Regular Expressions

Regular Sets

Made of $\Sigma, \epsilon, +, \circ, *$
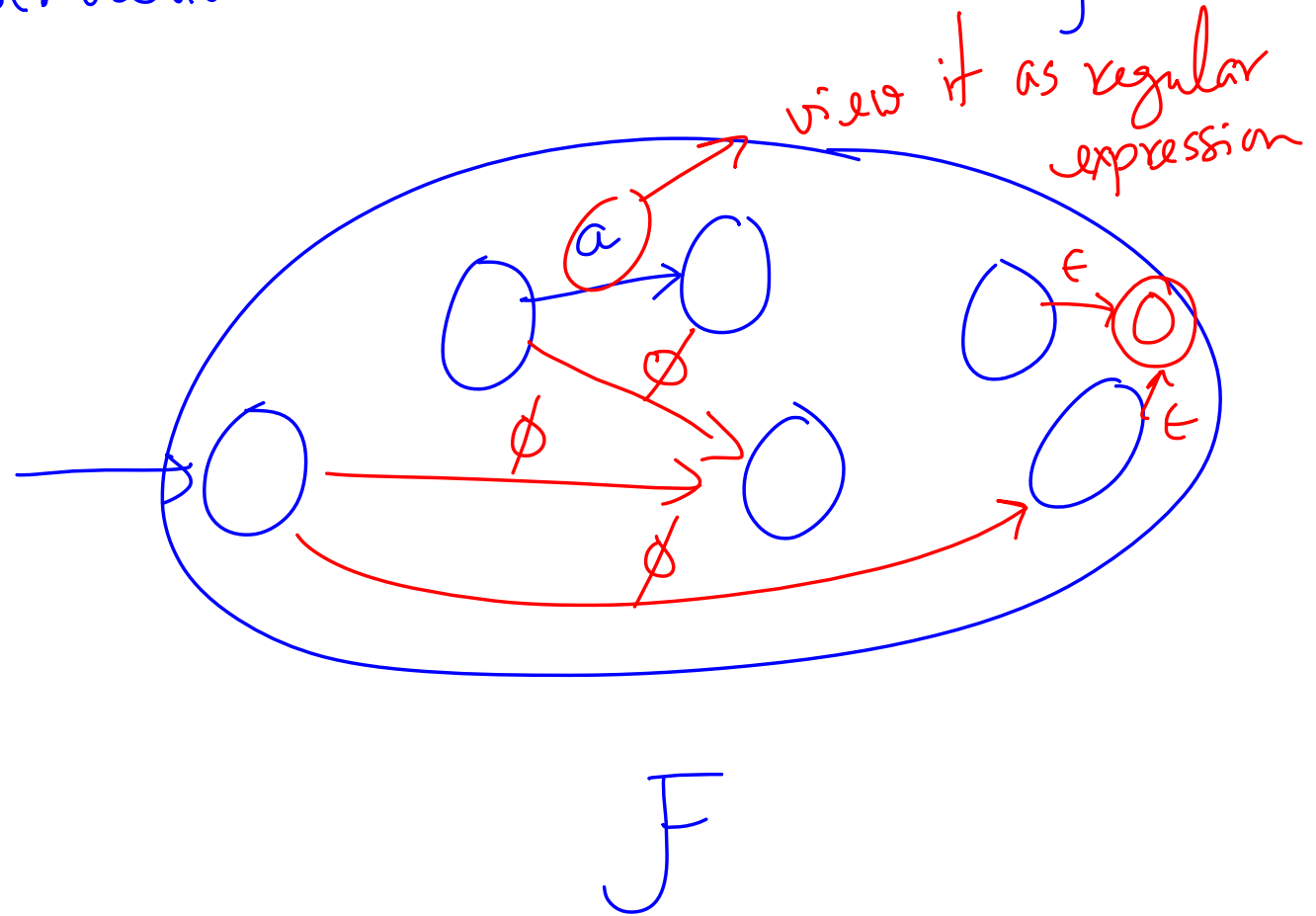
Accepted by FA

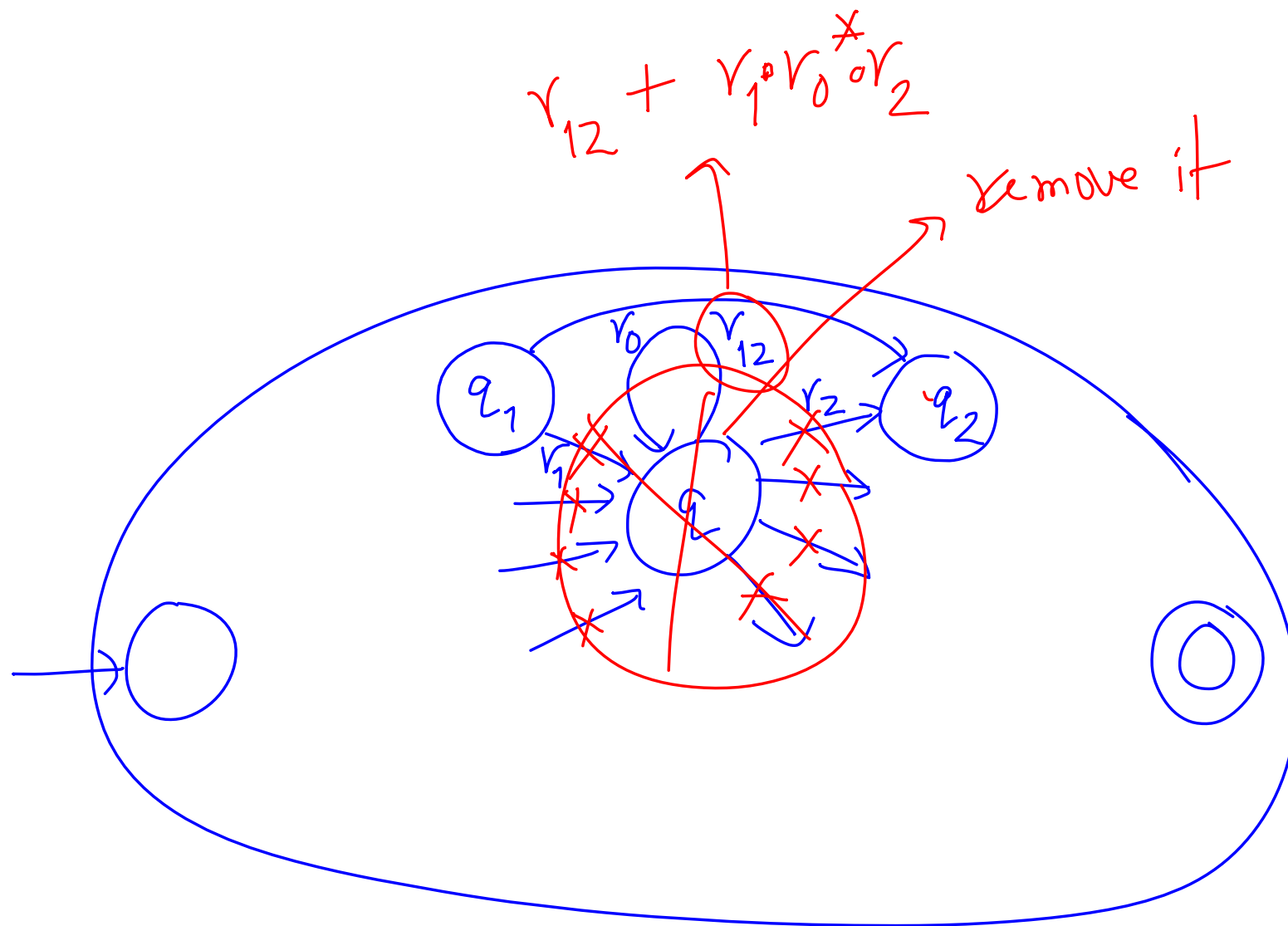Theorem: Set A is regular if and only if there exists a regular expression r with $A = L(r)$.

proof: Suppose A is accepted by DFA F.

A generalized NFA (GNFA) is a finite automata where transions are done on regular expressions.
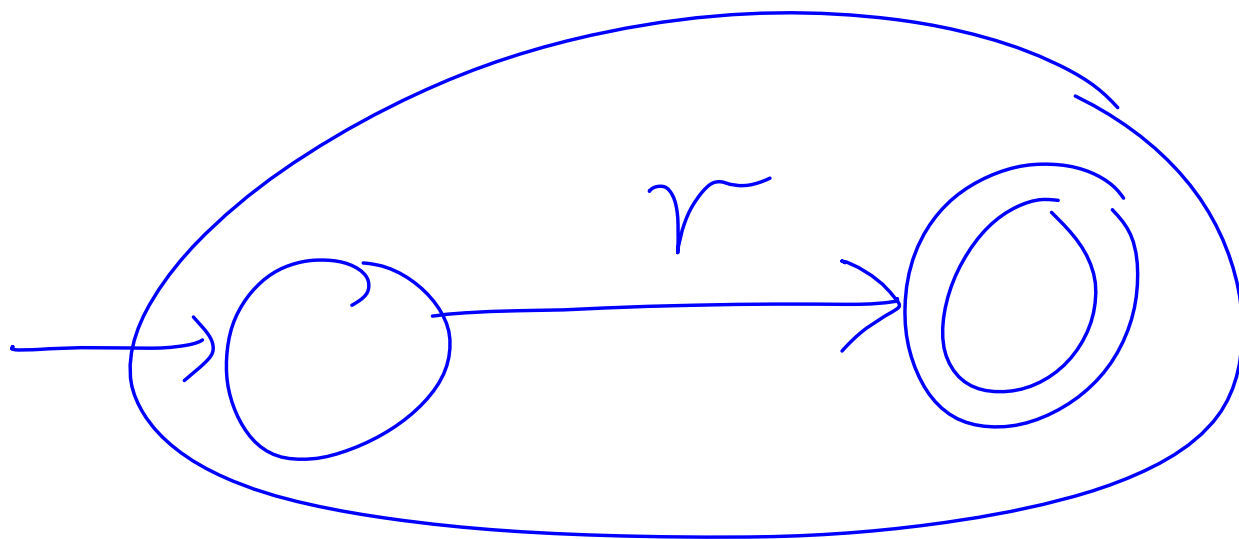
Formally, a GNFA $= (Q, \Sigma, q_0, \delta, F)$

with $\delta: Q \times R \rightarrow Q$ where R is set of all regular expressions over Σ and also includes $\emptyset$.
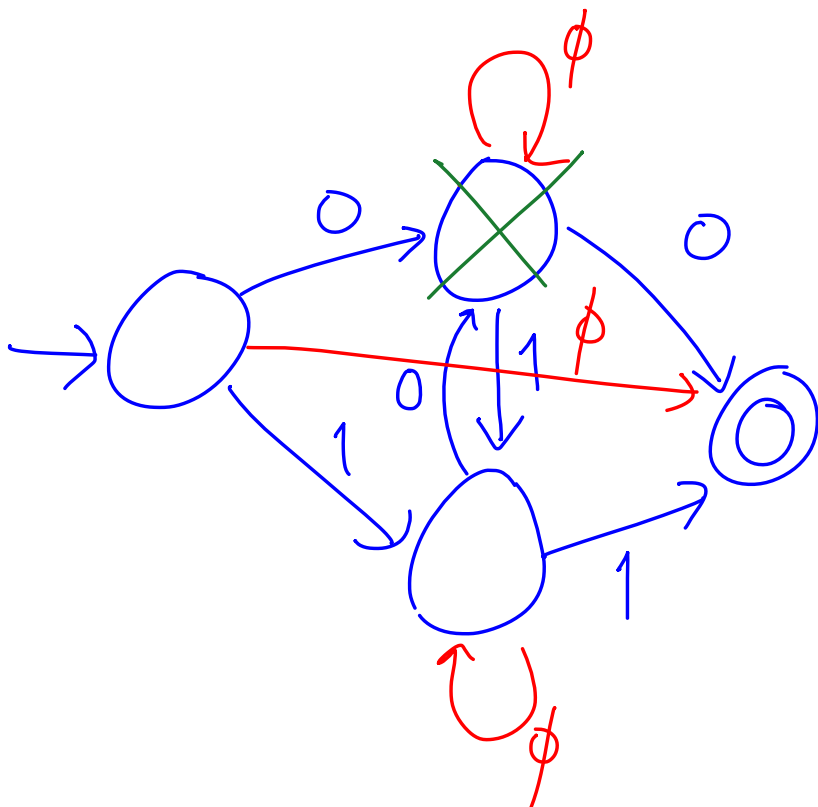
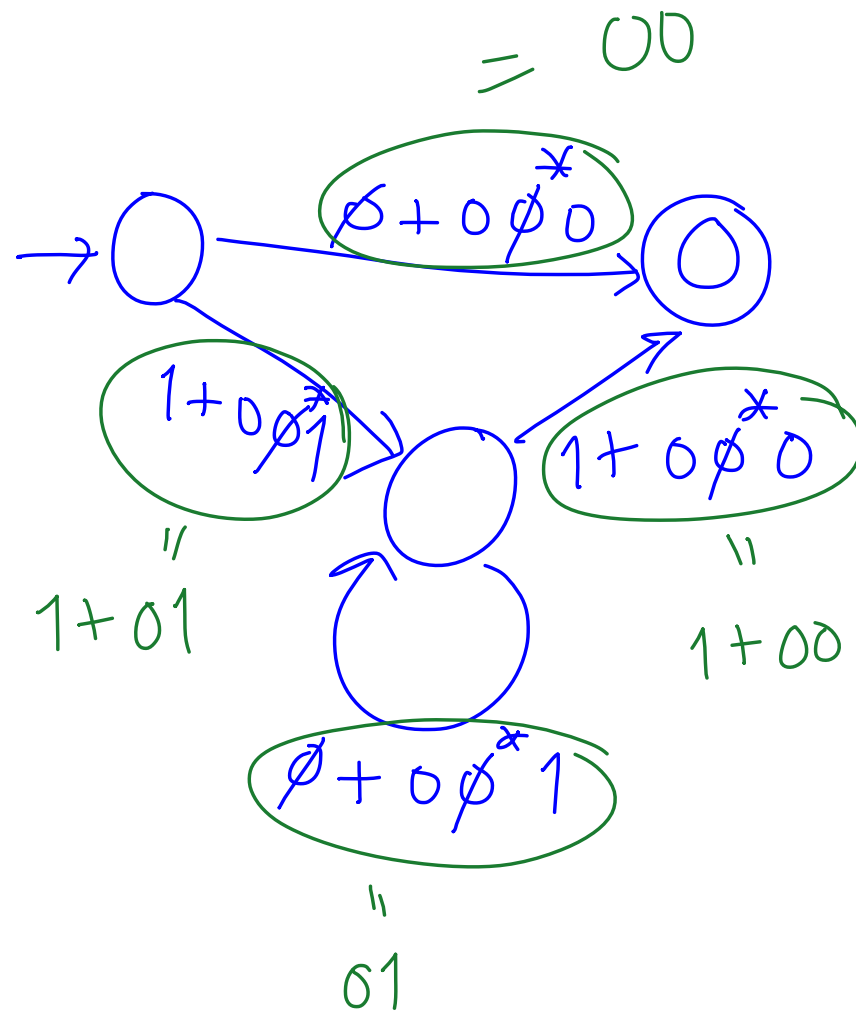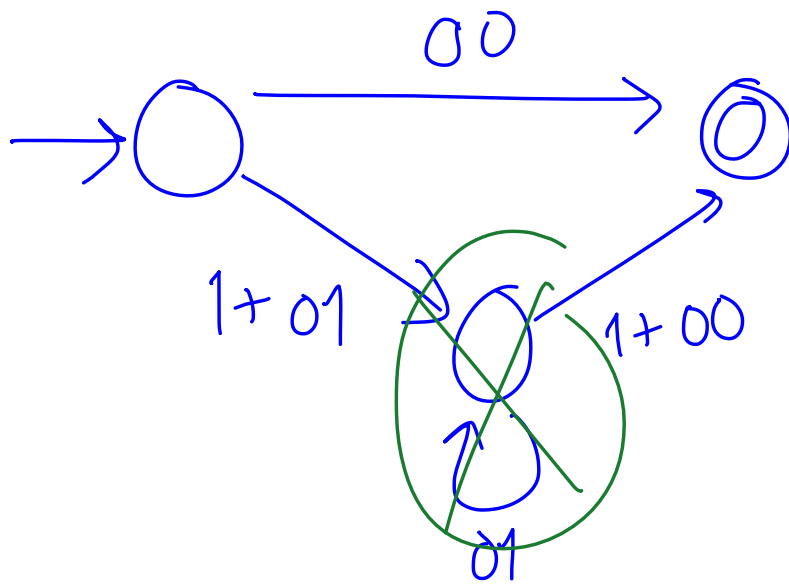**Observation:** We can easily convert F to a GNFA.

view it as regular expression

F

$$r_{12} + r_1 \circ r_0^* \circ r_2$$

remove it

Eventually, we have:

Then, $L(\gamma) = A$.

$$\phi^* = \in$$
$$\phi + S = S$$

= OO

1 + 01

1 + 00

01

$$00 + (1+01)(01)^*(1+00)$$