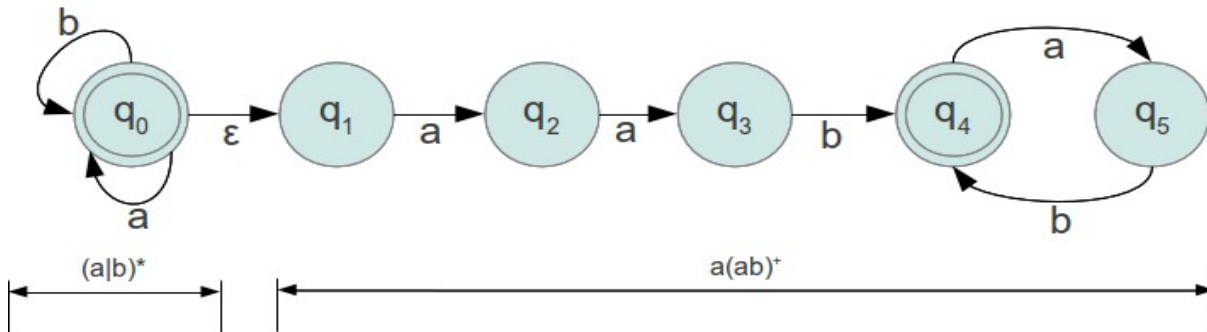**Example: Convert RE to DFA**

Consider this RE:

$a1 = (a|b)^*$

$a2 = a(ab)^+$

First:

Generate the NFA_ε:

$S_0 = \varepsilon\text{-closure}(\{q_0\}) = \{q_0, q_1\}$

$\delta'(S_0, a) = \varepsilon\text{-closure}(\delta(\{q_0, q_1\}, a))$
$= \varepsilon\text{-closure}(\{q_0, q_2, q_3\})$
$= \{q_0, q_1, q_2, q_3\} = S_0$

$\delta'(S_0, b) = \varepsilon\text{-closure}(\delta(\{q_0, q_1\}, b))$
$= \varepsilon\text{-closure}\{q_0\} = S_0$

$\delta'(S_1, a) = \varepsilon\text{-closure}(\delta(\{q_0, q_1, q_2, q_3\}, a))$
$= \varepsilon\text{-closure}\{q_0, q_2, q_3\} = S_1$

$\delta'(S_1, b) = \varepsilon\text{-closure}\{q_0, q_4\}$
$= \{q_0, q_1, q_4\} = S_2$

$\delta'(S_2, a) = \varepsilon\text{-closure}\{q_0, q_2, q_3, q_5\}$
$= \{q_0, q_1, q_2, q_3, q_5\} = S_3$

$\delta'(S_2, b) = \varepsilon\text{-closure}\{q_0\} = S_0$

$\delta'(S_3, a) = \varepsilon\text{-closure}\{q_0, q_2, q_3\} = S_1$

$\delta'(S_3, b) = \varepsilon\text{-closure}\{q_0, q_4\} = \{q_0, q_1, q_4\} = S_4$

$\delta'(S_4, a) = \varepsilon\text{-closure}\{q_0, q_2, q_3, q_5\} = S_3$

$\delta'(S_4, b) = \varepsilon\text{-closure}\{q_0\} = S_0$

The Resulted DFA: