

## 获得的答案

Given language is

$$A/B = \{w \mid wx \in A \text{ for some } x \in B\}$$

Here,  $A$  is a regular language and  $B$  is any language.

Now, the objective is to prove that  $A/B$  is regular.

Since  $A$  is a regular language, some DFA will recognize the language  $A$ .

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

Here,  $Q$  is the set of states.

$\Sigma$  is set of alphabets = of the alphabets for  $A$  and  $B$ .

$\delta$  is the transition function.

$q_0$  is the start state.

$F$  is the set of final states.

To prove  $A/B$  is a regular language, construct a DFA that recognizes the language  $A/B$

Let  $M' = (Q', \Sigma', \delta', F')$  be the DFA that recognizes  $A/B$ .

- $Q' = \text{set of states} = Q$
- $\Sigma' = \text{set of alphabets} = \Sigma$
- $\delta' = \text{transition function} = \delta$
- $q'_0 = \text{start state} = q_0$
- $F' = \{q \in Q \mid \exists x \in B \text{ such that } M \text{ goes from } q \text{ to some state in } F \text{ on reading } x\}$

Thus, a DFA  $M'$  to recognize the language  $A/B$  has been constructed.

Hence  $A/B$  is a regular language.