NFA-Λ, NFA, DFA dönüşümü
$\cup$ ve $\cap$ kümelerinin DFA'sı örnekler

Örnek: Birleşim ve kesişim kümesinin DFA'sının bulunması

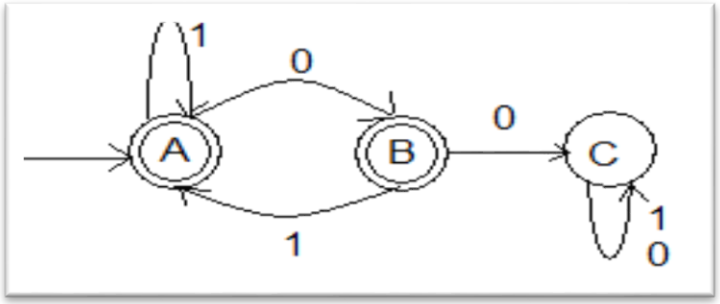
L1 ve L2 dilleri aşağıdaki gibi tanımlanmaktadır.

$L1=\{x \in (0,1)^* | x$ katarı 00 alt katarı içermez$\}$

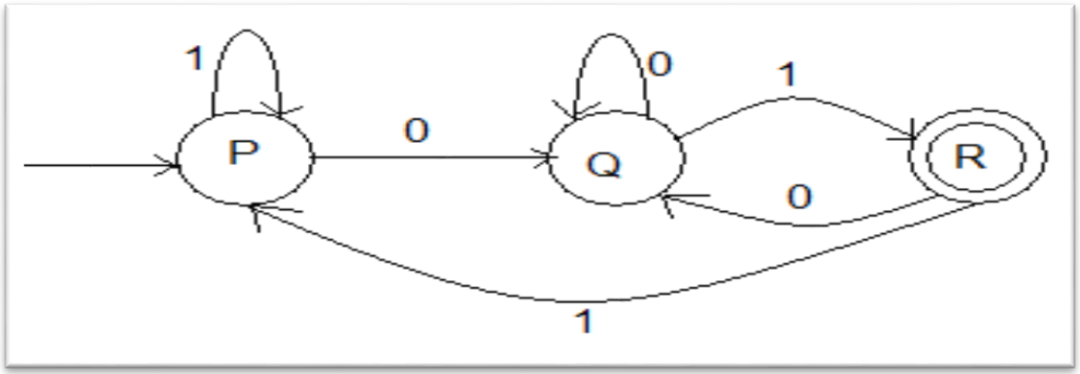
$L2=\{ x \in (0,1)^* | x$ katarı 01 ile biter$\}$

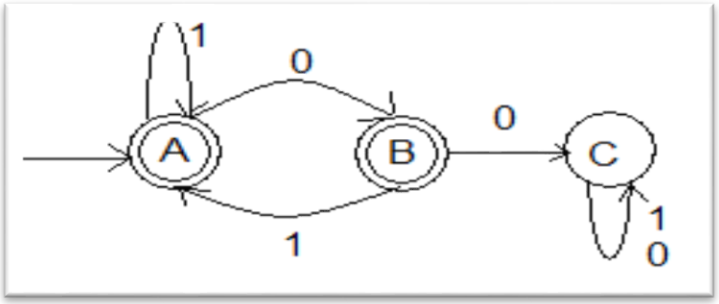
$L1 \cup L2$ ve $L1 \cap L2$ dillerini tanıtan DFA'yı çiziniz

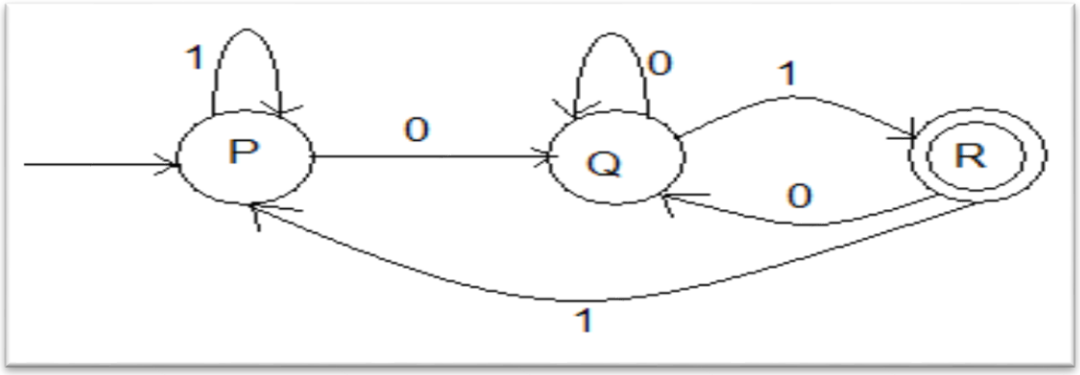
L1={xЄ(0,1)*|x katarı 00 alt katarı içermez}



L2={ xЄ(0,1)*|x katarı 01 ile biter}







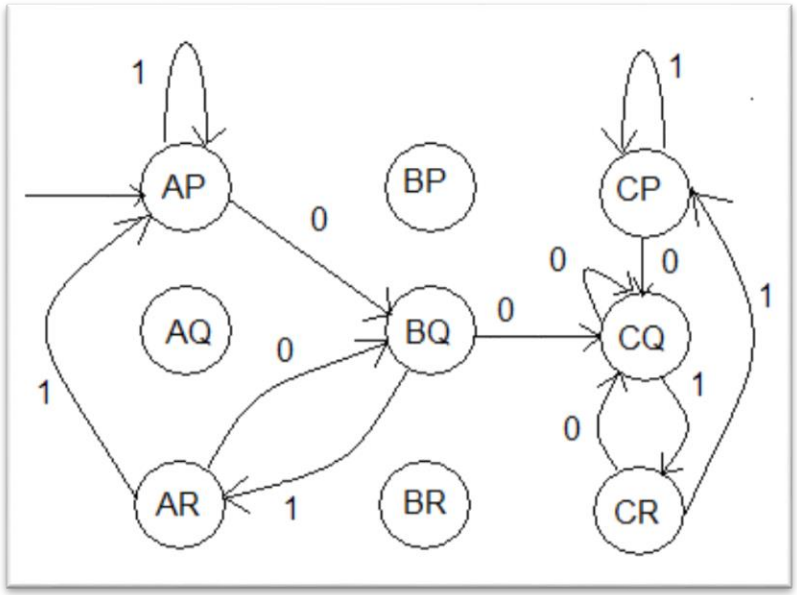
$\delta(AP,0) = (\delta_1(A,0), \delta_2(P,0)) = BQ$

$\delta(AP,1) = (\delta_1(A,1), \delta_2(P,1)) = AP$

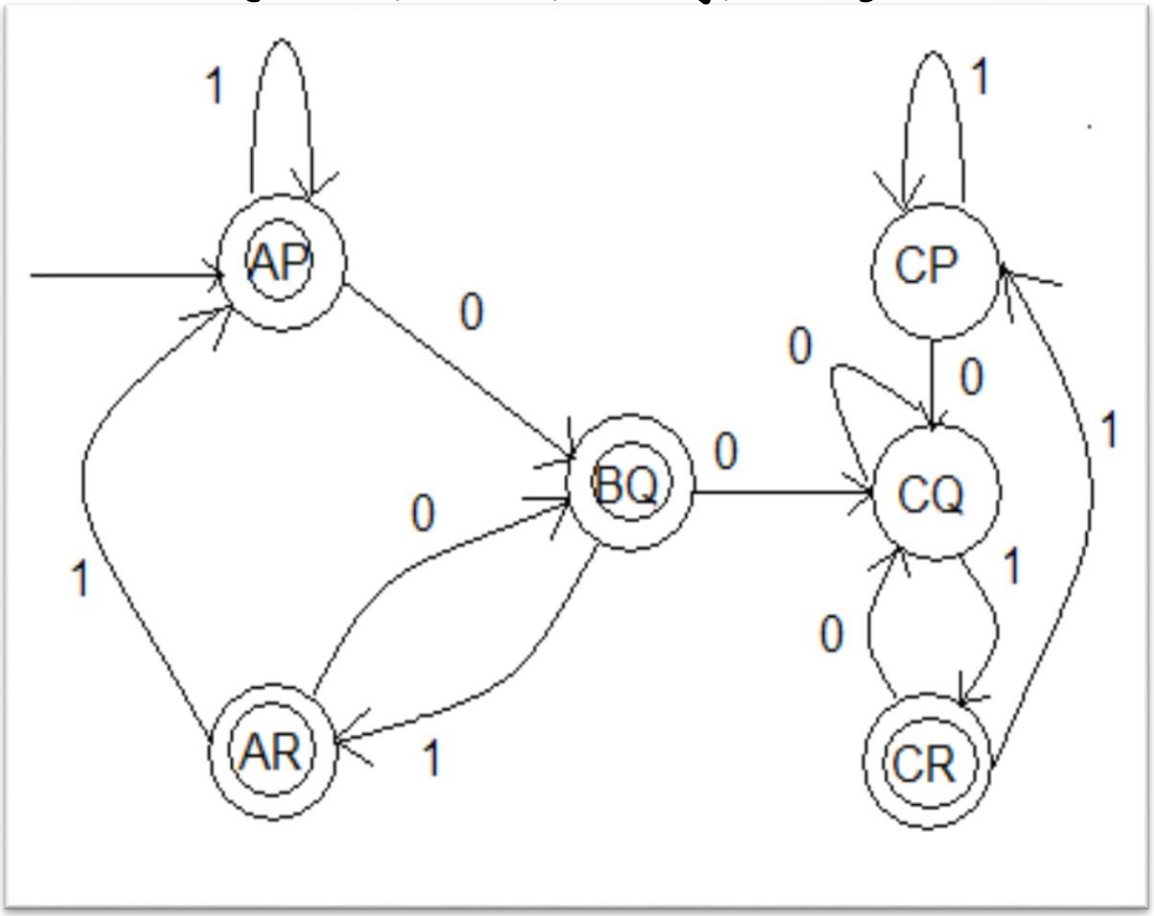
$\delta(BQ,0) = (\delta_1(B,0), \delta_2(Q,0)) = CQ$

$\delta(BQ,1) = (\delta_1(B,1), \delta_2(Q,1)) = AR$

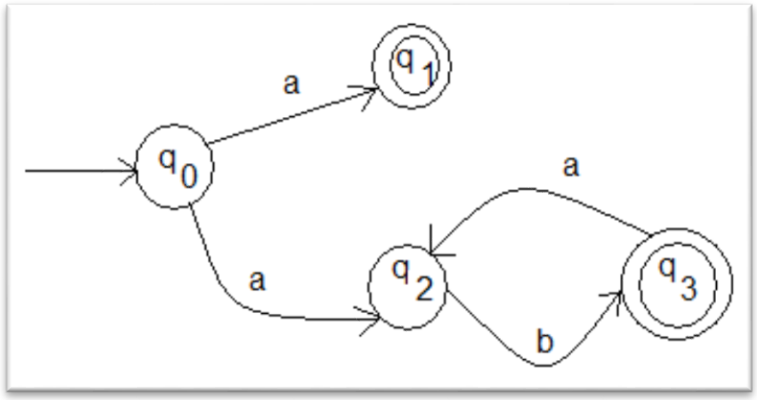
……



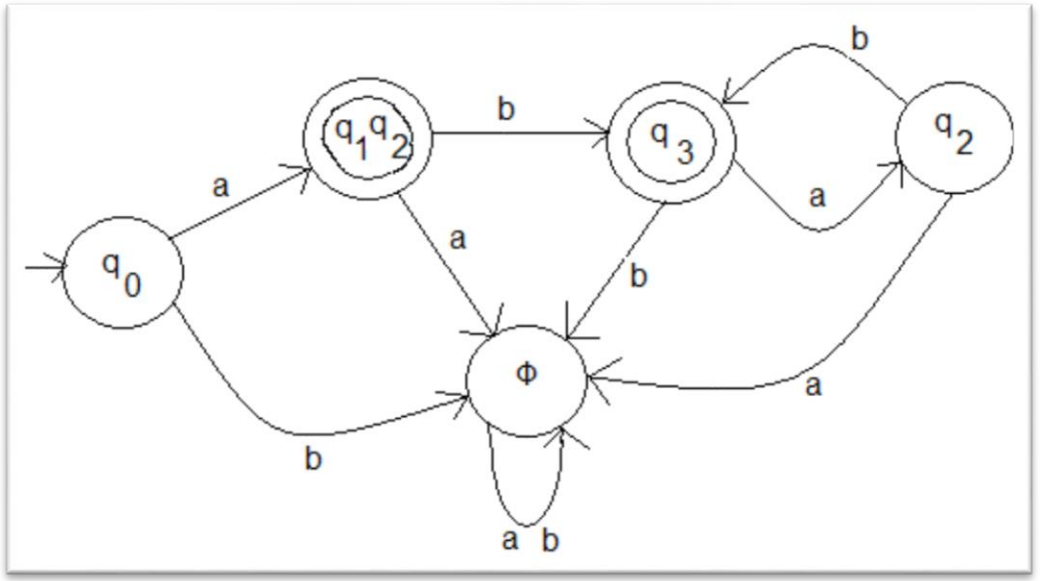
L1∪L2
F={AP,AR,BQ,CR}



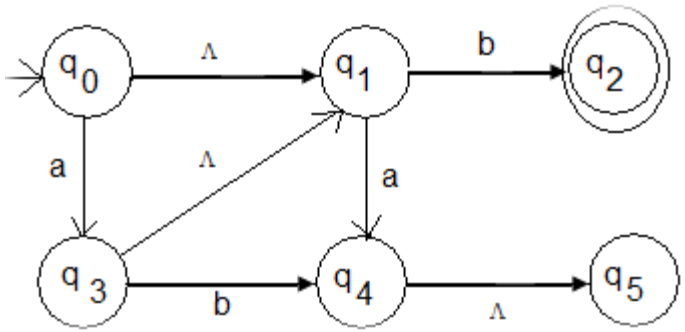
$a+(ab)^+$ regüler ifadesinin tanımlamış olduğu dili tanıyan NFA'yı çiziniz. Bu NFA'ya eşdeğer DFA'yı çiziniz.

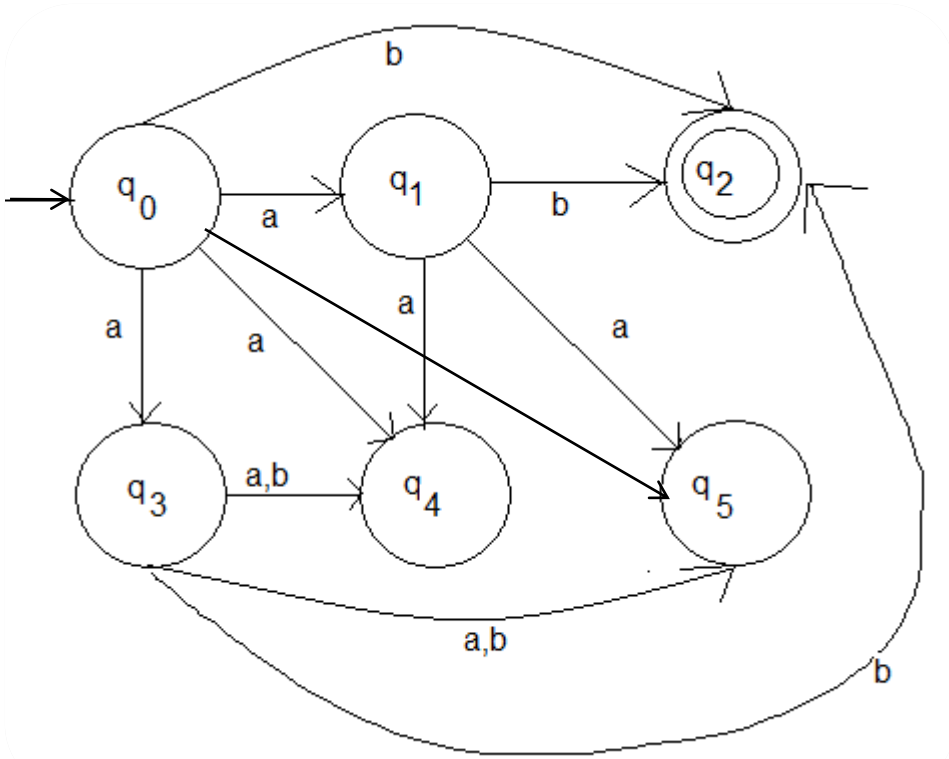


δ(q0,a)={q1,q2}
δ(q0,b)=Φ
δ({q1,q2},a)= Φ
δ({q1,q2},b)={q3}
δ(Φ, a)= δ(Φ,b)= Φ
δ(q3,a)={q2}
δ(q3,b)= Φ
δ(q2,a)= Φ
δ(q2,b)= {q3}



Aşağıda verilen boşluk geçişli NFA'ya karşılık gelen NFA yı bulunuz.





$\Lambda(q_0)=\{q0, q1\}$

$\delta(q0,a)= \delta(\{q0, q1\},a)= \delta(q0,a) \cup \delta(q1,a) =\{q3,q4\}$

$\Lambda(\{q3,q4\})=\{ q1, q3, q4, q5\}$

q0'dan b simgesiyle ulaşabileceğim durumları listelemek için aşağıdaki adımlar uygulanır.

$\Lambda(q_0)=\{q0, q1\}$

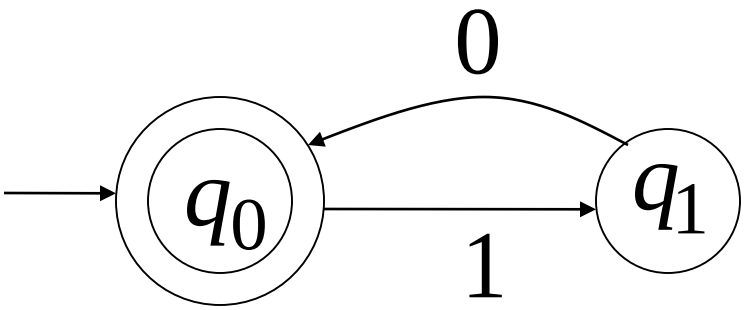
$\delta(q0,b)= \delta(\{q0, q1\},b)= \delta(q0,b) \cup \delta(q1,b) =\{q2\}$

$\Lambda(\{q2\})=\{ q2\}$

Örnek

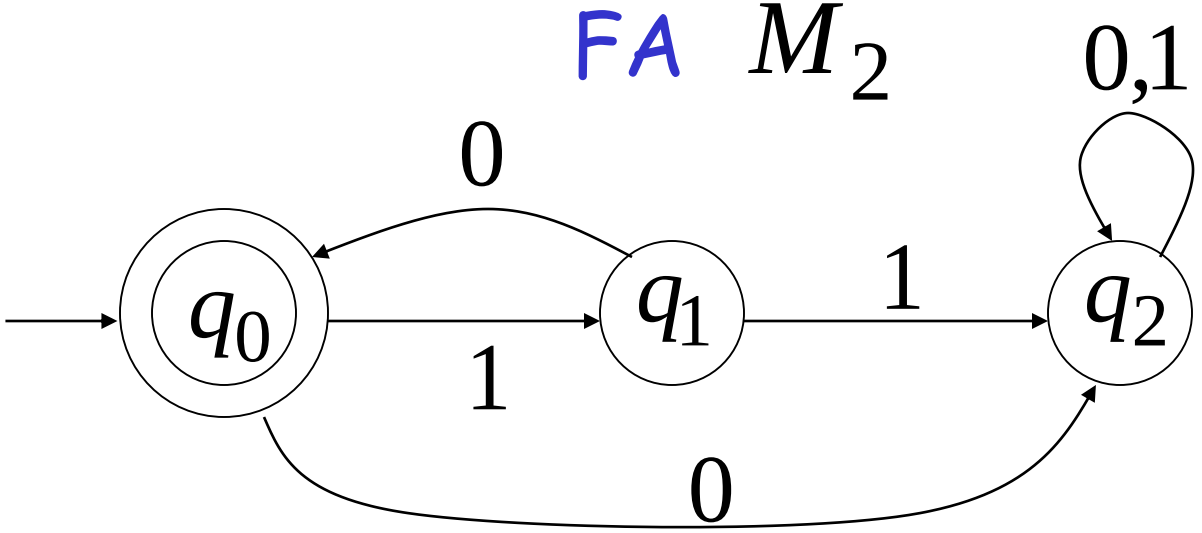
$L(M_1) = \{10\}*$

NFA M_1



$L(M_2) = \{10\}*$

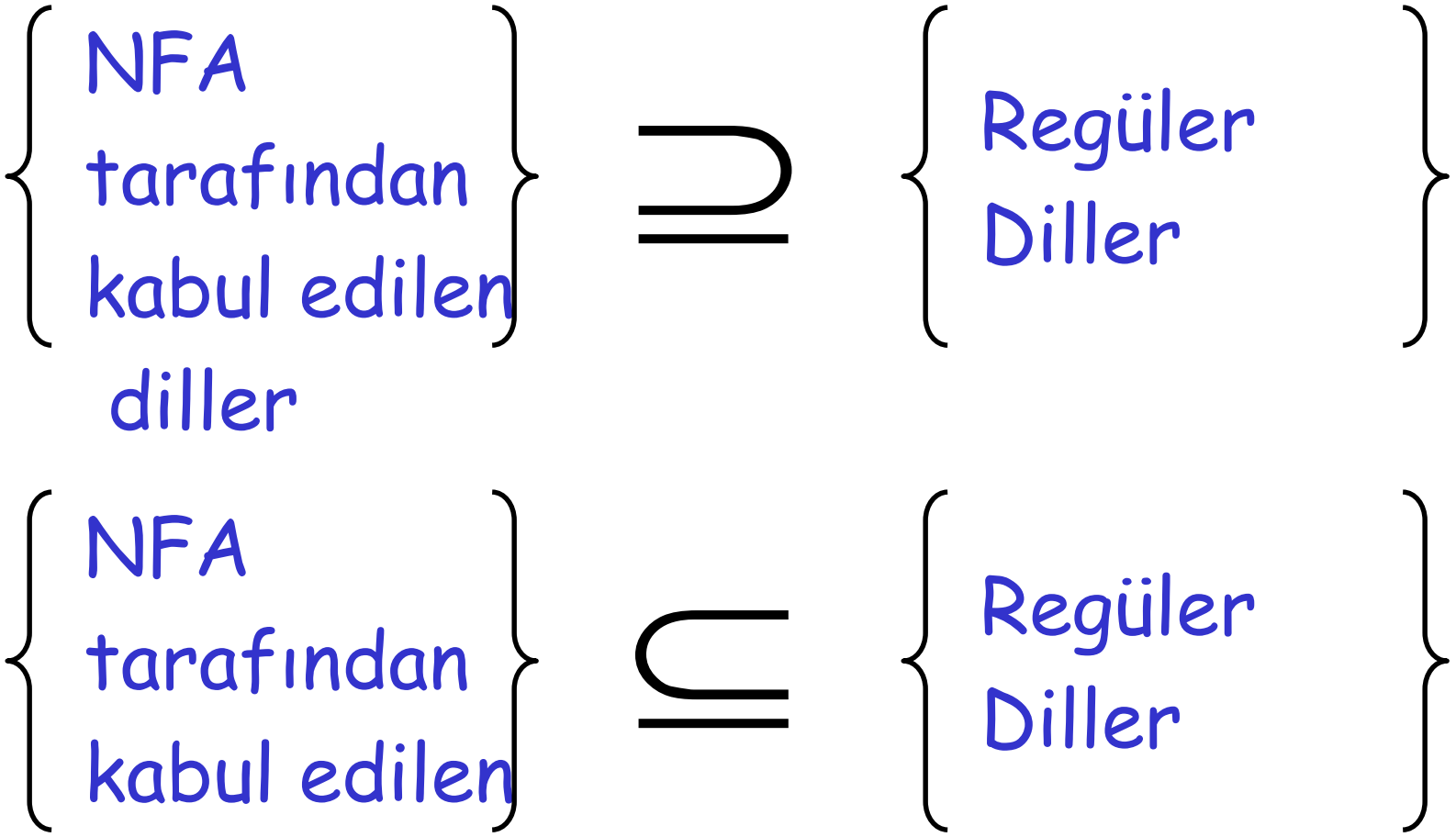
FA M_2



{ NFA'nın tanıdığı dil } = { Regüler Diller }

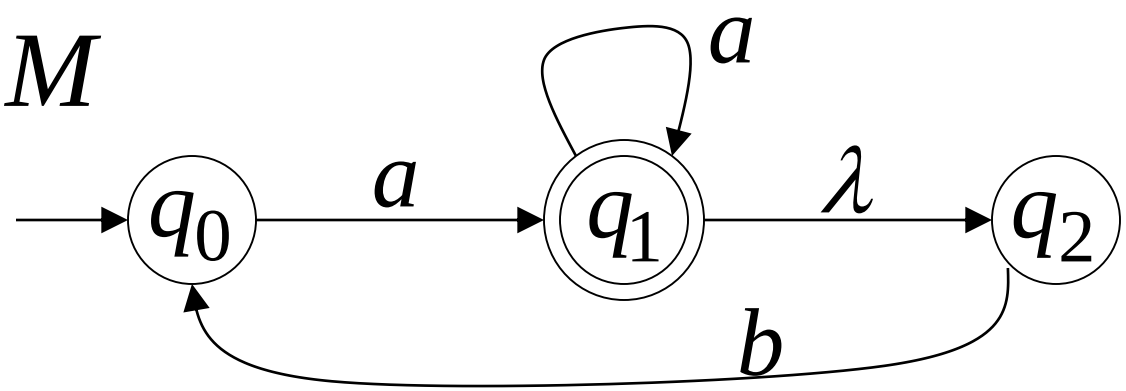
DFA tarafından kabul edilen Diller

Bu yüzden NFA ve DFA aynı hesaplama gücüne sahiptir.

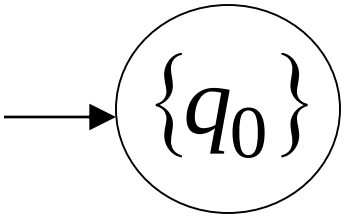

NFA tarafından kabul edilen diller
Regüler Diller
NFA tarafından kabul edilen diller
Regüler Diller

NFA'dan DFA'ya dönüşüm

NFA M

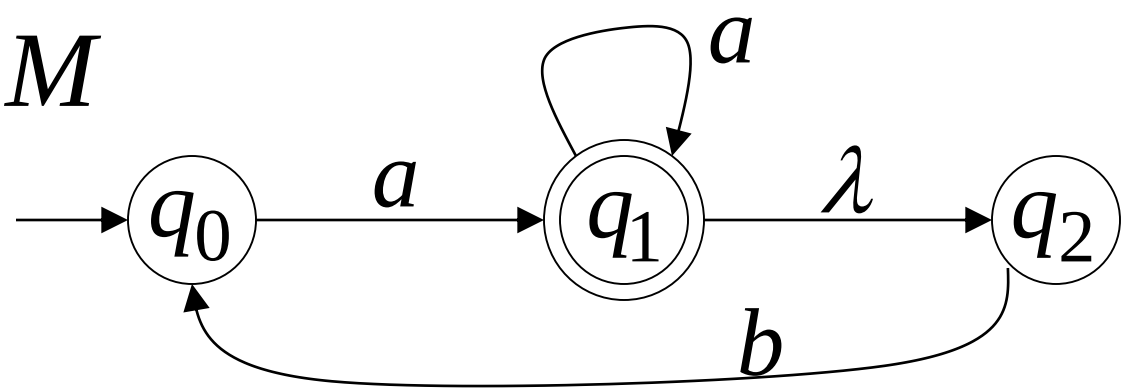


FA M'

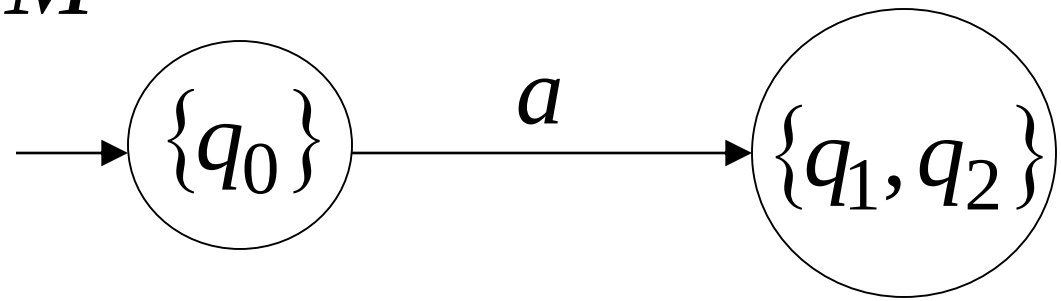


NFA'dan DFA'ya

NFA M

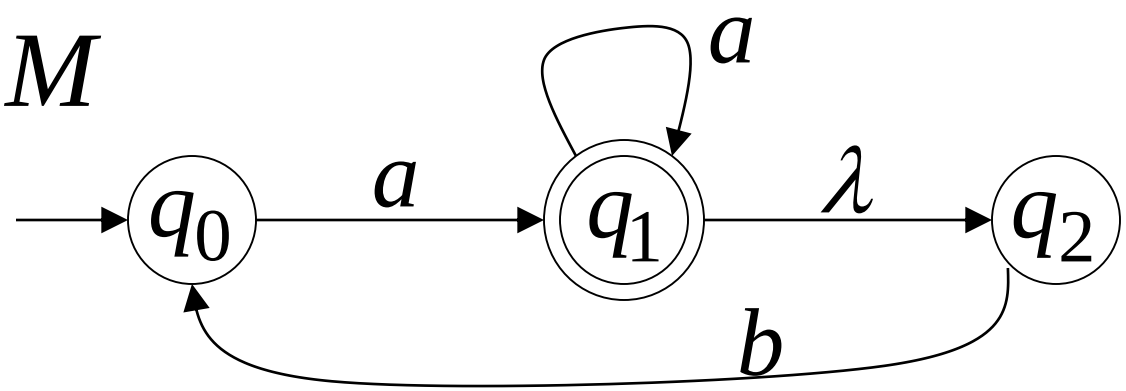


FA M'

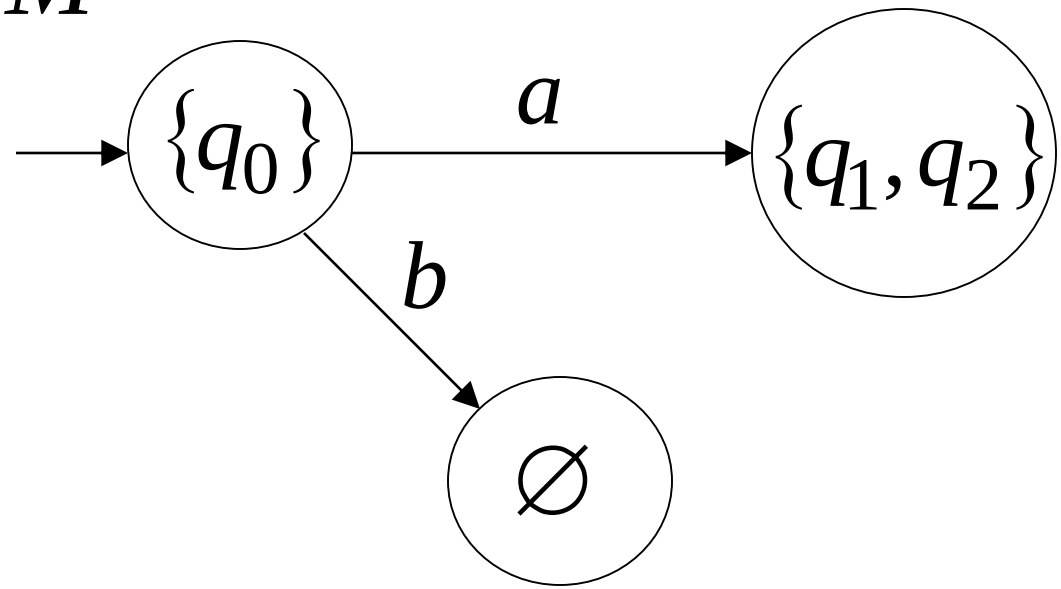


NFA'dan DFA'ya

NFA M

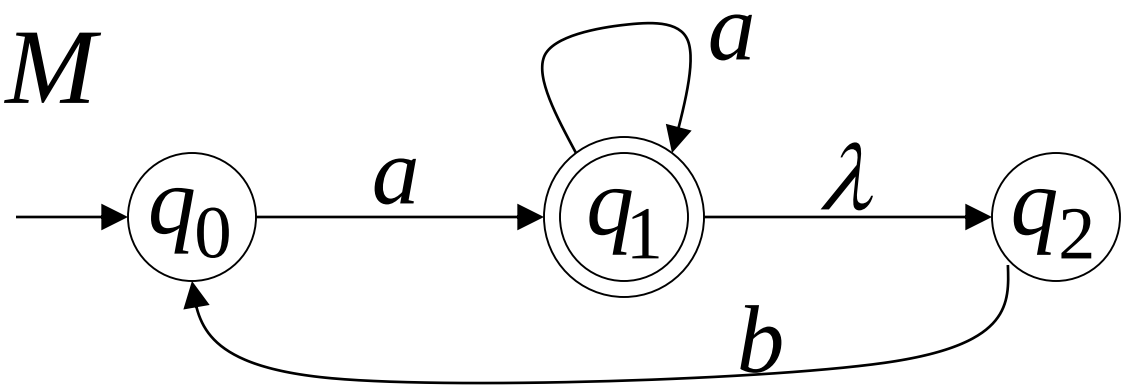


FA M'

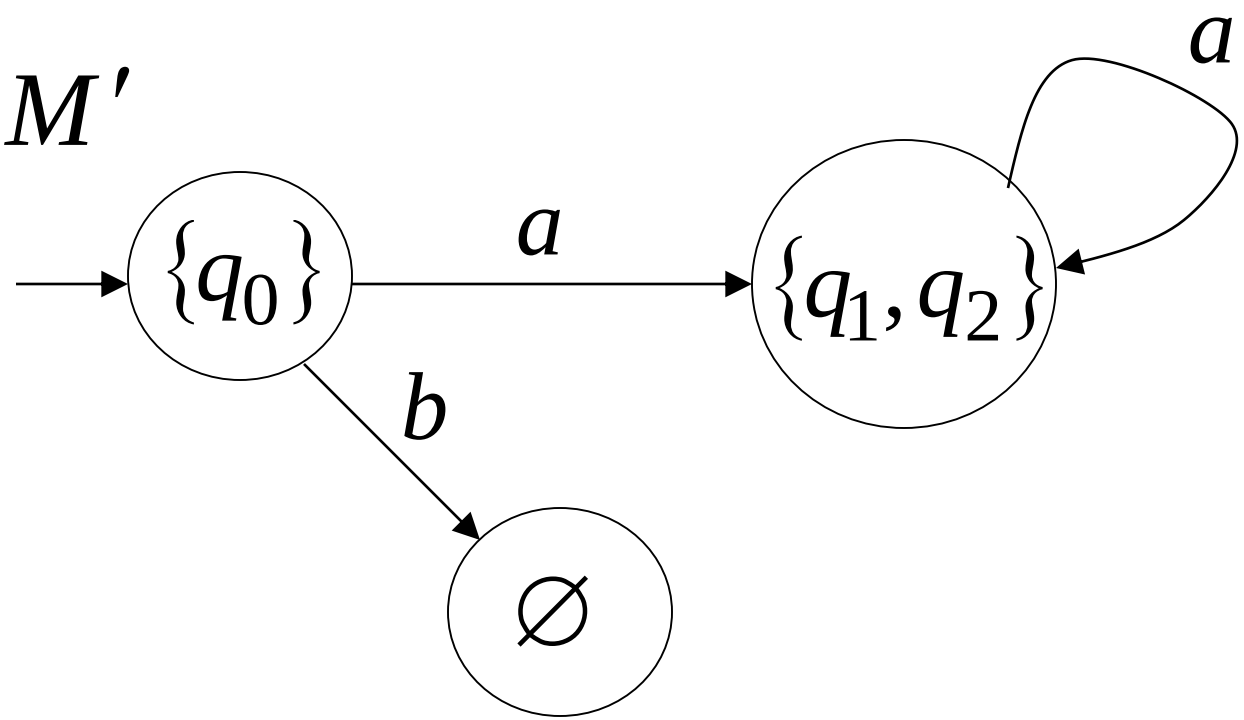


NFA'dan DFA'ya

NFA M

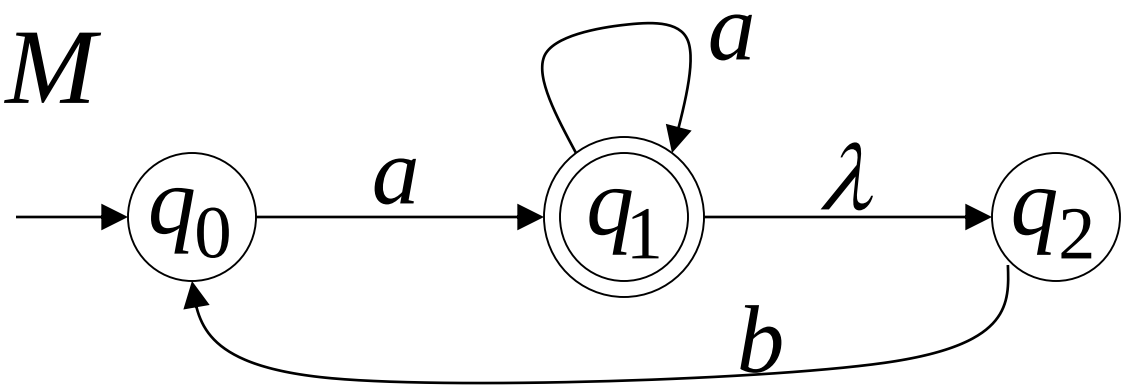


FA M'

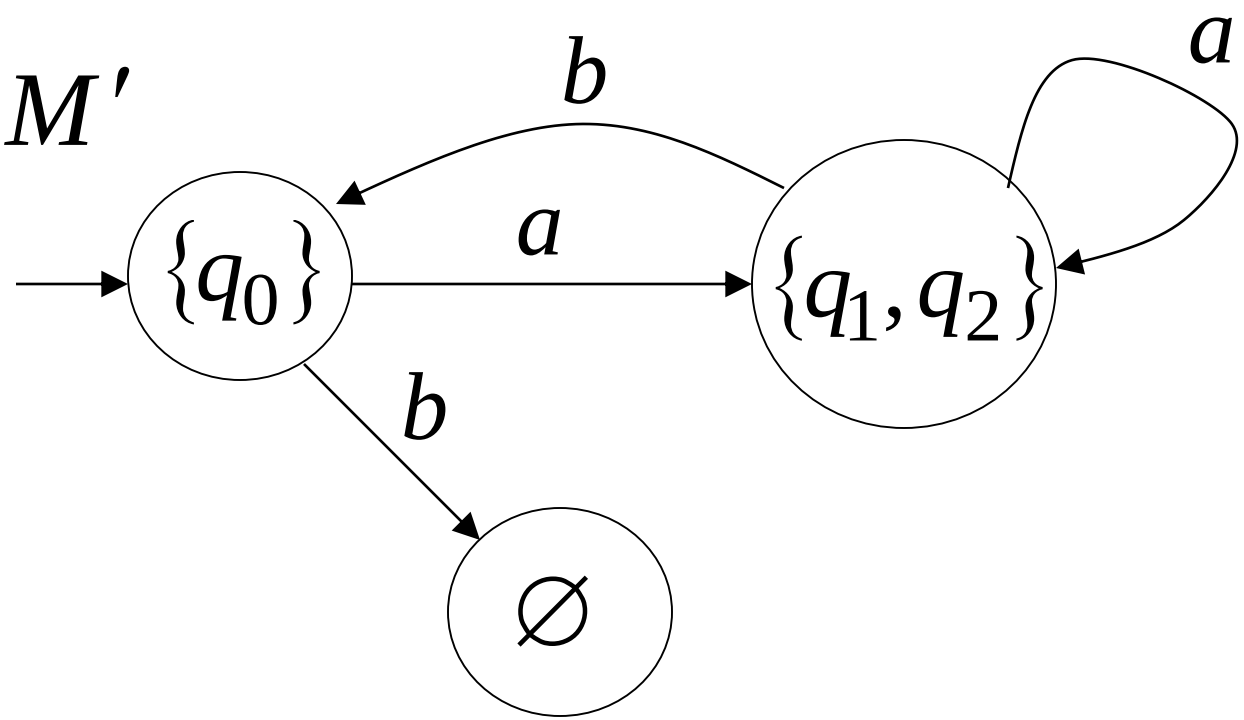


NFA'dan DFA'ya

NFA M

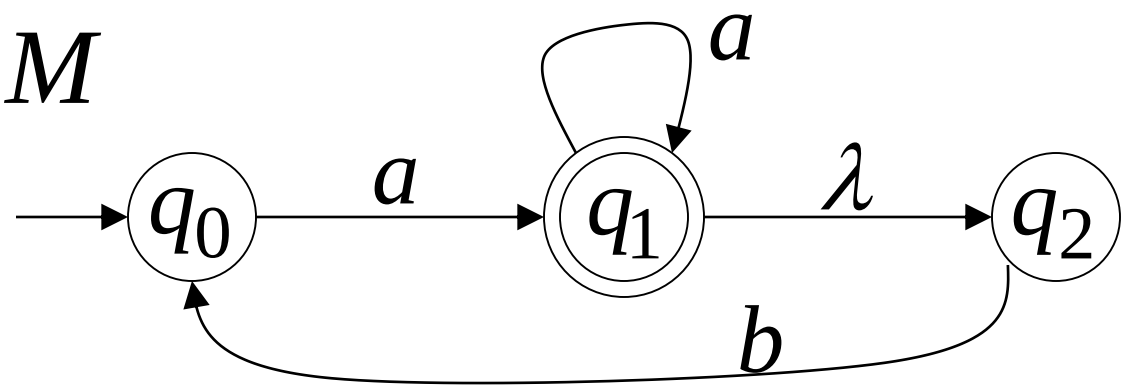


FA M'

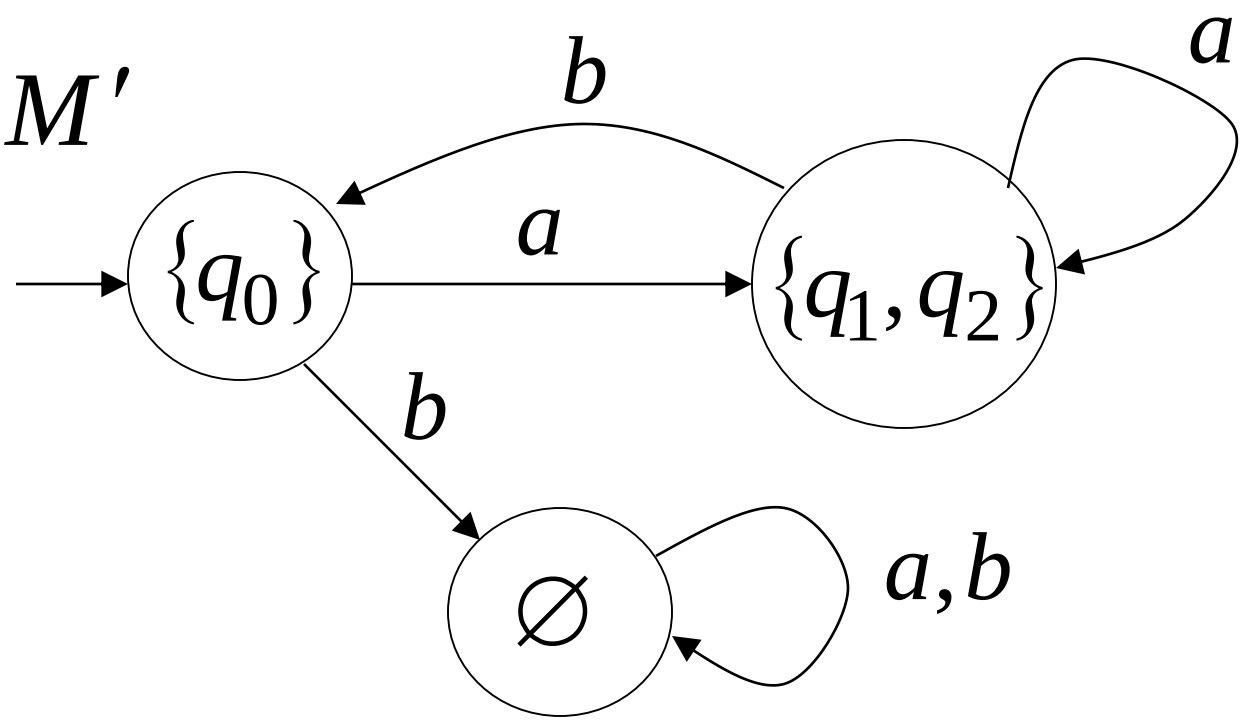


NFA'dan DFA'ya

NFA M

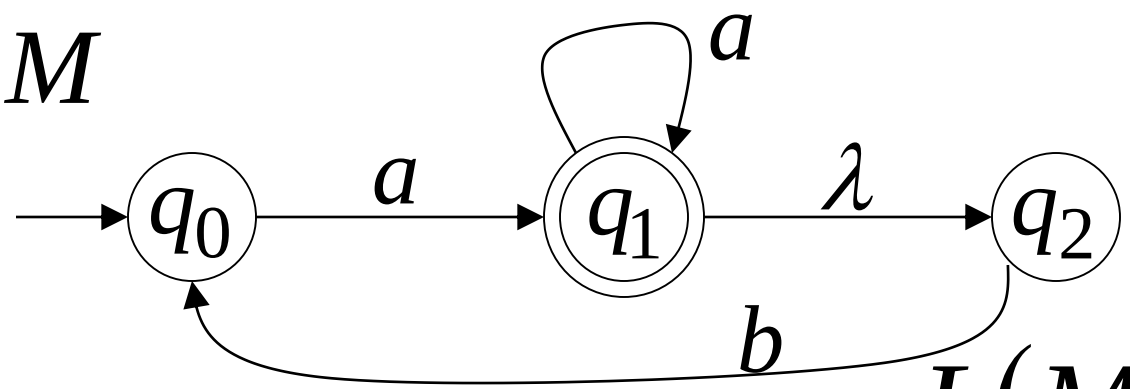


FA M'



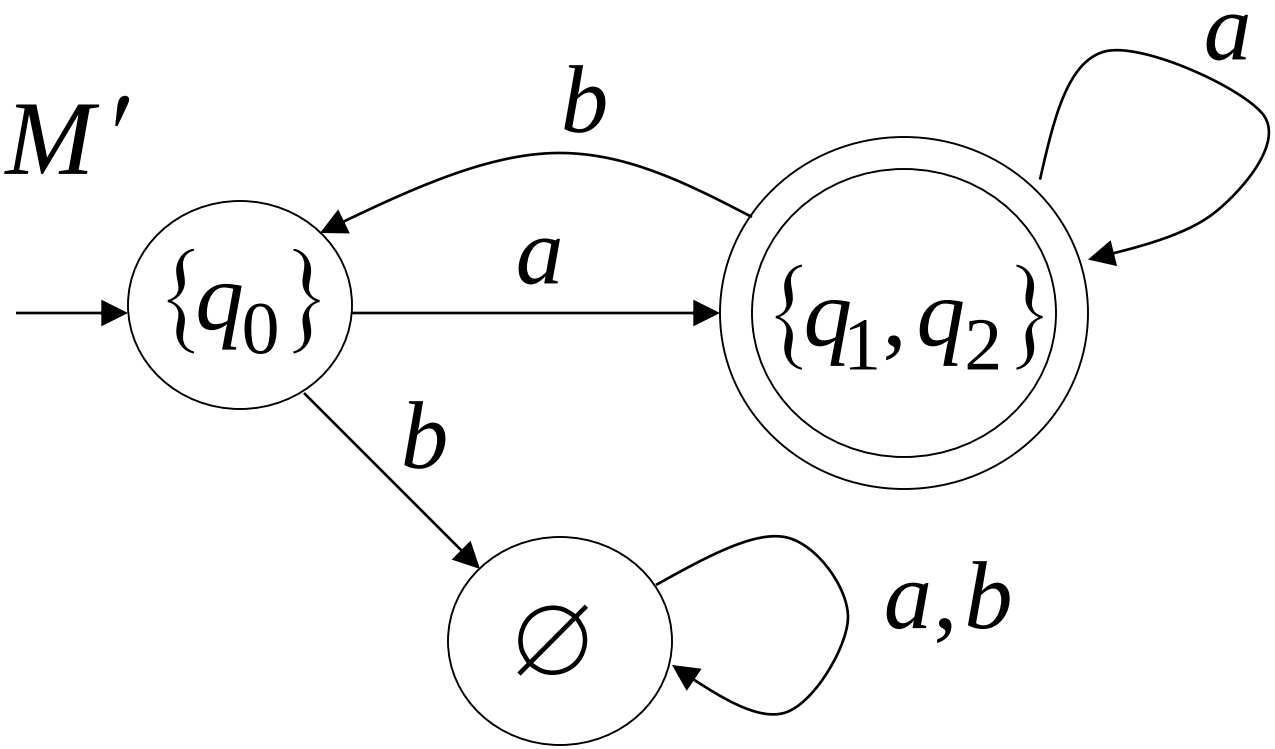
NFA'dan DFA'ya

NFA M



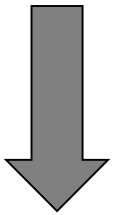
$$L(M) = L(M')$$

FA M'



NFA'dan to DFA'ya dönüşüm işlem sırası

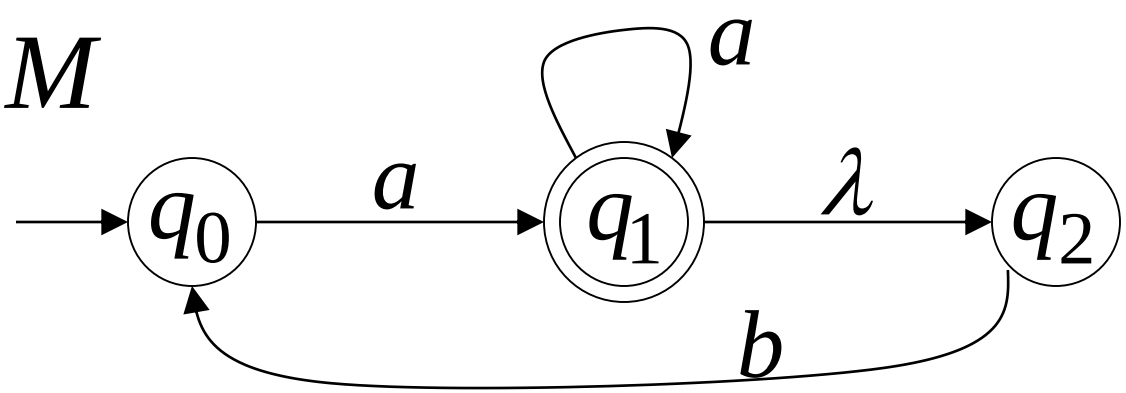
1. NFA'nın başlangıç durumu: q_0



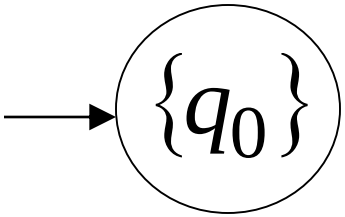
FA 'nın başlangıç durumu : $\{q_0\}$

Örnek

NFA M



FA M'



NFA'dan FA'ya

2. FA'nın her durumu için $\{q_i, q_j, \ldots, q_m\}$

NFA'nın rekürsif geçiş fonksiyonu

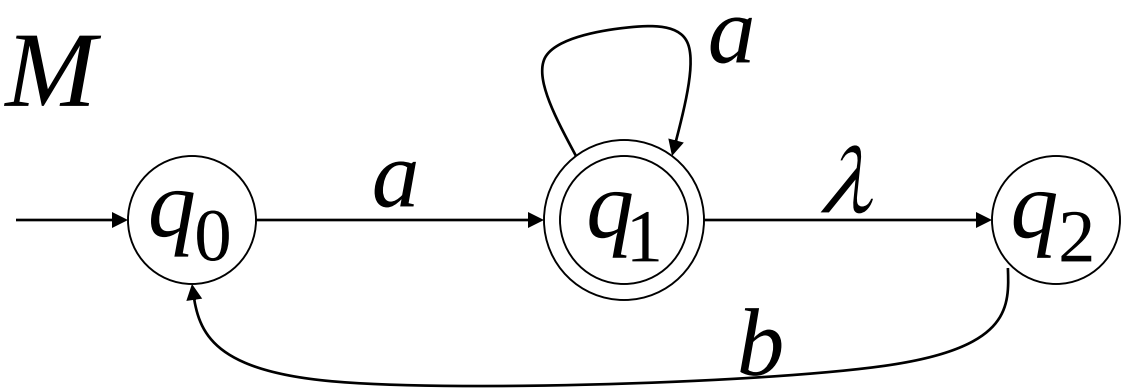
$$\left.\begin{array}{l} \delta^*(q_i, a), \\ \delta^*(q_j, a), \\ \\ \ldots \end{array}\right\} = \{q'_i, q'_j, \ldots, q'_m\}$$

geçişleri FA'ya eklenir.

$$\delta(\{q_i, q_j, \ldots, q_m\},\ a) = \{q'_i, q'_j, \ldots, q'_m\}$$

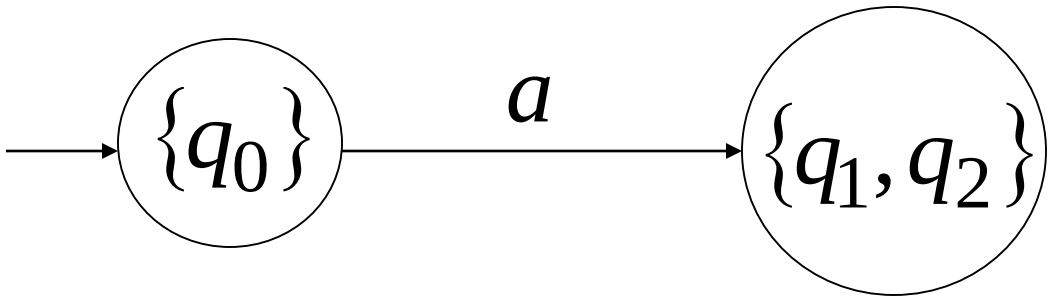
Örnek

NFA M



$$\delta^*(q_0, a) = \{q_1, q_2\}$$

FA M'



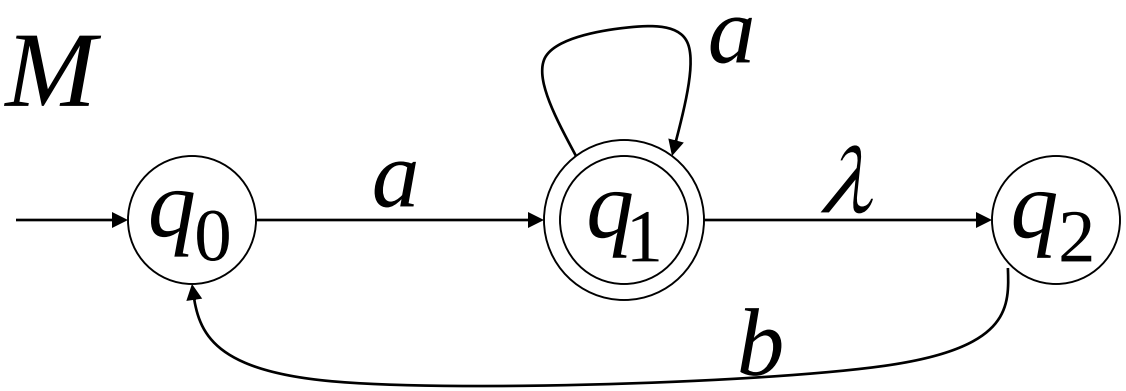
$$\delta(\{q_0\}, a) = \{q_1, q_2\}$$

NFA'dan DFA'ya

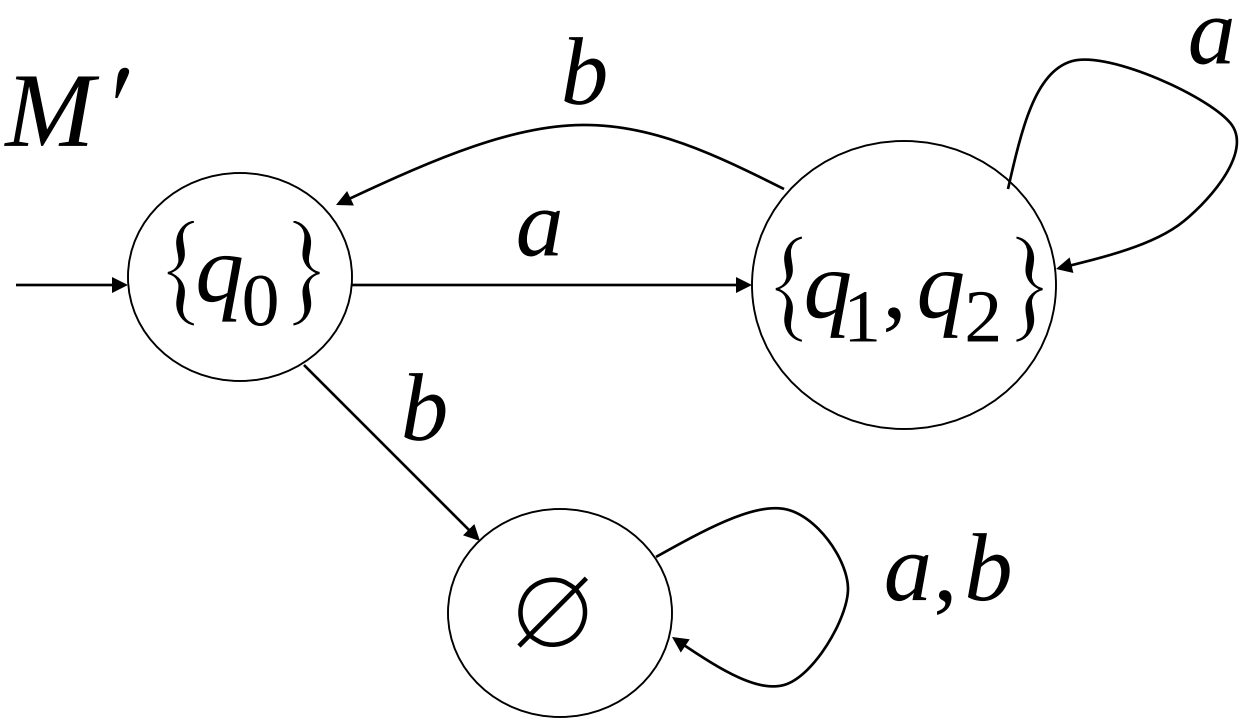
Adım 2 alfabedeki bütün geçişler (yeni geçişler eklenemeyinceye kadar) için tekrarlanır.

Örnek

NFA M



FA M'



NFA'dan DFA'ya

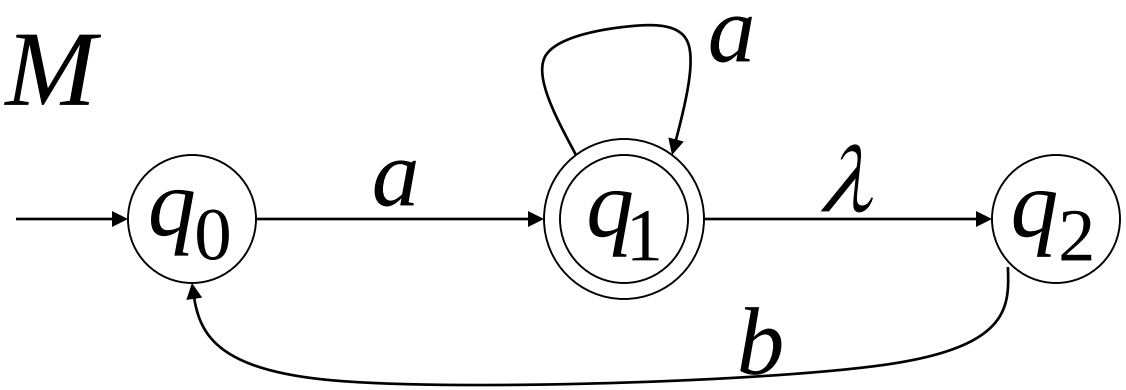
3. Herhangi bir FA durumu $\{q_i, q_j, \ldots, q_m\}$

Eğer q_j NFA'da bir kabul durumu ise FA'da kabul durumu olur.

$\{q_i, q_j, \ldots, q_m\}$

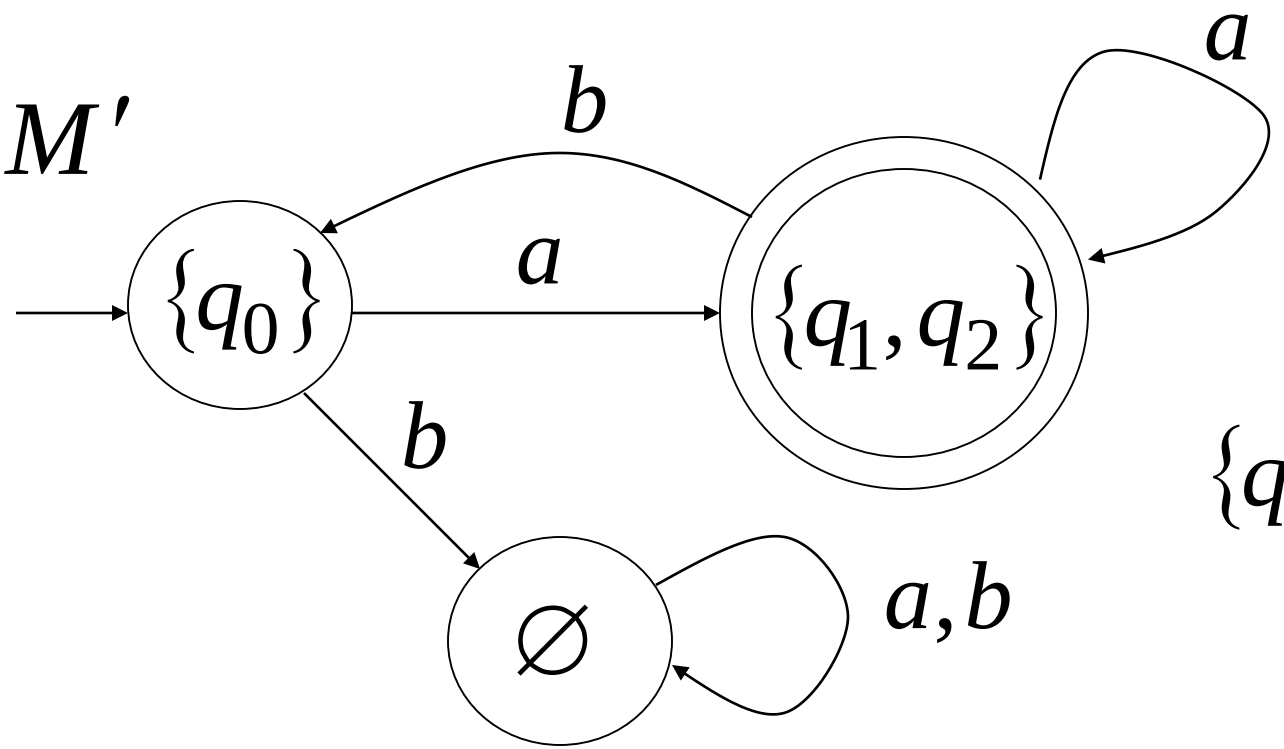
Örnek

NFA M



$q_1 \in F$

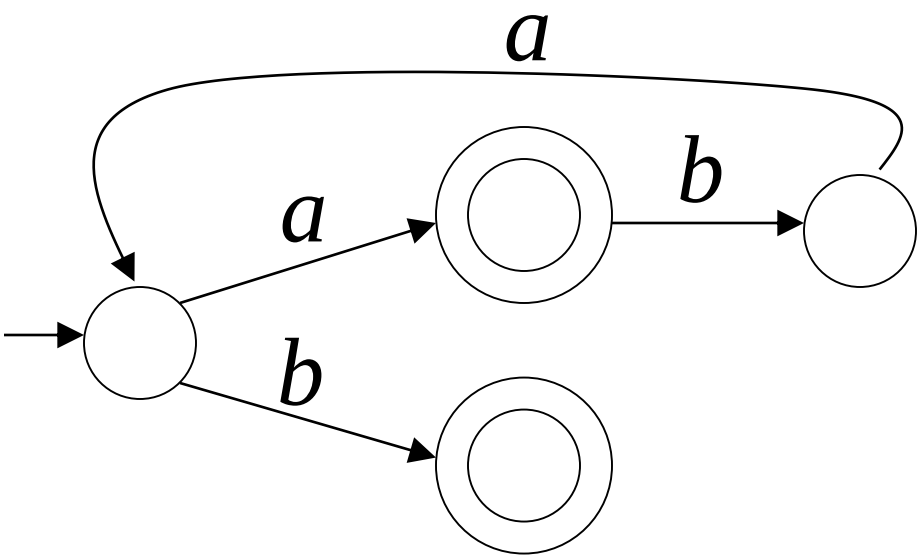
FA M'



$\{q_1, q_2\} \in F'$

Bir NFA tek kabul durumlu eşdeğer bir NFA'ya dönüştürülebilir.

Örnek

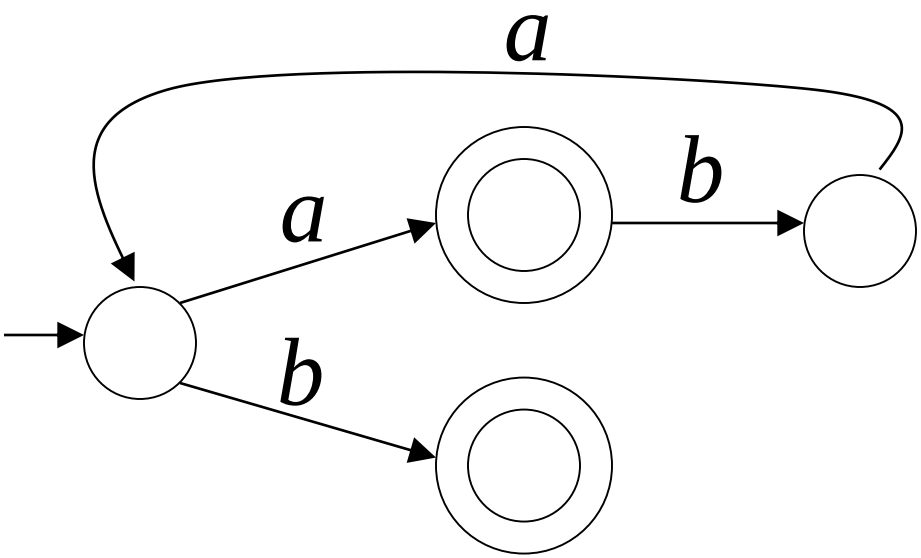


NFA

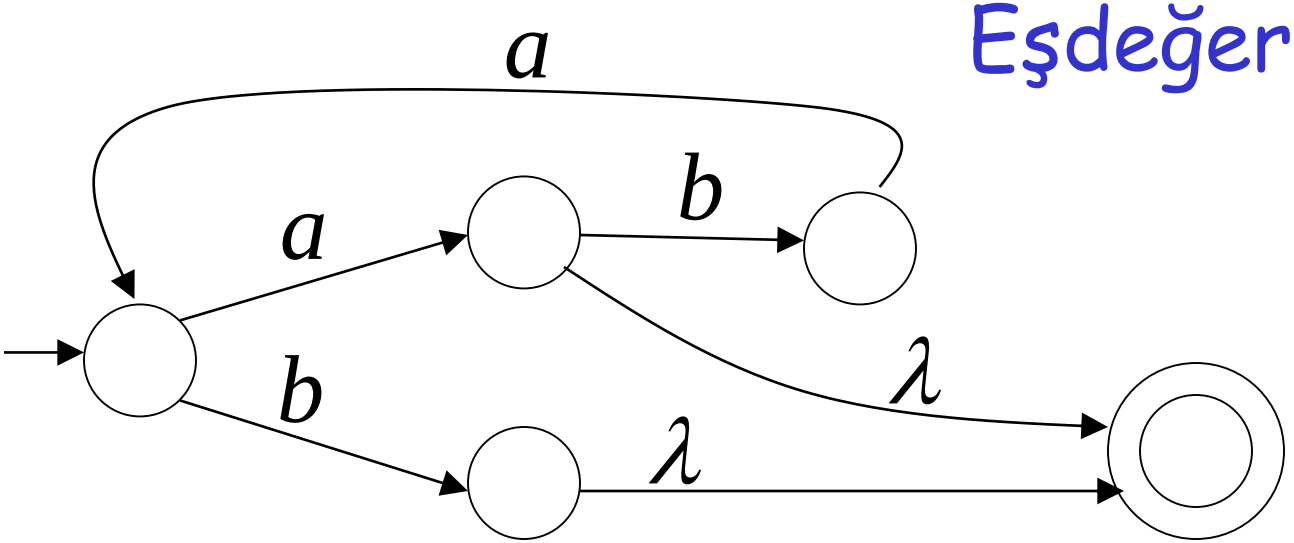
Tek kabul durumlu eşdeğer NFA?

Örnek

NFA

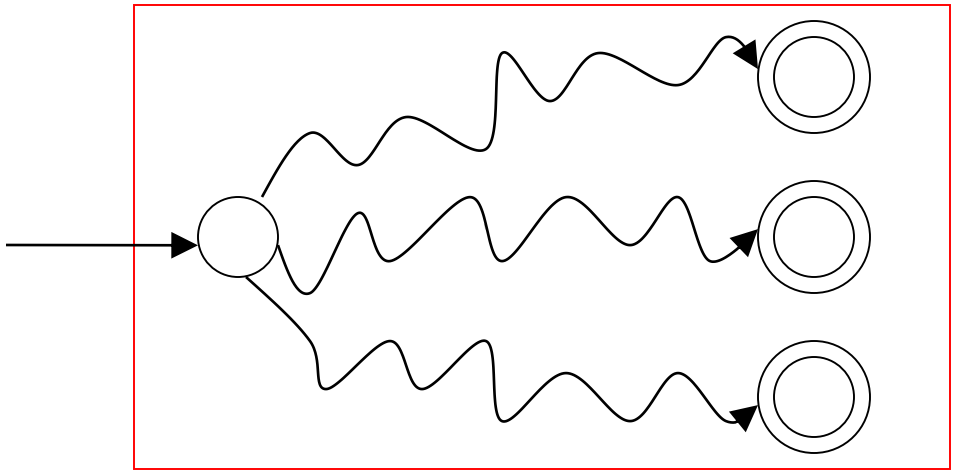


Eşdeğer NFA

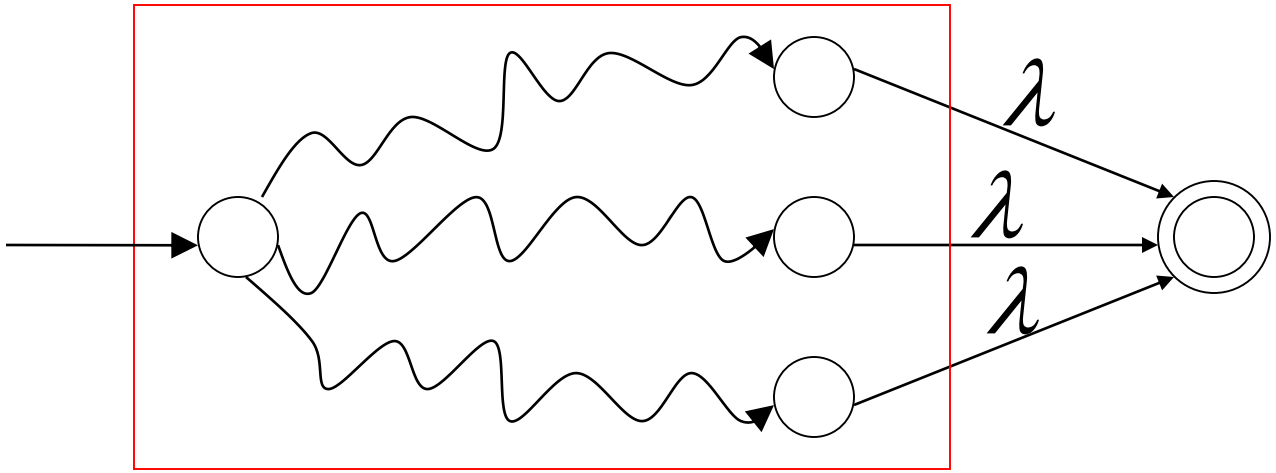


Genelleme

NFA



Eşdeğer NFA



Tek kabul durumlu