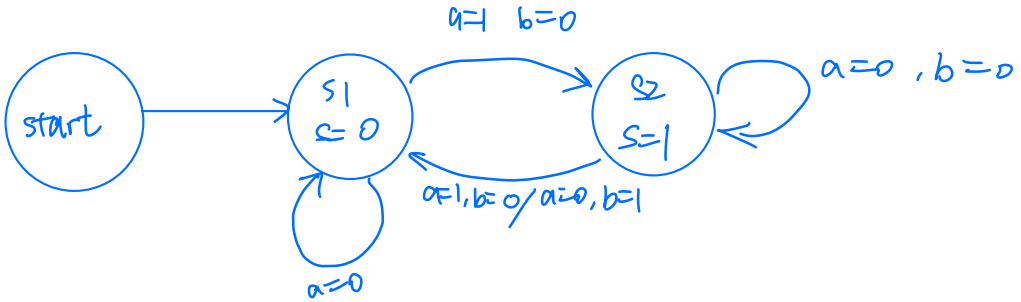
(a) State variables: S, a, b, x, y

(b) 3 states: $\begin{cases} S0: \text{initial state} \\ S1: S=0 \\ S2: S=1 \end{cases}$

(c)



(d.1) the variable S is initialized to False.

if $a=1, b=0$

or $a=0, b=0, S=\text{true}$ } S transisit from false to true otherwise it remains false

the output x, y are defined by a, b, S

S wait for a to turn 1 then it can turn from $0 \to 1$

S	0	1	0	0	0	1	1	0
press	\	0	1	0	0	0	1	1

a	\	1	0	0	0	1	0	1
b	\	0	1	0	1	0	0	0
x	0	0	1					
y	0	0	1					