

$$a \cdot b = ab$$

$$\begin{array}{l} L_1 = \{a, b, cc\} \\ L_2 = \{c, ca\} \end{array} \xrightarrow{L_1 \cdot L_2} \{ac, acca, bc, bca, ccc, caca\}$$

$$L_2 L_1 = \{ca, x\}$$

$$\begin{aligned} L_1^2 &= L_1 \cdot L_1 \\ L_1^3 &= L_1 \cdot L_1^2 \\ &= L_1^2 L_1 \end{aligned}$$

$$\begin{aligned} L_1 &\Rightarrow L_1^2 \\ &\{aa, ab, acc, ba, bb, bcc, cca, ccab, \\ &\quad cccc\} \end{aligned}$$

$$A^* = \{A^0 \cup A^1 \cup A^2 \cup A^3 \cup \dots \cup A^n\}$$

$$L_2 = \{a, aba\} \quad L_2^* = \{E, a, abaa, aa, aabaa, aabaaa, aabaaaa, \dots\}$$

$$\sum^* \supseteq L^*$$

$$L_3 = \{a, bbb\} = L_3^* = \{E, a, bbb, aa, abbb, bbb a, bbbbb, \\ aaaa, abbb a, aabbb, bbb a bbb, \\ bbbbbb, bbbba\}$$

$$L^+ = \{L^1 \cup L^2 \cup L^3 \cup L^4 \cup \dots \cup L^n\}$$

$$L = \{a, cc\}$$

$$L^+ = \{a, cc, aa, acc, cca, cccc, \dots\}$$

$$L_1 = \{a^*b\}$$

$$L_{11} = a^*$$

$$\{\epsilon, a, aa, aaa, \dots\}$$

$$L_{12} = b$$

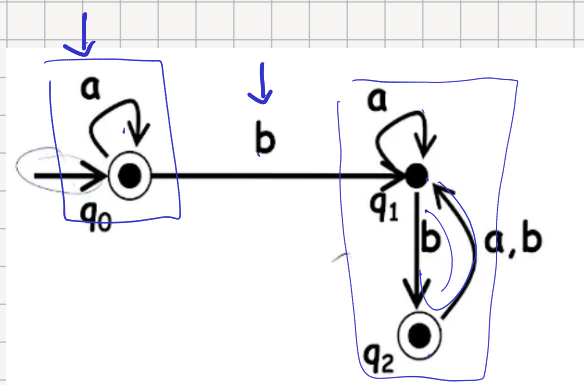
$$L_1 = \{b, ab, aab, \textcircled{aaab}, \dots\}$$

$$L_2 = \{a^n b^n \mid n \geq 0\}$$

$$a^n = \{\epsilon, a, aa, aaa, \dots\}$$

$$b^n = \{\epsilon, b, bb, bbb, bbbb\}$$

$$\{\epsilon, b, bb, \dots, a, ab, aab\}$$



- 1)  $\epsilon$
  - 2)  $a$
  - 3)  $aa$
  - 4)  $aaa$
  - 5)  $aaaa$
- }  $a^*$

$$\textcircled{a^*} \cup \textcircled{a^*ba^*b}^+$$

- 1)  $aa\ bb$  ✓
- 2)  $aa\ bb\ a\ b\ bb$

- 1)  $bb$
- 2)  $a\ b\ a\ a\ a\ a\ b$
- 3)  $a\ b\ \underline{aa\ bb\ aa\ bb}$

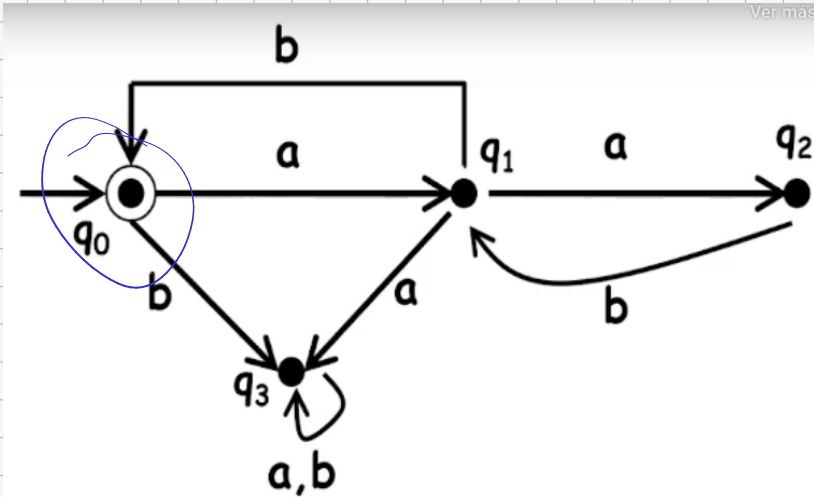
$$L = \{a, b, c\}$$

$$P(L) = \{\emptyset, \{a\}, \{b\}, \{c\},$$

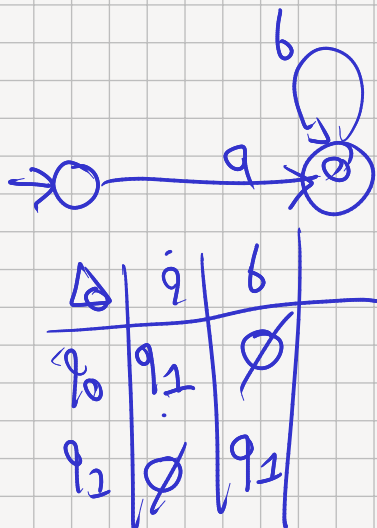
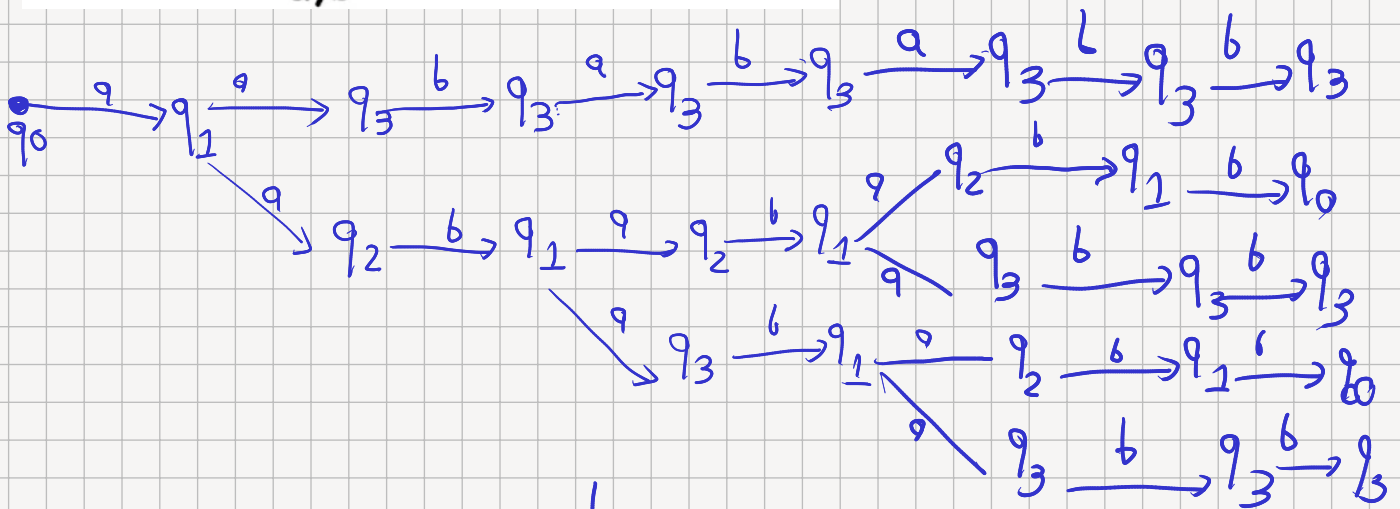
$$\{a, b\}, \{a, c\}, \{b, c\}$$

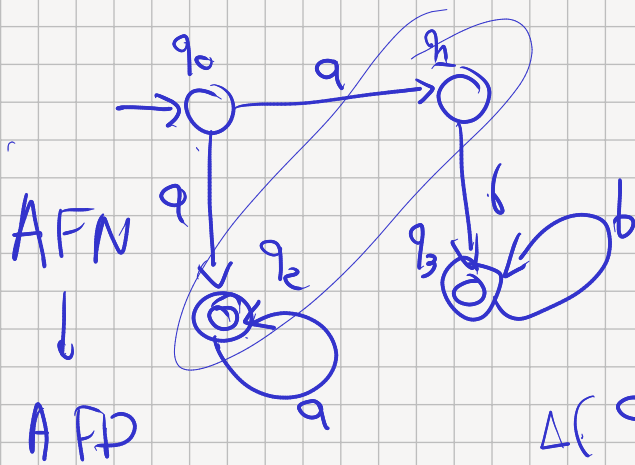
$$\{a, b, c\}\}$$

$\mathcal{P}$



q a b a b a b b





$$ab^+ \cup a^+$$

$$\Delta(q_0, a) = \{q_1, q_2\}$$

$$\Delta(q_0, b) = \emptyset$$

$$\Delta(\{q_1, q_2\}, a) = \{q_2\}$$

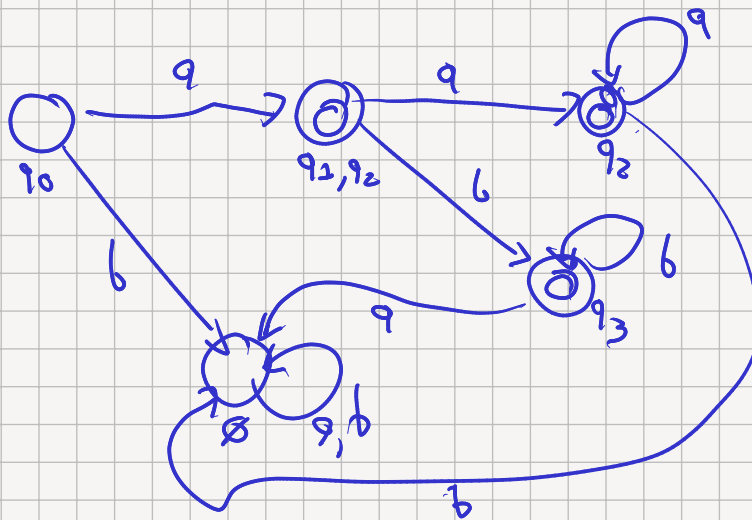
$$\Delta(\{q_1, q_2\}, b) = \{q_3\}$$

$$\Delta(\{q_3\}, a) = \emptyset$$

$$\Delta(\{q_3\}, b) = q_3$$

$$\Delta(q_2, a) = q_2$$

$$\Delta(q_2, b) = \emptyset$$



$$ab^+ \cup a^+$$