We want your feedback!

http://ed.evasys.co.uk/evasys/online.php?pswd=D83QD

Please use the further comments section to also provide feedback for Matthew on the FSM Workbench

Eventually the link below should work

https://www.inf.ed.ac.uk/teaching/take-surveys

Resolution

$$\frac{X \vee R \qquad \neg R \vee Y}{X \vee Y}$$

R does not occur in X or Y

This rule is **sound**:

if a valuation satisfies both **premises**
then it satisfies the **conclusion**

if a valuation falsifies the **conclusion**
then it falsifies one of the **premises**

key-facts

A

~~**¬A, X0**~~
~~**¬A, X1**~~
~~**¬A, X2**~~
~~**A, Y0**~~
~~**A, Y1**~~

¬B, D
¬E, B

X0, Y0
X0, Y1
X1, Y0
X1, Y1
X2, Y0
X2, Y1

If we can satisfy **all** clauses in this set

then we can satisfy **all** clauses in this set, so we can forget them.

These are carried forward.

$$\frac{\Gamma \vdash A, \Delta \quad \Gamma, B \vdash \Delta}{\Gamma, A \to B \vdash \Delta} \; (\to L)$$

a **counterexample** to the **sequent** Γ ⊢ A, Δ
is a **counterexample** to Γ, A→B ⊢ Δ
(since if A is false then A→B is true)

a **counterexample** to the **sequent** Γ, B ⊢ Δ
is a **counterexample** to Γ, A→B ⊢ Δ
(since if B is true then A→B is true)

States of the DFA are just sets of states of the NFA.

The start state of the DFA is the set of start states of the NFA.

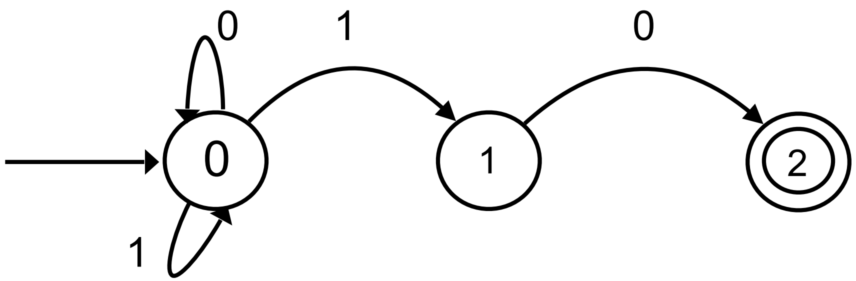
The accepting states of the DFA are those sets of states of the NFA that include at least one accepting state of the NFA.

The DFA has a transition labelled s from a set X of states of the NFA to the set Y consisting of all states y of the NFA such that there exists a $x \in X$ with a transition $s{:}x \to y$ in the NFA.

In the DFA,

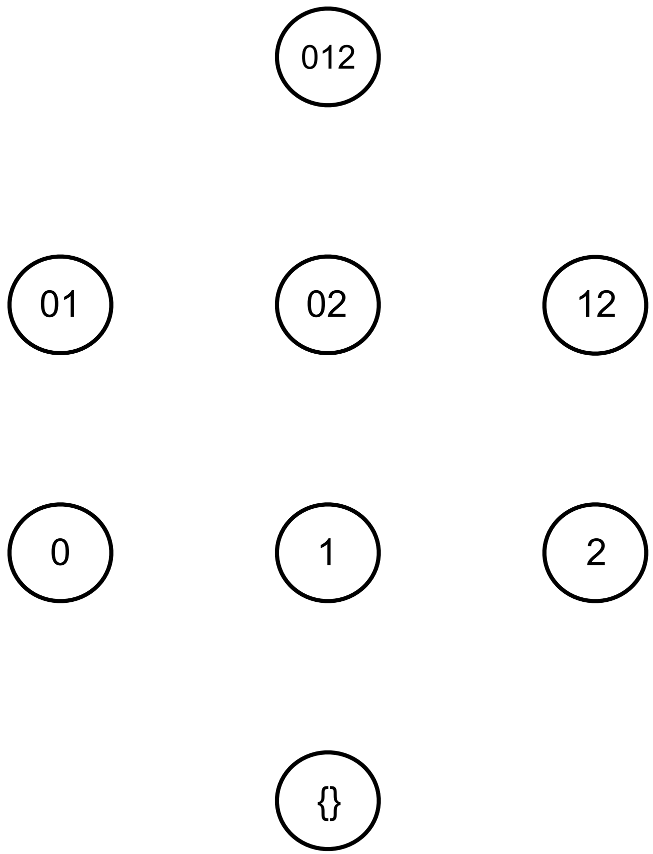
$$s{:}X \to \{y \mid \exists x \in X,\ s{:}x \to y \text{ in the NFA.}\}$$

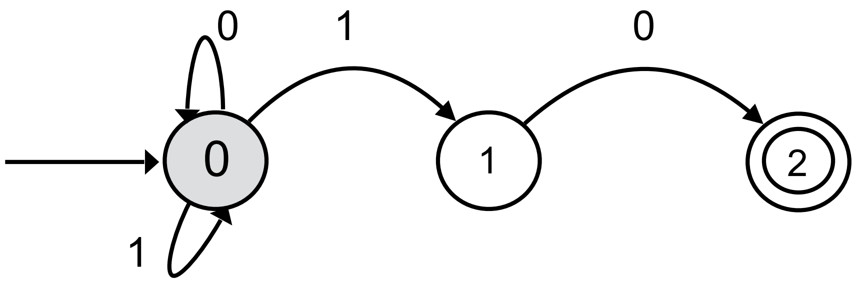
This is the only transition from X with label s.



	0	1
0	0	0,1
1	2	
2		

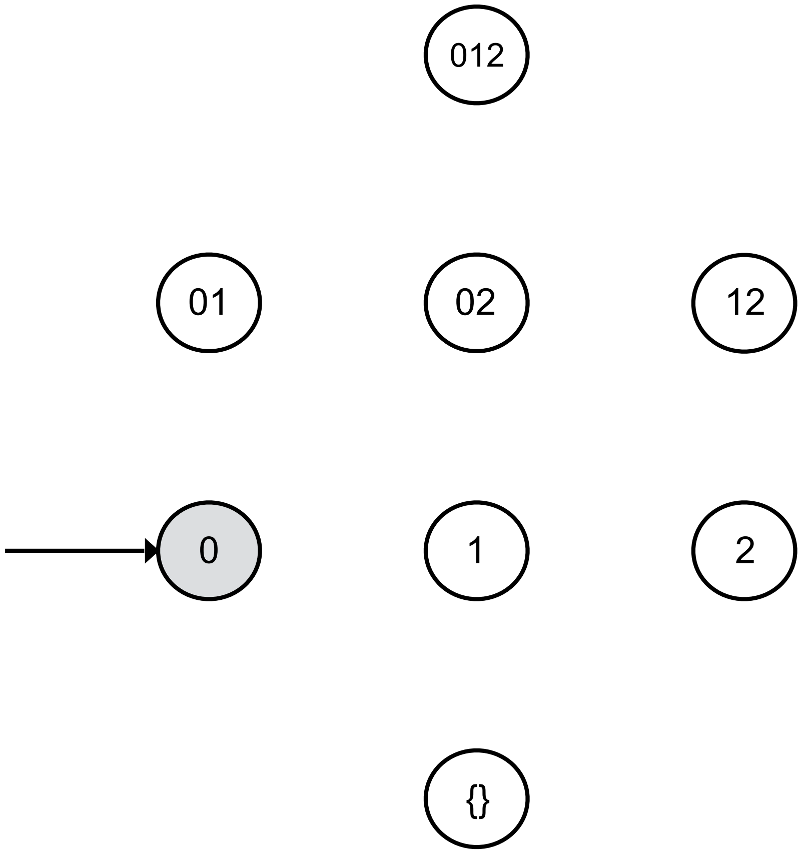
States of the DFA are just sets of states of the NFA.

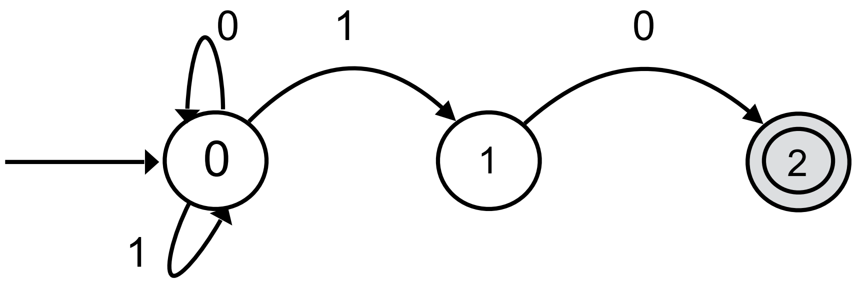




	0	1
0	0	0,1
1	2	
2		

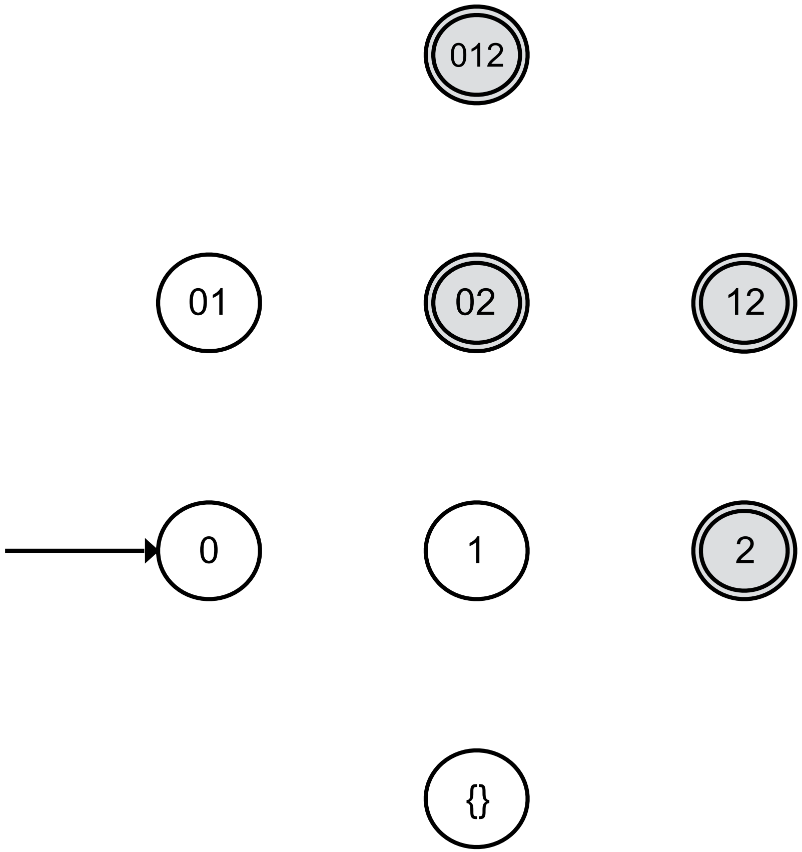
The start state of the DFA is the set of start states of the NFA.

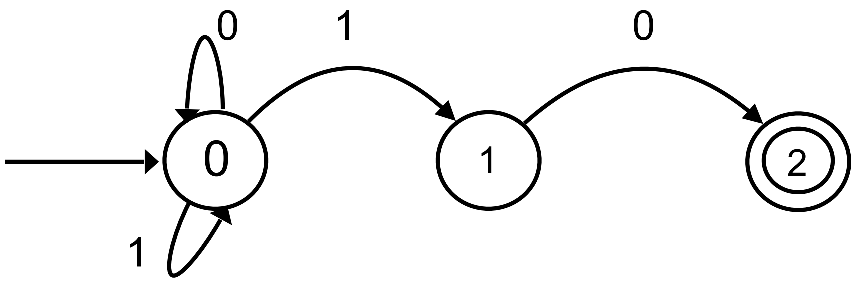




	0	1
0	0	0,1
1	2	
2		

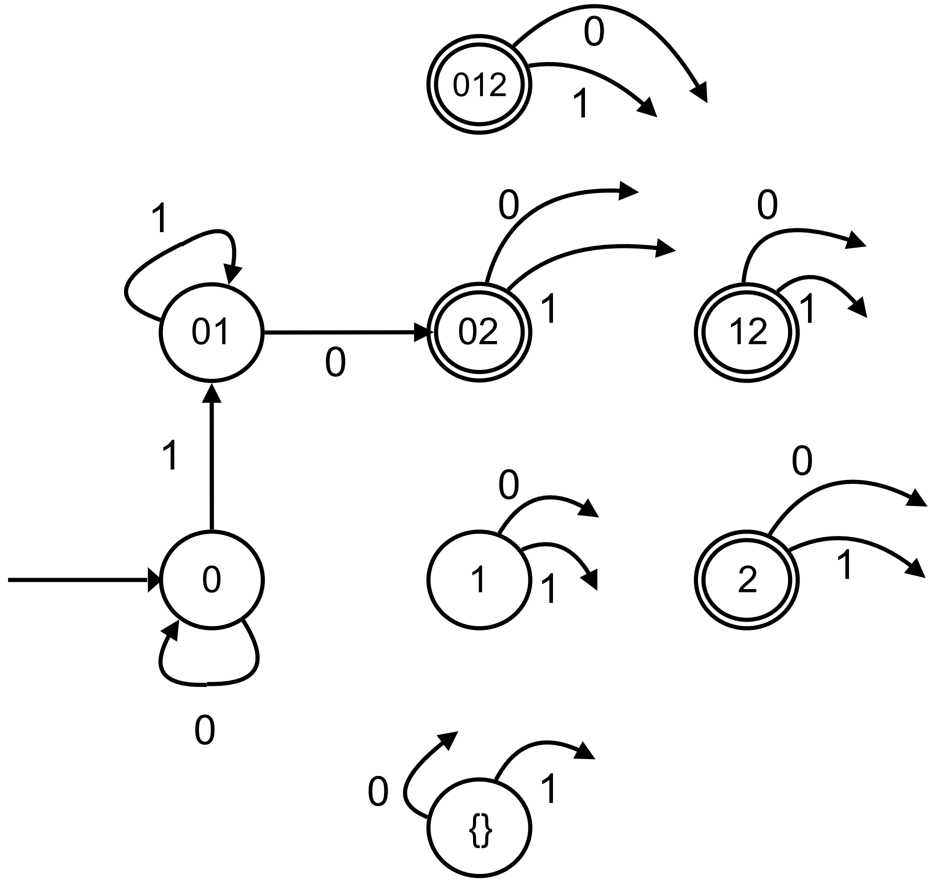
The accepting states of the DFA are those sets of states of the NFA that include at least one accepting state of the NFA.





	0	1
0	0	0,1
1	2	
2		

s:X→{y | ∃x∈X, s:x→y in the NFA.}



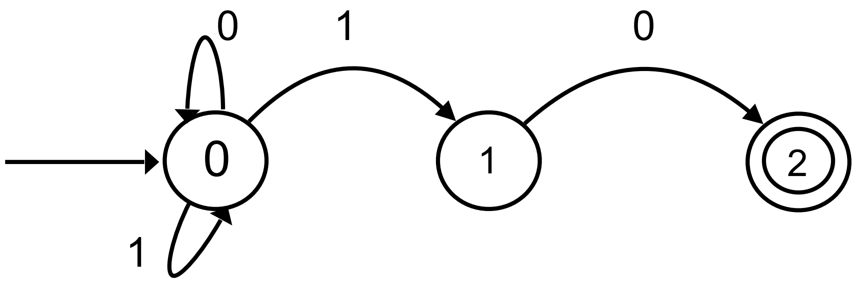
For each set of states, X, we compute

$Y_s = \{y \mid \exists x \in X,\ s{:}x \rightarrow y\}$

for each s in { 0, 1 }, and add a transition,

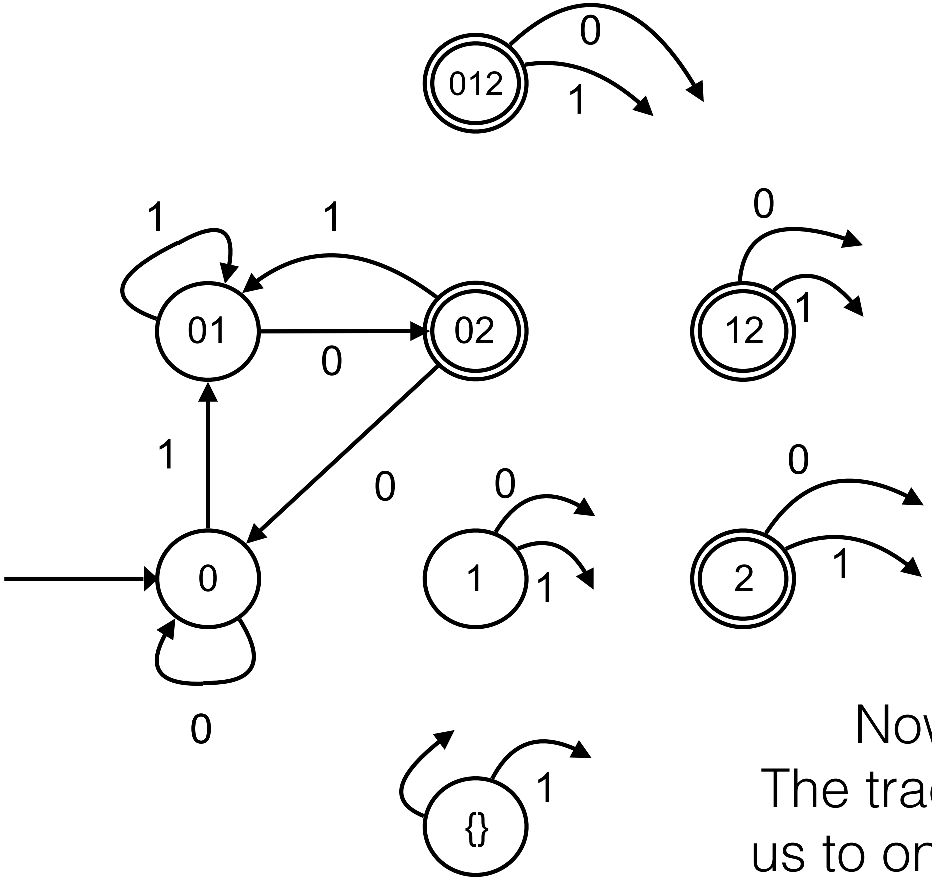
$X \xrightarrow{s} Y_s$

Here we still have some work to do …



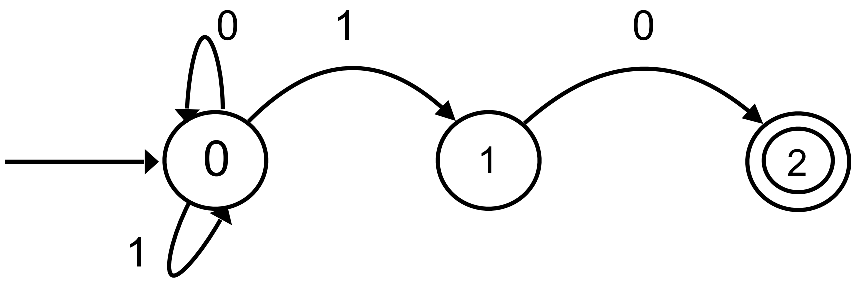
	0	1
0	0	0,1
1	2	
2		

$s{:}X \rightarrow \{y \mid \exists x \in X,\ s{:}x \rightarrow y$ in the NFA.$\}$



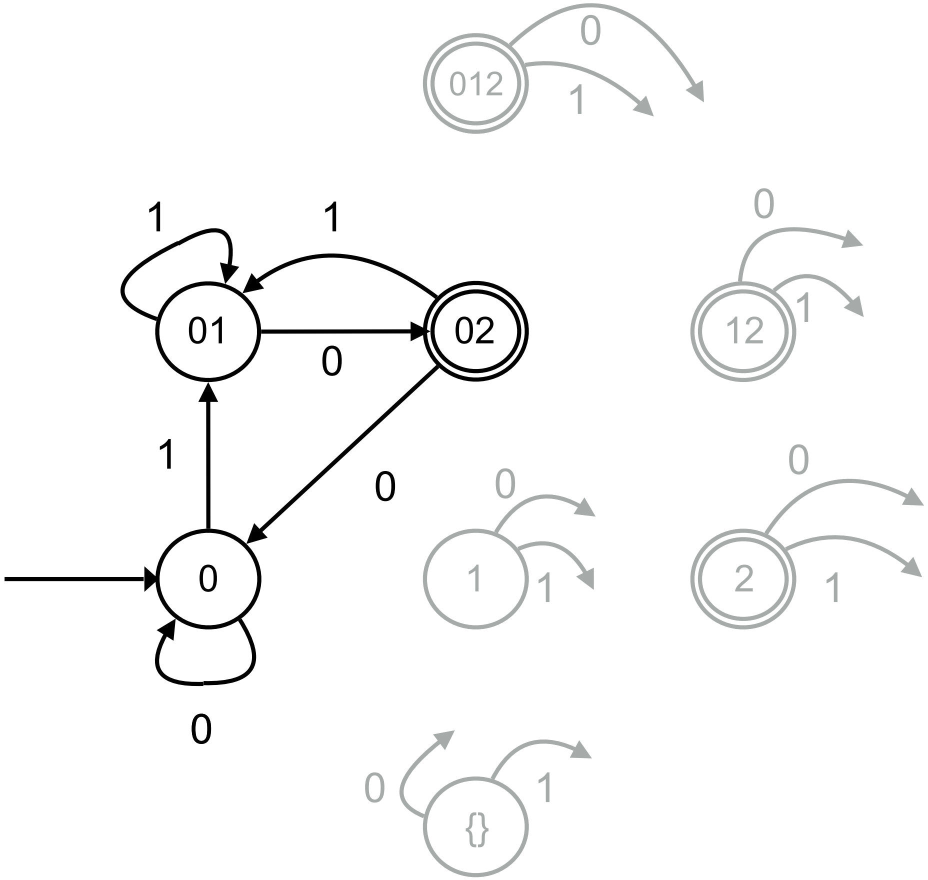
	0	1
0	0	0,1
1	2	
2		
0,1	0,2	0,1
0,2	0	0,1

Now we have a closed system.
The trace for any binary string will lead us to one of the three completed states.

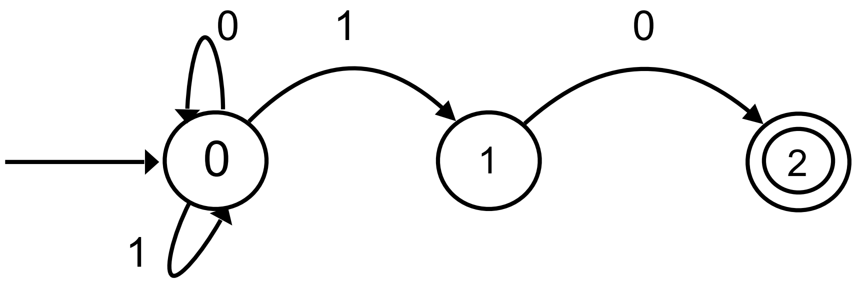


	0	1
0	0	0,1
1	2	
2		

$s : X \to \{ y \mid \exists x \in X,\ s : x \to y$ in the NFA.$\}$

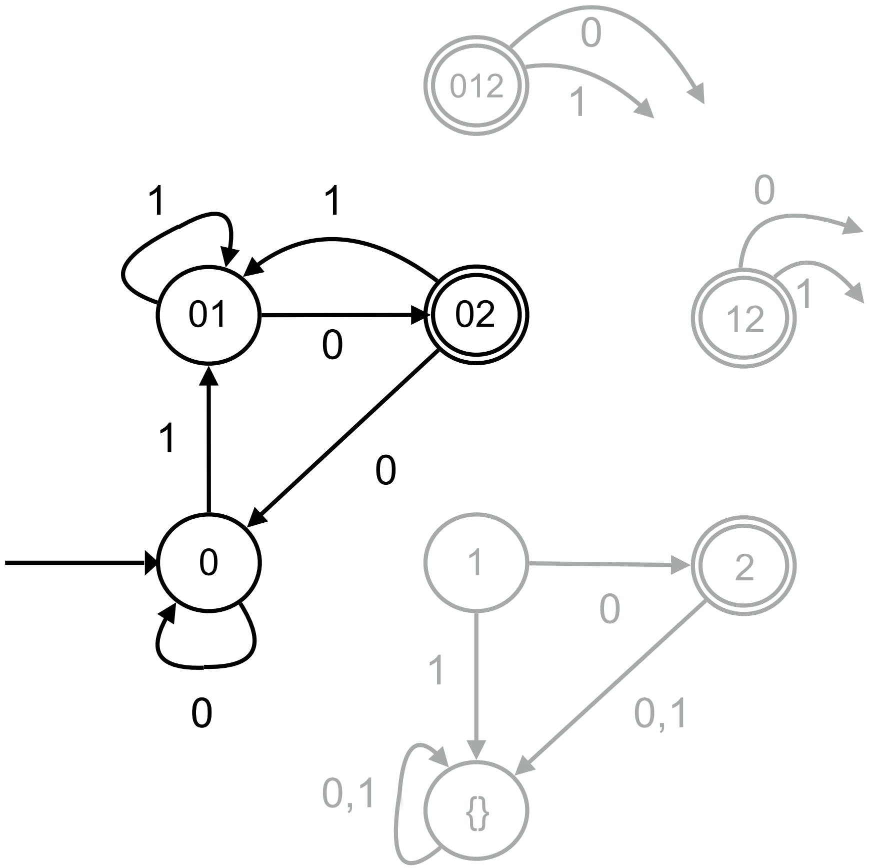


The remaining states are unreachable



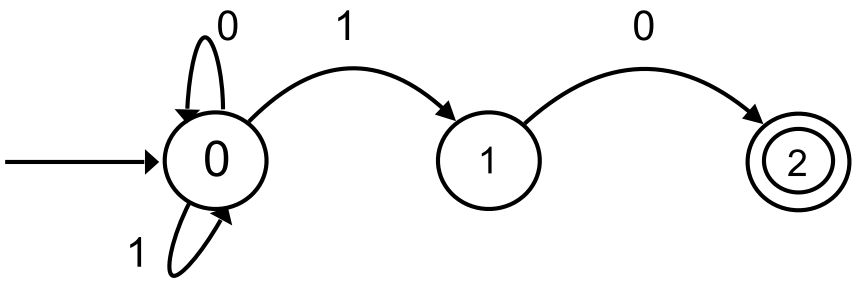
	0	1
0	0	0,1
1	2	
2		

$$s:X \to \{y \mid \exists x \in X,\ s:x \to y \text{ in the NFA.}\}$$



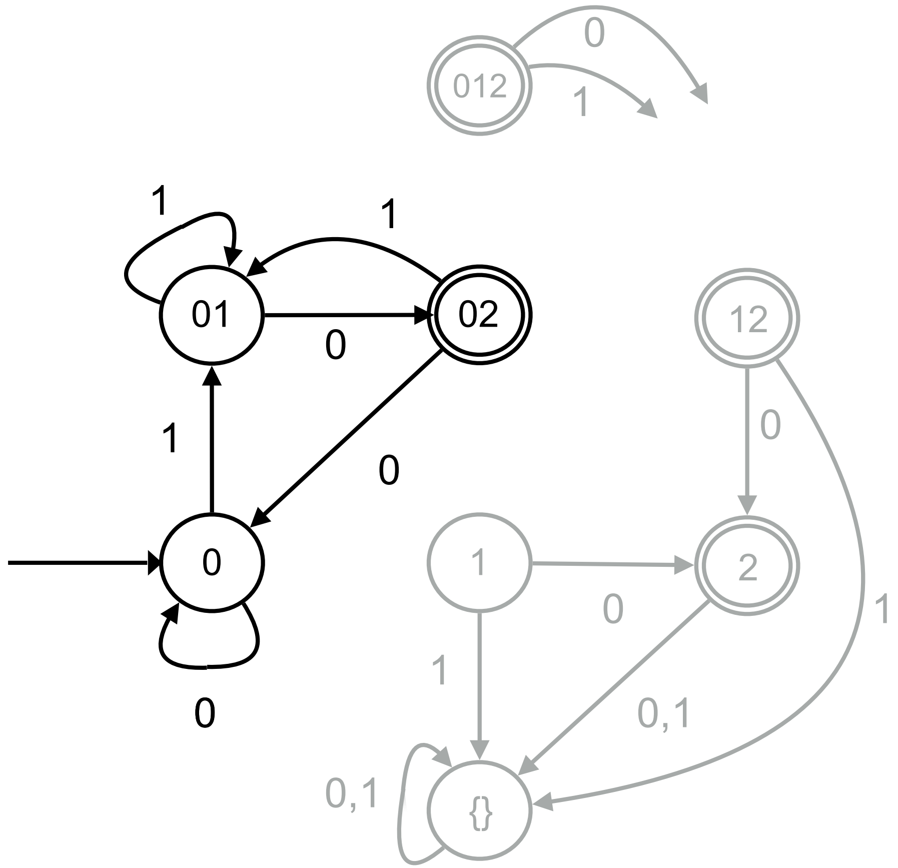
The remaining states are unreachable from the start state.

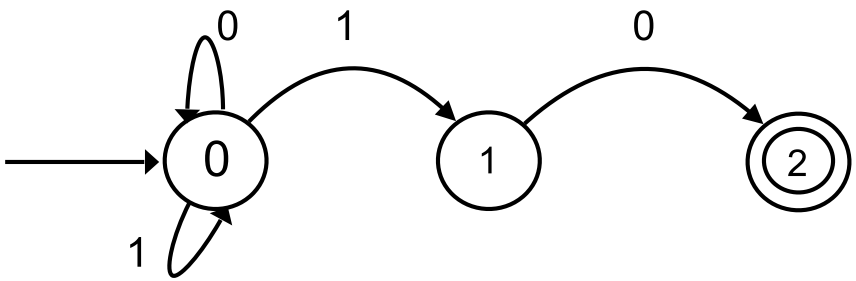
We can still compute the transitions between them.



	0	1
0	0	0,1
1	2	
2		

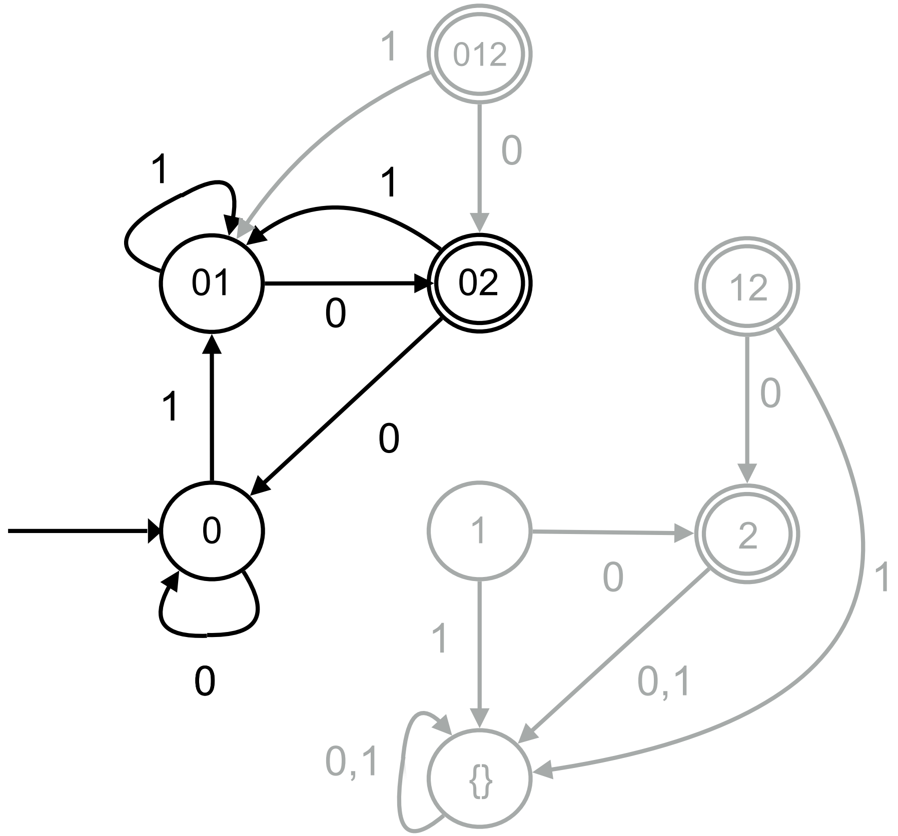
$$s: X \rightarrow \{y \mid \exists x \in X,\ s: x \rightarrow y \text{ in the NFA.}\}$$

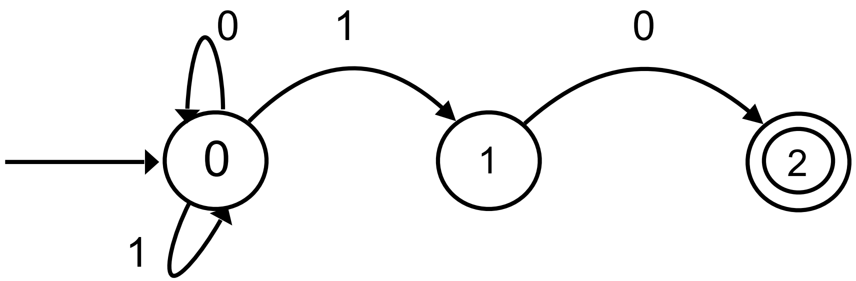




	0	1
0	0	0,1
1	2	
2		

$s:X \rightarrow \{y \mid \exists x \in X,\ s:x \rightarrow y \text{ in the NFA.}\}$





	0	1
0	0	0,1
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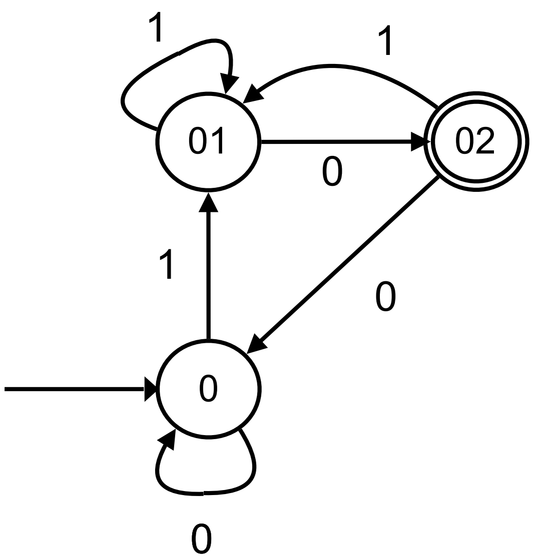

	0	1
0	0	0,1
1	2	
2		
0,1	0,2	0,1
0,2	0	0,1

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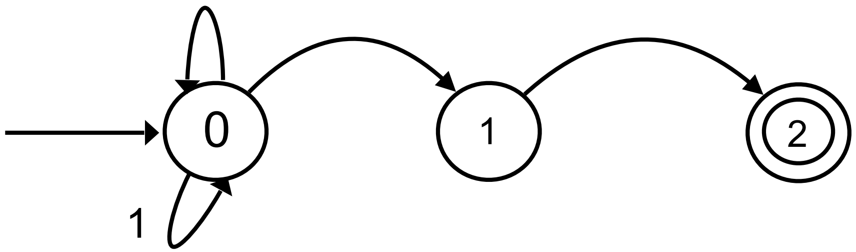
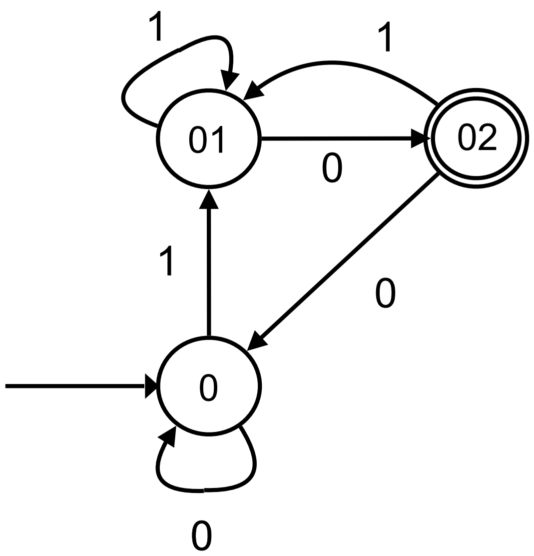


	0	1
0	0	0,1
1	2	
2		

From this description, we get a DFA equivalent to the NFA, but it generally includes many unreachable states.

We normally just construct the set of reachable states, which gives a smaller, but still equivalent DFA.



	0	1
0	0	0,1
1	2	
2		
0,1	0,2	0,1
0,2	0	0,1