Problem

For any string $w = w_1w_2 \cdots w_n$, the ***reverse*** of w, written w^R, is the string w in reverse order, $w_n \cdots w_2w_1$. For any language A, let $A^R = \{w^R | w \in A\}$. Show that if A is regular, so is A^R.

Step-by-step solution

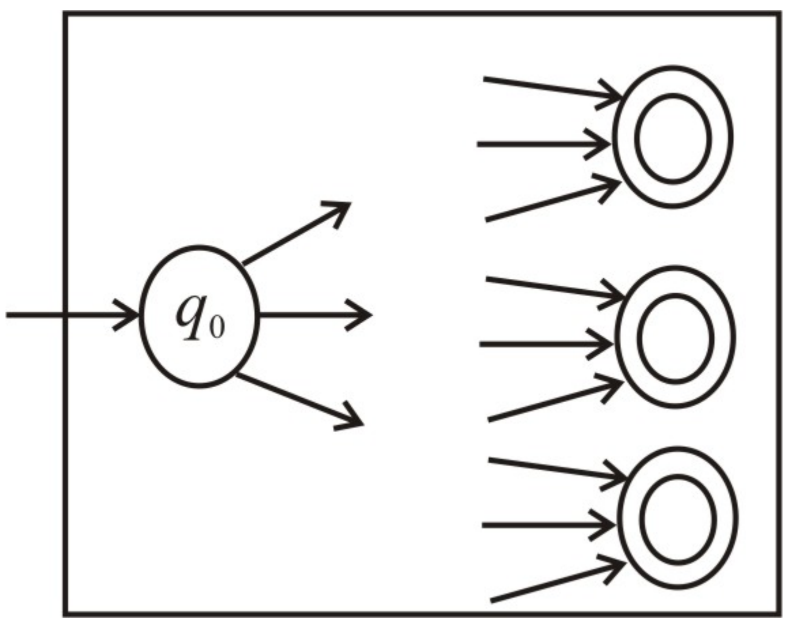
Step 1 of 3

Let $M = (Q, \Sigma, \delta, q_0, F)$ be the DFA that recognizes *A*,

Now we build a NFA M' for A^R as follows:

- Reverse all the arrows of *M*
- Convert the start state for M as the only accept state q'_{accept} for M'.
- Add a new start state q_0' for M', and from q_0', add $\in -$transitions to each state of M' corresponding to accept states of *M*.

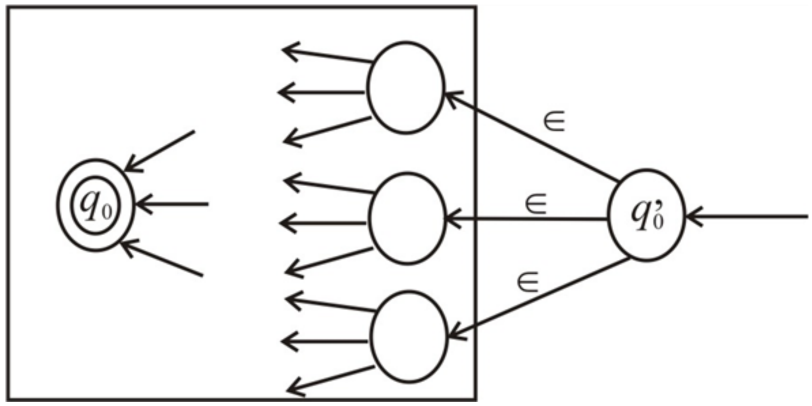
M



Comment

Step 2 of 3

M':



Comment

Step 3 of 3

Here $q_0' = q'_{accept}$

- For any $w \in \Sigma*$, there is a path following *w* from the start state to an accept sate in *M* iff there is a path following w^R from q_0' to q'_{accept} in M'
- That means that $w \in A$ iff $w^R \in A^R$.

Comments (1)