

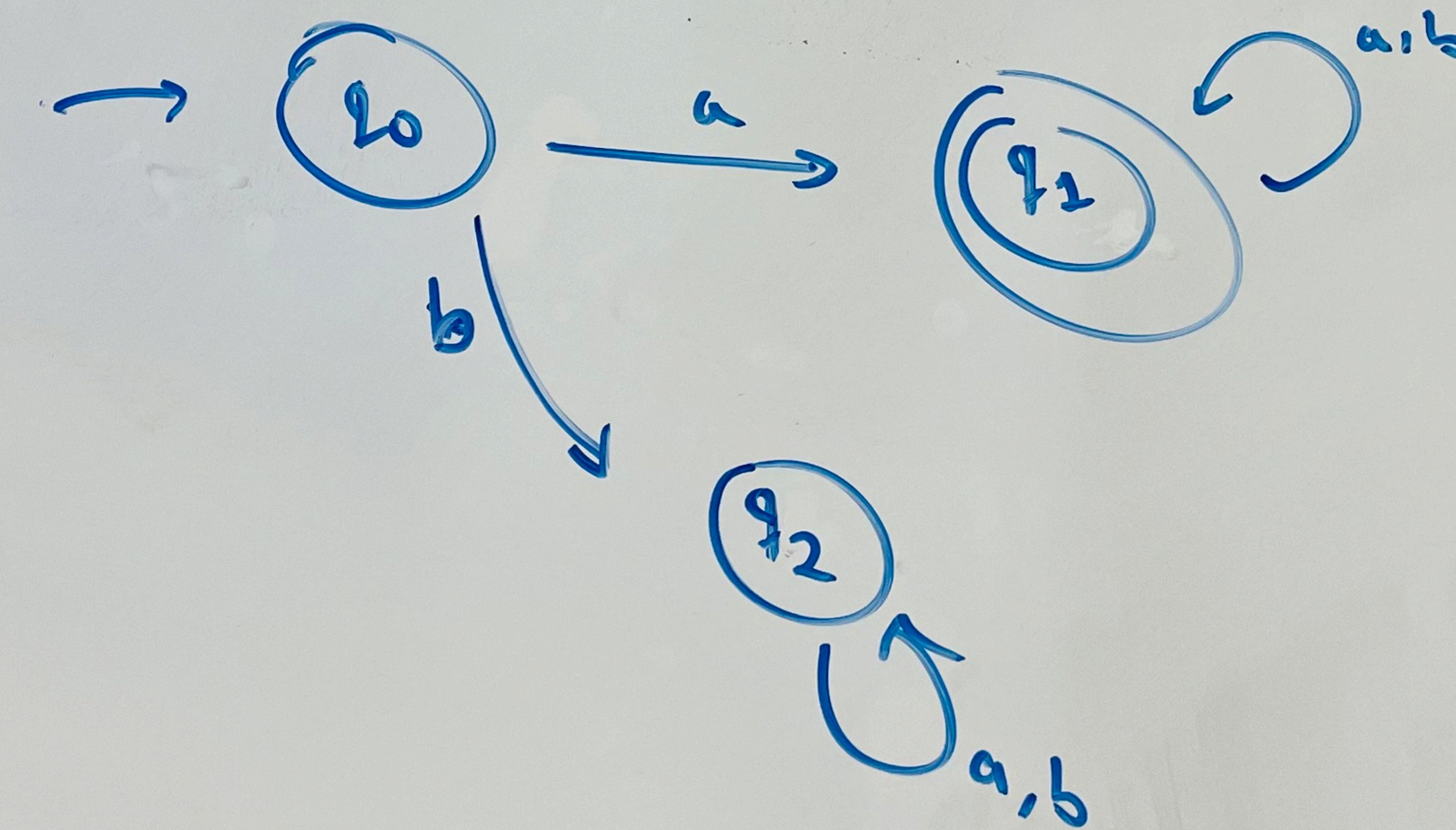
## Deterministic finite Automata (DFA)

Example 8

Design a DFA for the language accepting strings

Starting with 'a' over input alphabet  $\Sigma = \{a, b\}$

(a, aaa, abba, b<sub>x</sub>, bba<sub>x</sub>)

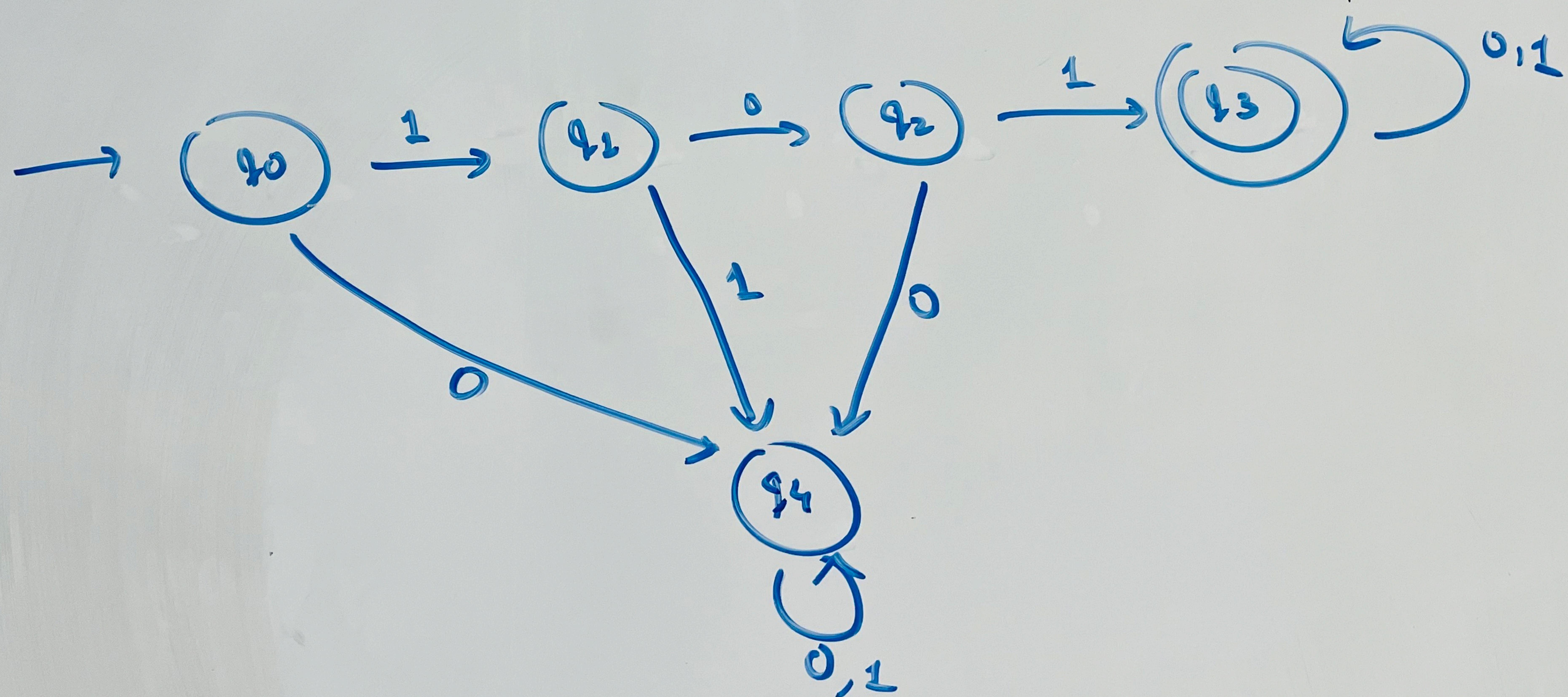


\* Ex

### \* Example 9

Design a DFA for the language accepting strings starting with '101' over input alphabet  $\Sigma = \{0,1\}$

$\{ \text{101}, \text{102} \}$



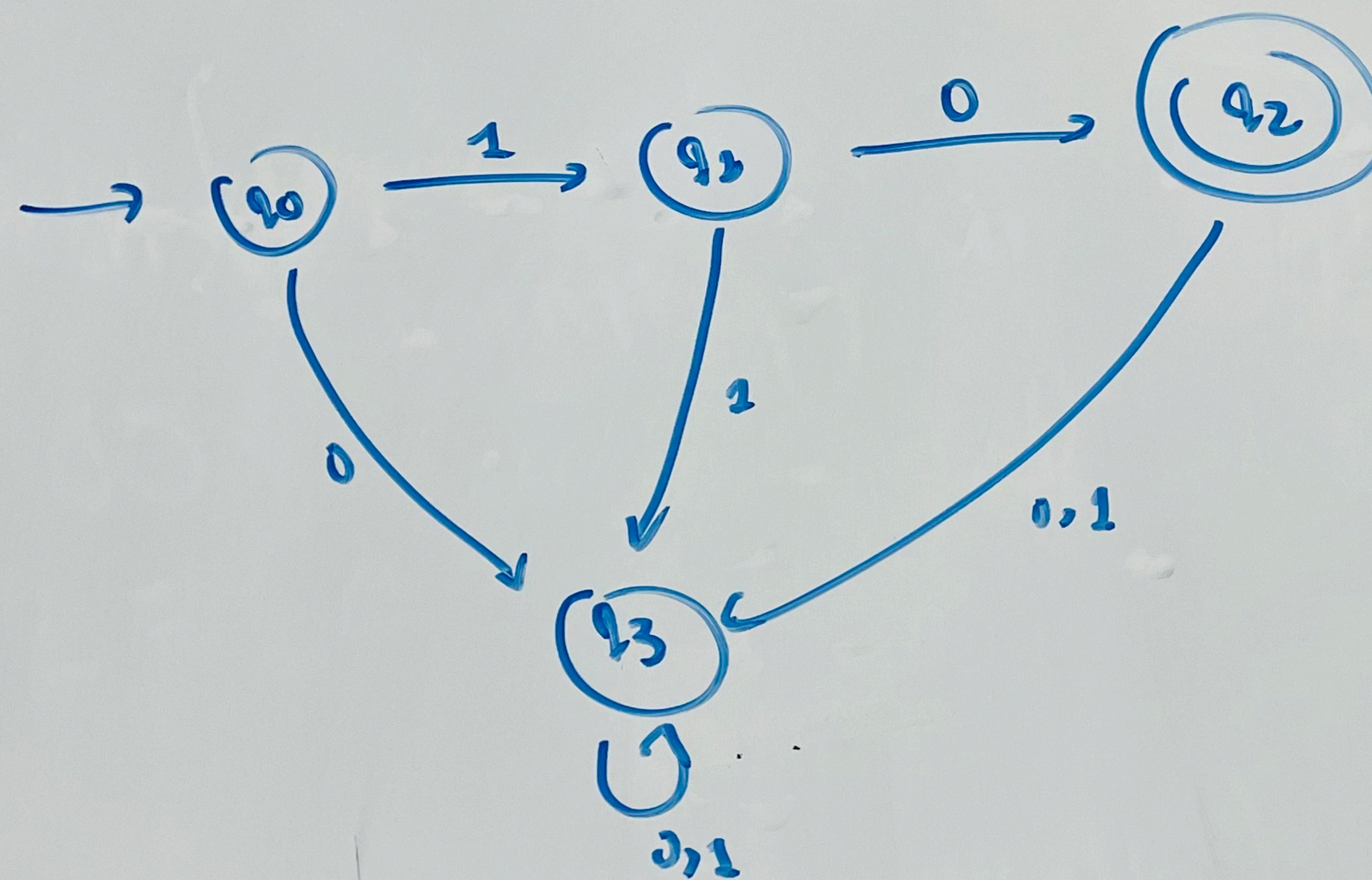
$\Sigma = \{0,1\}$

$\{0,1\}$

$0,1$

### \* Example 10

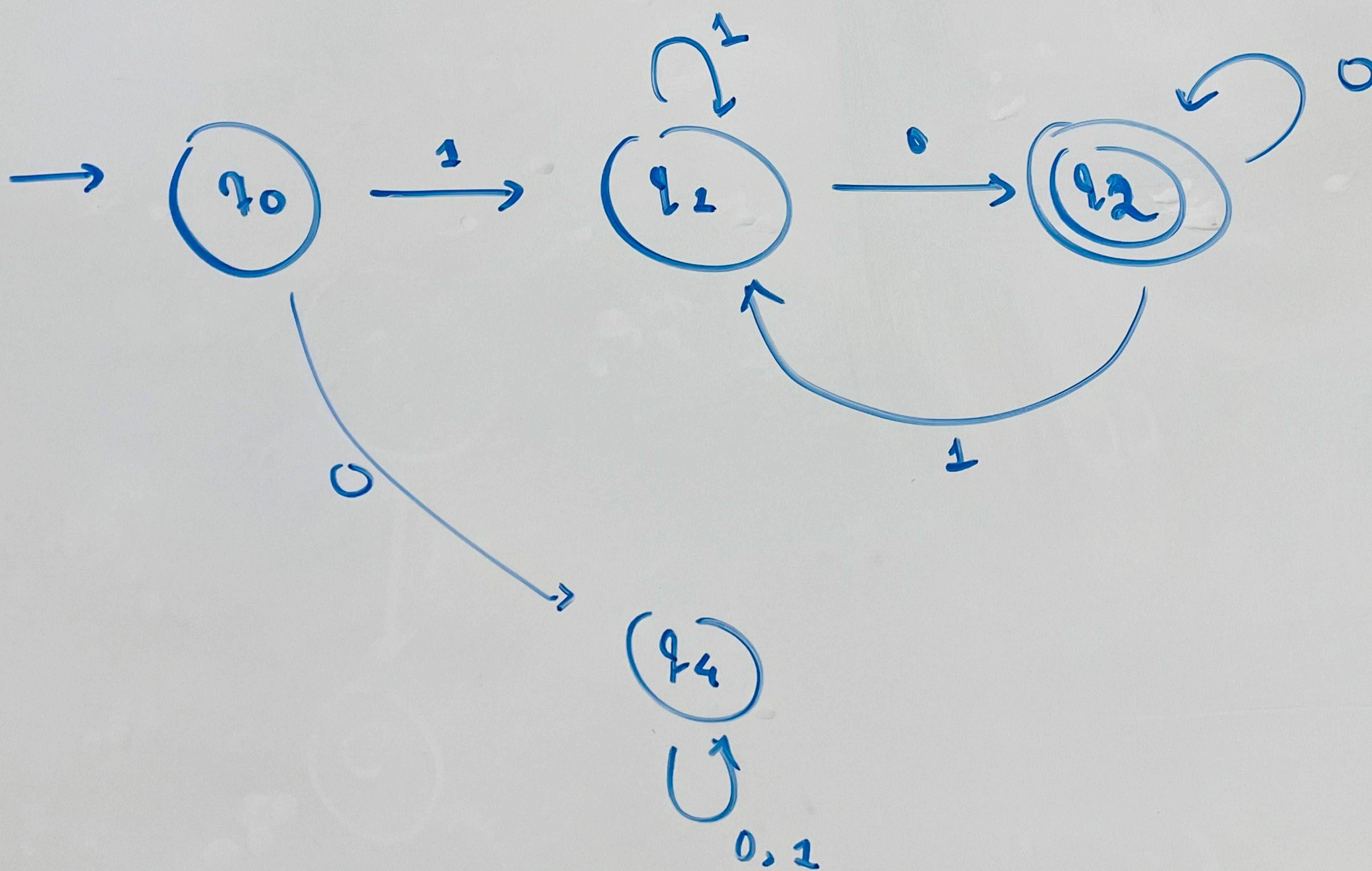
Design a DFA with  $\Sigma = \{0,1\}$  which accepts the  
only input string "10".



## \* Example 1!

Construct a DFA with  $\Sigma = \{1, 0\}$  that accepts the string which starts with '1' and ends with '0'.

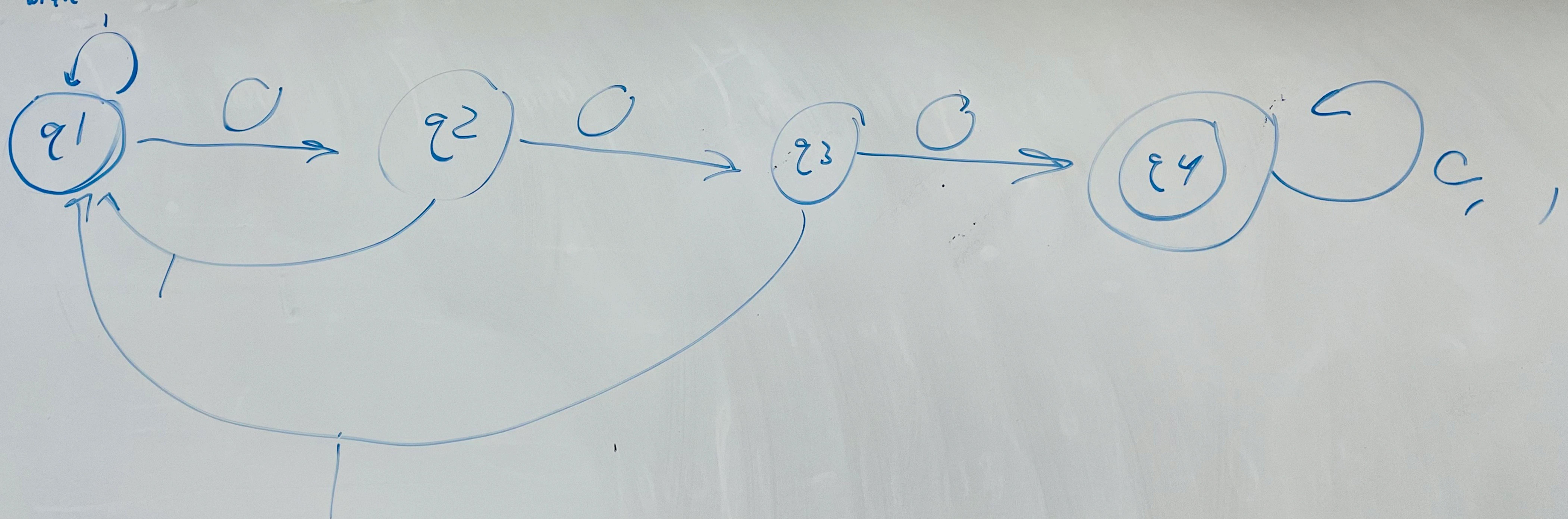
{ 10, 1 . . . . . , ends with 0 } starts with 0  
x, x, ends with 1 }



$aaaa \times 10^6$   
aa bb

\* Example 22

Construct a DFA with  $\Sigma = \{0,1\}$  that accepts  
the set of all strings with three consecutive '0's.



## Special Case !

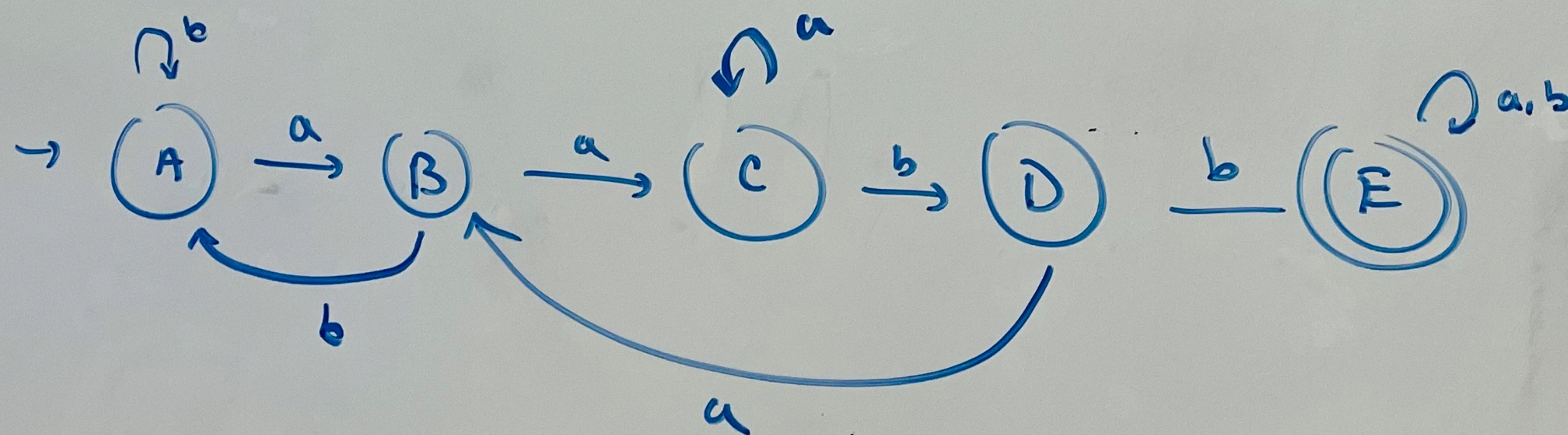
(\*) Construct a DFA that accepts any string

over  $\Sigma = \{a, b\}$  that does not contain  
the string 'aabb' in it.

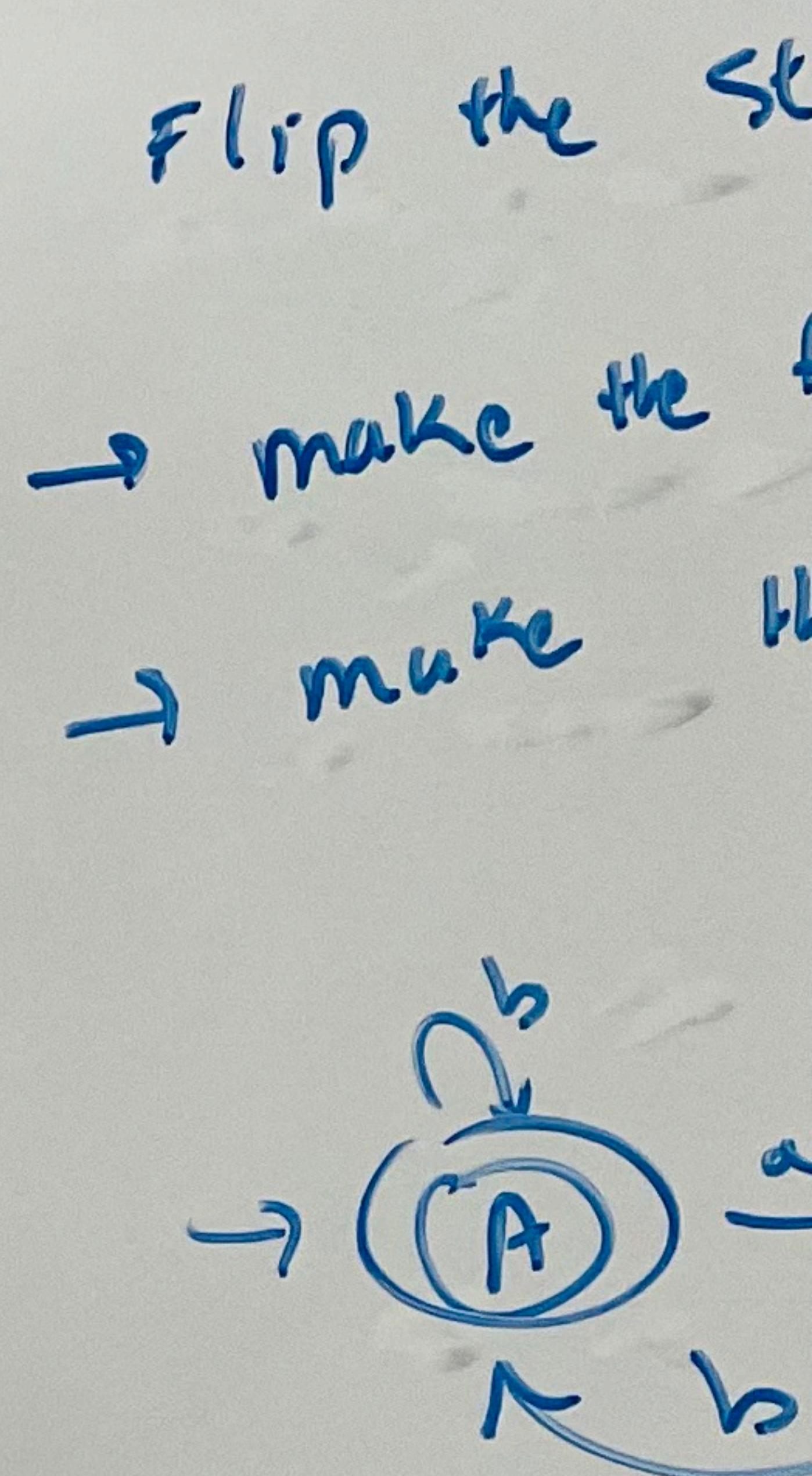
Try to design a simple problem

Let us construct a DFA that accepts any string

over  $\Sigma : \{a, b\}$  that contains the string 'aabb' in it

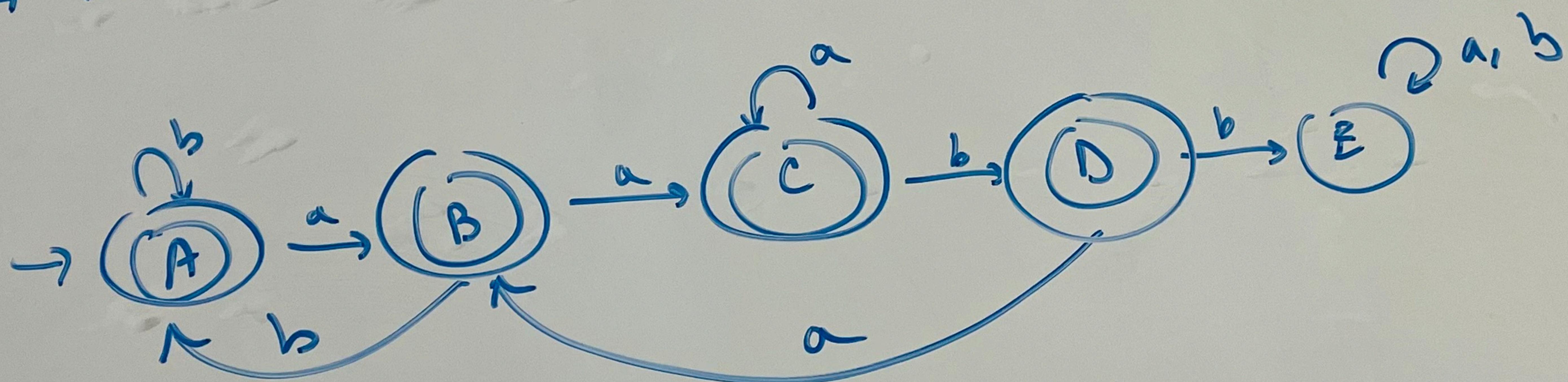


a a b a ~~a b b~~



flip the states

- make the final state to a non final state
- make the non final states to a final state



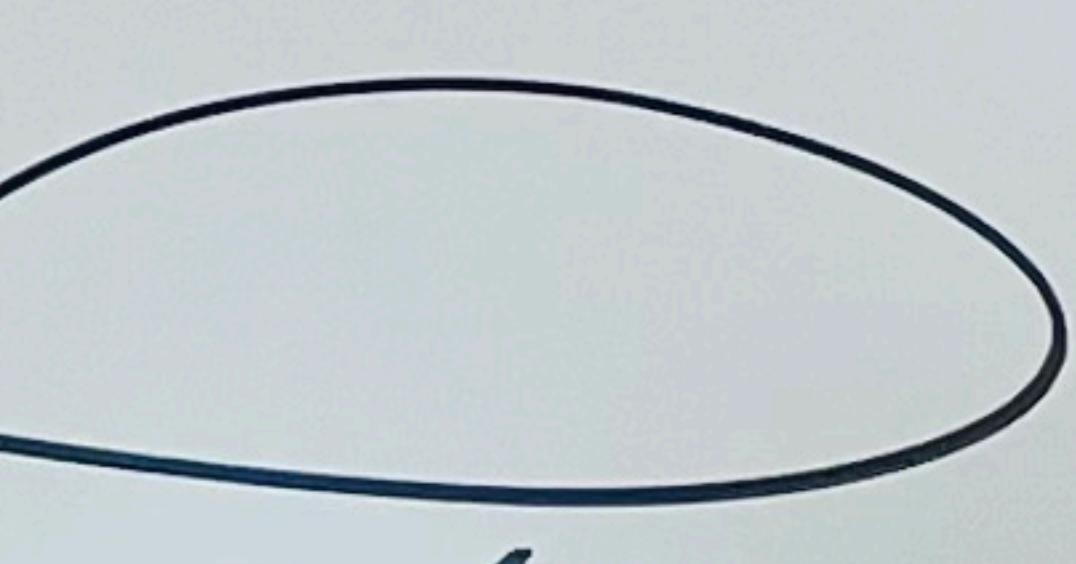
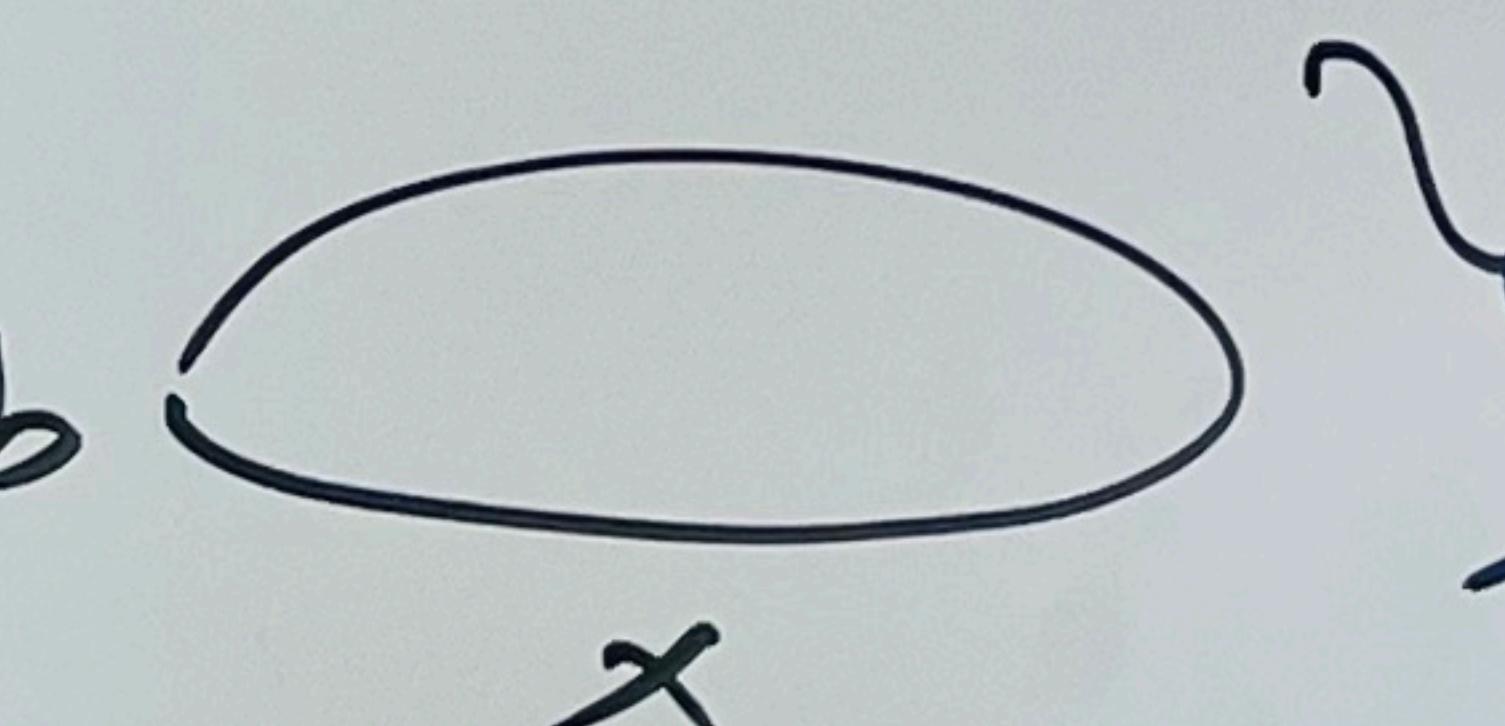
$a a a a \times 10^6$   
 $a a b b$

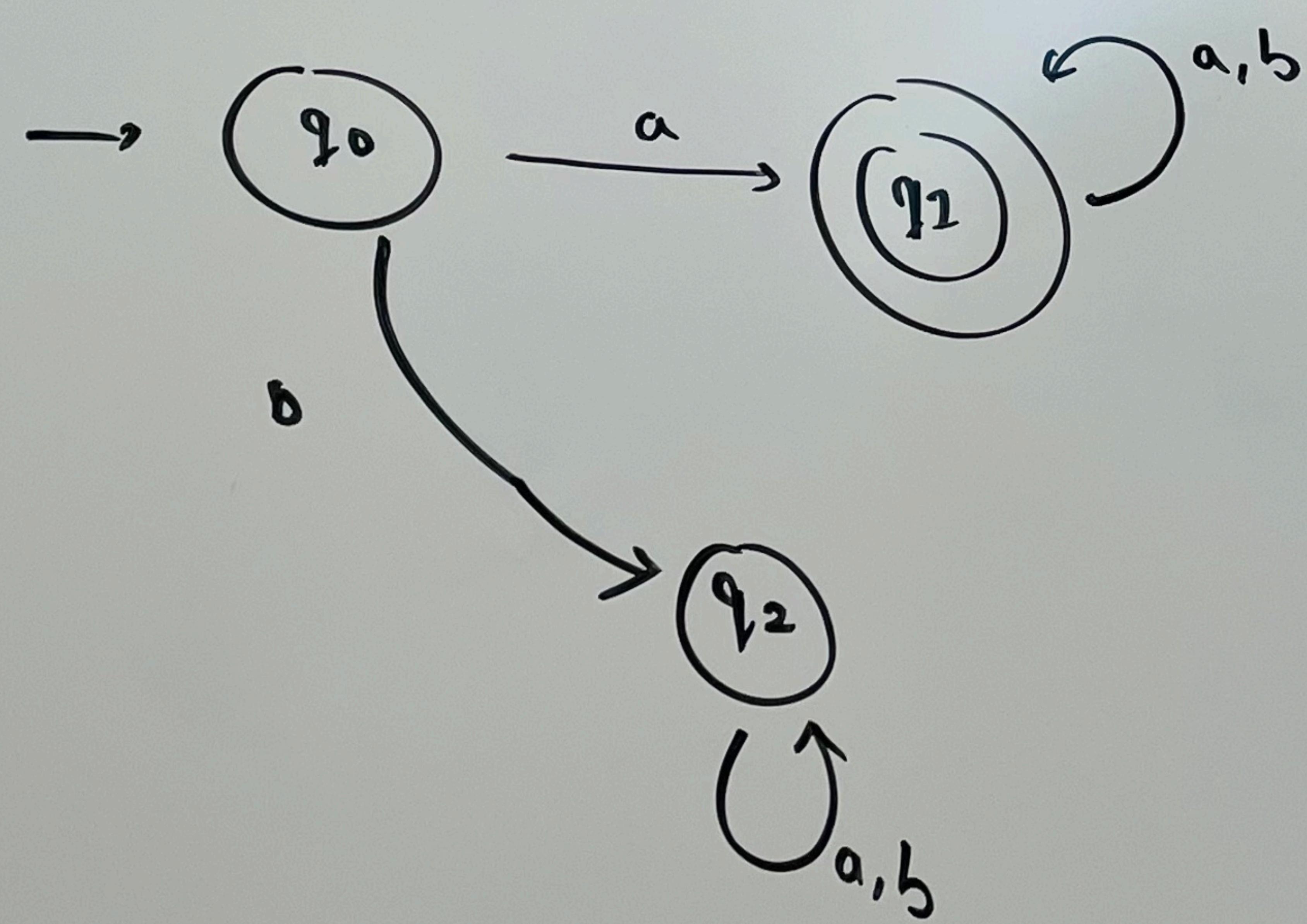
$aabb$

## Deterministic Finite Automata (DFA)

\* Example 3

Design a DFA for the language accepting strings  
Starting with 'a' over input alphabet  $\Sigma = \{a, b\}$

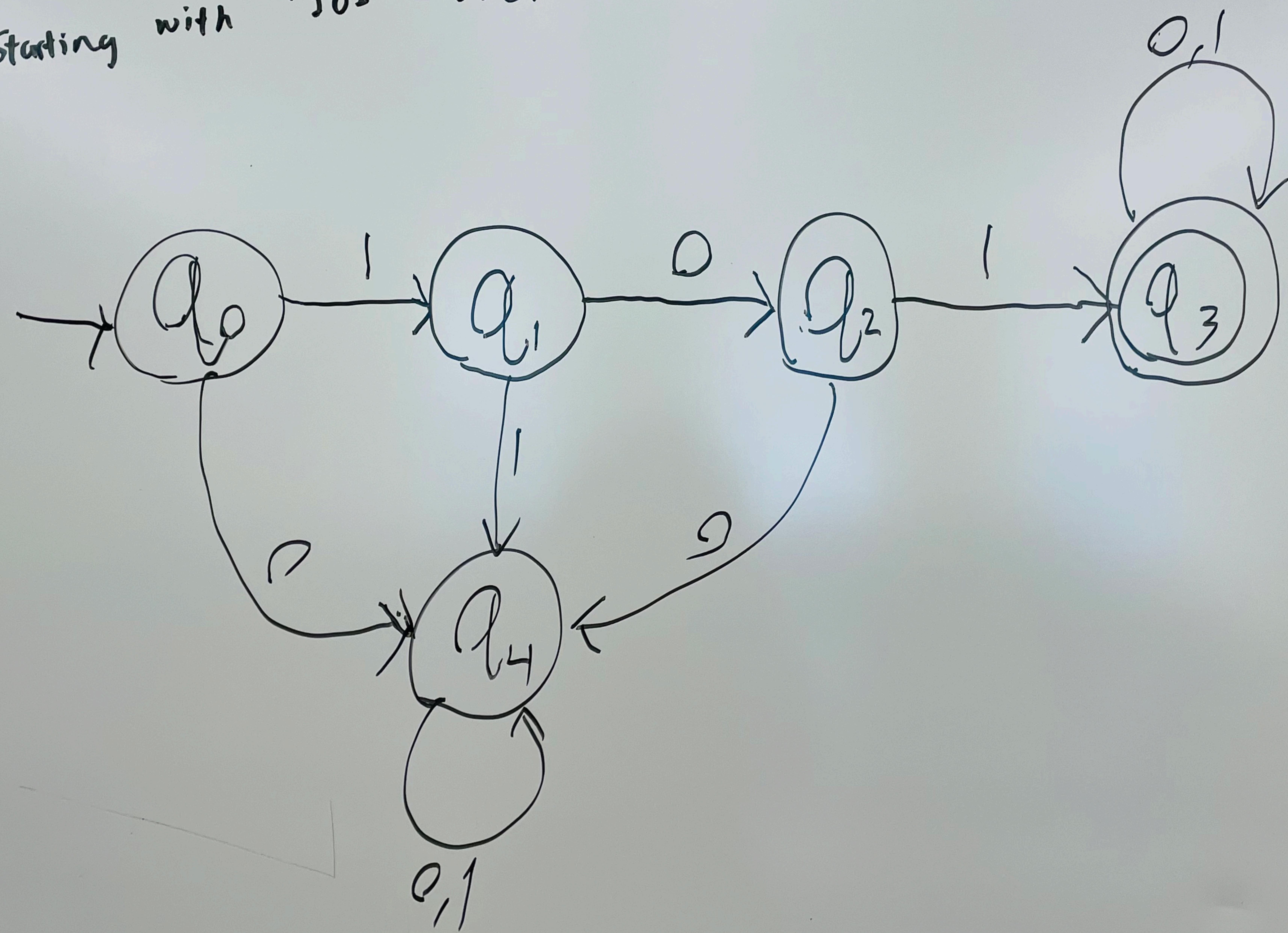
{  $a$ ,  $aa$ ,  $ab$ ,  $a$   ,  $b$ ,  $x$  } 



\* Example 9

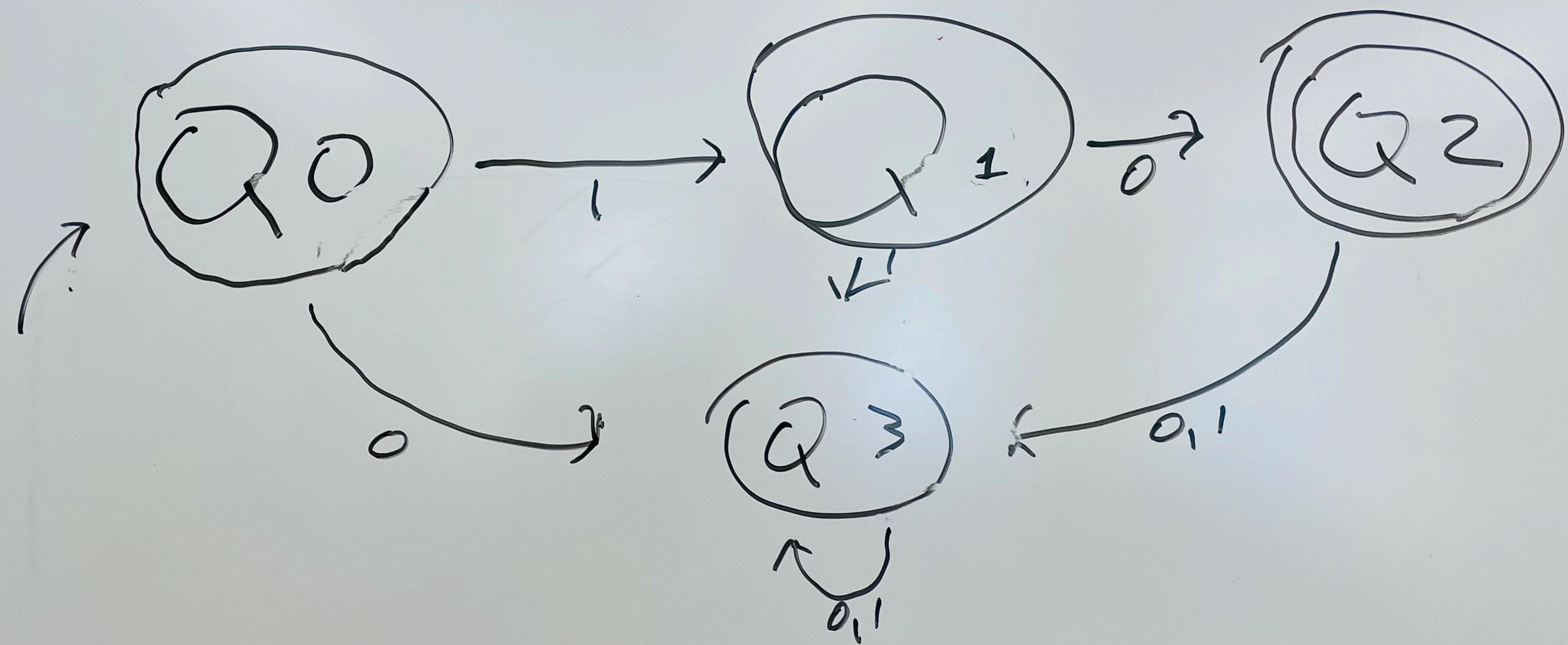
Design a DFA for the language accepting strings

Starting with '101' over input alphabet  $\Sigma = \{0, 1\}$



\* Example 10

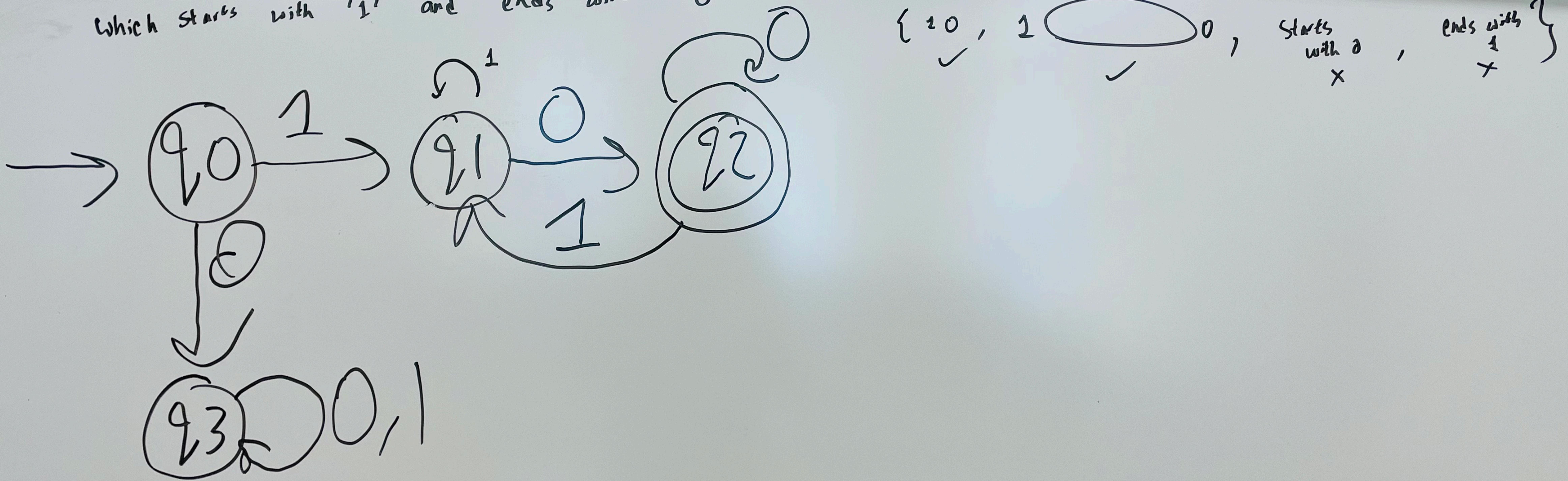
Design a DFA with  $\Sigma = \{0, 1\}$  which accepts the only input string '10'



Example 1:

Construct a DFA with  $\Sigma = \{0, 1\}$  that accepts those strings

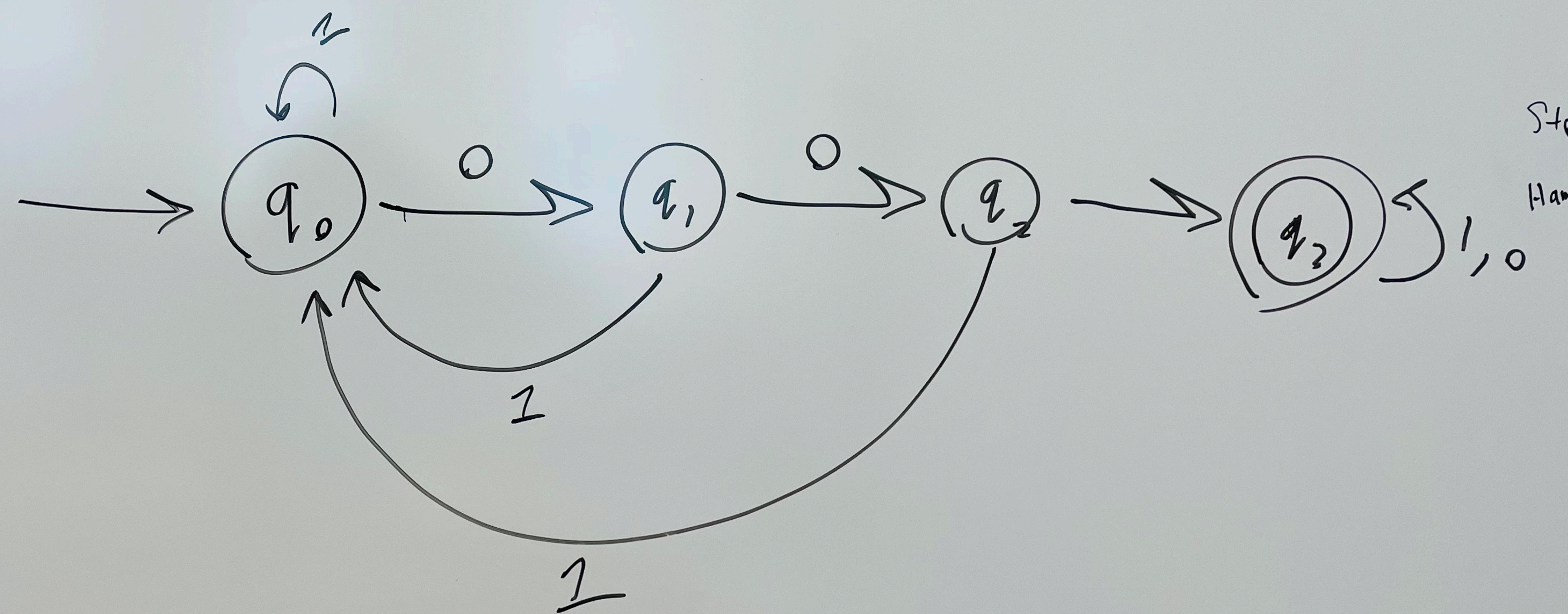
which starts with '1' and ends with '0'



starts  
with 0 , ends with 1 }  
X }

\* Example 12

Construct a DFA with  $\Sigma = \{0, 1\}$  that accepts the  
set of all strings with three consecutive '0's



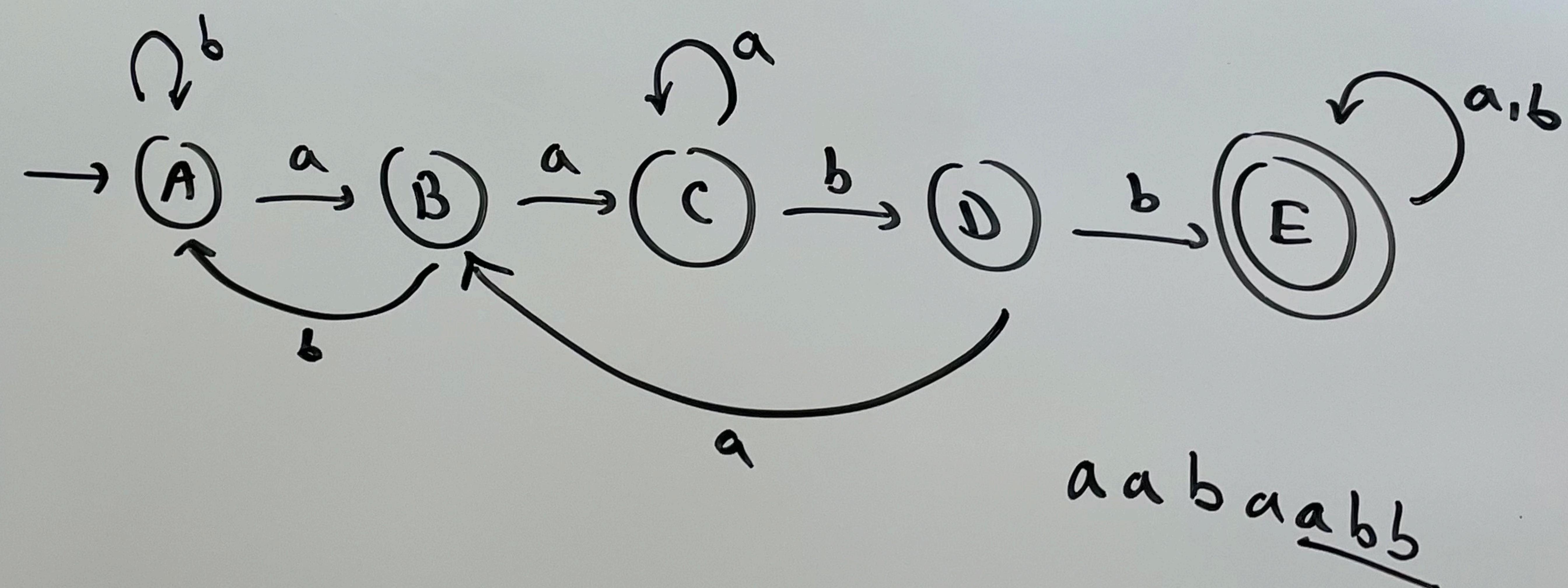
Please Erase!  
Boards After  
Each Lecture

### Special Case

- \* Construct a DFA that accepts any string over  $\Sigma = \{a, b\}$  that does not contain the string 'aabb' in it.

① Try to design a simpler problem

↳ Construct a DFA that accepts any string over  $\Sigma = \{a, b\}$  that contains the string 'aabb' in it.



② Flip the

$\rightarrow m$

$\rightarrow n$

② Flip the States

→ make the final state into non final state

→ make the non final state into final state

