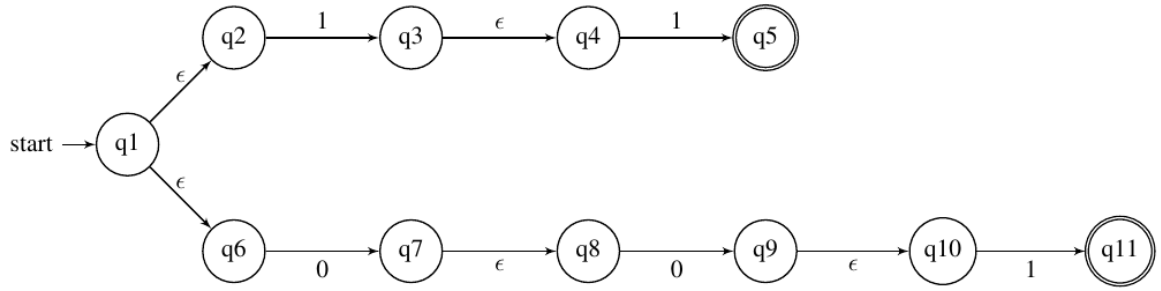
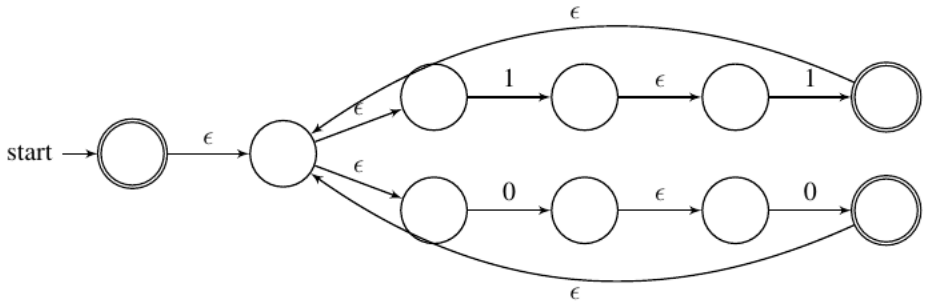
Chapter 1.5 Practice Key

Construct an NFA from the following regular expressions.

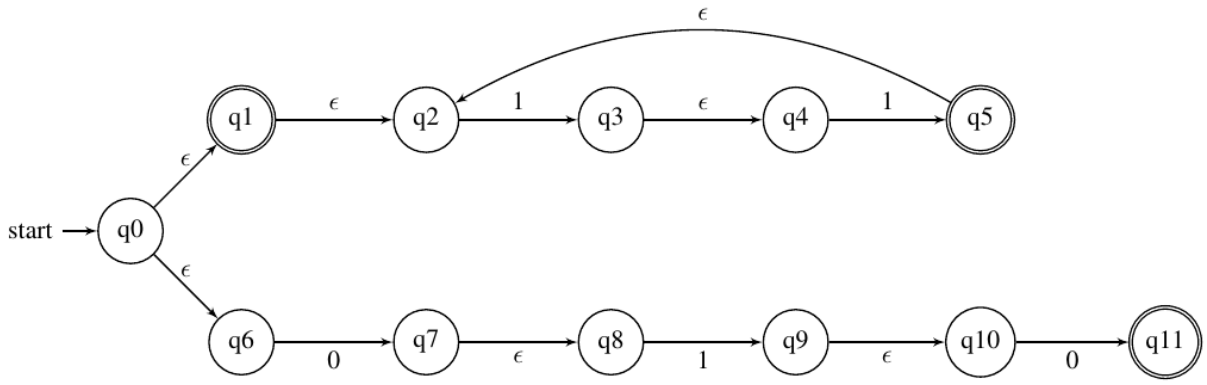
1. 11 ∪ 001



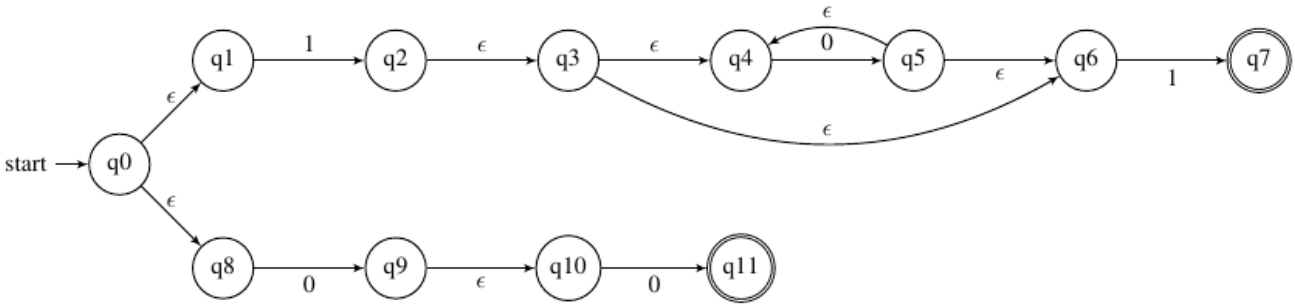
2. (11 ∪ 00)*



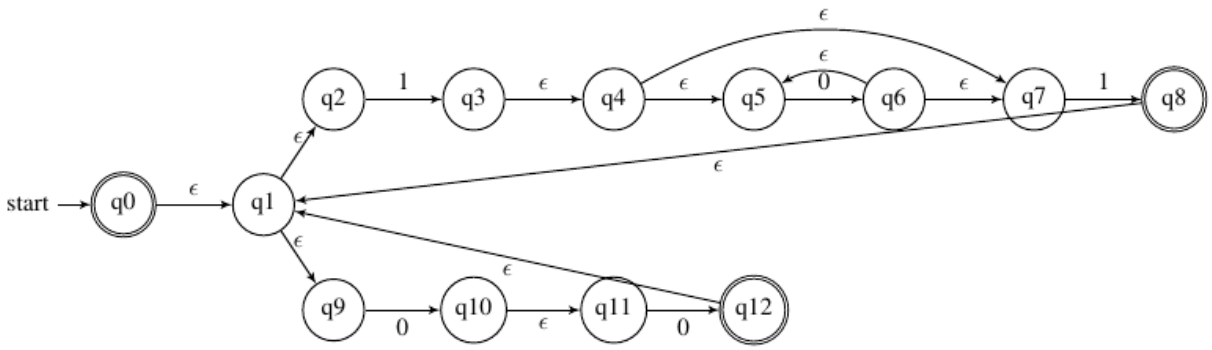
3. (11)* ∪ 010



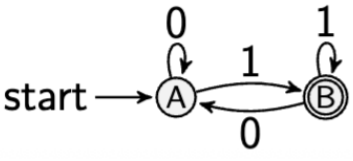
4. 10*1 ∪ 00



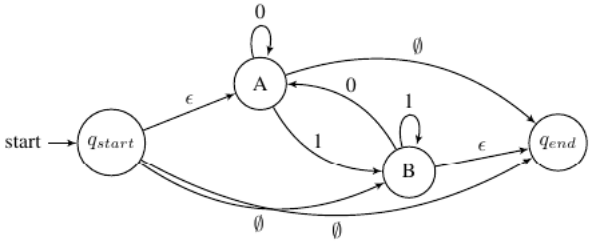
5. (10*1 ∪ 00)*



Convert the DFAs/NFAs below to regular expressions.

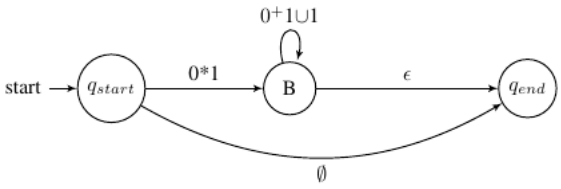
6. 

NFA:

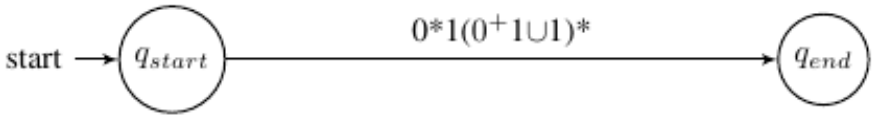


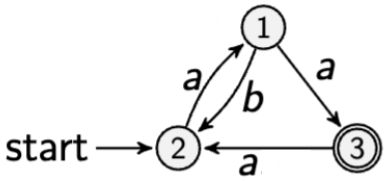
Remove A = (q_{start}, B) → $\varepsilon 0^* 1 \cup \emptyset = 0^* 1$

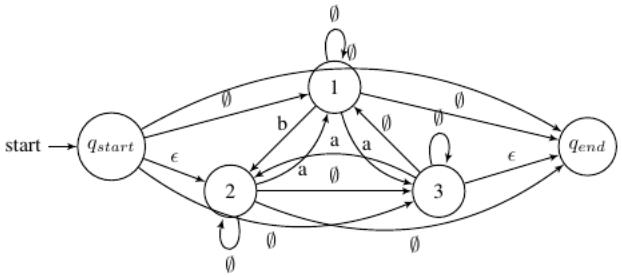
(B, B) → $00^* 1 \cup 1 = 0^+ 1 \cup 1$



Remove B = (q_{start}, q_{end}) → $0^* 1(0^+ 1 \cup 1)^* \varepsilon \cup \emptyset = 0^* 1(0^+ 1 \cup 1)^*$



7. 



NFA:

Remove 1 = (q_{start}, 2) → $\emptyset\emptyset^*b \cup \varepsilon = \varepsilon$

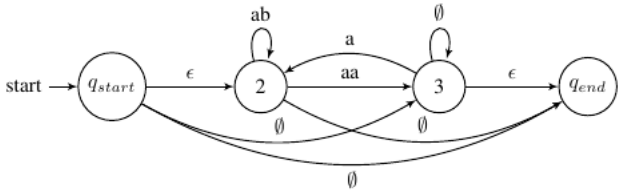
(2, 2) → $a0^*b \cup \emptyset = ab$

(q_{start}, 3) → $\emptyset\emptyset^*a \cup \emptyset = \emptyset$

(3, 3) → $\emptyset\emptyset^*a \cup \emptyset = \emptyset$

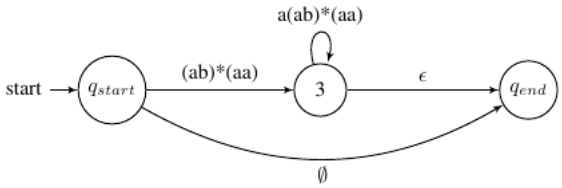
(2, 3) → $a\emptyset^*a \cup \emptyset = aa$

(3, 2) → $\emptyset\emptyset^*b \cup a = a$



Remove 2 = (q_{start}, 3) → $\varepsilon(ab)^*(aa) \cup \emptyset = (ab)^*(aa)$

(3, 3) → $a(ab)^*(aa) \cup \emptyset = a(ab)^*(aa)$



Remove 3 = (q_{start}, q_{end}) → $(ab)^*(aa)(a(ab)^*(aa))^*\varepsilon \cup \emptyset =$
$(ab)^*(aa)(a(ab)^*(aa))^*$