

Conversion of RE to FA

To convert the RE to FA, we are going to use a method called the subset method. This method is used to obtain FA from the given regular expression. This method is given below:

Step 1: Design a transition diagram for given regular expression, using NFA with ϵ moves.

Step 2: Convert this NFA with ϵ to NFA without ϵ .

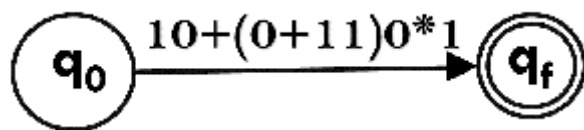
Step 3: Convert the obtained NFA to equivalent DFA.

Example 1:

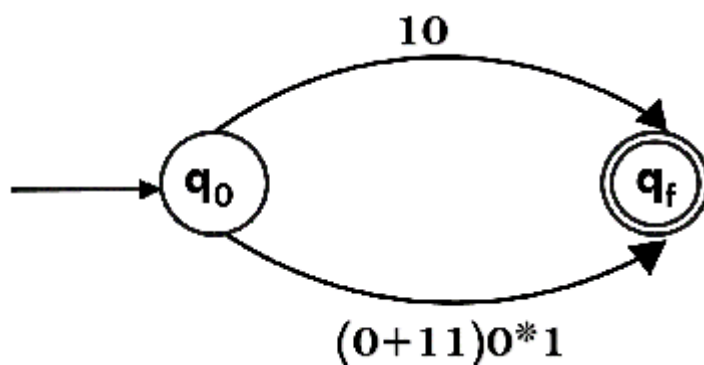
Design a FA from given regular expression $10 + (0 + 11)0^*1$.

Solution: First we will construct the transition diagram for a given regular expression.

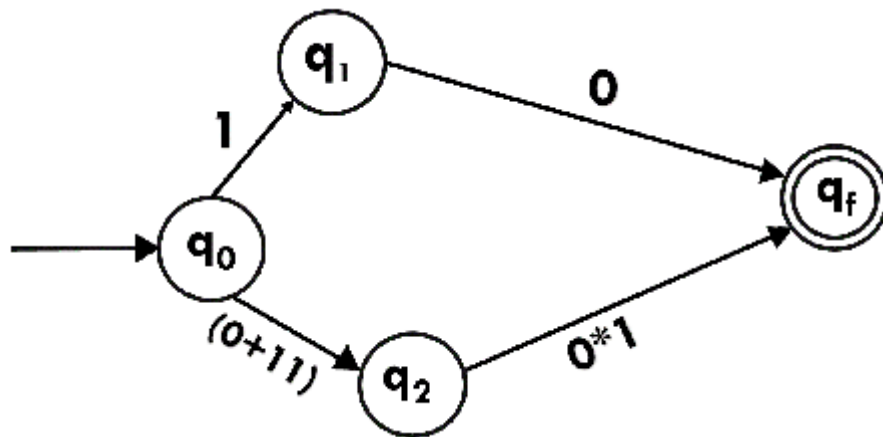
Step 1:



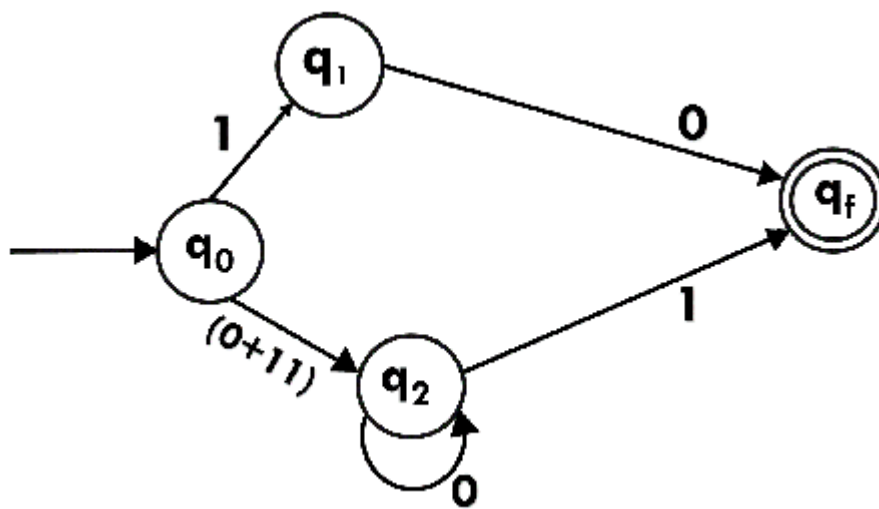
Step 2:



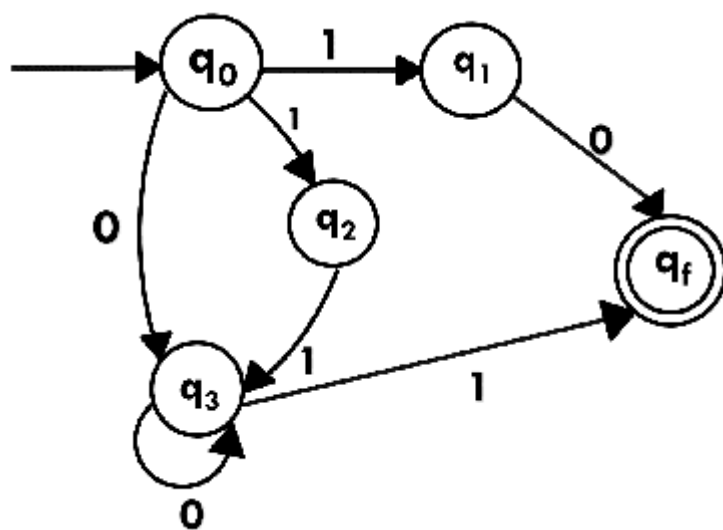
Step 3:



Step 4:



Step 5:



Now we have got NFA without ϵ . Now we will convert it into required DFA for that, we will first write a transition table for this NFA.

State	0	1
$\rightarrow q_0$	q_3	$\{q_1, q_2\}$
q_1	q_f	ϕ
q_2	ϕ	q_3
q_3	q_3	q_f
$*q_f$	ϕ	ϕ

The equivalent DFA will be:

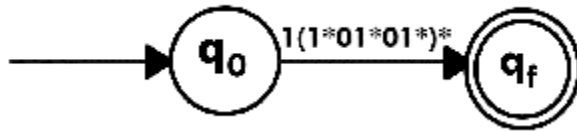
State	0	1
$\rightarrow [q_0]$	$[q_3]$	$[q_1, q_2]$
$[q_1]$	$[q_f]$	ϕ
$[q_2]$	ϕ	$[q_3]$
$[q_3]$	$[q_3]$	$[q_f]$
$[q_1, q_2]$	$[q_f]$	$[q_f]$
$*[q_f]$	ϕ	ϕ

Example 2:

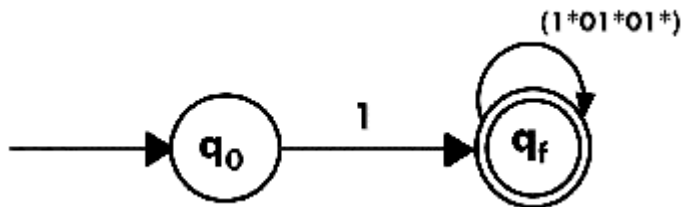
Design a NFA from given regular expression $1(1^*01^*01^*)^*$.

Solution: The NFA for the given regular expression is as follows:

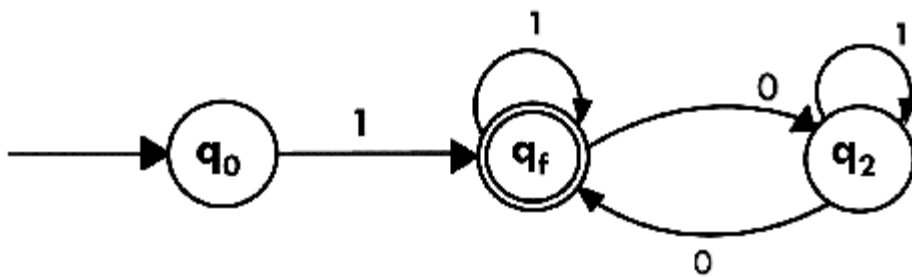
Step 1:



Step 2:



Step 3:



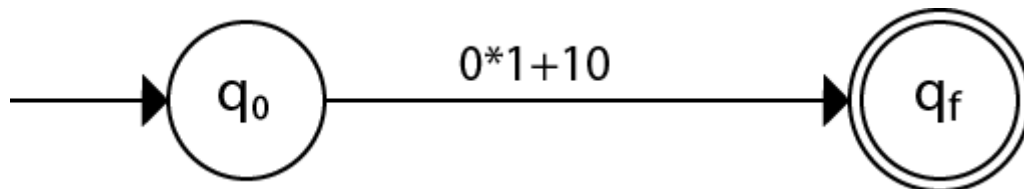
Example 3:

Construct the FA for regular expression $0^*1 + 10$.

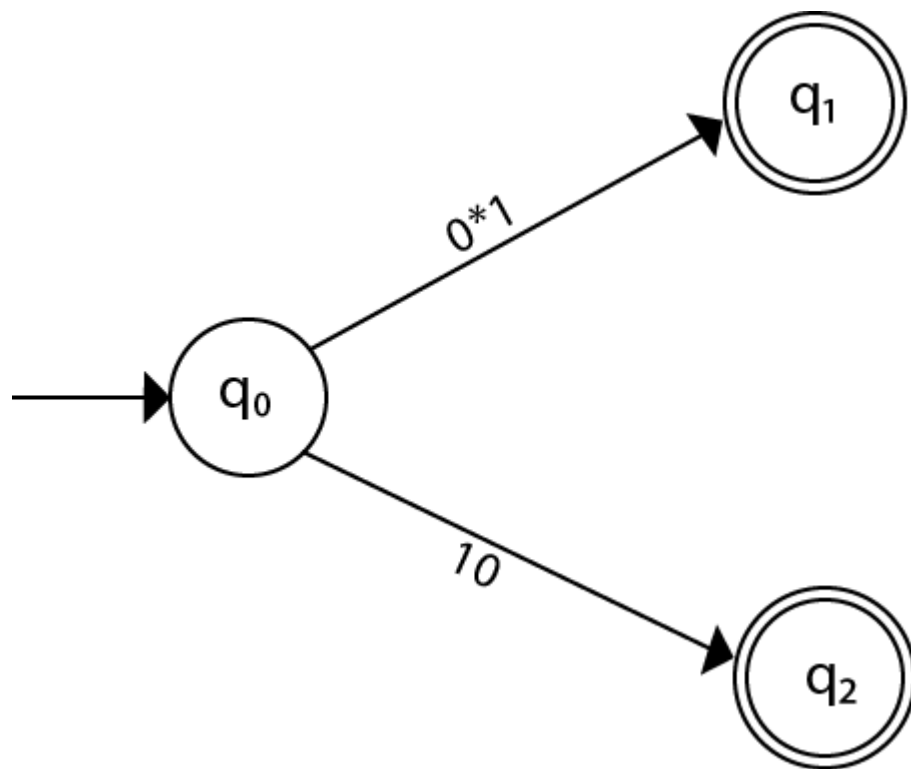
Solution:

We will first construct FA for $R = 0^*1 + 10$ as follows:

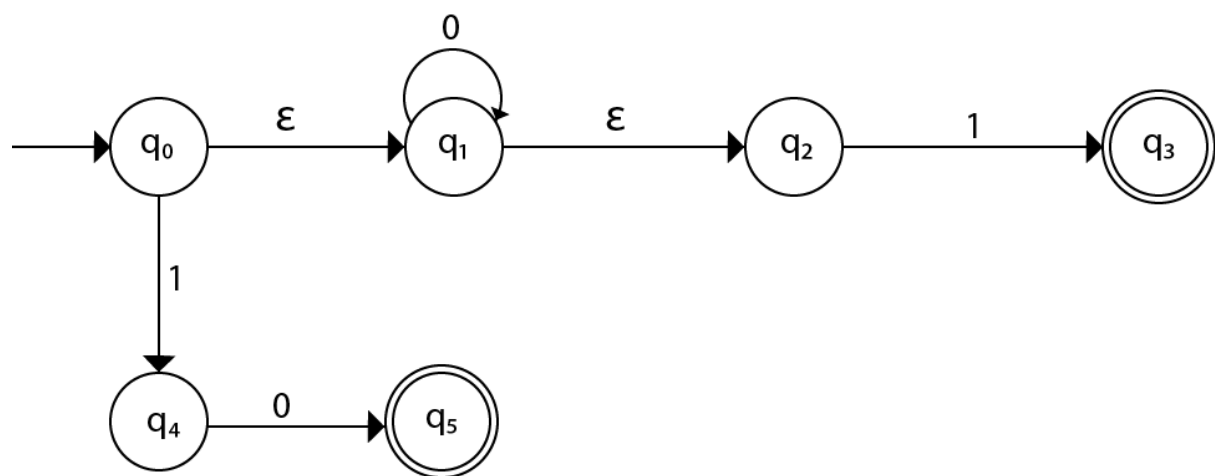
Step 1:



Step 2:



Step 3:



Step 4:

