

Definition of δ^*

Given a DFA $M = (Q, \Sigma, \delta, q_0, F)$ define δ^* as follows:

δ^* takes a state q and a string

$$w = w_0w_1w_2\dots w_n \text{ for } n \geq 0$$

and creates a sequence of states

$$r_0r_1r_2\dots r_n \text{ where}$$

1. $r_0 = q_0$

2. $\delta(r_i, w_i) = r_{i+1}$ for $i = 0, 1, \dots, n$

and returns r_{n+1}

Alternate Definition

δ^* is a function that takes a state and a string and returns a state.

```
Q  $\delta^*(Q\ q, \Sigma^*\ w)$  {  
    if ( $w.length() > 0$ )  
        return  
             $\delta^*(\delta(q, w[0]),$   
                 $w.substr(1, w.length() - 1) )$   
    else  
        return  $q$   
}
```