

Regüler İfadelerden NFA'ya ve NFA'dan Regüler İfadelere

L_1 L_2

Union:

$$L_1 \cup L_2$$

Concatenation:

$$L_1 L_2$$

Star:

$$L_1^*$$

Reversal:

$$L_1^R$$

Complement:

$$\overline{L_1}$$

Intersection:

$$L_1 \cap L_2$$

Are regular
Languages

Regüler Diller şu işlemlere göre kapalıdır.

Union:

$$L_1 \cup L_2$$

Concatenation:

$$L_1 L_2$$

Star:

$$L_1^*$$

Reversal:

$$L_1^R$$

Complement:

$$\overline{L_1}$$

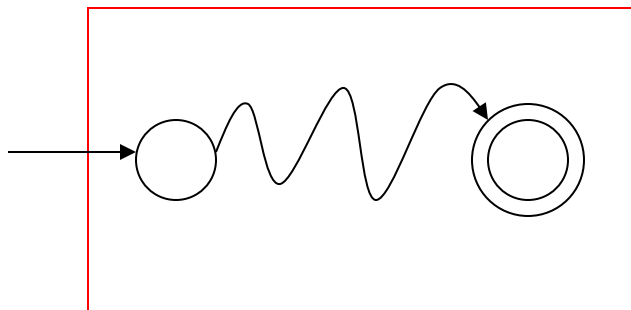
Intersection:

$$L_1 \cap L_2$$

L_1

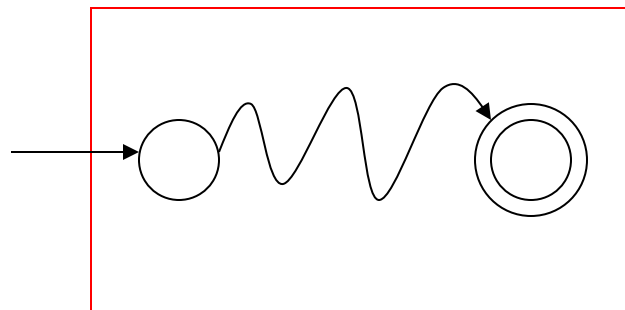
$$L(M_1) = L_1$$

NFA

 M_1  L_2

$$L(M_2) = L_2$$

NFA

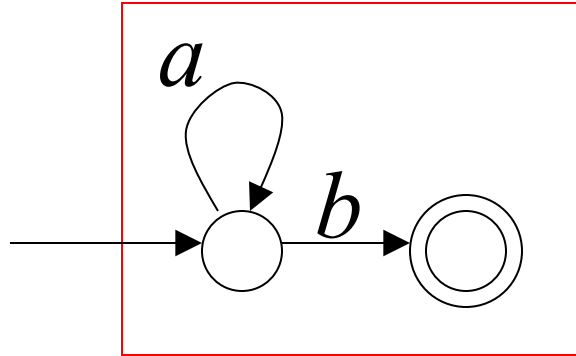
 M_2 

Örnek

M_1

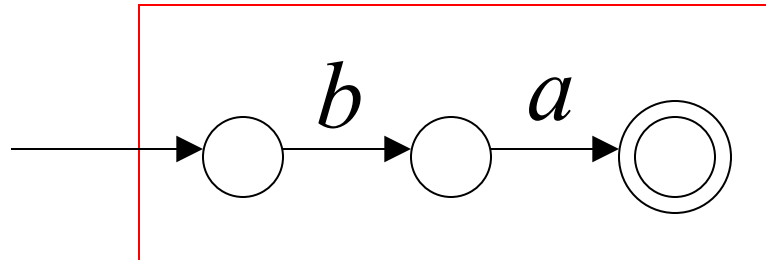
$$n \geq 0$$

$$L_1 = \{a^n b\}$$

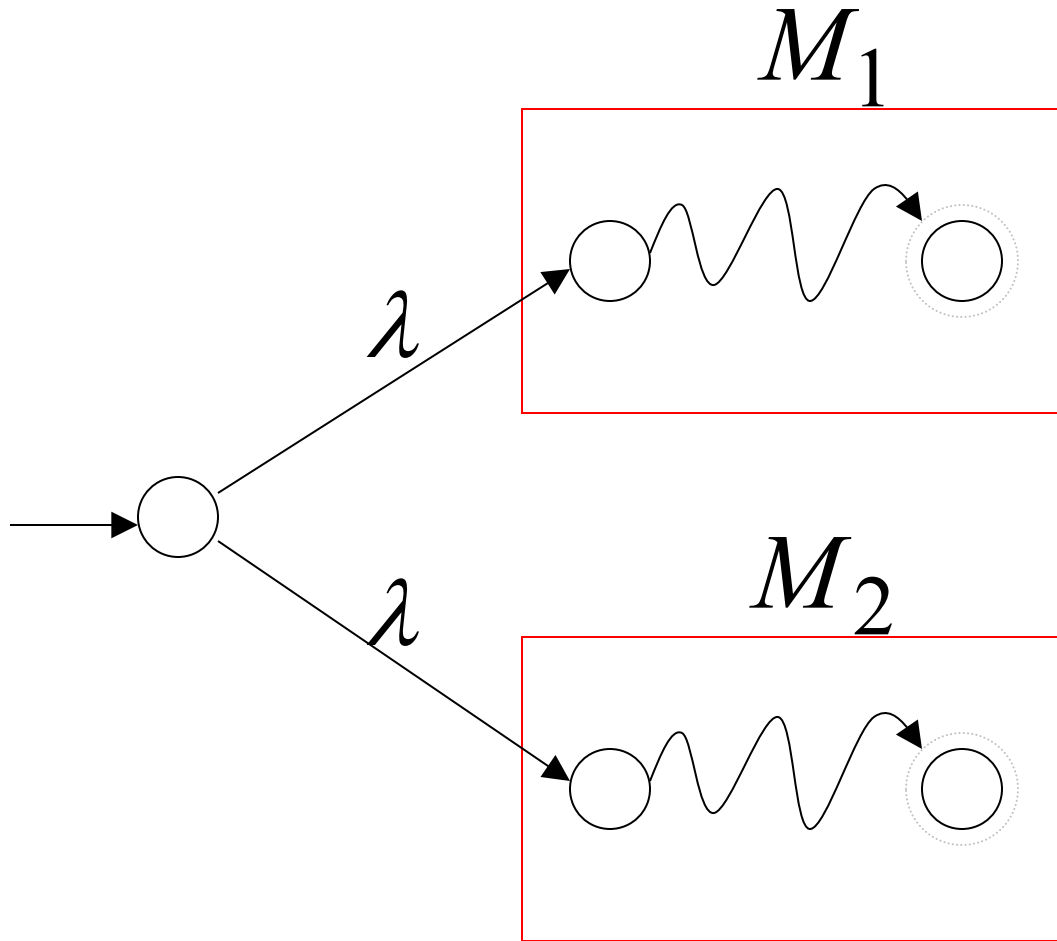


M_2

$$L_2 = \{ba\}$$



Birleşim için NFA



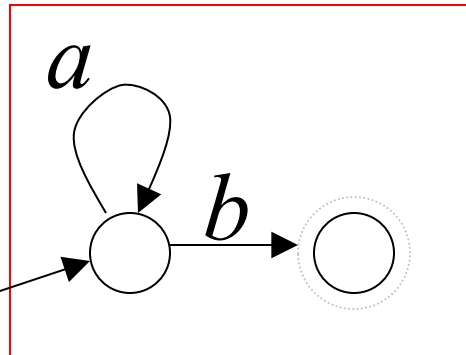
$$L_1 \cup L_2$$

Örnek

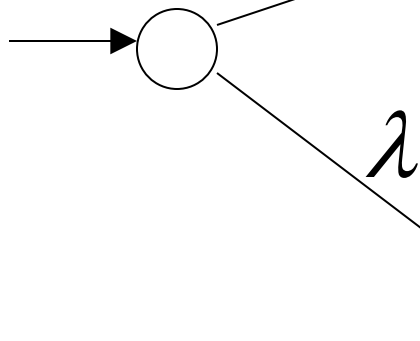
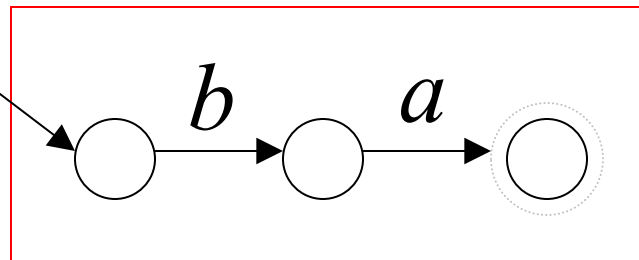
$$L_1 \cup L_2 = \{a^n b\} \cup \{ba\}$$

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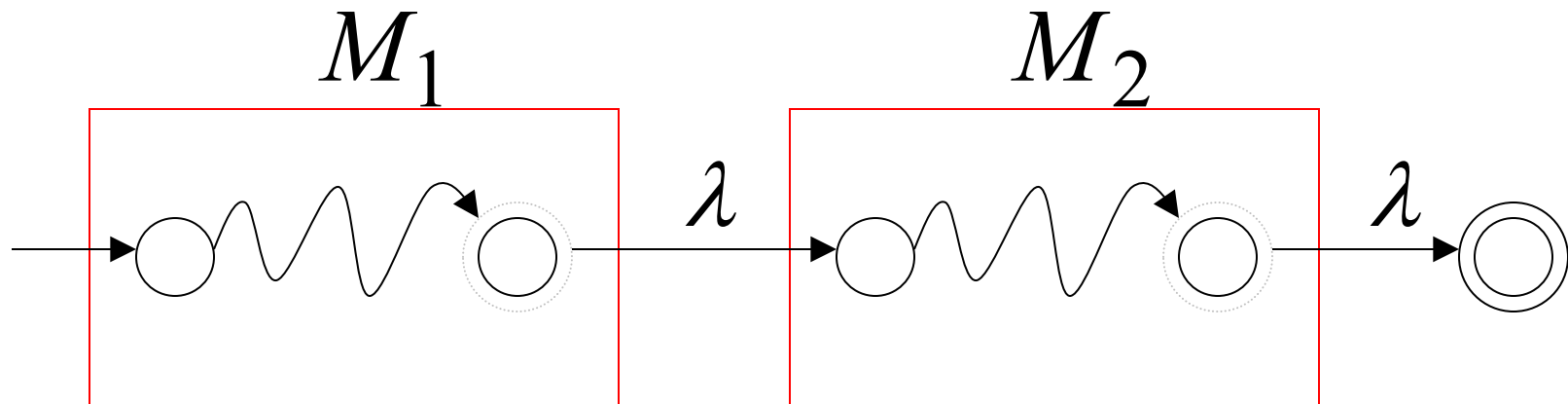
$$L_1 = \{a^n b\}$$



$$L_2 = \{ba\}$$



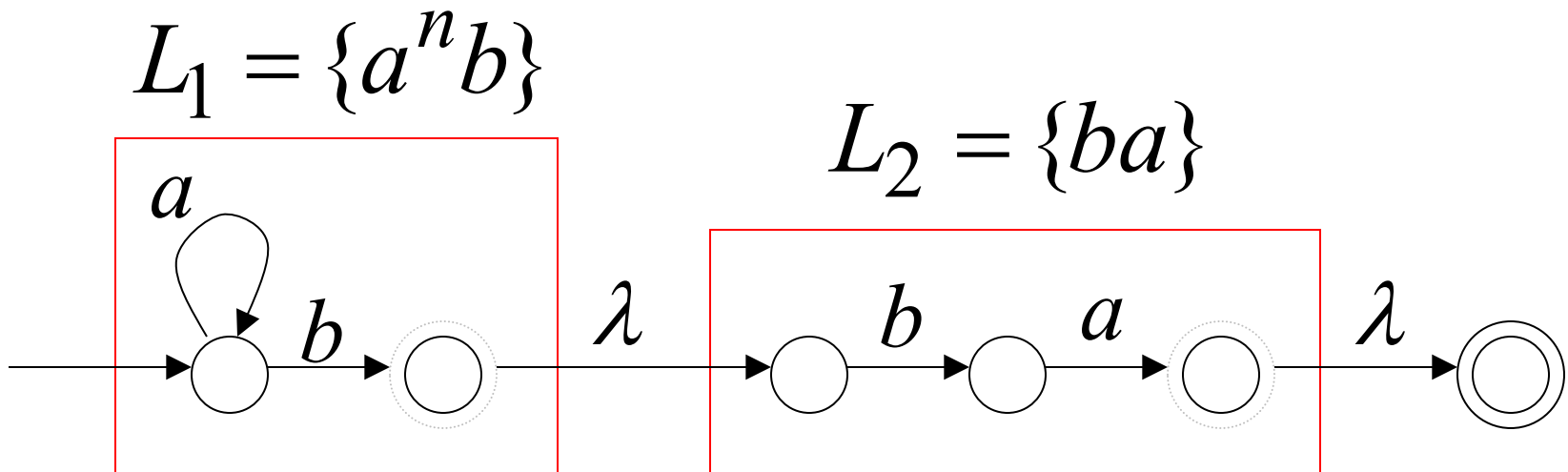
Bitiştirme (Concatenation)



L_1L_2

Örnek

$$L_1 L_2 = \{a^n b\} \{ba\} = \{a^n bba\}$$



Aşağıdaki her işlem için NFA ve DFA çizebilmeliyiz.

Union:

$$L_1 \cup L_2$$

Concatenation:

$$L_1 L_2$$

Star:

$$L_1^*$$

Reversal:

$$L_1^R$$

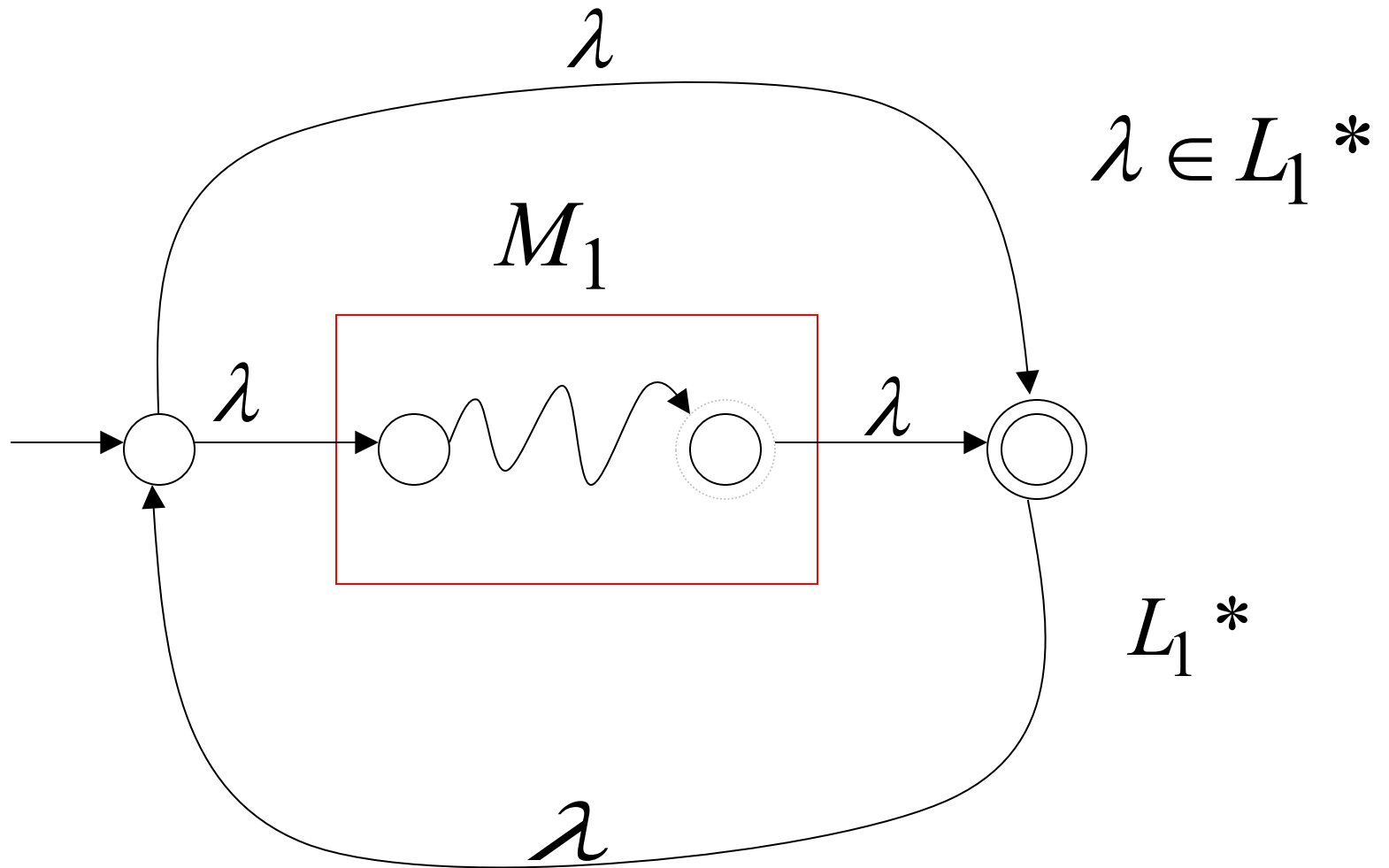
Complement:

$$\overline{L_1}$$

Intersection:

$$L_1 \cap L_2$$

Kleene Star İşlemi

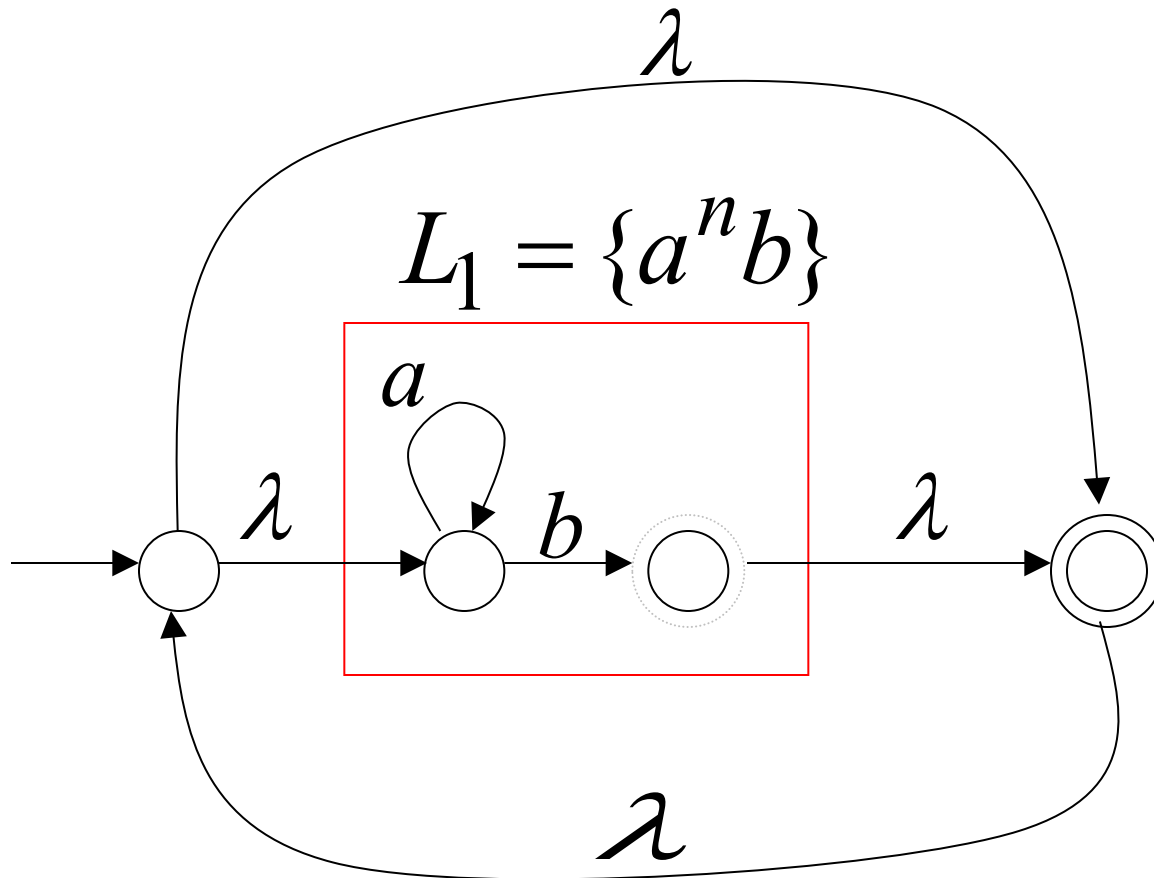


Örnek

$$L_1^* = \{a^n b\}^*$$

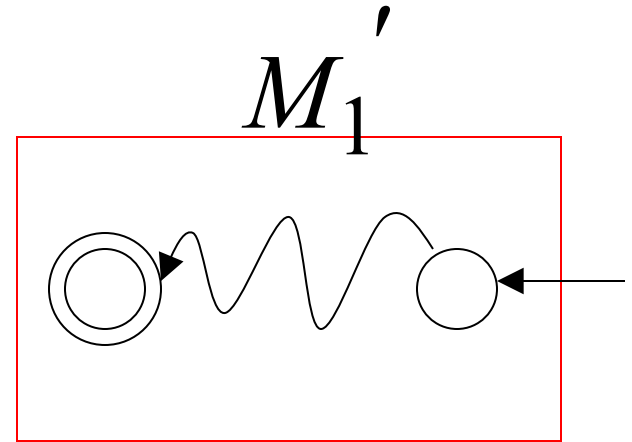
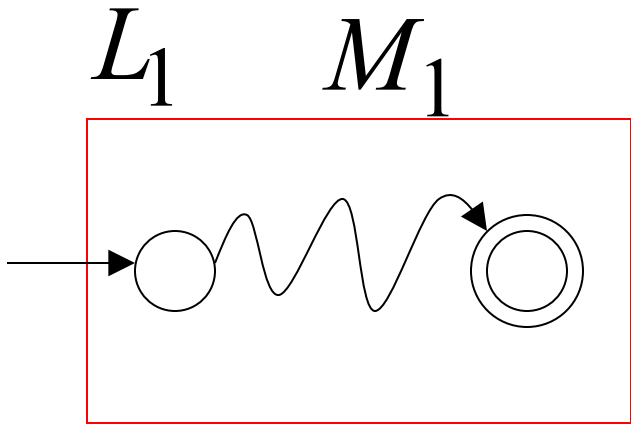
$$w = w_1 w_2 \cdots w_k$$

$$w_i \in L_1$$



Reverse

NFA for L_1^R

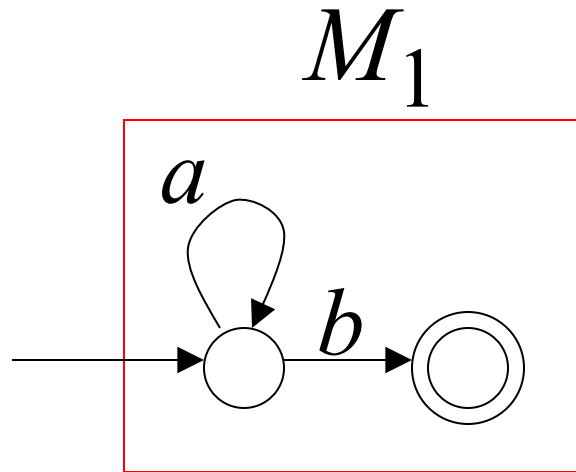


1. Bütün geçişleri ters çevir.

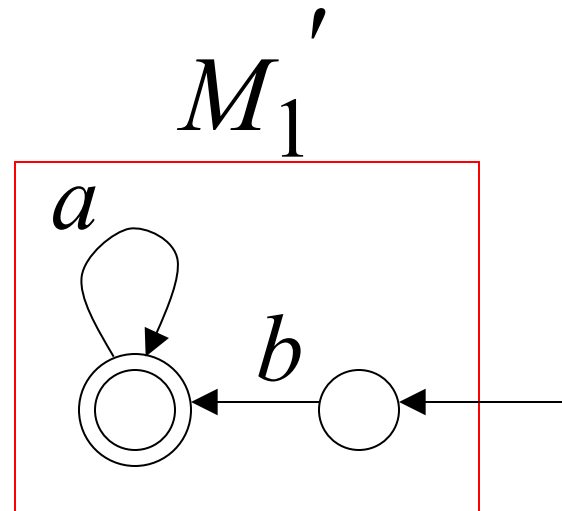
2. Başlangıç durumunu kabul durumu yap

Örnek

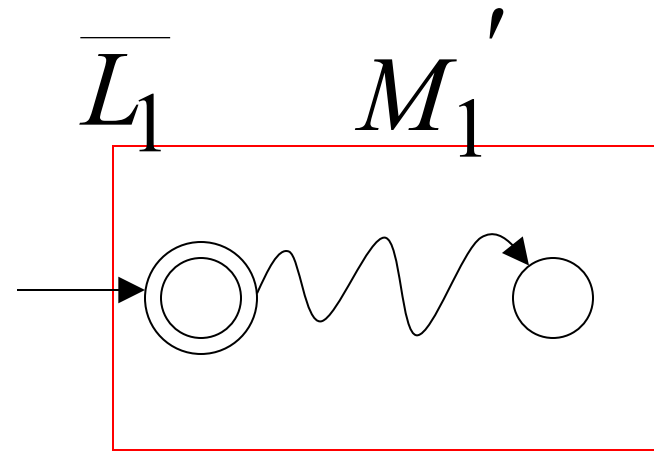
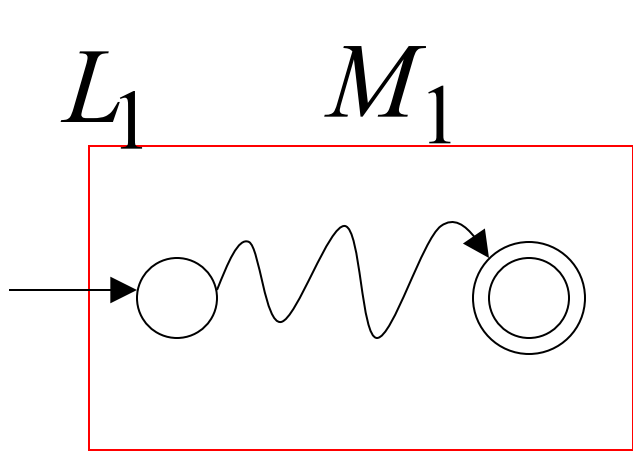
$$L_1 = \{a^n b\}$$



$$L_1^R = \{ba^n\}$$



Complement



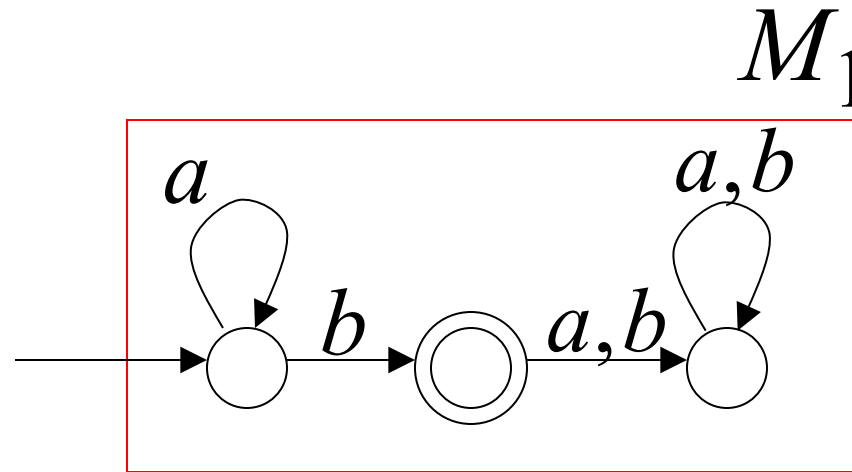
1. L_1 'i kabul eden **FA'** yı al

L_1

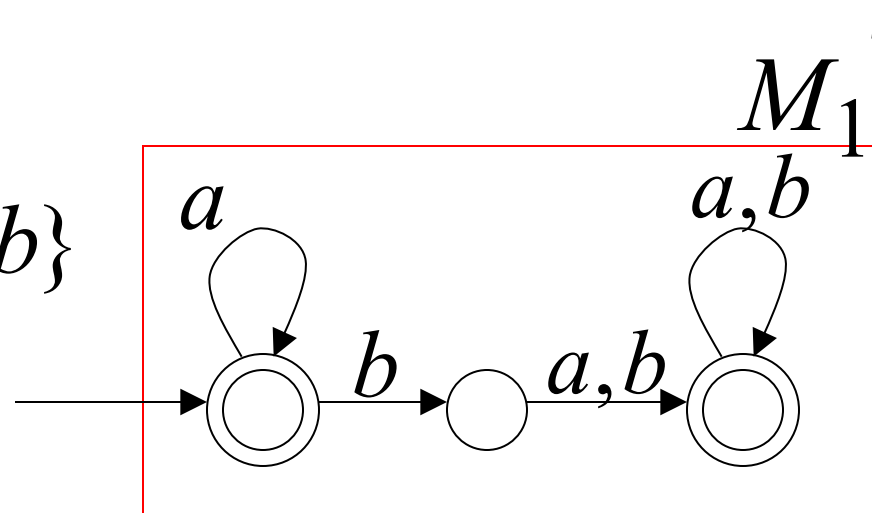
2. Kabul durumunu red ve red'leri kabul yap.

Örnek

$$L_1 = \{a^n b\}$$



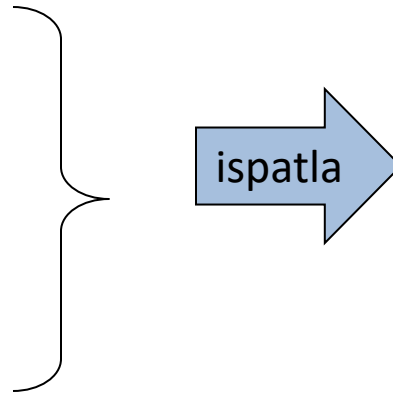
$$\overline{L_1} = \{a,b\}^* - \{a^n b\}$$



Kesişim

L_1 regular

L_2 regular



$L_1 \cap L_2$

regular

DeMorgan's Law:

$$L_1 \cap L_2 = \overline{\overline{L_1} \cup \overline{L_2}}$$

L_1, L_2 regular



$\overline{L_1}, \overline{L_2}$

regular



$\overline{L_1} \cup \overline{L_2}$

regular



$\overline{\overline{L_1} \cup \overline{L_2}}$

regular



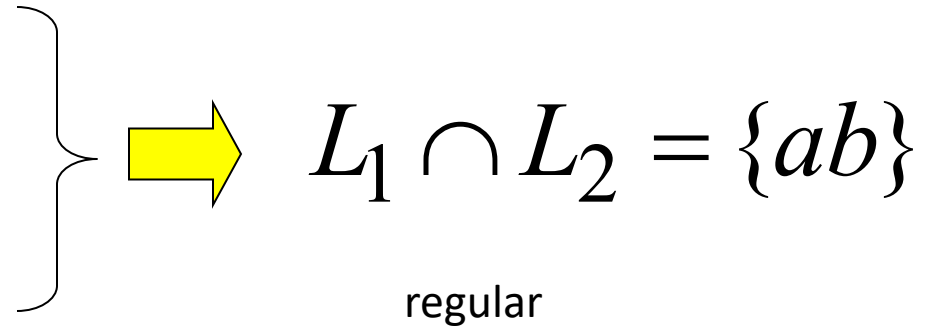
$L_1 \cap L_2$

regular

Örnek

$$L_1 = \{a^n b\} \quad \text{regular}$$

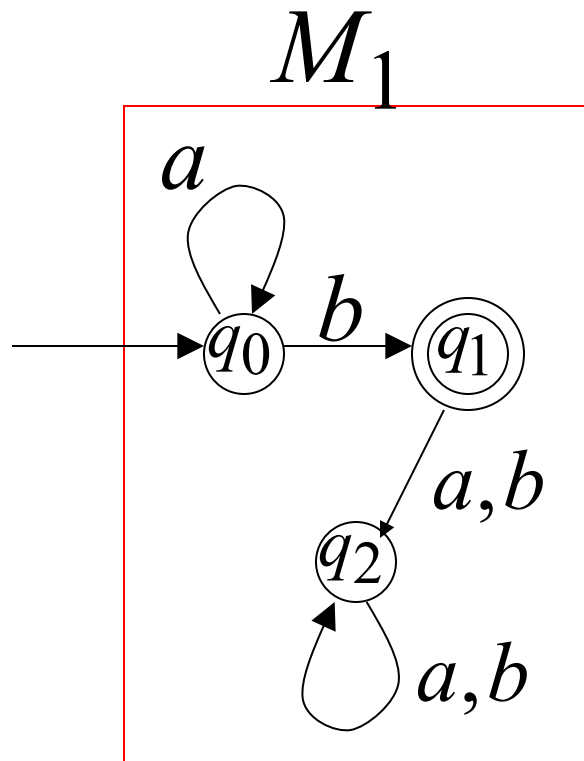
$$L_2 = \{ab, ba\} \quad \text{regular}$$


$$L_1 \cap L_2 = \{ab\}$$

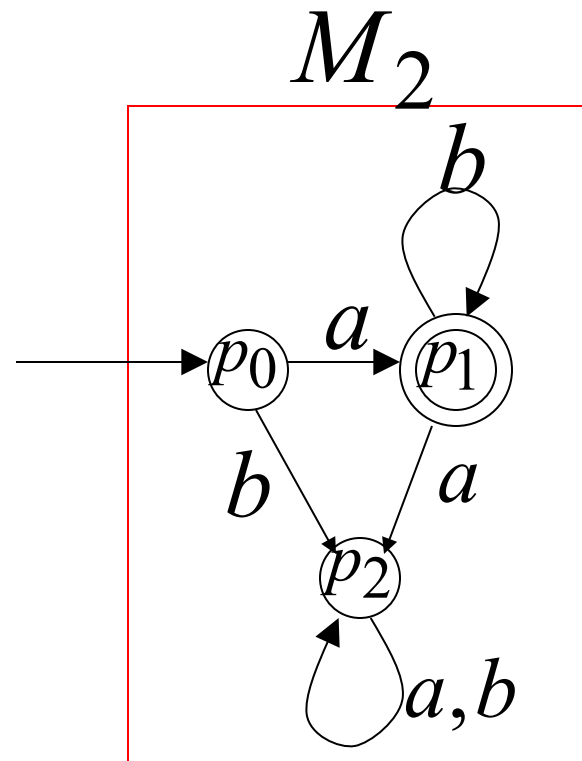
regular

Örnek:

$$L_1 = \{a^n b\} \quad n \geq 0$$

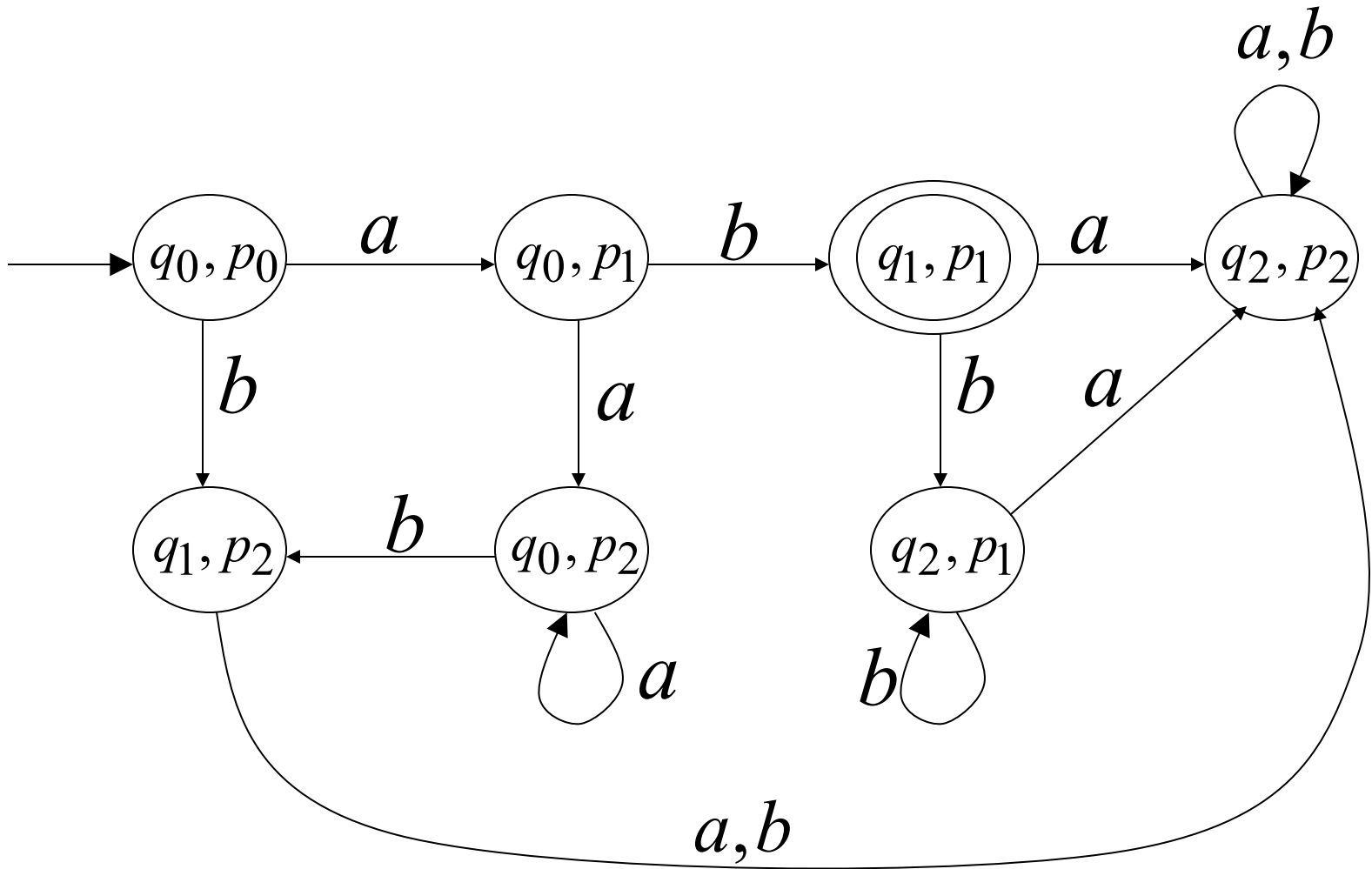


$$L_2 = \{ab^m\} \quad m \geq 0$$



Kesişim için DFA'yı oluştur.

$$L = \{a^n b\} \cap \{ab^n\} = \{ab\}$$



Teşekkürler