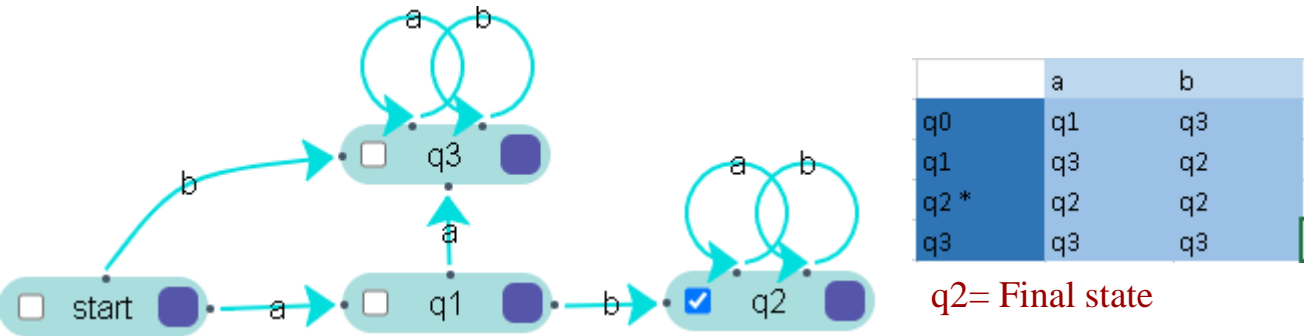


Q1:

Given  $\Sigma = \{a; b\}$  and the language  $L = \{w \text{ belongs to } \Sigma \mid w \text{ starts with 'a' followed by at least one 'b' (maybe more)}\}$ .

1. Create a DFA that accepts L and give its graph and transition table.



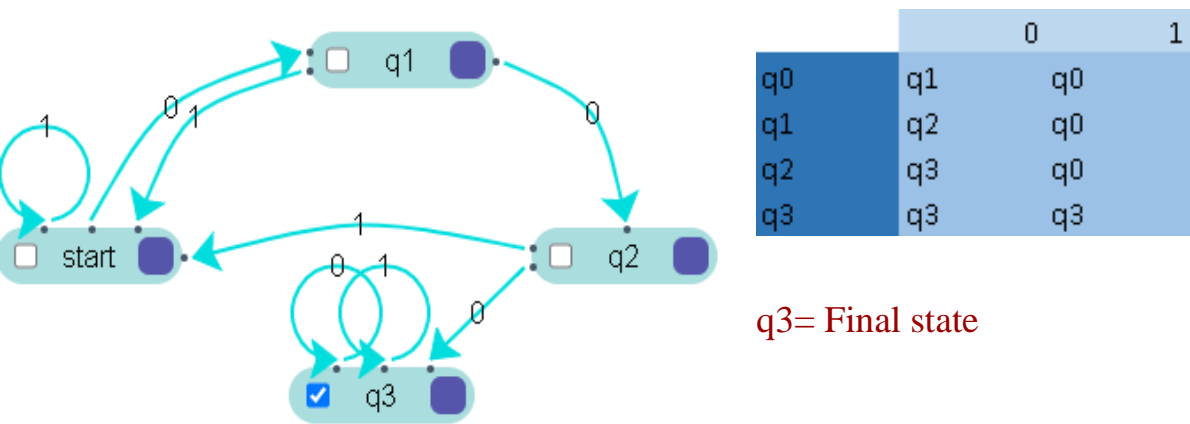
2. Run your DFA on four inputs of your choice using the extended transition function.

$$\delta(q_0, abba) = \delta(\delta(q_0, abb)a) = \delta(\delta(\delta(q_0, ab)b)a) = \delta(\delta(\delta(\delta(q_0, a)b)b)a) = \delta(\delta(\delta(q_1, b)b)a) = \delta(\delta(q_2, b)a) = \delta(q_2, a) = q_2$$

Q2:

Give DFA that accepting the following language L over the alphabet  $\{0, 1\}$ , The set of all strings with three consecutive zeros (000) (not necessarily at the end).

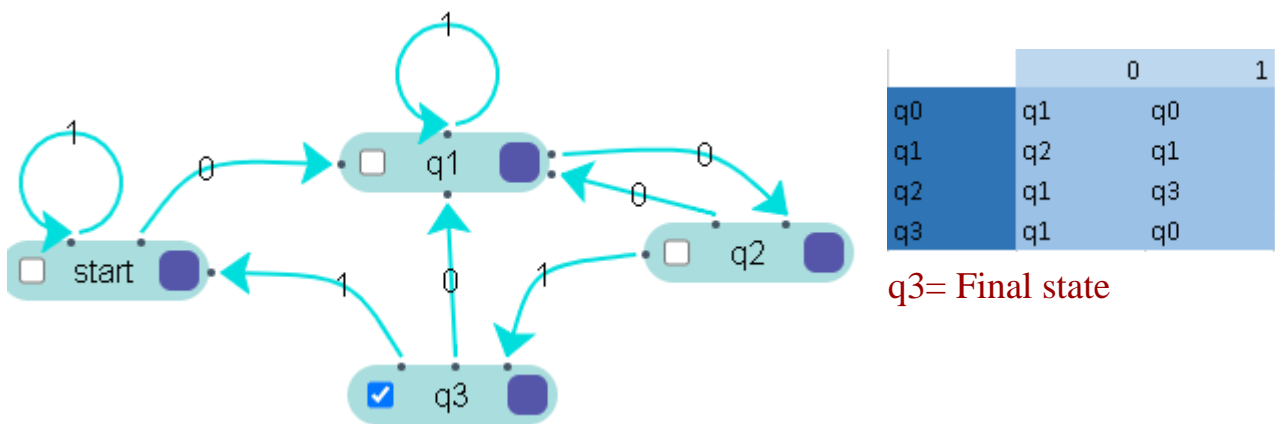
1. Create a DFA that accepts L and give its graph and transition table.



2. Run your DFA on four inputs of your choice using the extended transition function

$$\delta(q_0, 0001) = \delta(\delta(q_0, 000)1) = \delta(\delta(\delta(q_0, 00)0)1) = \delta(\delta(\delta(\delta(q_0, 0)0)0)1) = \delta(\delta(\delta(q_1, 0)0)1) = \delta(\delta(q_2, 0)1) = \delta(q_3, 1) = q_3$$

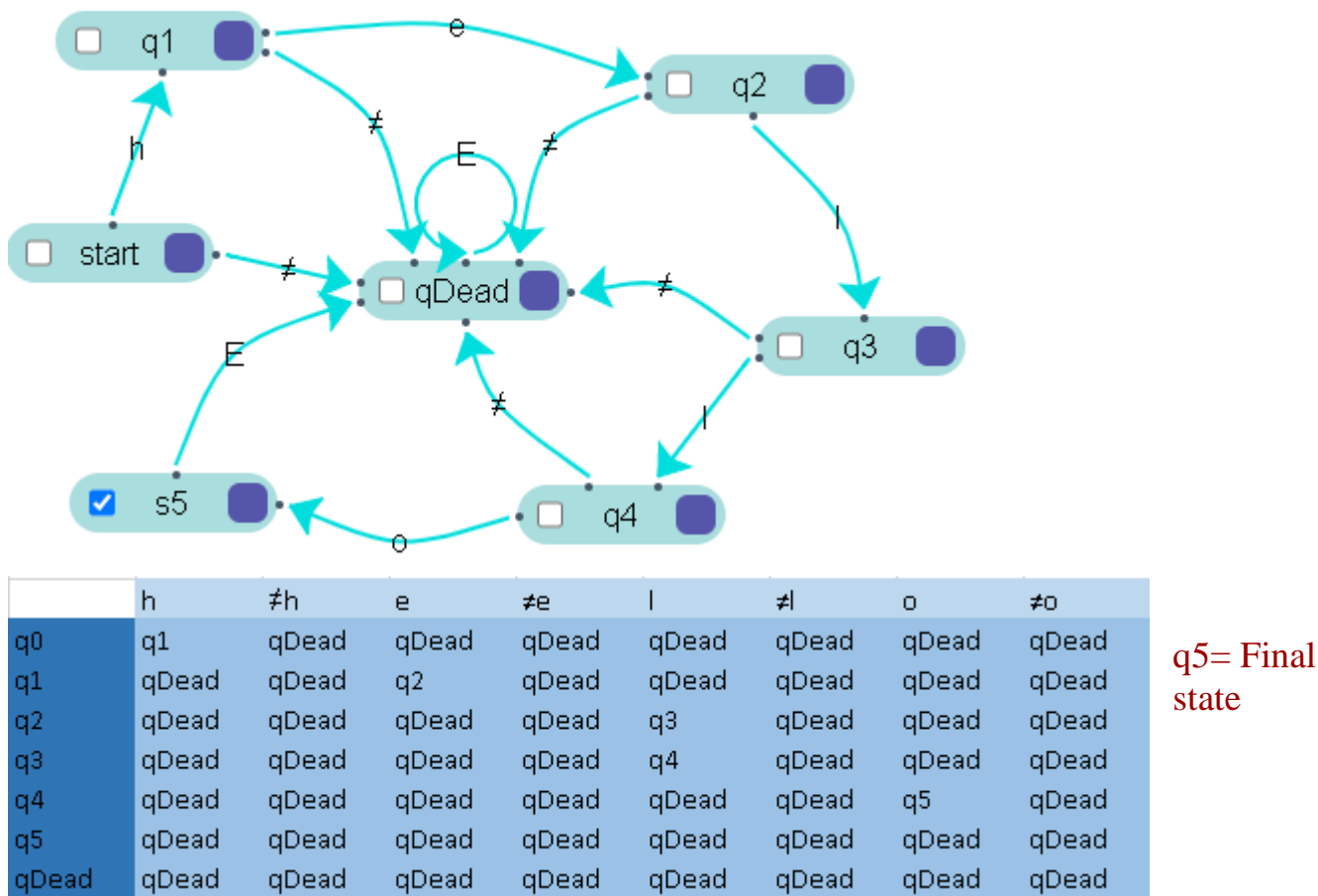
Q3:  
 Design a DFA with  $\Sigma = \{0, 1\}$  accepts the strings with an even number of 0's followed by single 1.  
 1. Create a DFA that accepts L and give its graph and transition table.



2. Run your DFA on three inputs of your choice using the extended transition function

$$\delta(q_0, 001) = \delta(\delta(q_0, 00)1) = \delta(\delta(\delta(q_0, 0)0)1) = \delta(\delta(q_1, 0)1) = \delta(q_2, 1) = q_3$$

Q4:  
 Build a DFA that accepts only the word “hello” using Dead State  
 1. Create a DFA that accepts L and give its graph and transition table.



2. Run your DFA on three inputs of your choice using the extended transition function  
 $\delta(q_0, hel) = \delta(\delta(q_0, he)l) = \delta(\delta(\delta(q_0, h)e)l) = \delta(\delta(q_1, e)l) = \delta(q_2, l) = q_3$

Q5:

What is the difference between regular languages and non-regular languages give two examples from each one and explain why they are regular or not.

$L = \{ a^n \mid n \text{ is prime.} \}$  non-regulardır çünkü asal sayılar belirli bir dizi şeklinde ilerlemez.

$L = \{ a^n b^n \mid n \leq 10^{10} \}$  regulardır, çünkü üst sınırlıdır ve dolayısıyla sonu vardır.