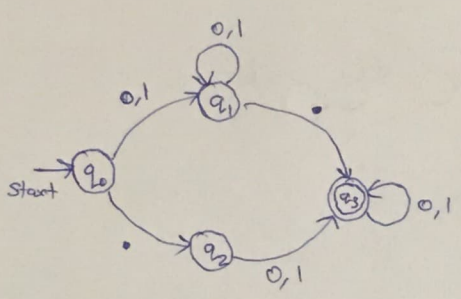
1. Consider the following DFA: $D = \langle \{q_0, q_1, q_2, q_3\}, \{q_0\}, \{q_3\}, \{0, 1, .\}, \delta \rangle$

(Q, S, F, A)



with start state q_0, end state q_3. This generates the language of unsigned real numbers in binary given by the regex $(0|1)^*.(0|1)^+ \mid (0|1)^+.(0|1)^*$.

2. Consider the CFG $G = \langle \{A, B, C, S\}, \{0, 1, .\}, P, S \rangle$ given by the production rules.

$$S \rightarrow 0A \mid 1A \mid .B$$

$$A \rightarrow 0A \mid 1A \mid .C$$

$$B \rightarrow 0C \mid 1C$$

$$C \rightarrow 0C \mid 1C \mid \varepsilon.$$

This is a right linear grammar which generates the language of unsigned real numbers in binary.