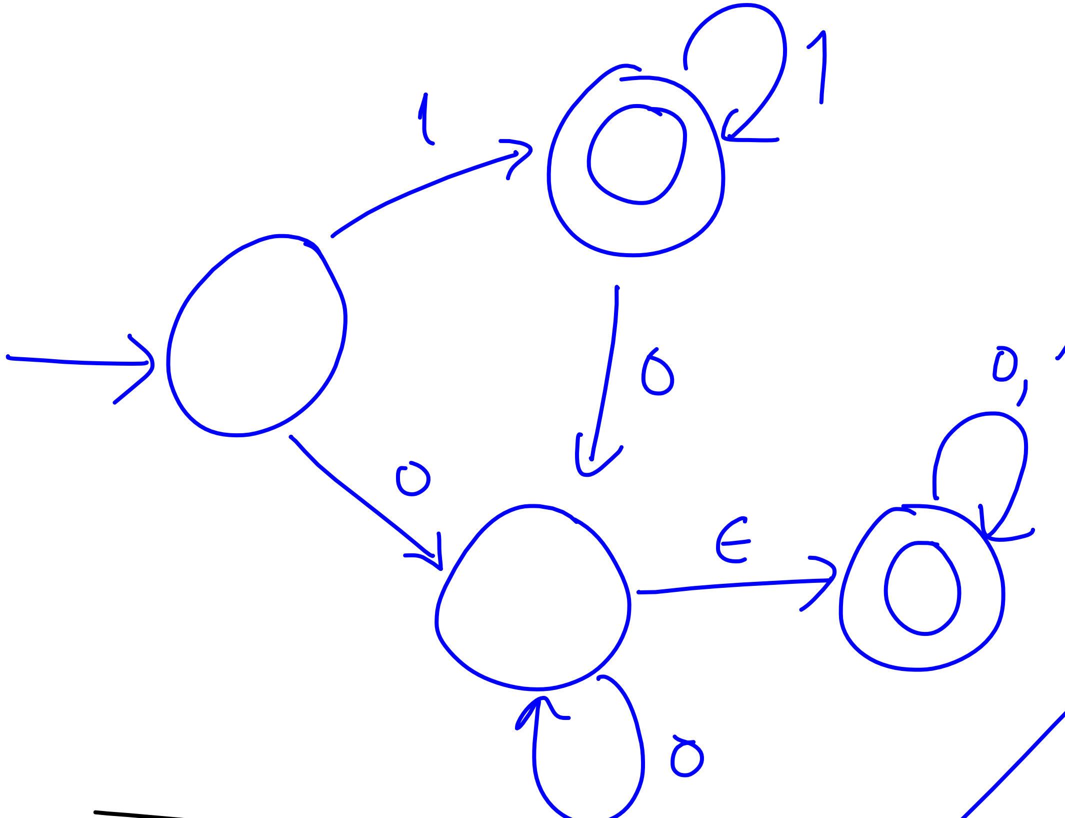
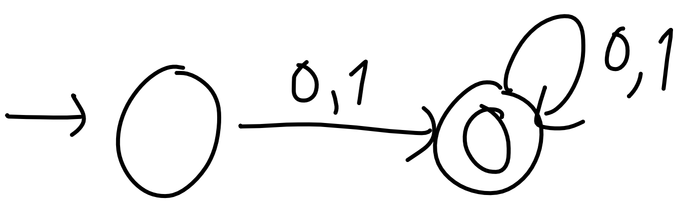
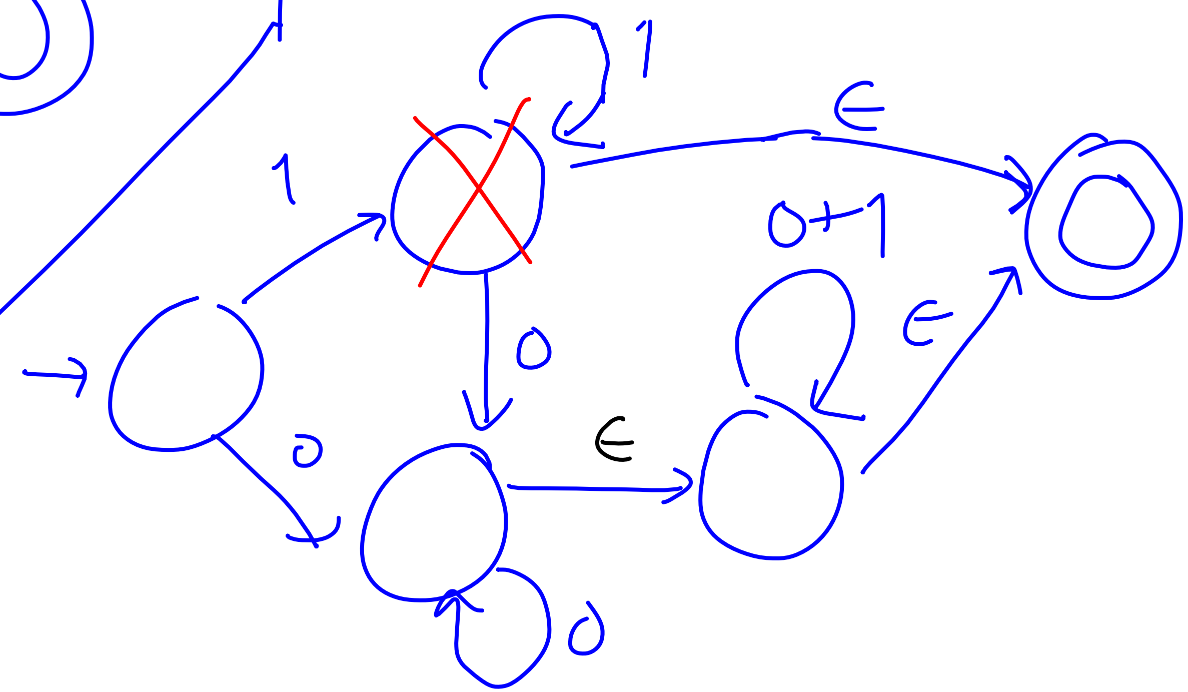
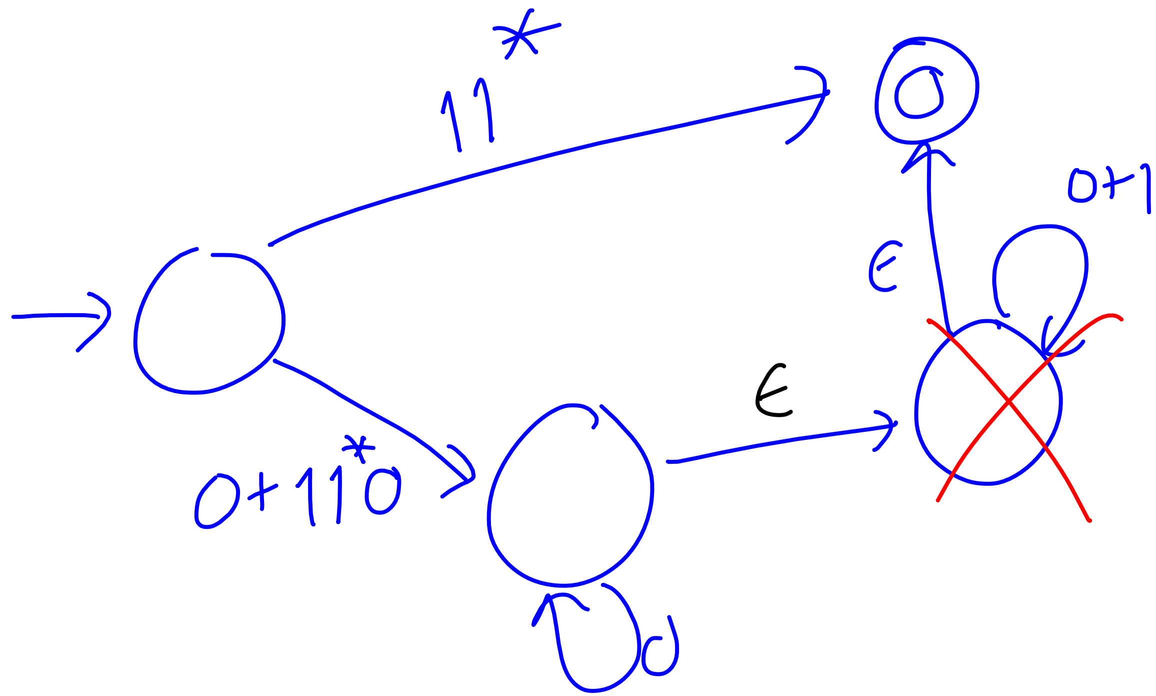


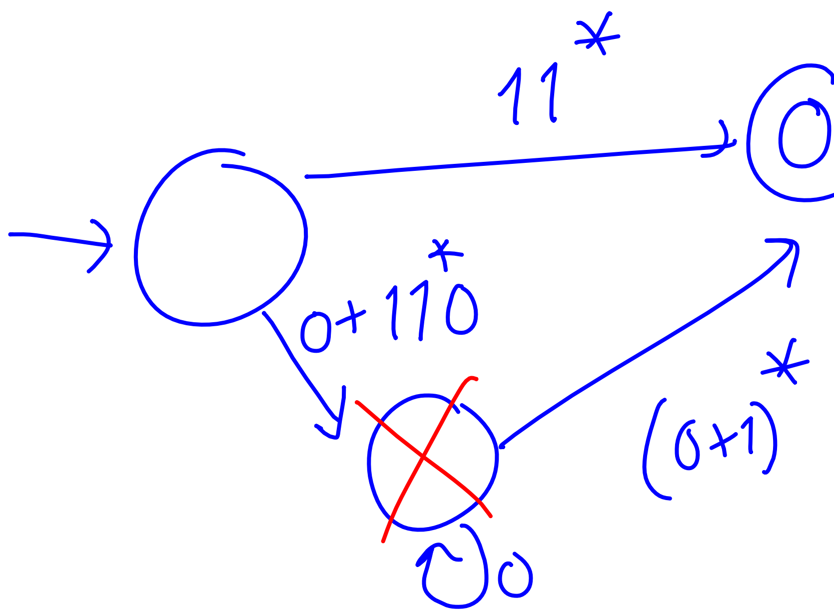


$\Rightarrow$

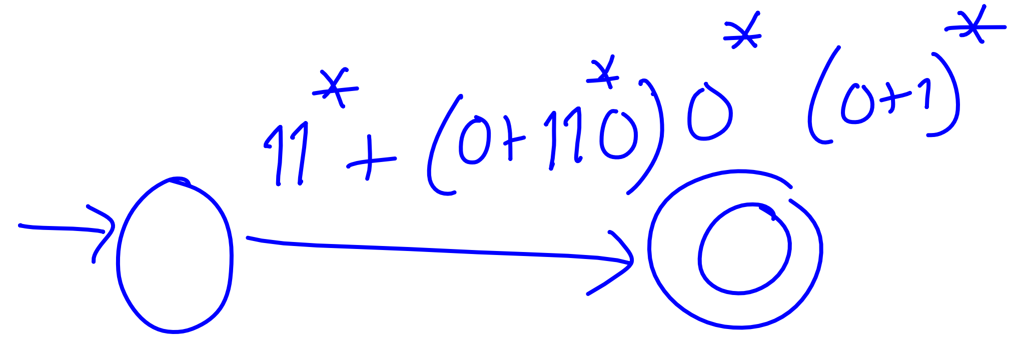




11*
0+11*0
ε
ε
0+1
0



11*
0+11*0
(0+1)*
0



11* + (0+11*0)0*(0+1)*

Myhill-Nerode Theorem:

For any regular set A, there is a unique deterministic automata with minimum number of states accepting it.

proof: Let A be a regular set.

Define a relation R on it as follows:

xRy if for every z, $xz \in A$ iff $yz \in A$.

R is an equivalence relation:

(reflexive) xRx

(symmetric) $xRy \Rightarrow yRx$

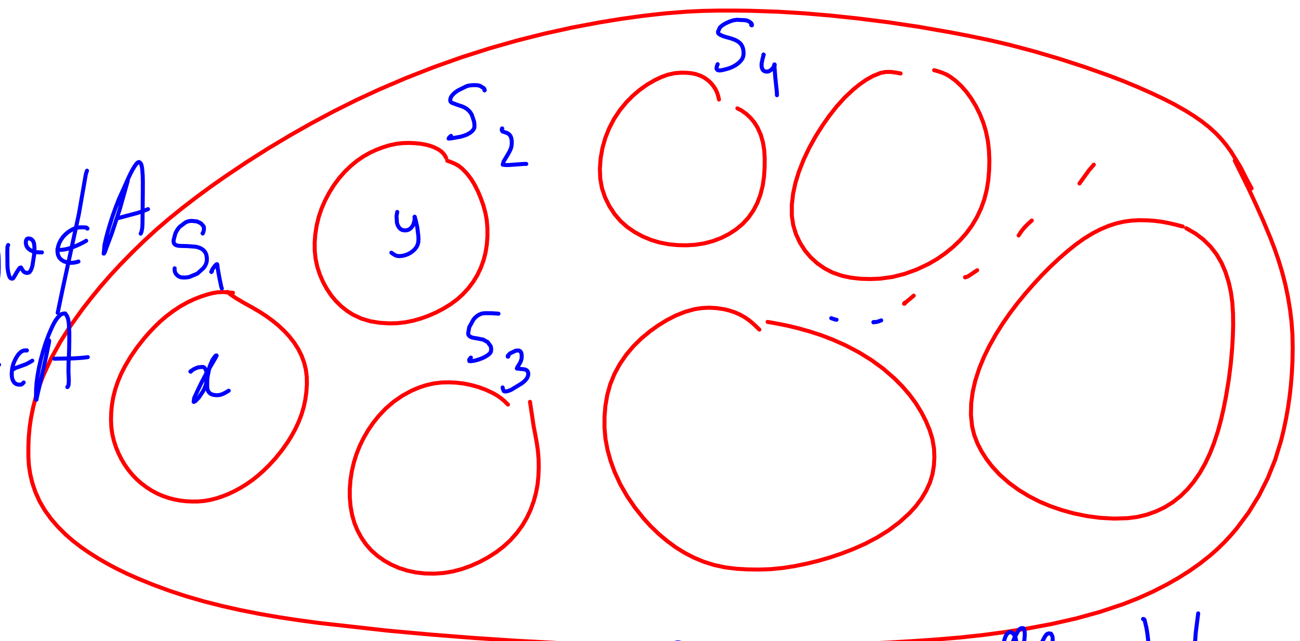
(transitive) $xRy \ \& \ yRz \Rightarrow xRz$

Consider any w & xw, zw

$xw \in A$ iff $yw \in A$ iff $zw \in A$

Consider equivalence classes formed by R on Σ^*

$\exists w$ s.t.
either $xw \in A$ & $yw \notin A$
or $xw \notin A$ & $yw \in A$



$\Rightarrow$ Different eq classes will take a DFA accepting A to different states.

S_i : set of states DFA ends up in on reading strings in i^{th} eq class.

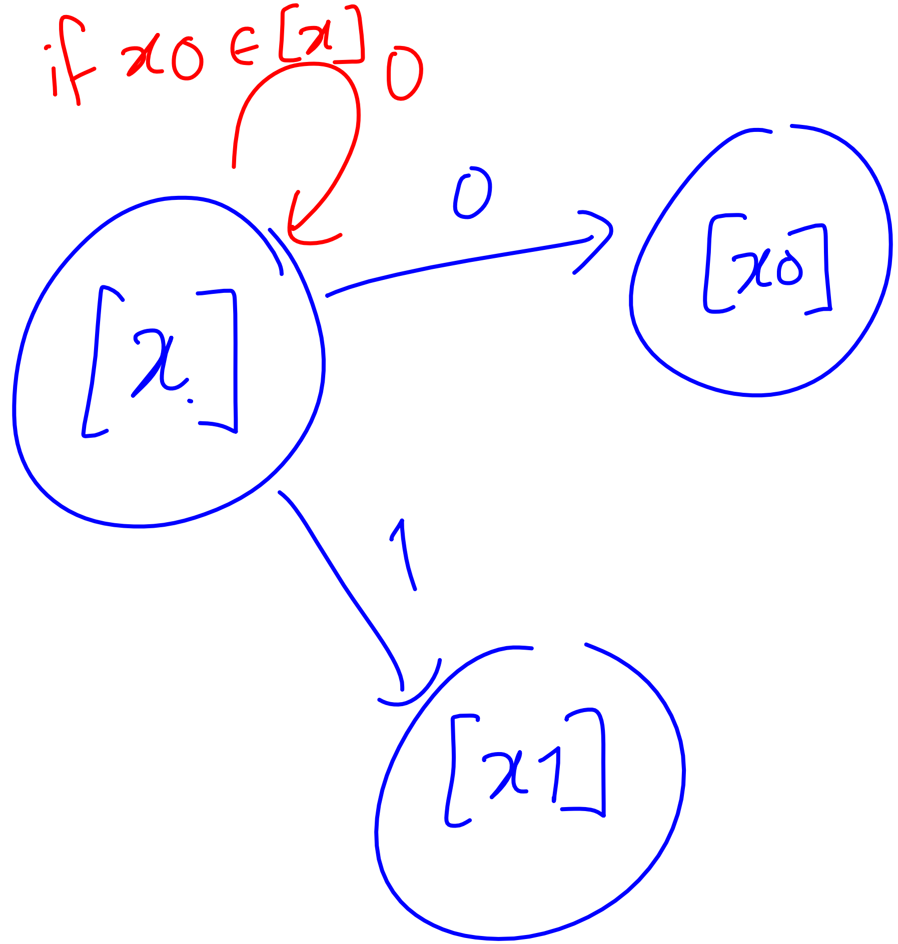
$S_i \cap S_j = \phi$ for $i \neq j$

& $\bigcup S_i = Q$ (the set of states of DFA)

A new DFA based on equivalence classes:

Let E = set of all eq classes, each represented as $[x]$ where x belongs to the class

Define $\mathcal{F} = \{ E, [\epsilon], \delta, F, \Sigma \}$


if x0 ∈ [x] 0
0
1
[x]
[x0]
[x1]