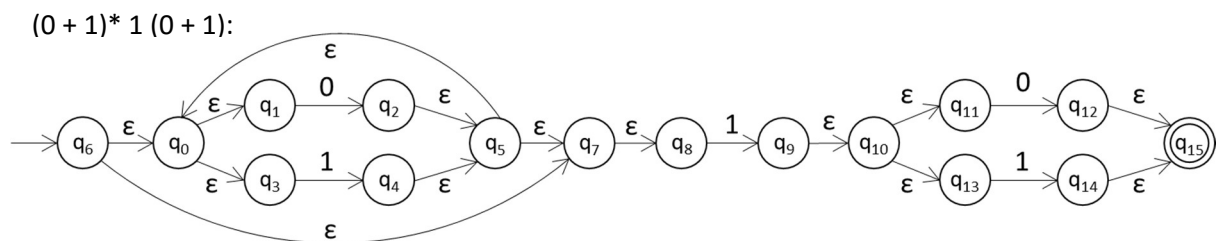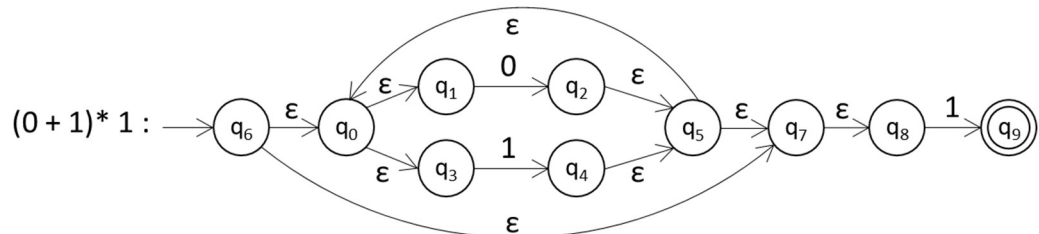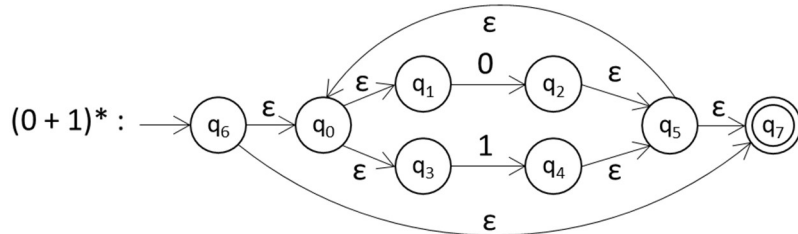# Regular Expressions to Automata

Convert the following RE to Automata

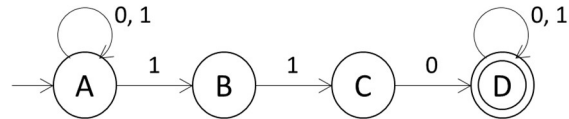$(0 + 1)* \ 1 \ (0 + 1)$

0 : $\rightarrow q_0 \xrightarrow{0} q_1$

1 : $\rightarrow q_0 \xrightarrow{1} q_1$

0 + 1 : $\rightarrow q_0 \xrightarrow{\varepsilon} q_1 \xrightarrow{0} q_2 \xrightarrow{\varepsilon} q_5$; $q_0 \xrightarrow{\varepsilon} q_3 \xrightarrow{1} q_4 \xrightarrow{\varepsilon} q_5$

$(0 + 1)* :$ $\rightarrow q_6 \xrightarrow{\varepsilon} q_0$ ... $q_5 \xrightarrow{\varepsilon} q_7$ (with ε loops)

$(0 + 1)* \ 1 :$ $\rightarrow q_6 \xrightarrow{\varepsilon} q_0$ ... $q_5 \xrightarrow{\varepsilon} q_7 \xrightarrow{\varepsilon} q_8 \xrightarrow{1} q_9$

$(0 + 1)* \ 1 \ (0 + 1):$ $\rightarrow q_6 \xrightarrow{\varepsilon} q_0$ ... $q_5 \xrightarrow{\varepsilon} q_7 \xrightarrow{\varepsilon} q_8 \xrightarrow{1} q_9 \xrightarrow{\varepsilon} q_{10}$ ... $q_{11} \xrightarrow{0} q_{12}$, $q_{13} \xrightarrow{1} q_{14}$ ... q_{15}
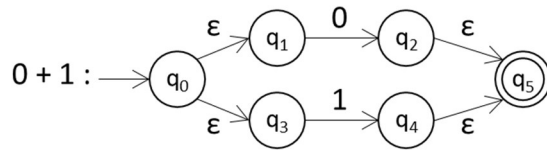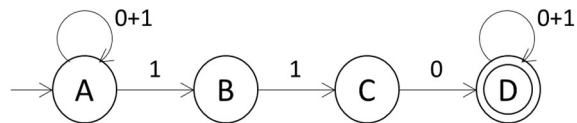
Automata to Regular Expressions
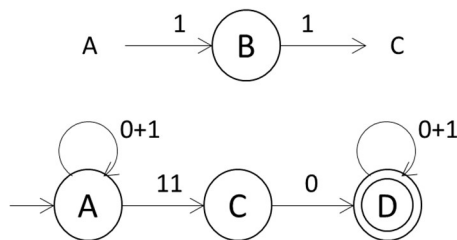
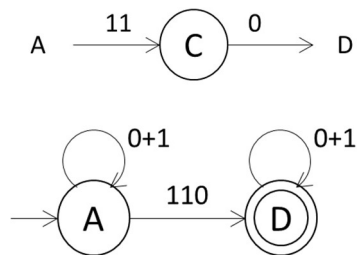Convert the following automata to RE by eliminating states

1)

Given automata:

Eliminating B:

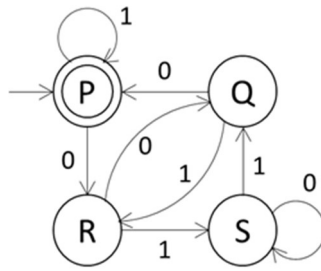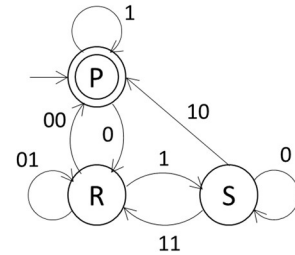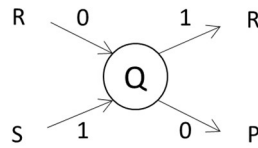Eliminating C:

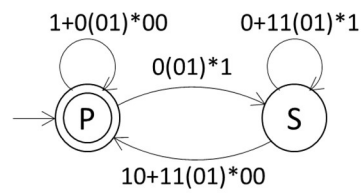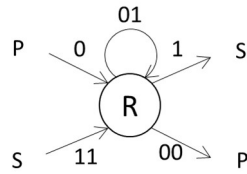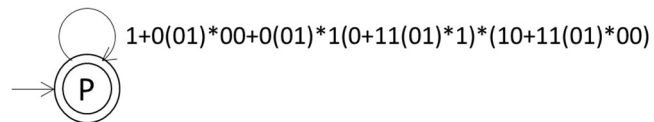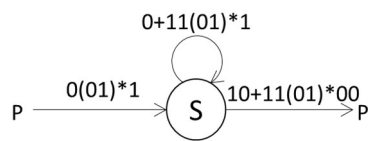RE = ((0+1) + 110(0+1)*ϕ)*110(0+1)*

RE = (0 + 1)* 110 (0 + 1)*

2)

Eliminating Q:

Eliminating R:

Eliminating S:

RE = (1+0(01)*00+0(01)*1(0+11(01)*1)*(10+11(01)*00))*