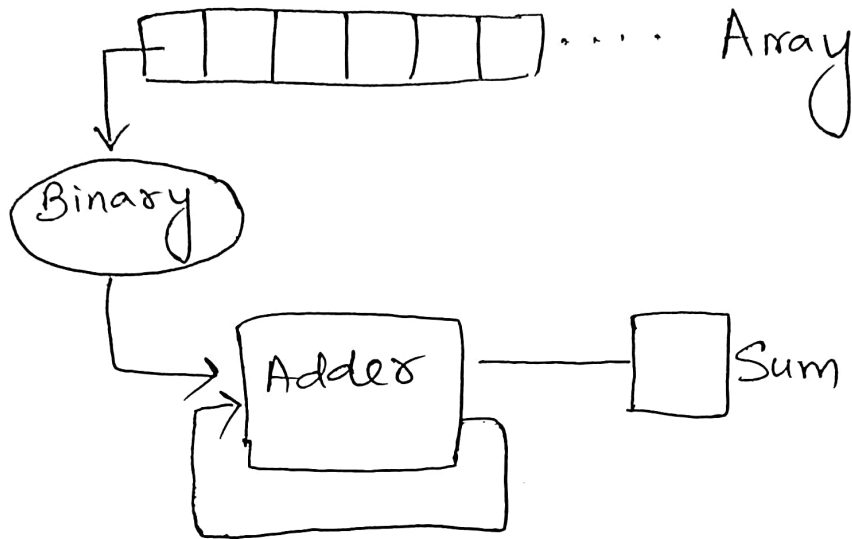


8-bit adder-subtractor circuit

$$\text{Total no. of gates} = 9 + 8(3) + 8(5) = 73$$

$$\text{Delay} = 4 + 5(8) = 44 \text{ td}$$

③ Give the circuit idea for adding the values of all the elements of an array.



We first convert the array elements into 8-bit binary representation. Then we will ^{take the} 1st element of array & add it to 0^8 through 8-bit adder and S be the result. Then we will take the 2nd element of the array & add it to S through 8-bit adder and modify S to be the result. Like this we will continue. Finally S will have the sum of all the elements of the array.