



BİÇİMSEL DİLLER VE OTOMATA TEORİSİ

Pushdown otomata

12. Hafta

DR. ÖĞR. ÜYESİ. HÜSEYİN VURAL



Ders izlencesi

- Pushdown otomata



Pushdown Otomata Tanımı

- $M = (Q, \Sigma, \Gamma, \delta, q_0, F)$
- 1.) Q , sonlu durumlar kümesidir.
- 2.) Σ , alfabeyi gösterir.
- 3.) Γ , stack alfabesini gösterir.
- 3.) $\delta : Q \times \Sigma \times \Gamma \rightarrow Q \times \Gamma$ δ (delta) geçiş fonksiyonudur
- 4.) q_0 başlangıç durumunu gösterir
- 5.) F , kabul durumlarının kümesini gösterir.



İçerikten Bağımsız Diller

- $A \rightarrow 0A1$
 - $A \rightarrow B$
 - $B \rightarrow \epsilon$
- $\{0^n 1^n, n \geq 0\}$ dili içerikten bağımsız gramer ile tanımlanabilmektedir.



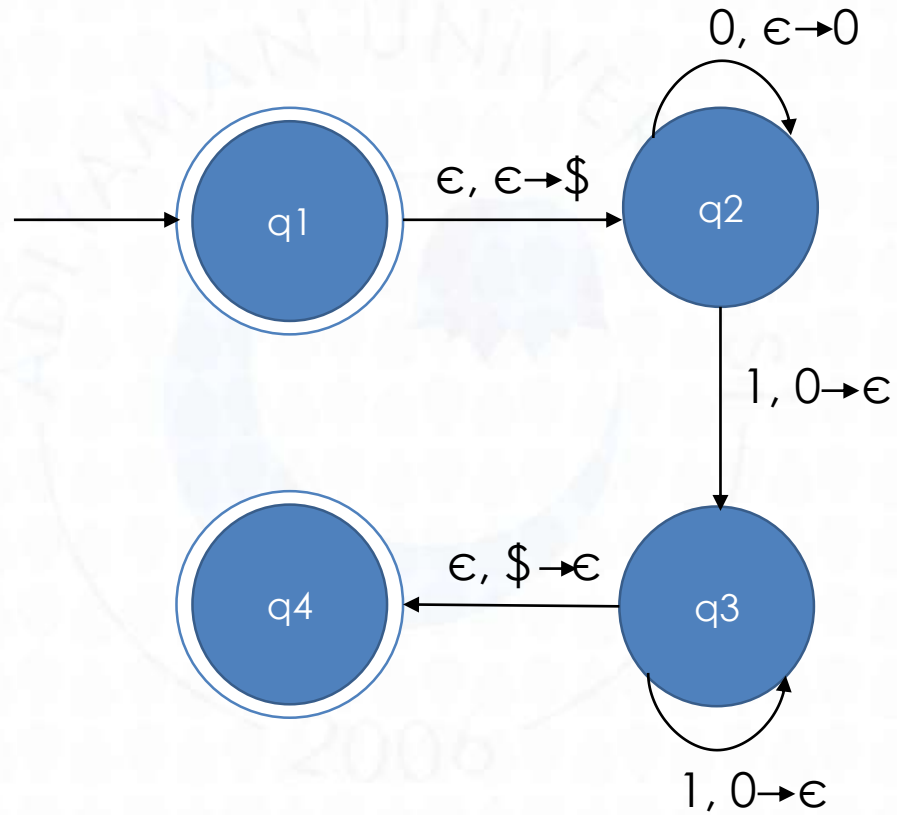
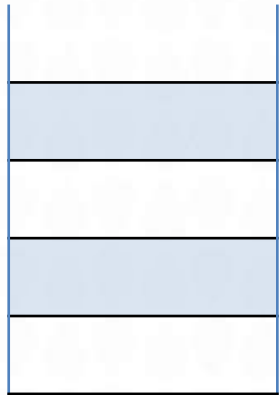
Pushdown Otomata

- $M1 = (Q, \Sigma, \Gamma, \delta, q_1, F)$ PDA'sı $\{0^n 1^n, n \geq 0\}$ dili için aşağıdaki şekilde tanımlanmaktadır
- $Q = \{q_1, q_2, q_3, q_4\}$
- $\Sigma = \{0, 1\}$
- $\Gamma = \{0, \$\}$
- $F = \{q_1, q_4\}$

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000111

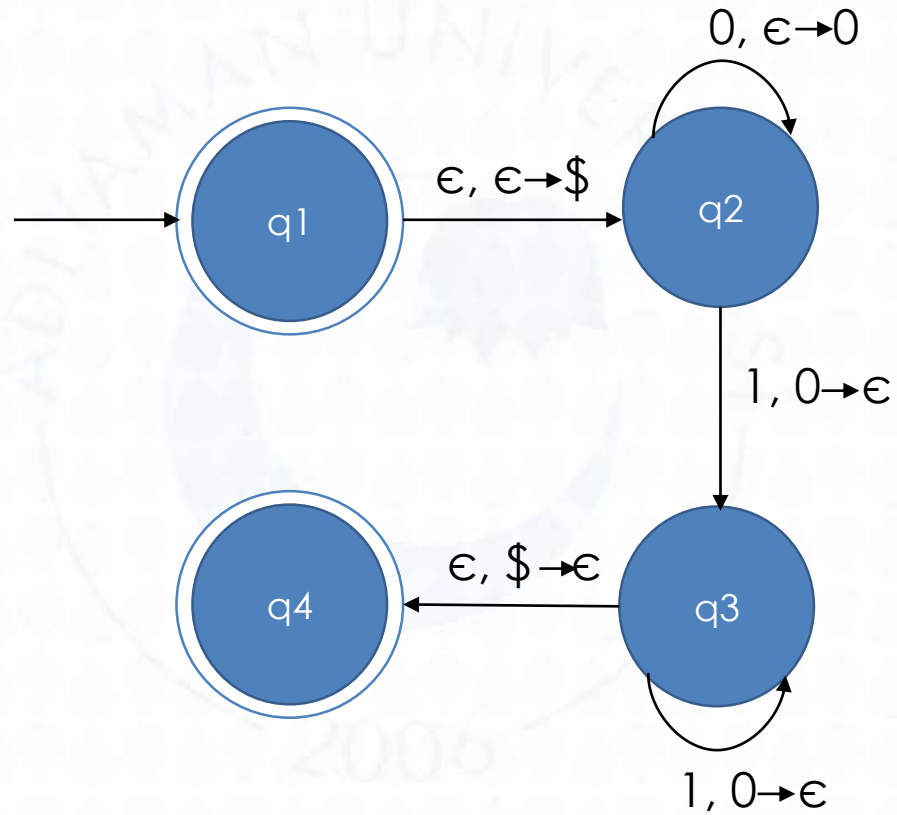
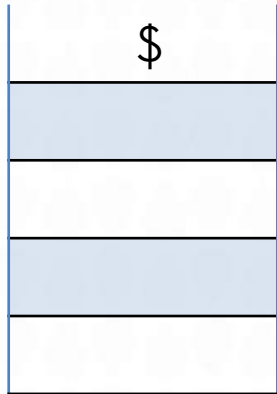
Stack



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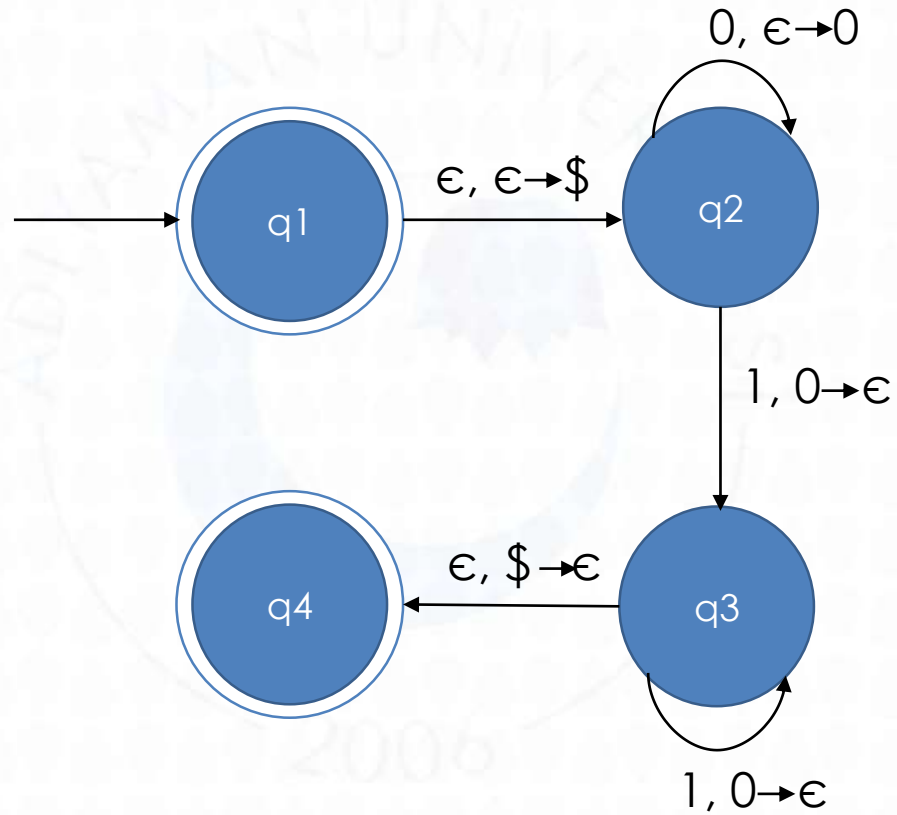
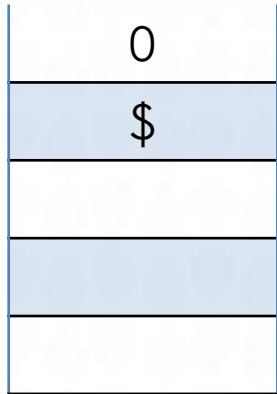
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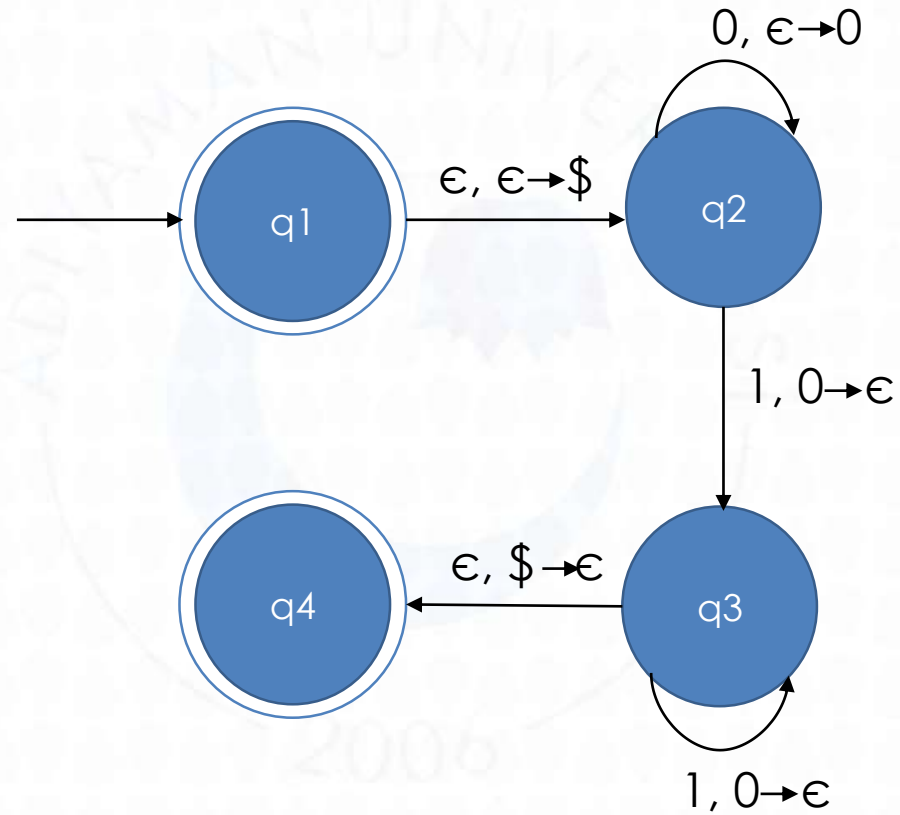


Pushdown Otomata

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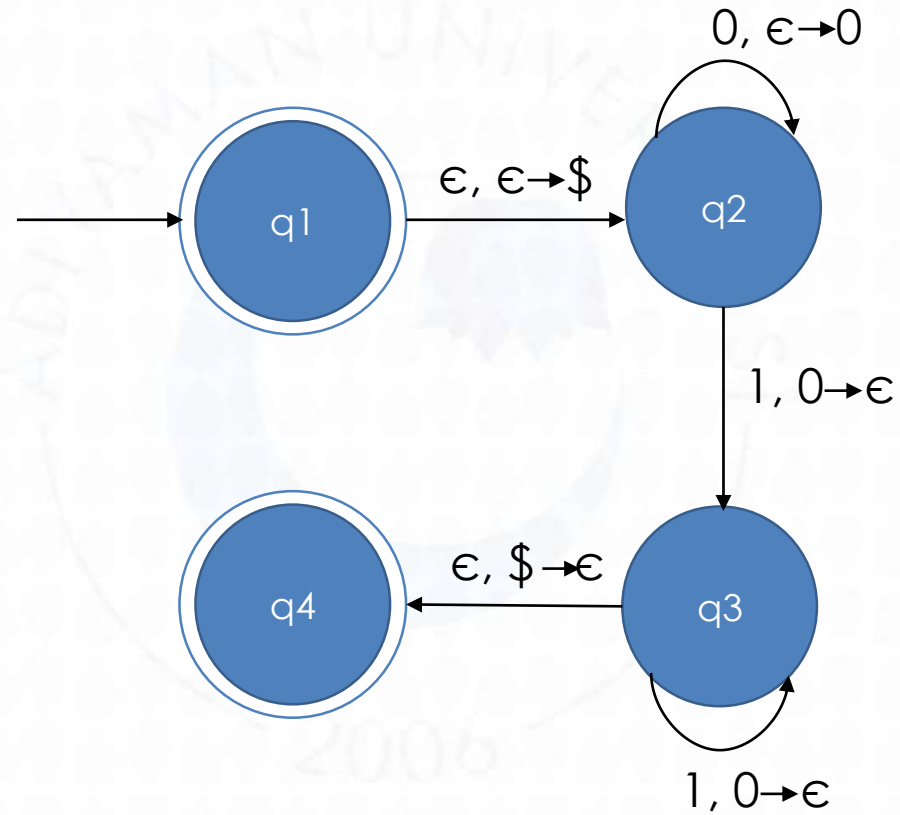


Pushdown Otomata

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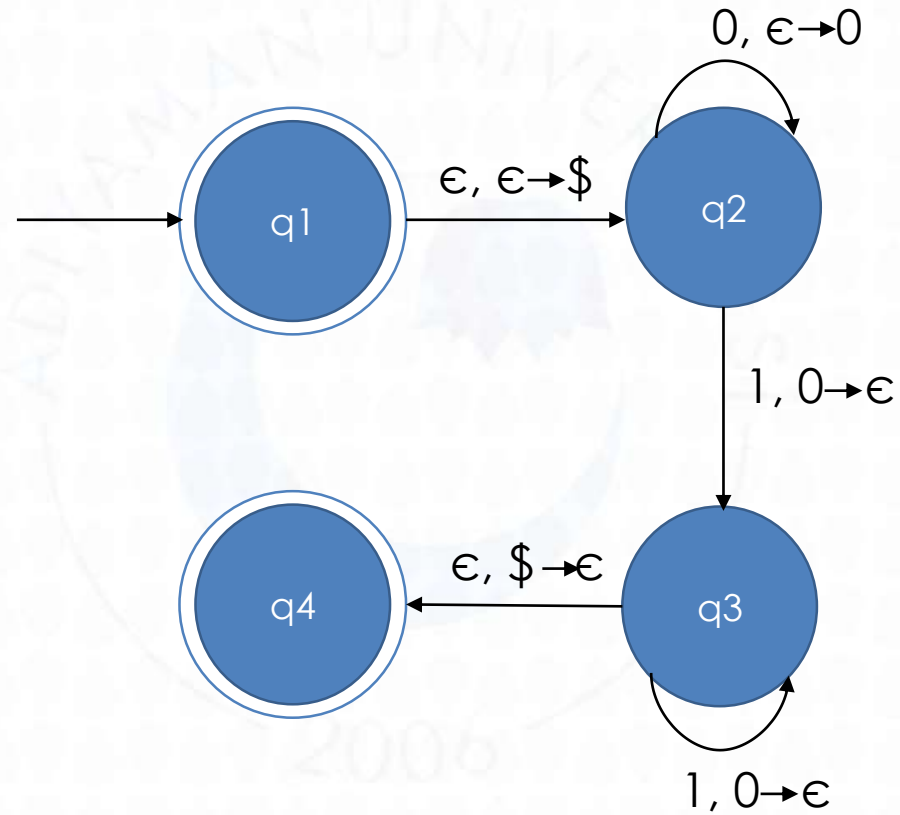


Pushdown Otomata

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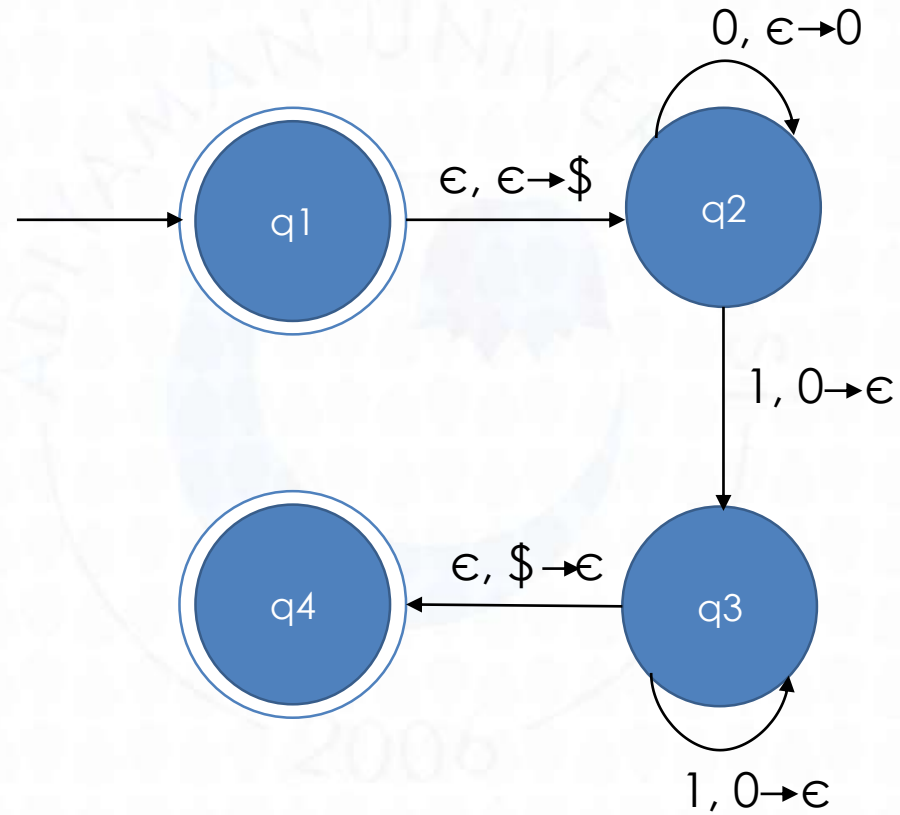
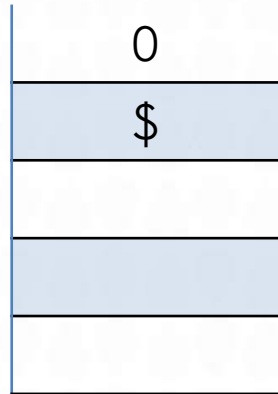
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Pushdown Otomata

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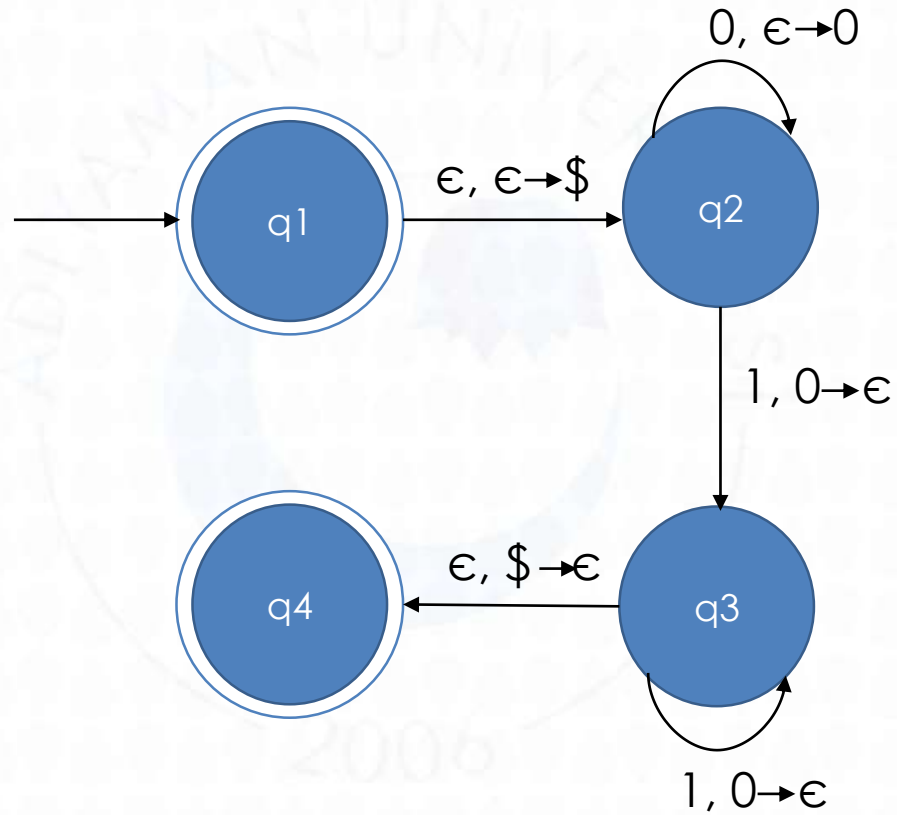
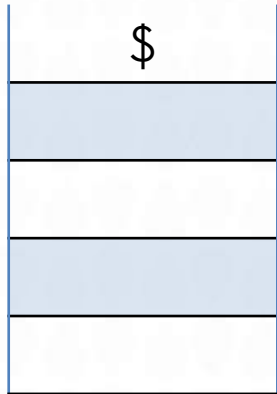
Stack



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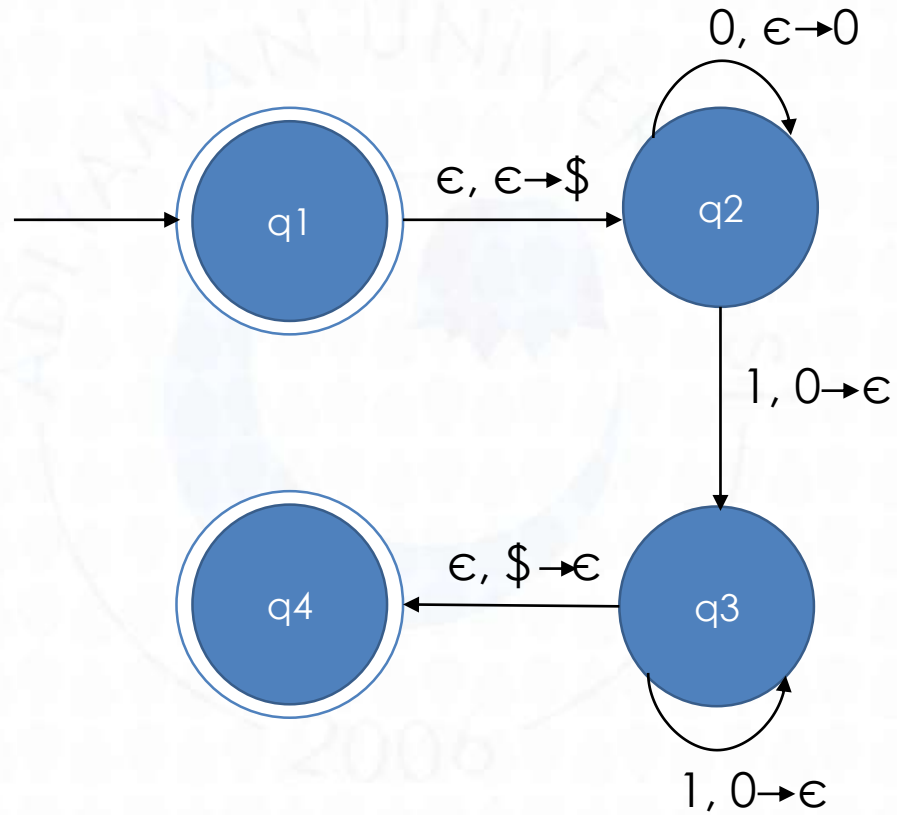
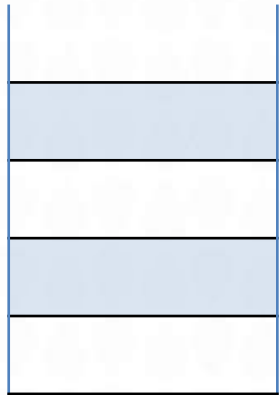
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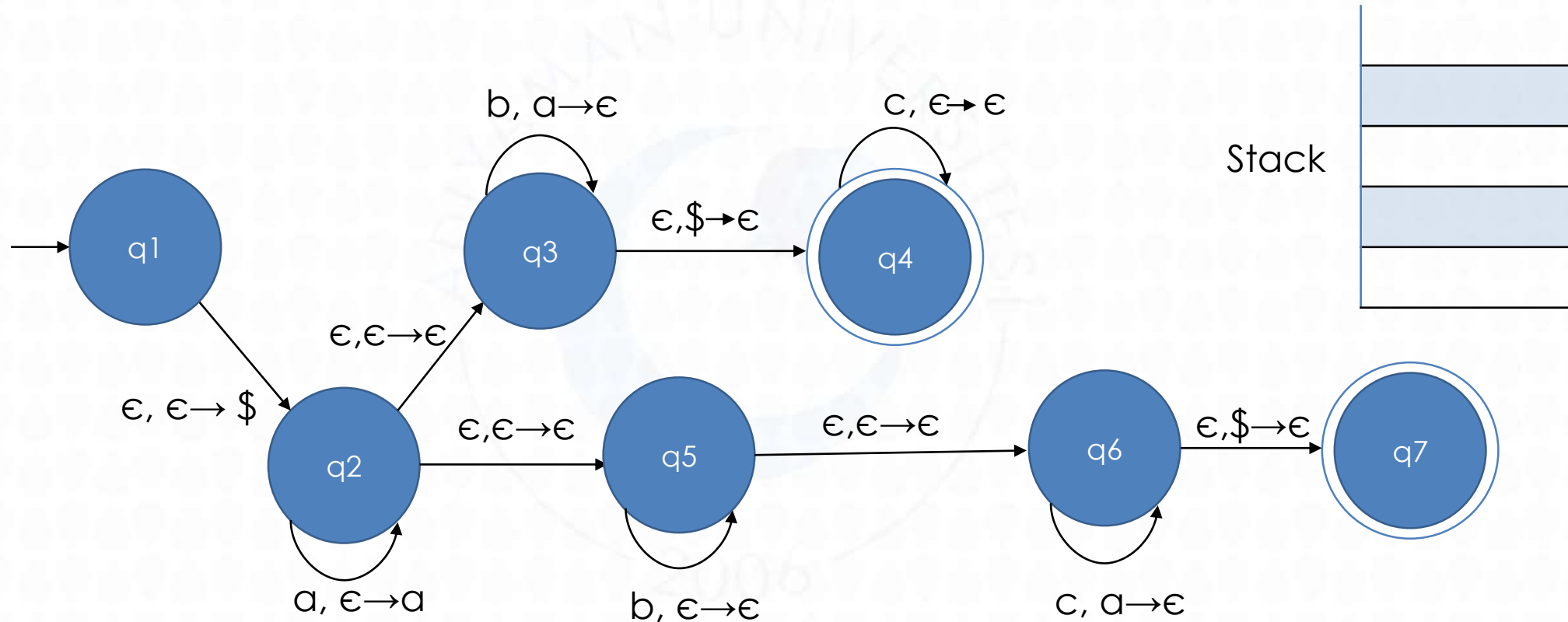




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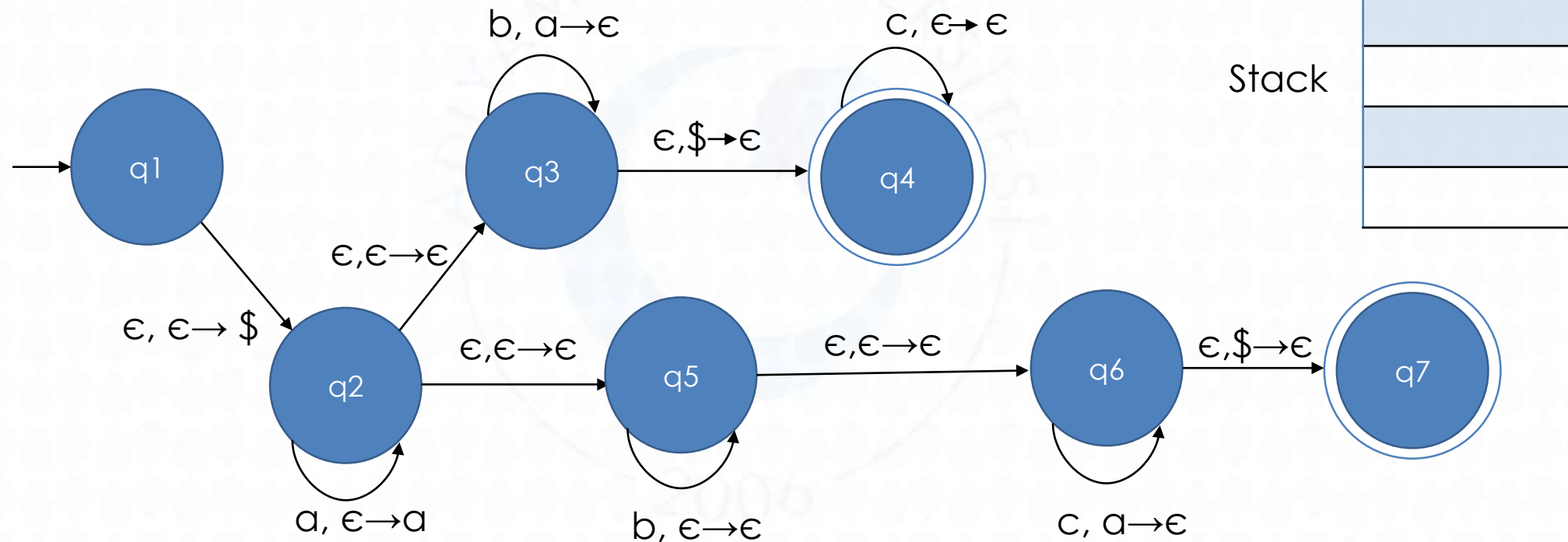
- $M2 = (Q, \Sigma, r, \delta, q_1, F)$ PDA'sı $\{a^i b^j c^k, i = j \text{ veya } i = k\}$ dili için aşağıdaki şekilde tanımlanmaktadır.
- $Q = \{q_1, q_2, q_3, q_4, q_5, q_6, q_7\}$
- $\Sigma = \{a, b, c\}$
- $r = \{a, \$\}$
- $F = \{q_4, q_7\}$

Pushdown Otomata



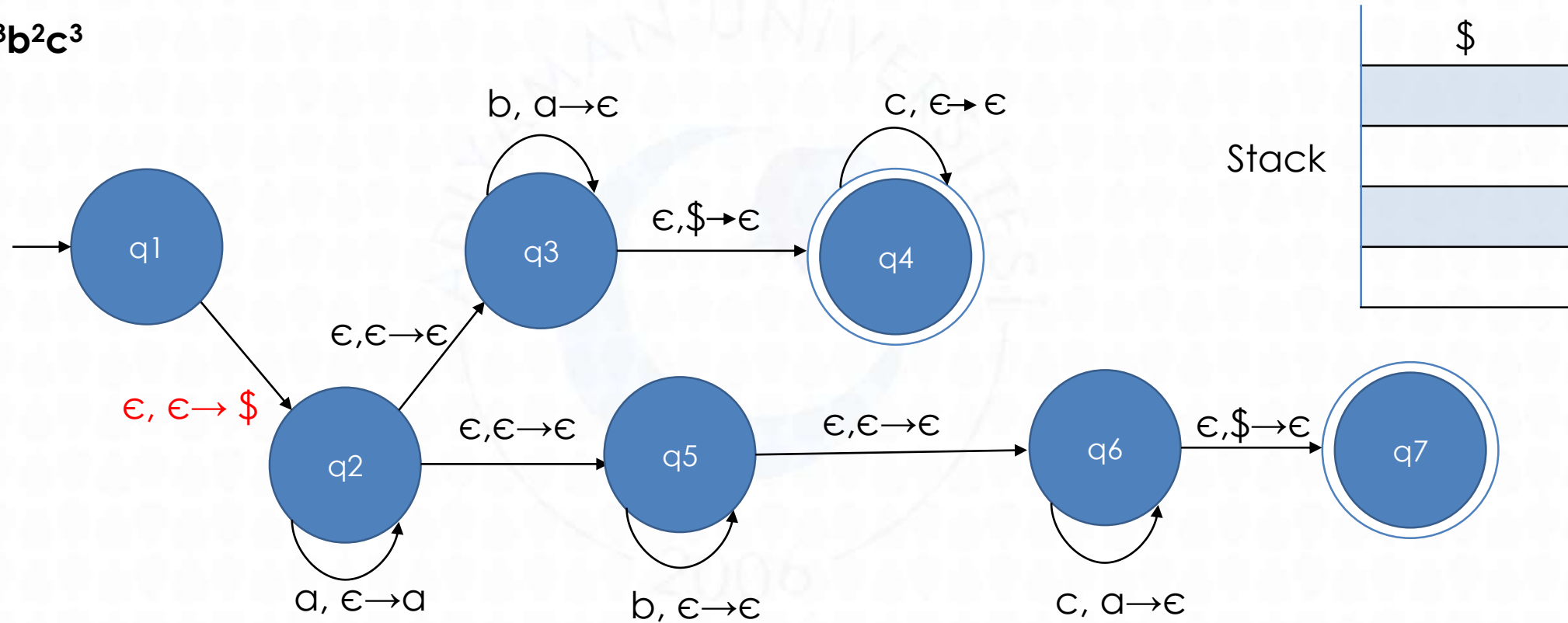
Pushdown Otomata

$a^3b^2c^3$



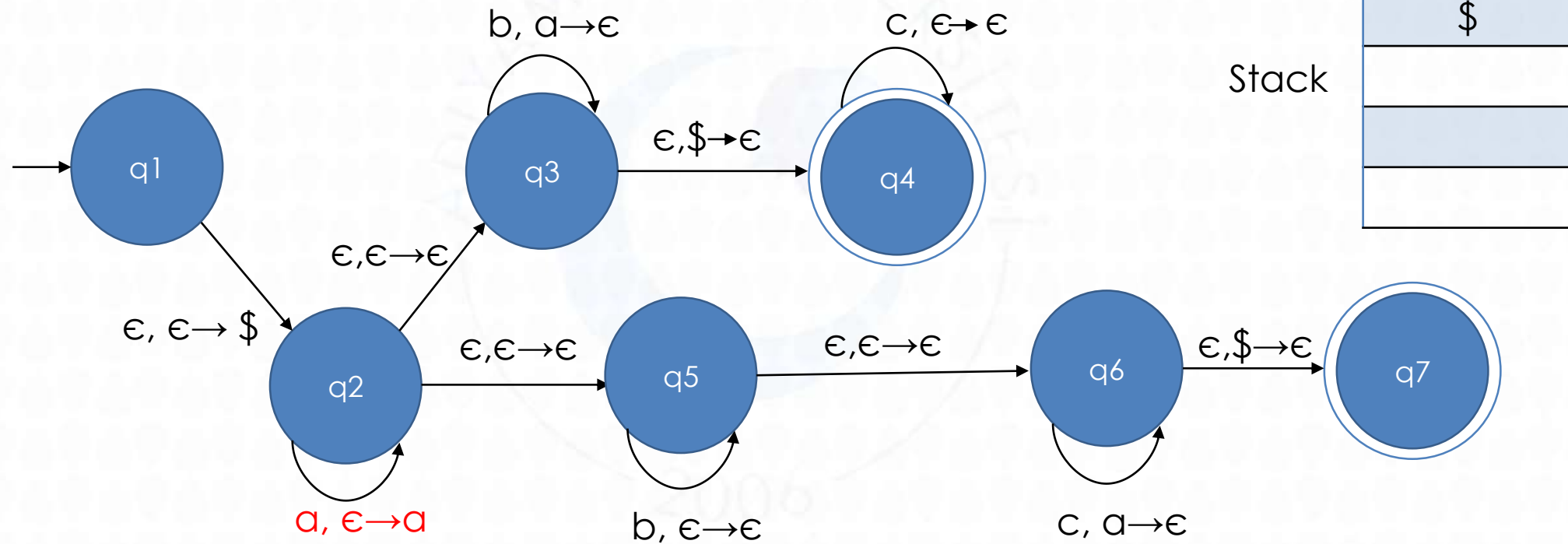
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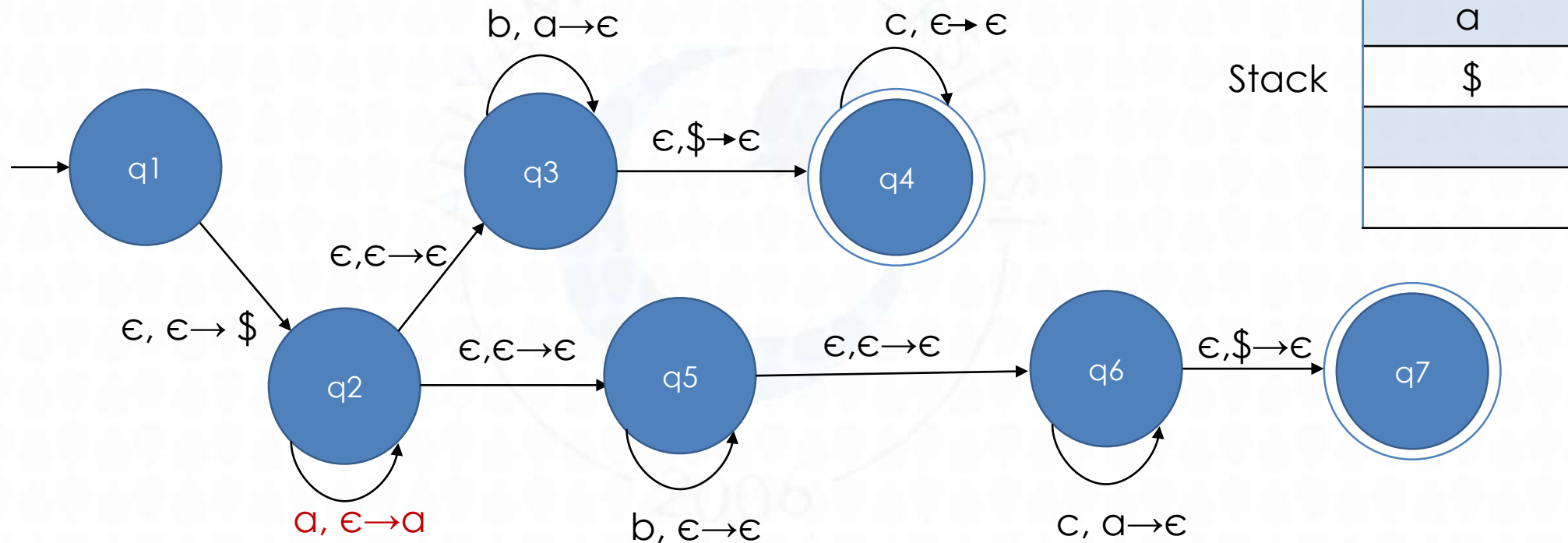
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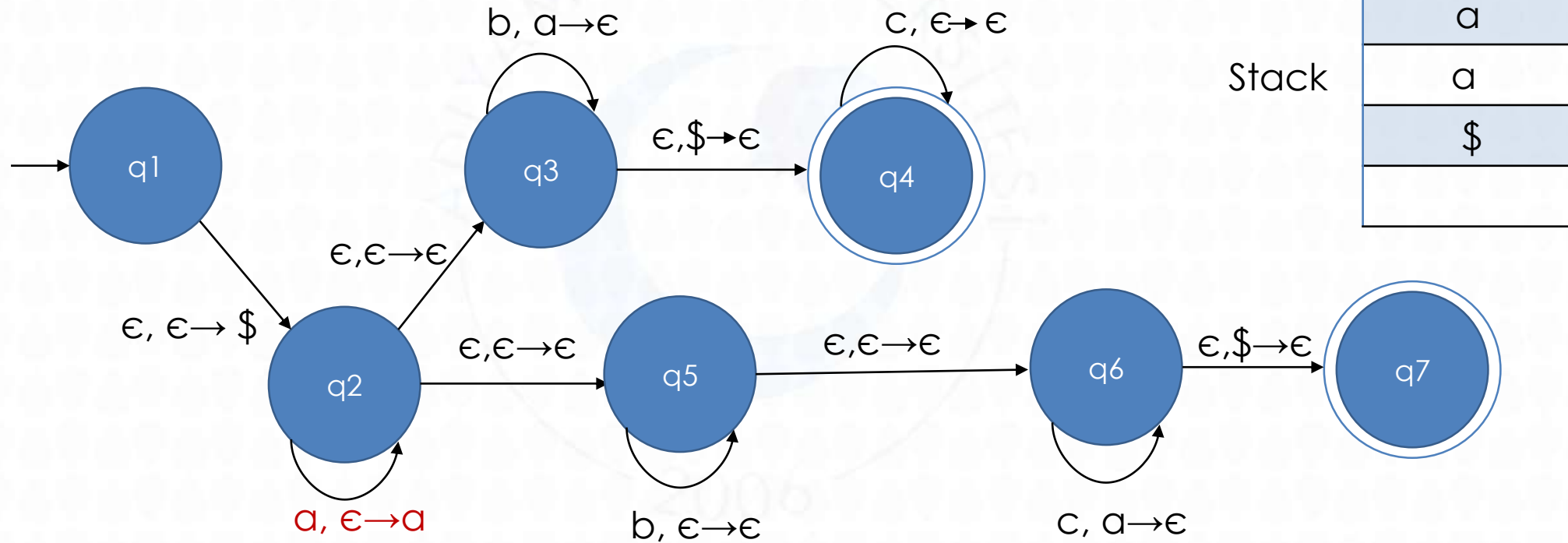
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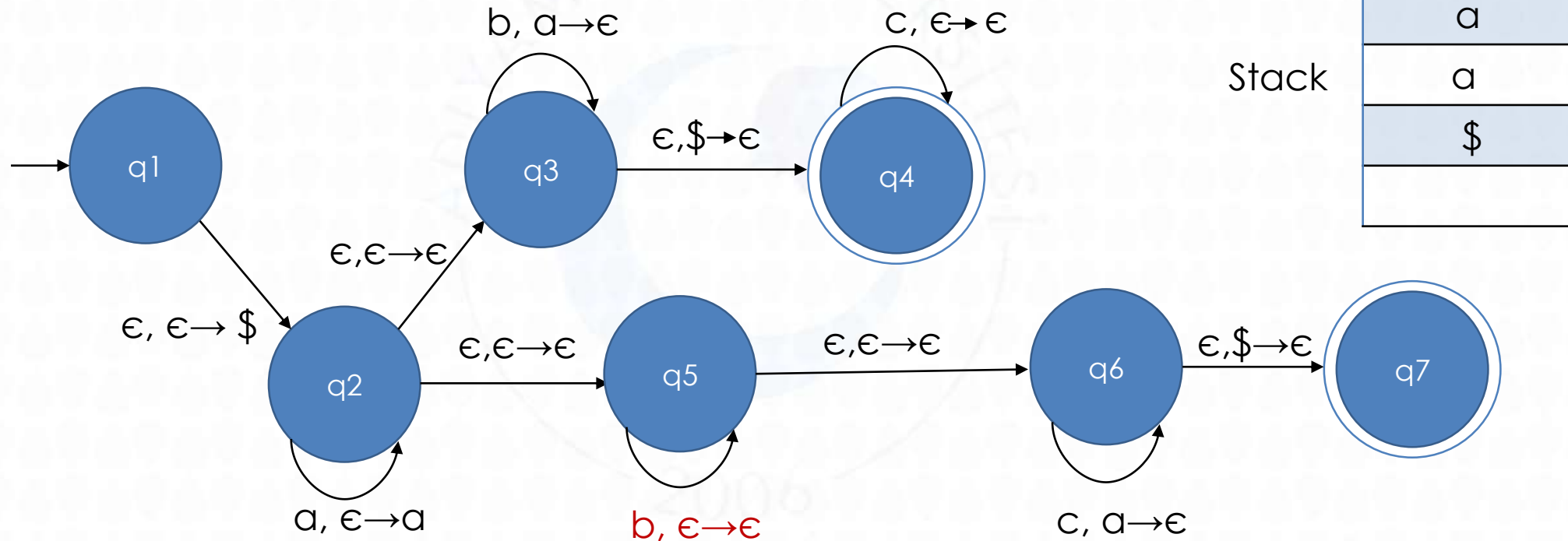
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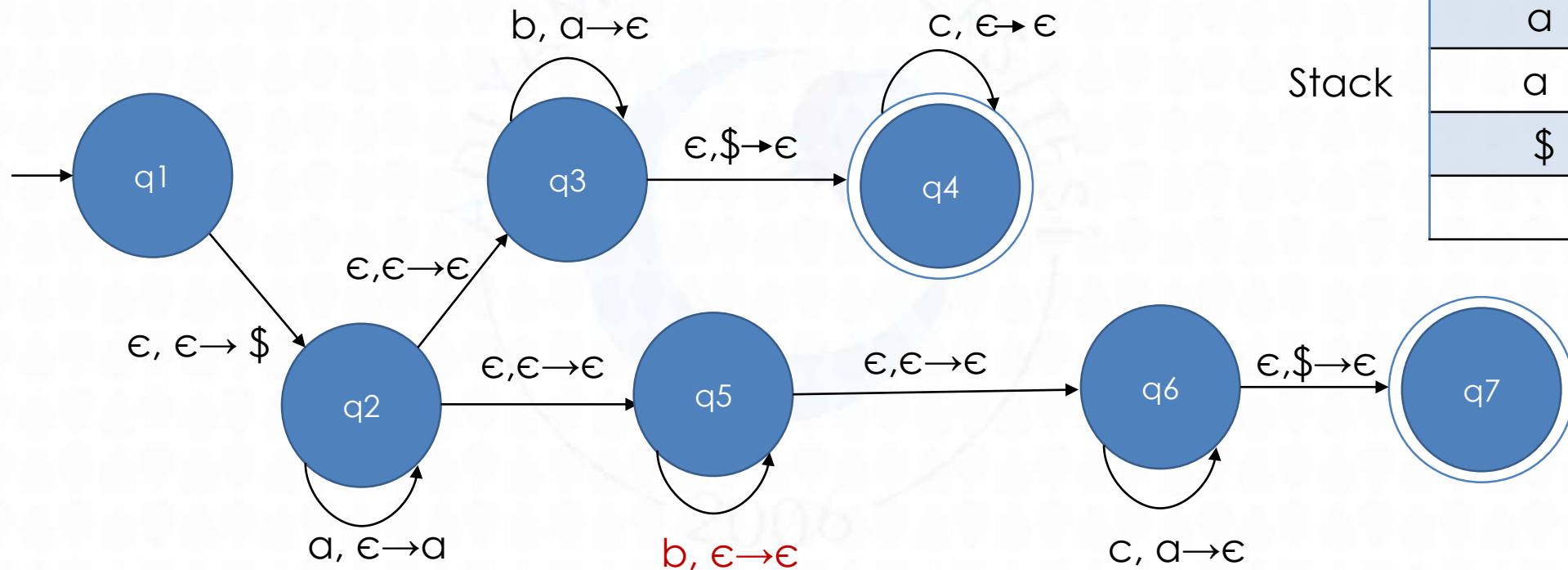
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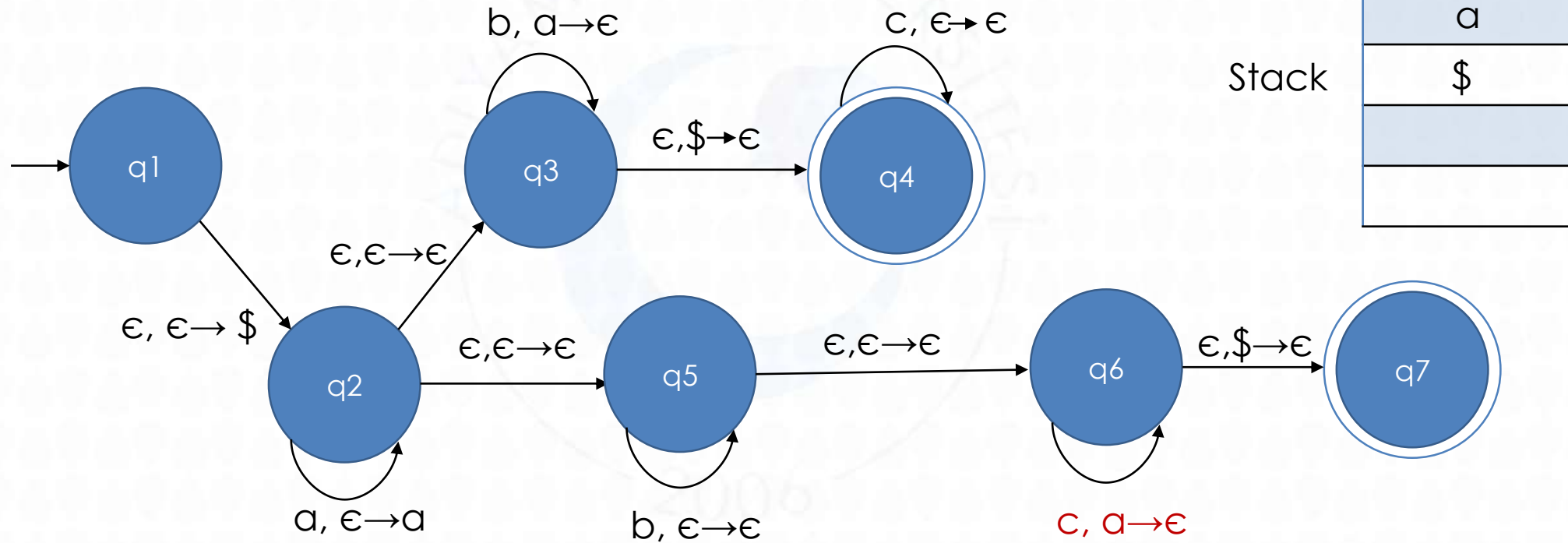
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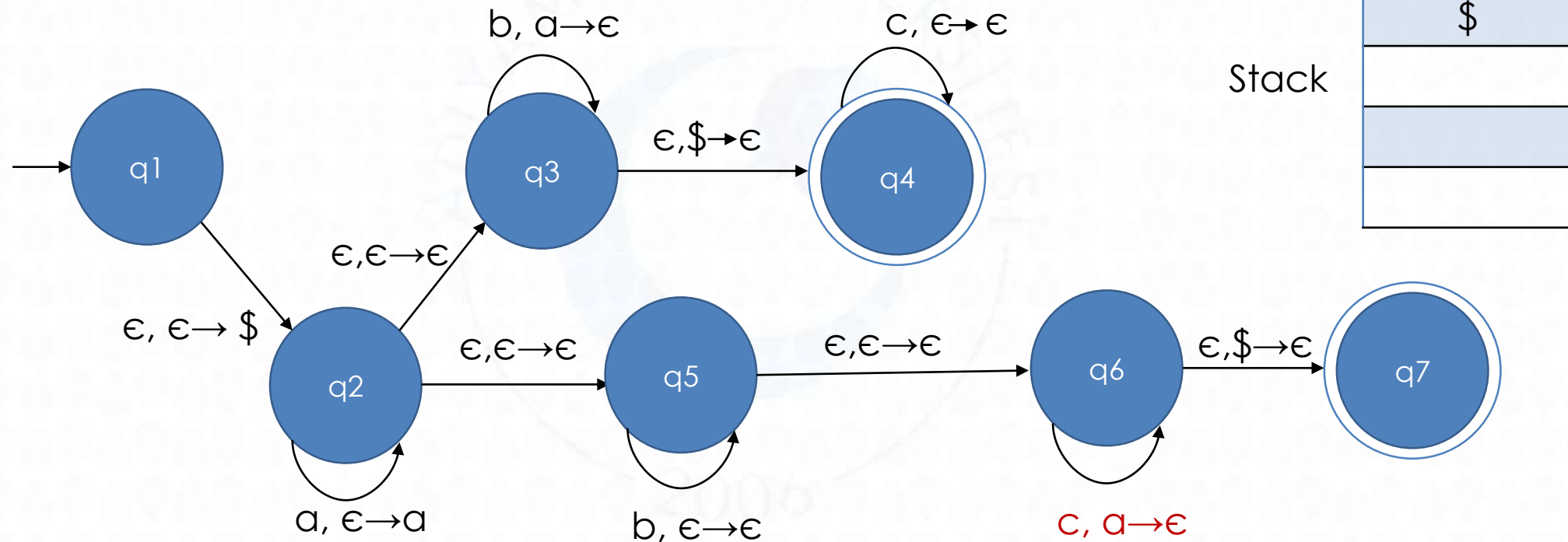
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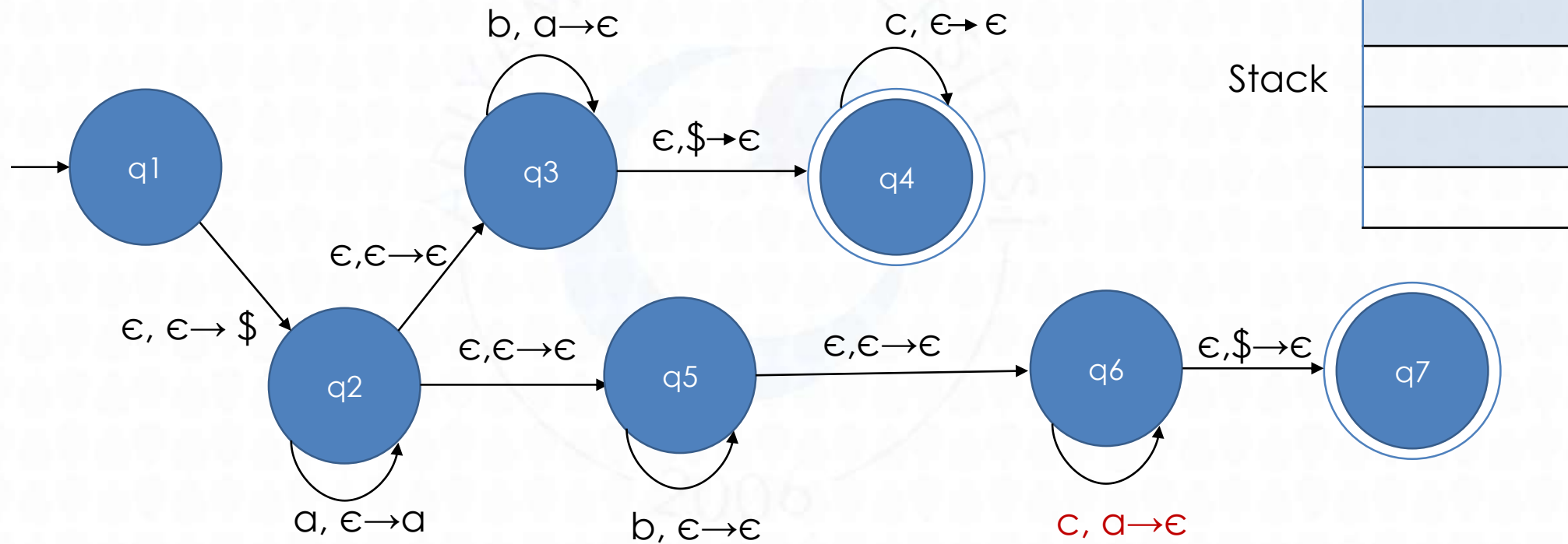
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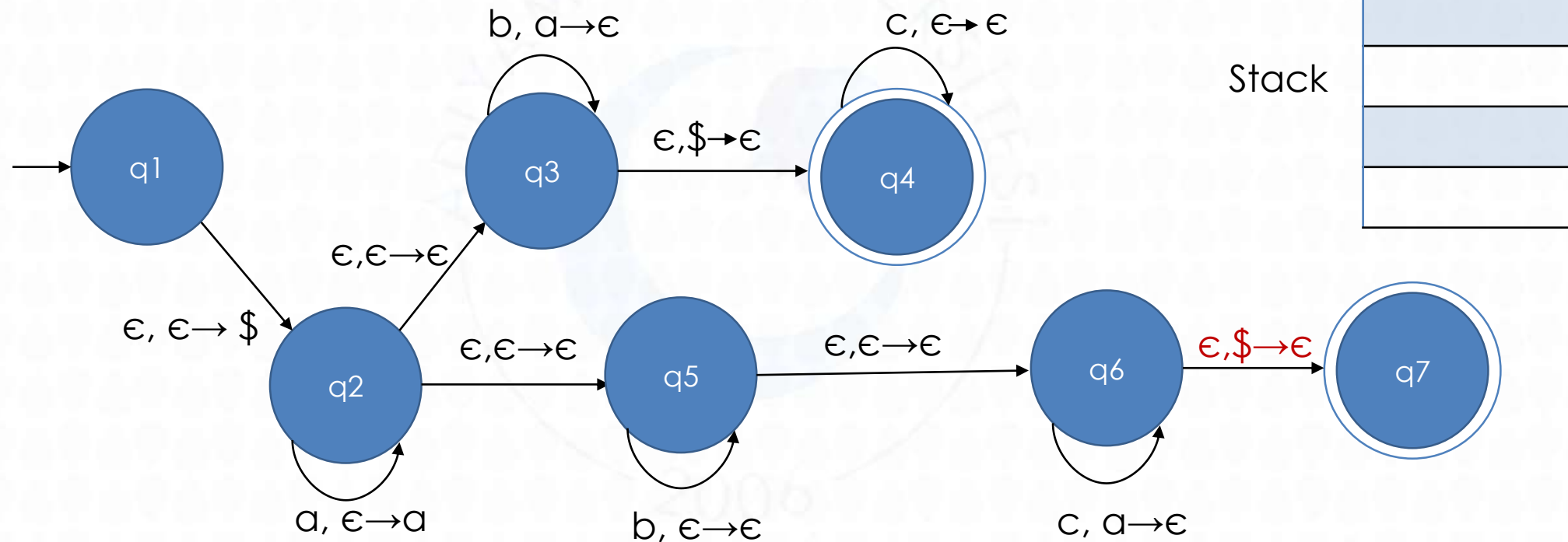
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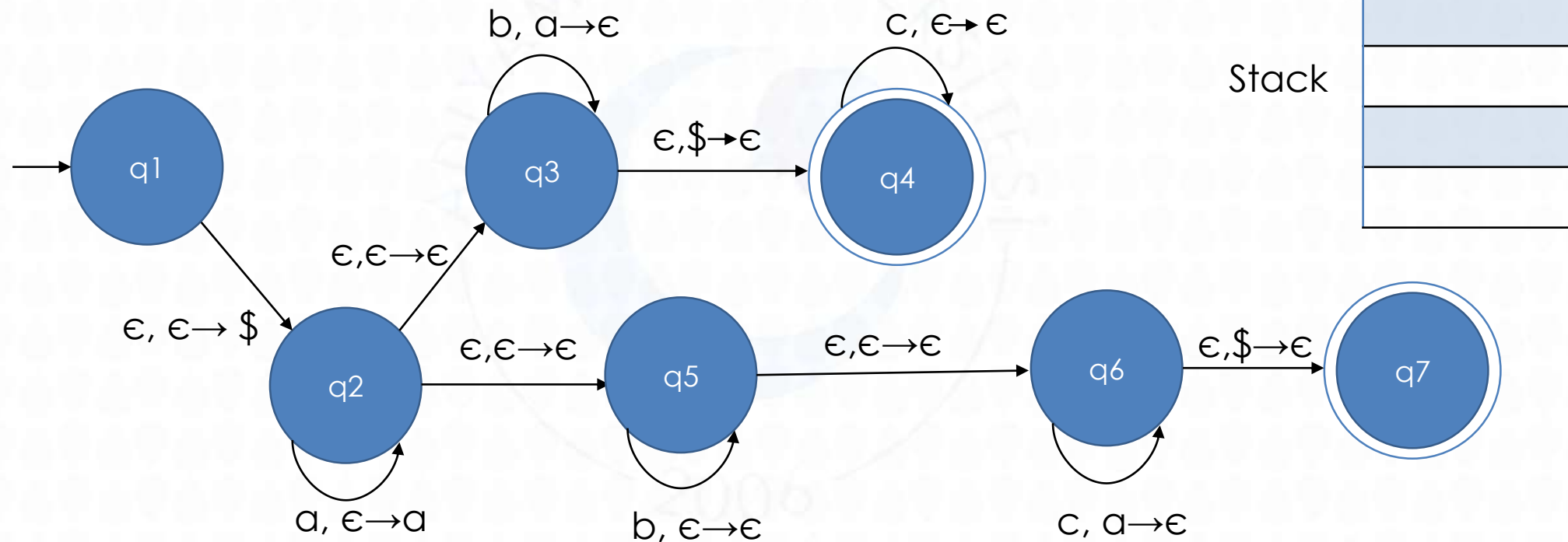
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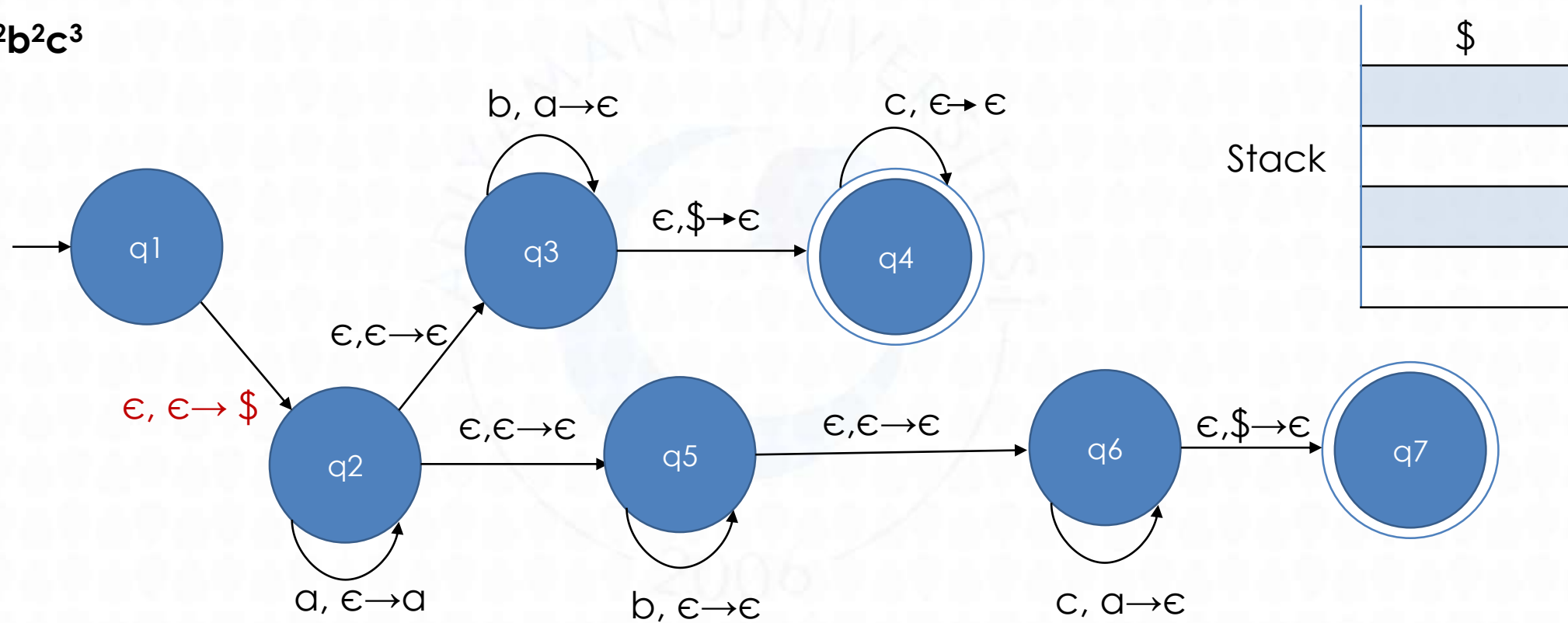
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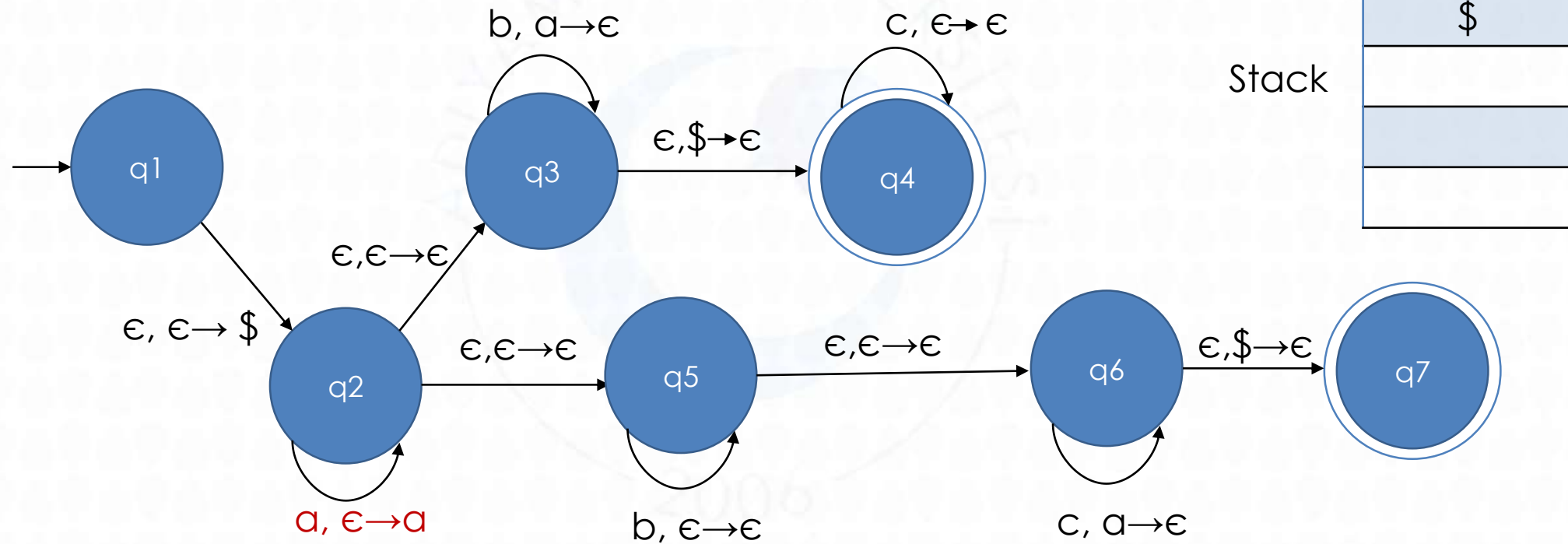
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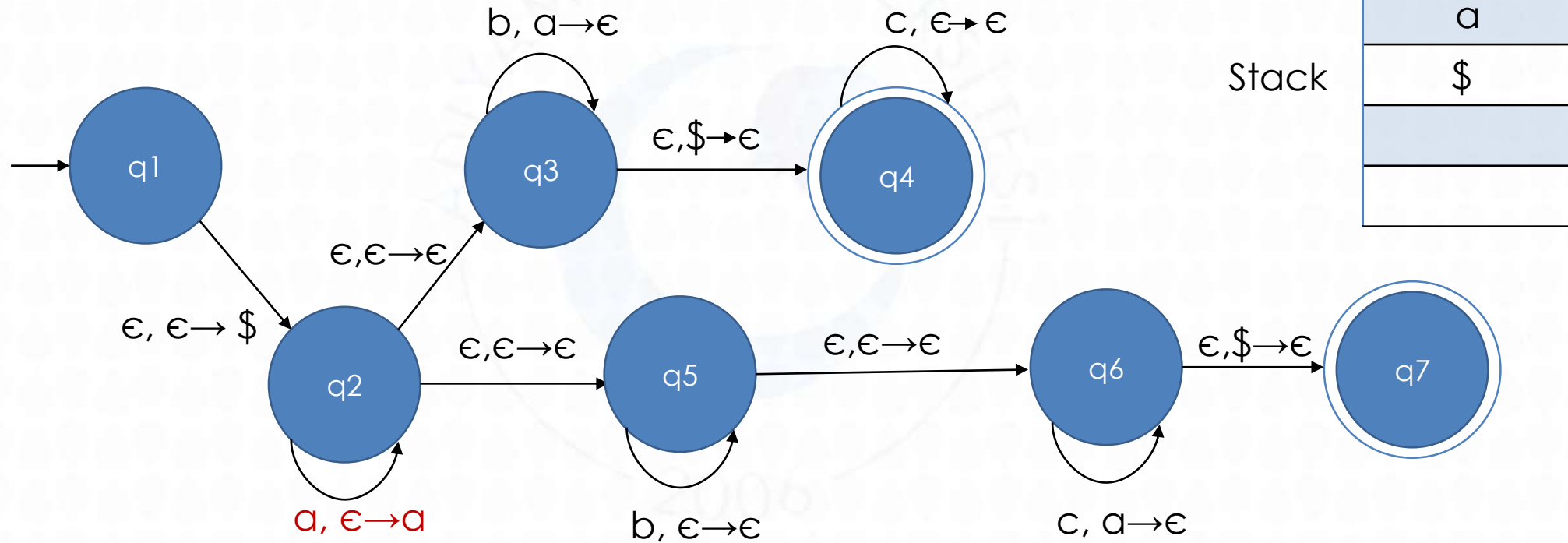
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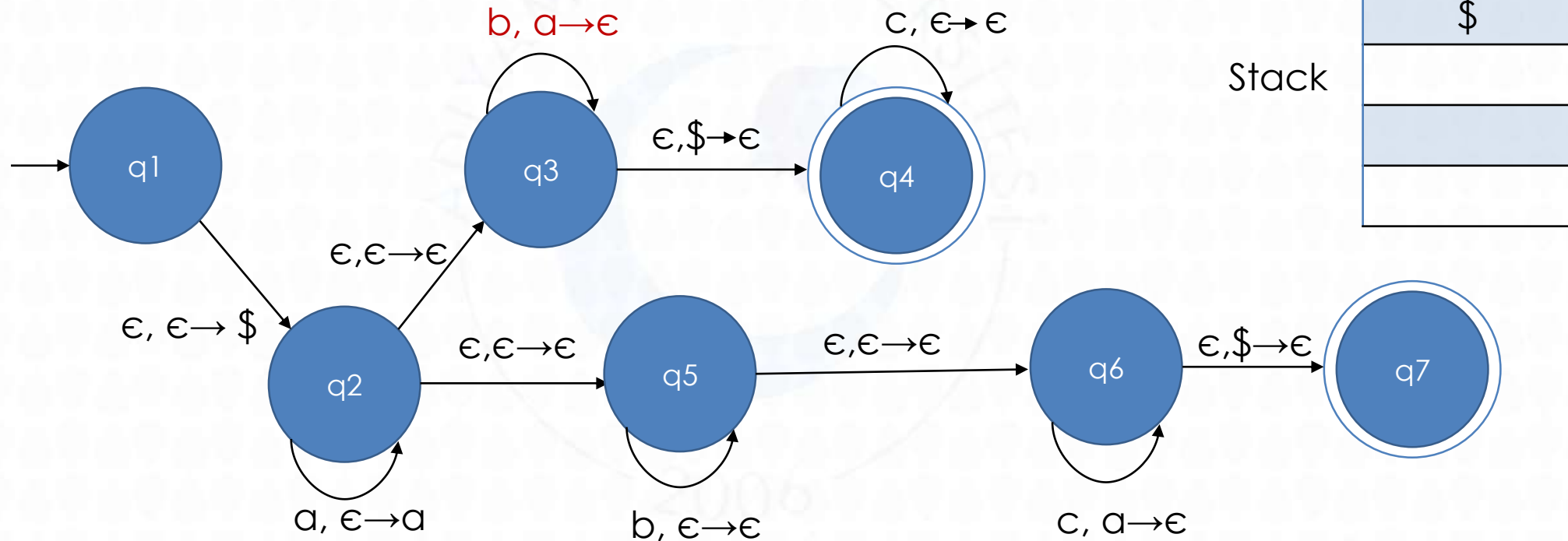
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$a^2b^2c^3$



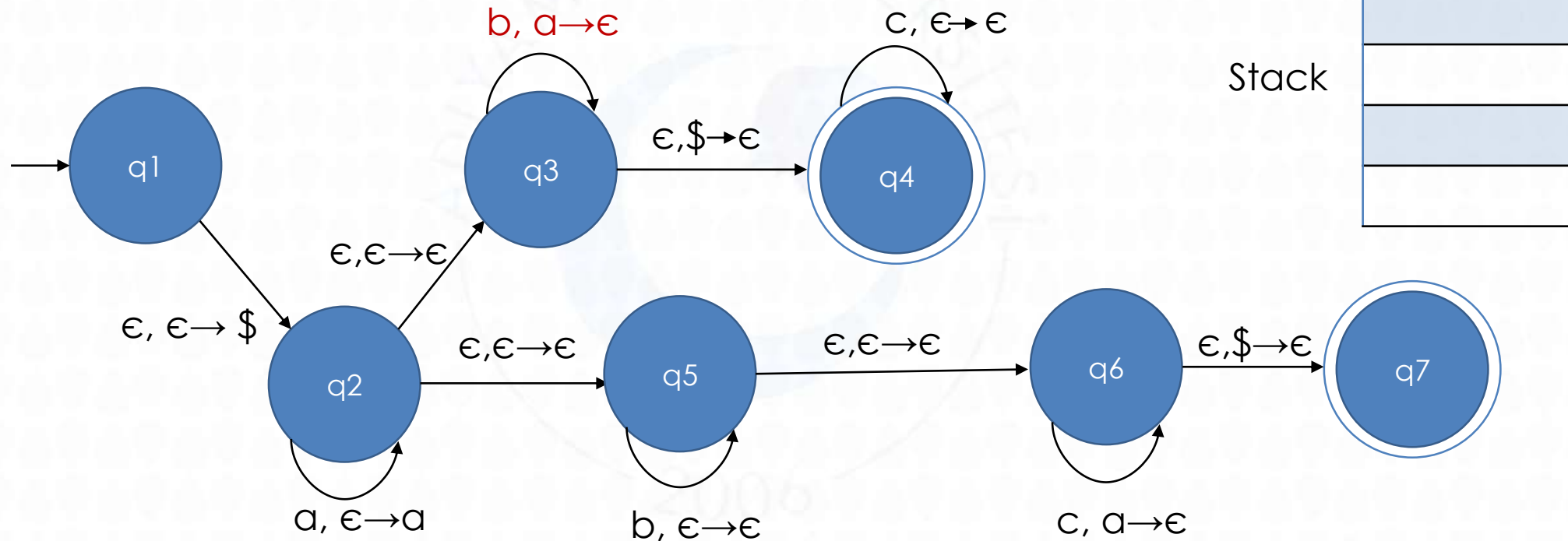
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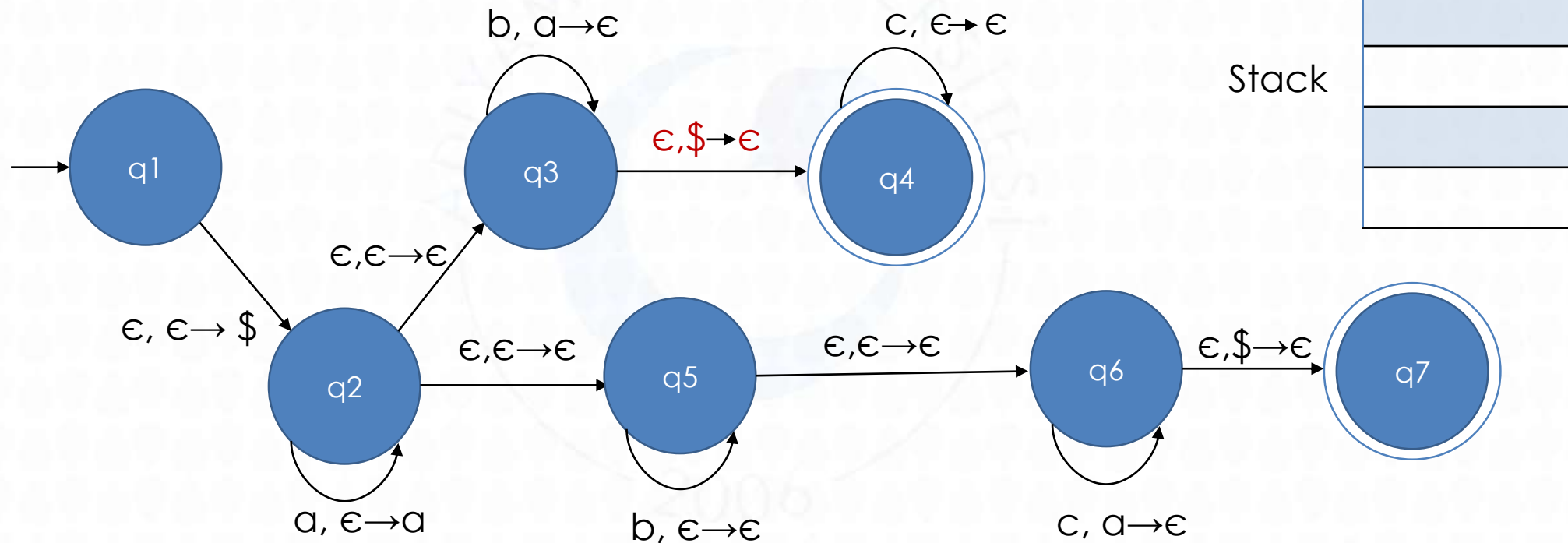
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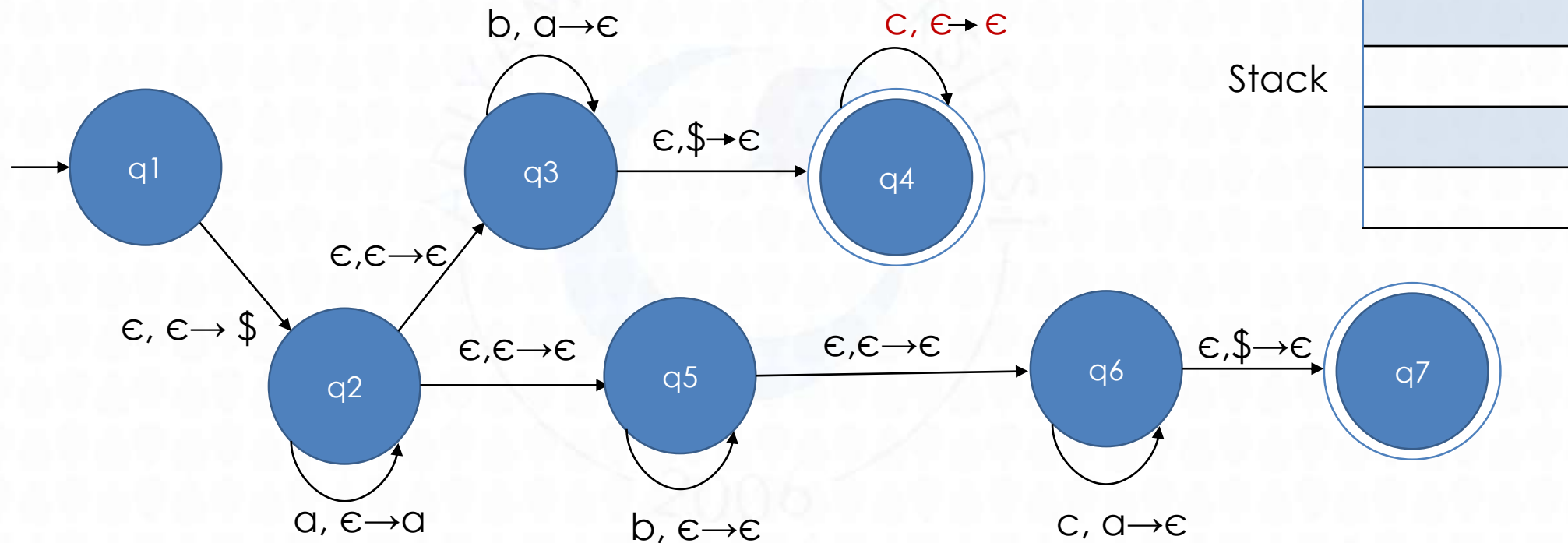
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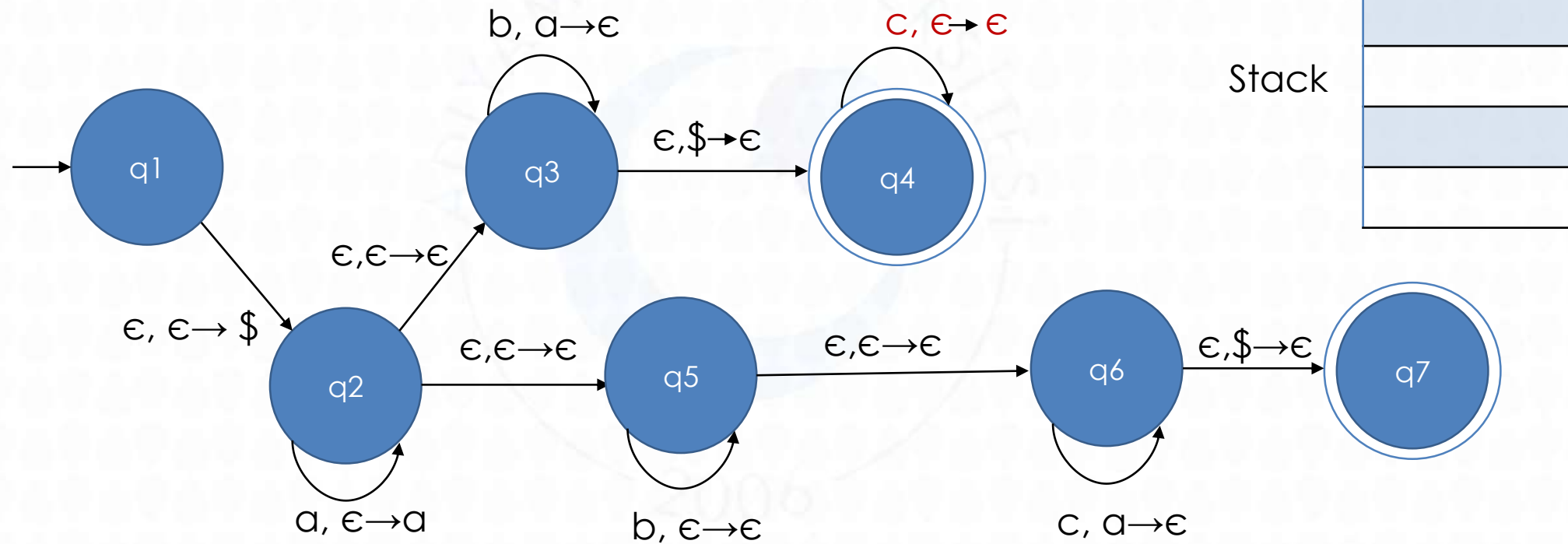
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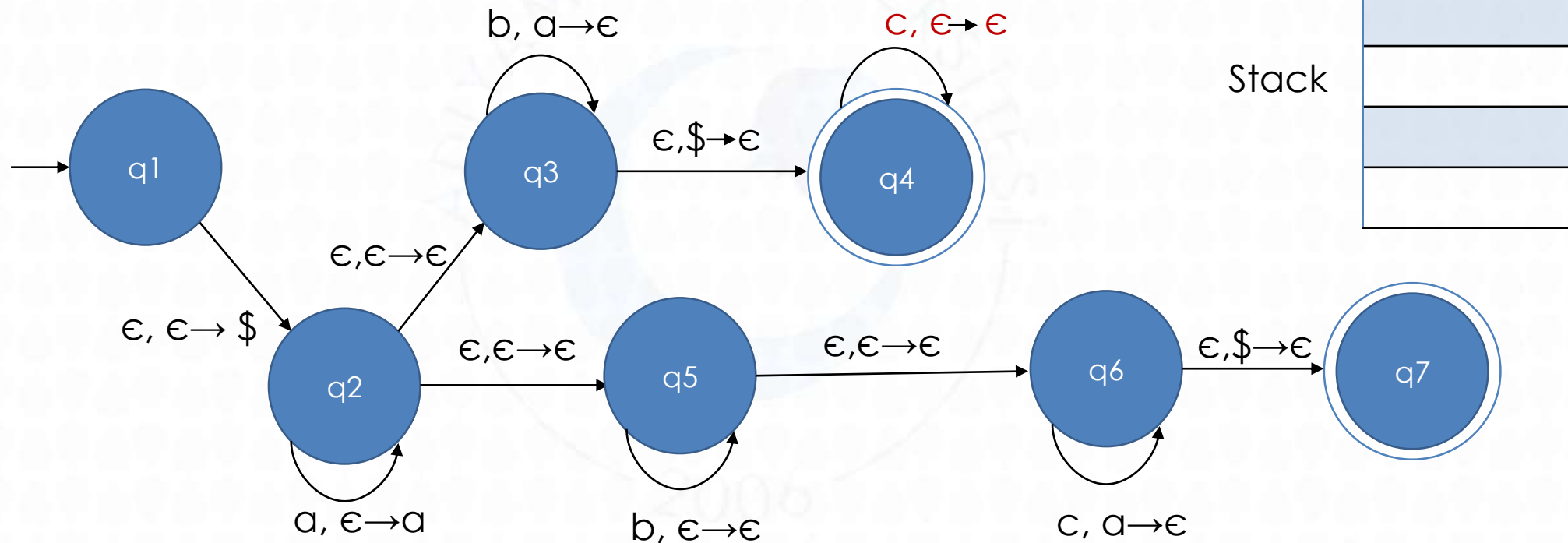
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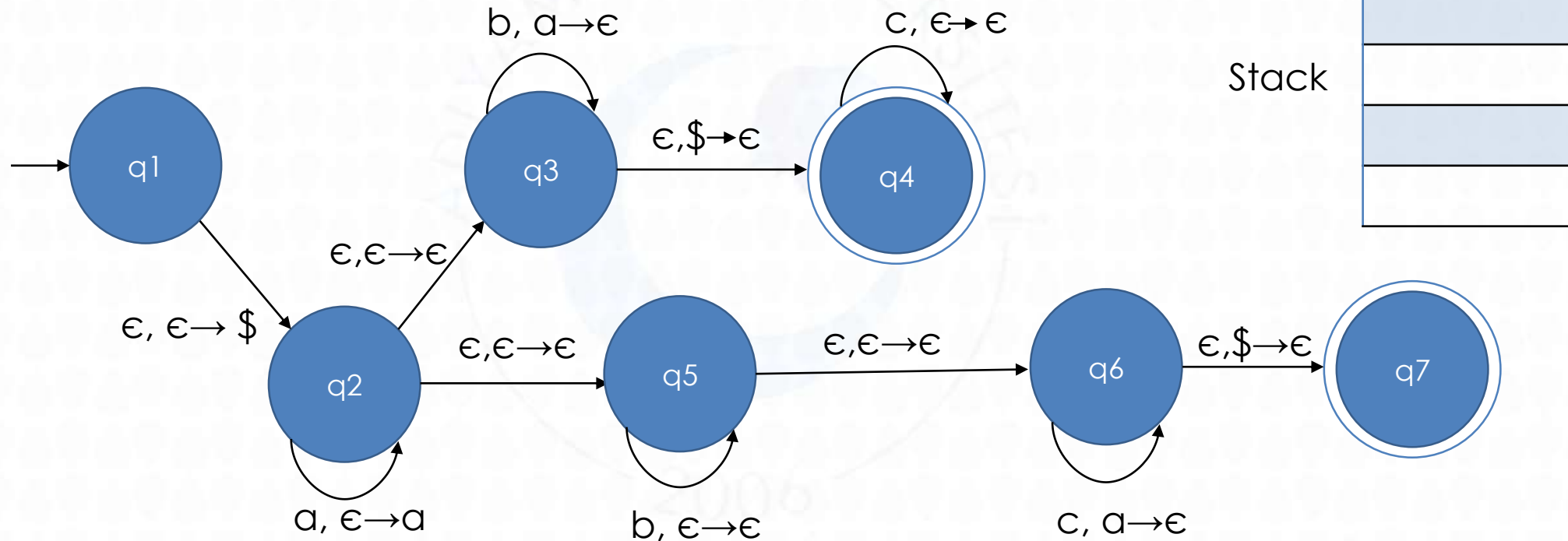
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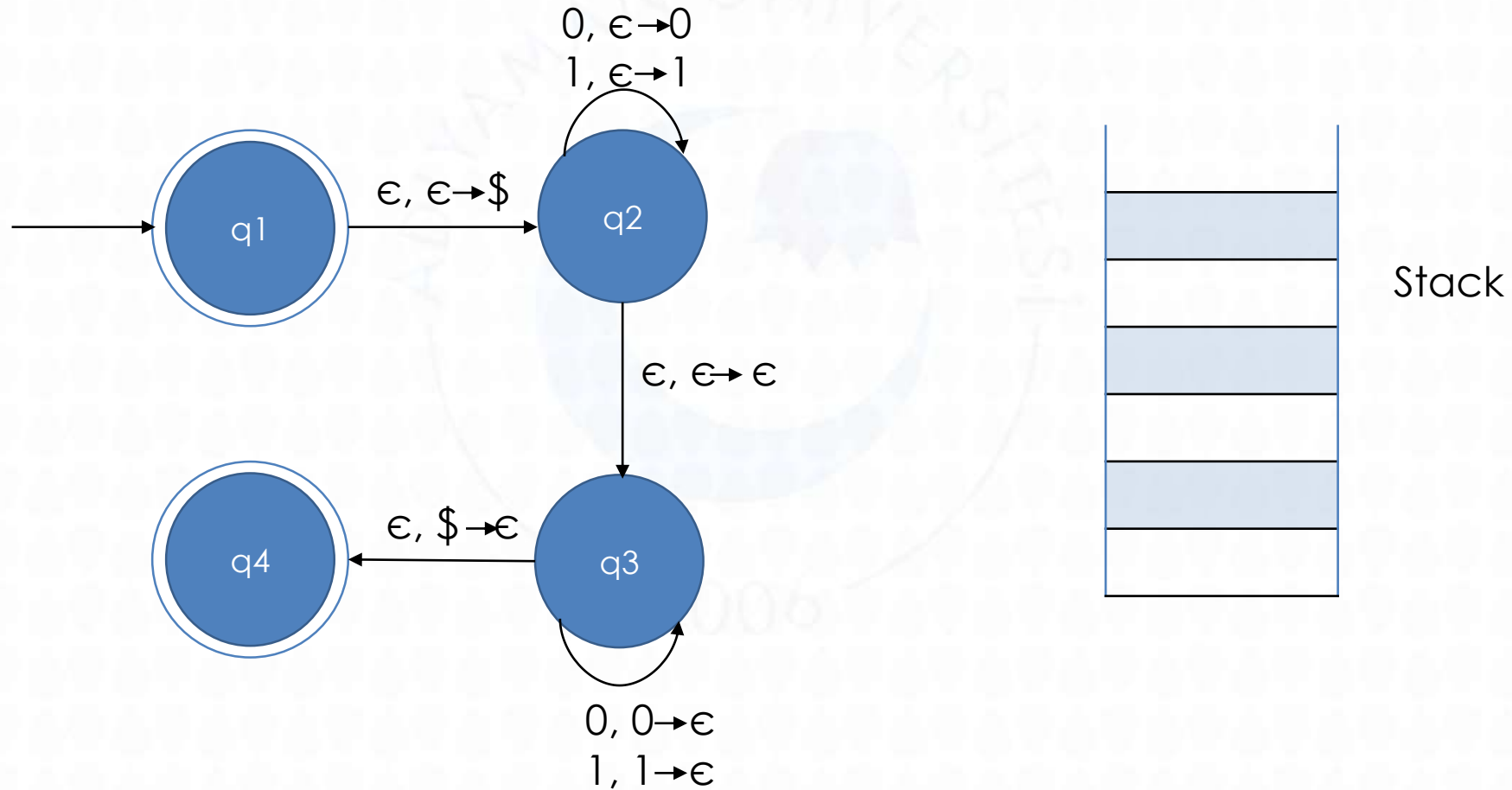
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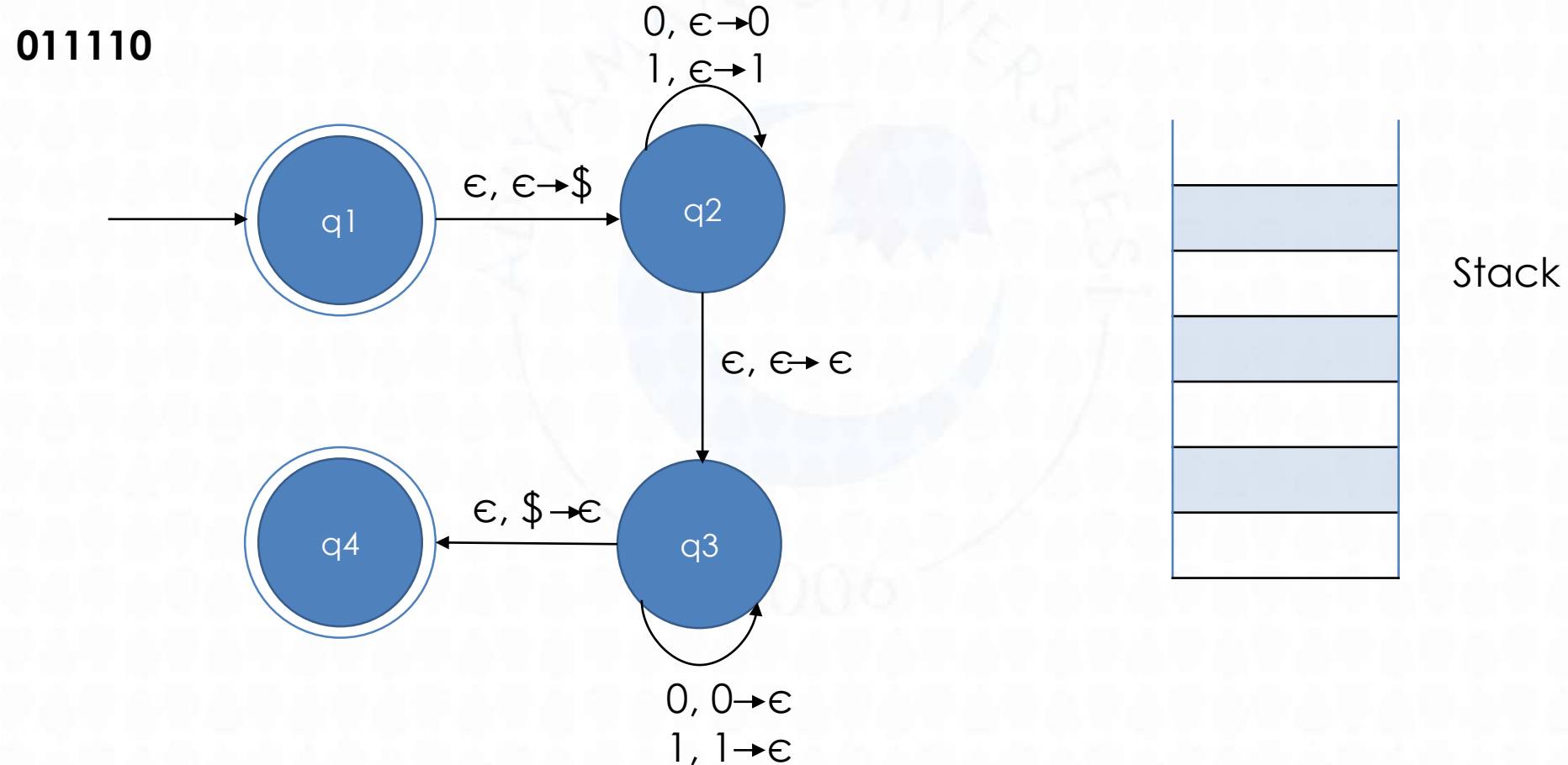
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- $M2 = (Q, \Sigma, \Gamma, \delta, q_1, F)$ PDA'sı $\{ww^R, w \in \{0,1\}^*\}$ dili için aşağıdaki şekilde tanımlanmaktadır. w^R 'nin anlamı w kelimesinin ters yazılmasıdır. Ör: $w = 011$ ise $w^R = 110$
- $Q = \{q_1, q_2, q_3, q_4\}$
- $\Sigma = \{0, 1\}$
- $\Gamma = \{0, 1, \$\}$
- $F = \{q_1, q_4\}$

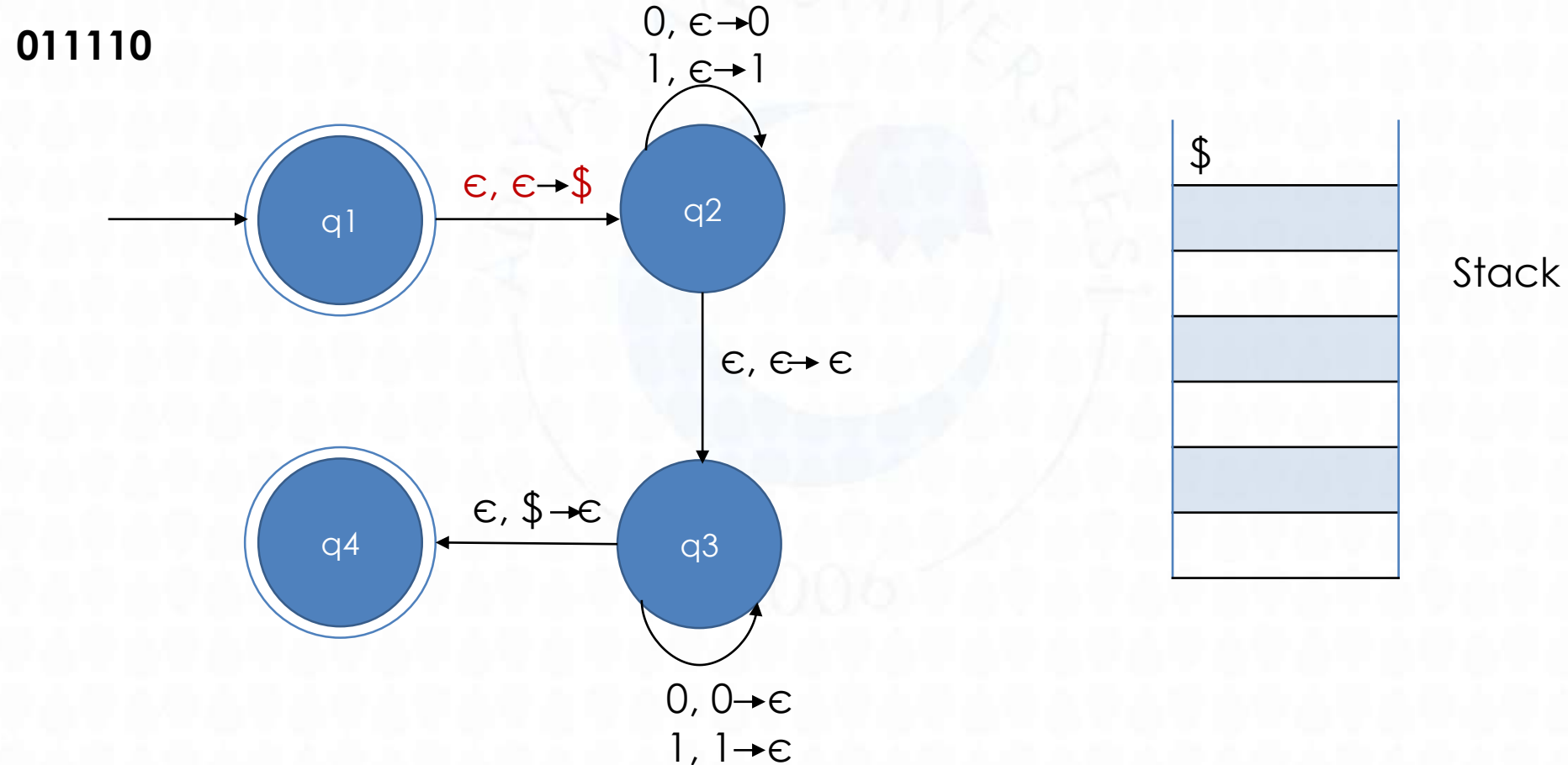
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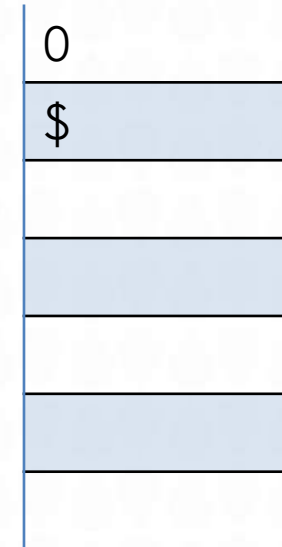
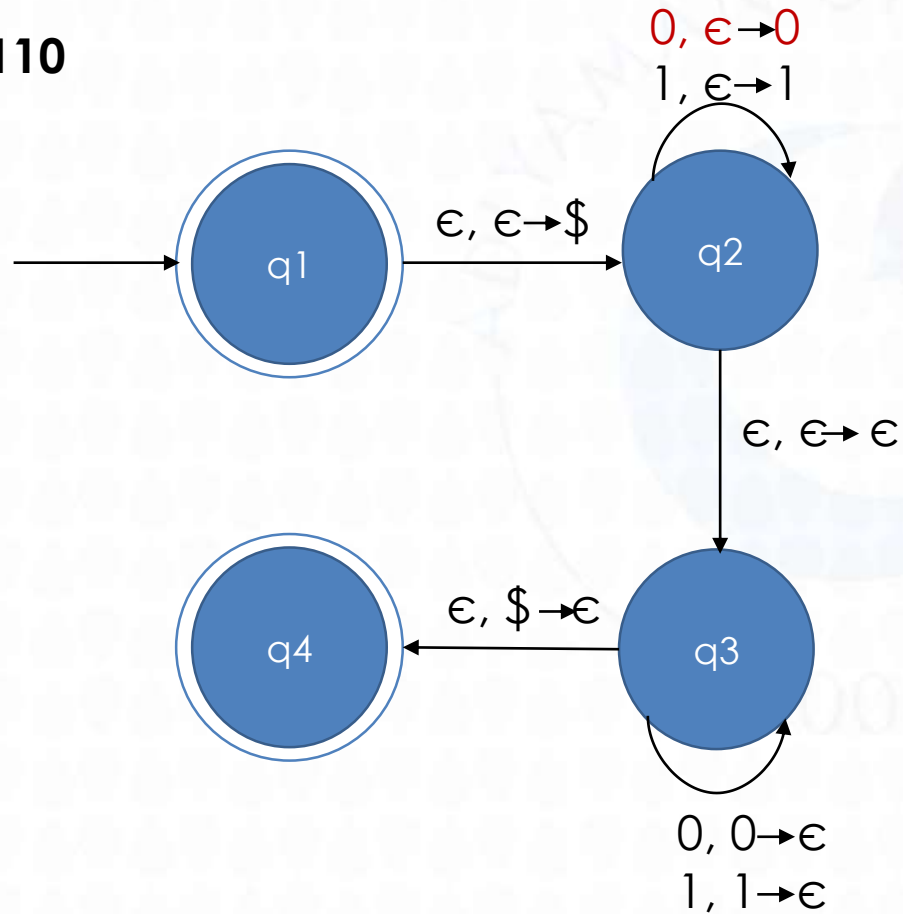


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Pushdown Otomata

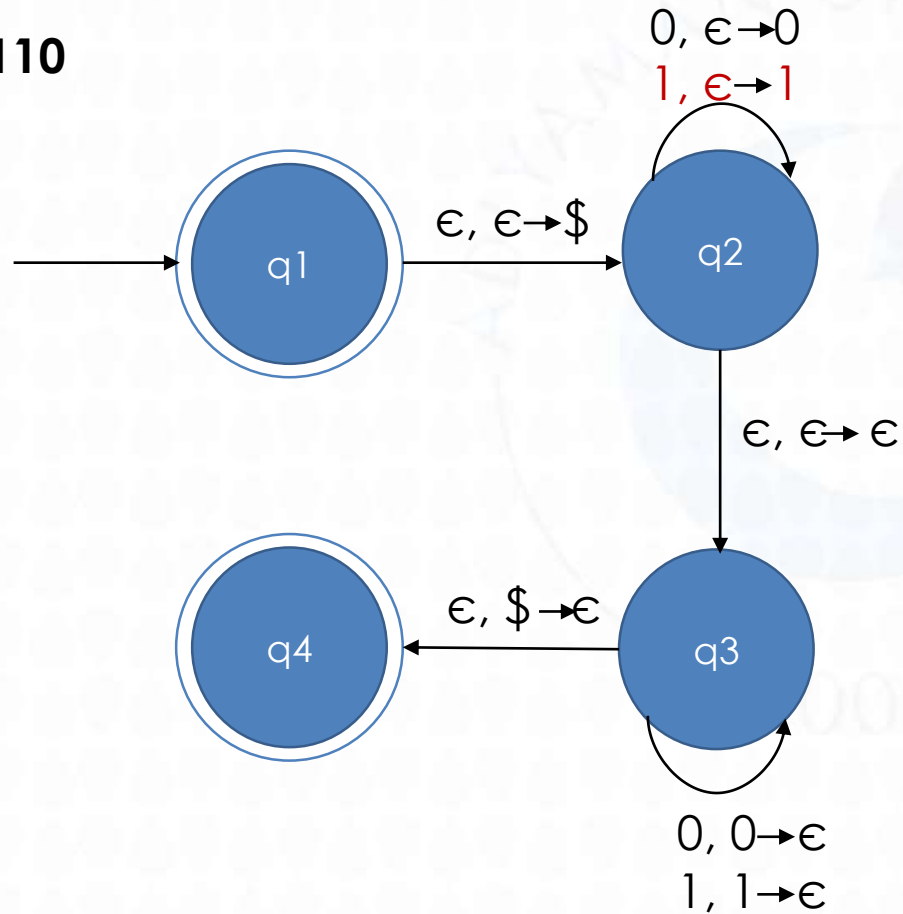
011110



Stack

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011110

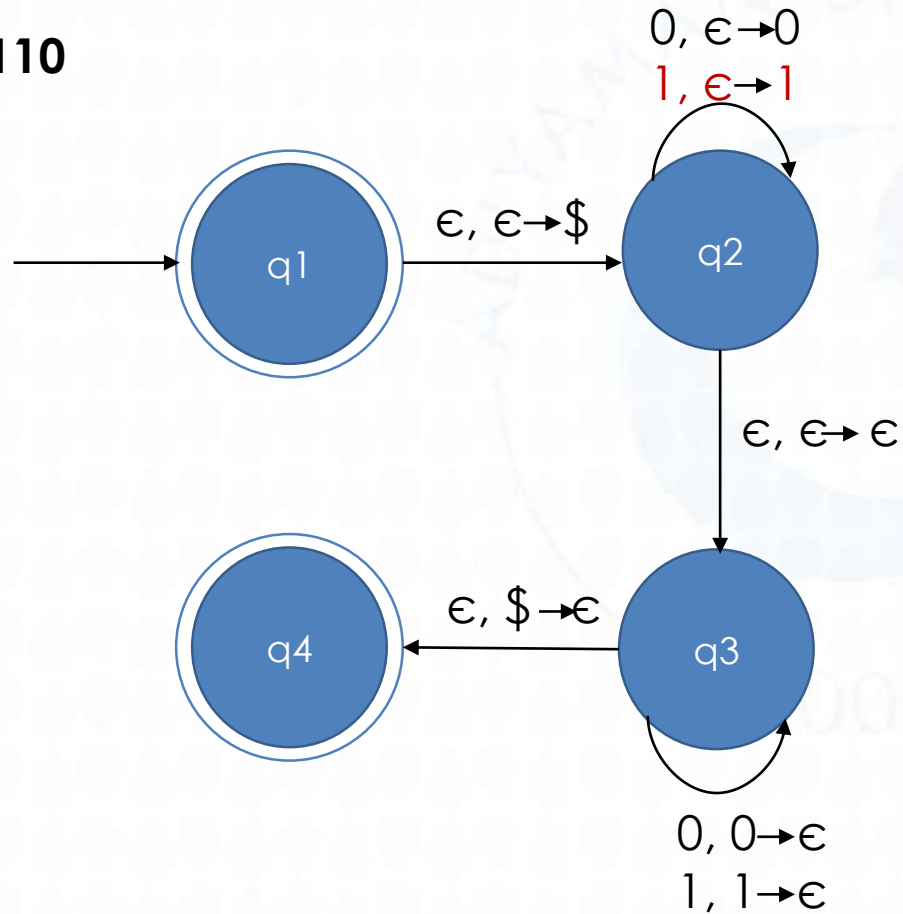


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Pushdown Otomata

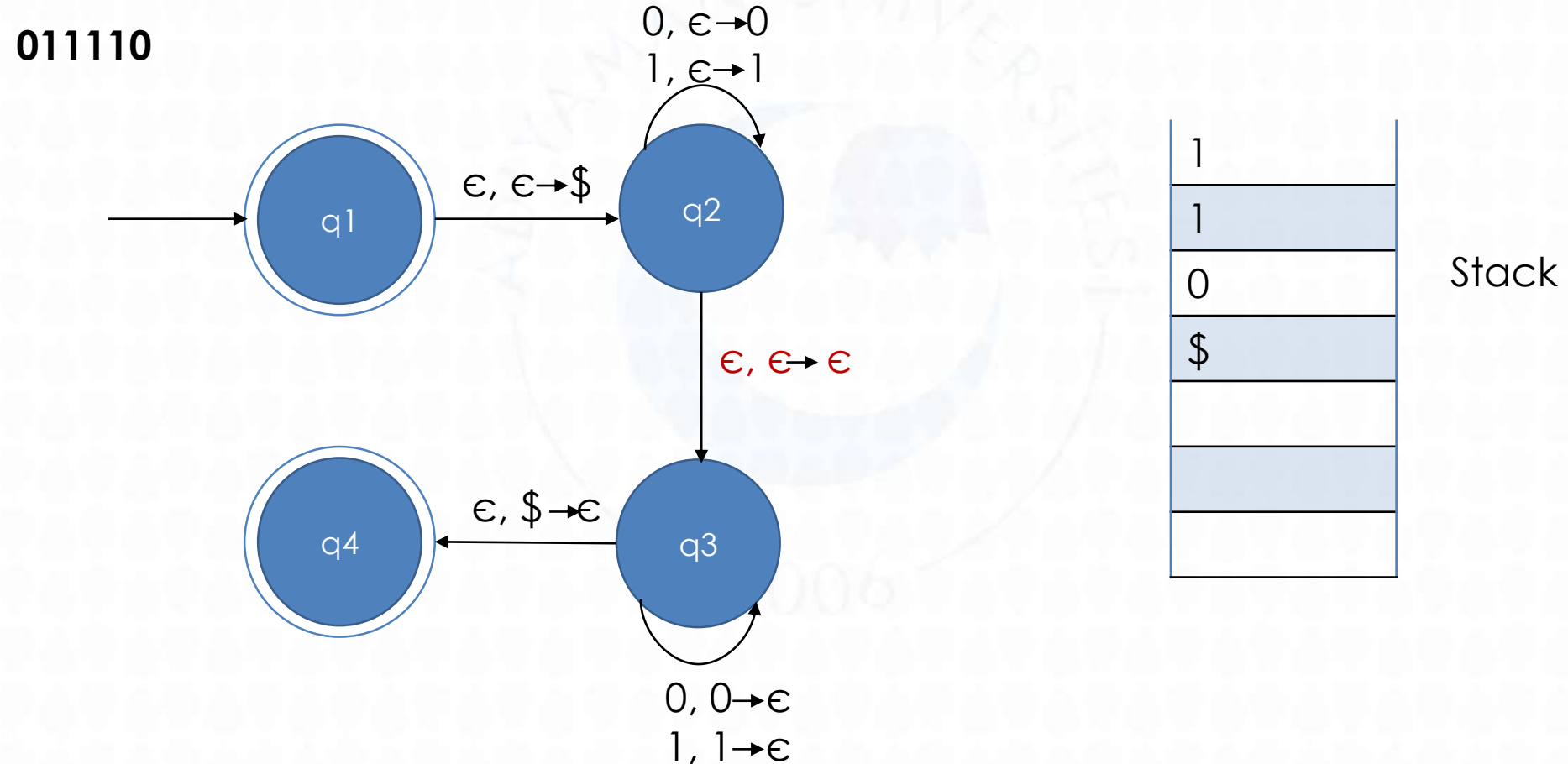
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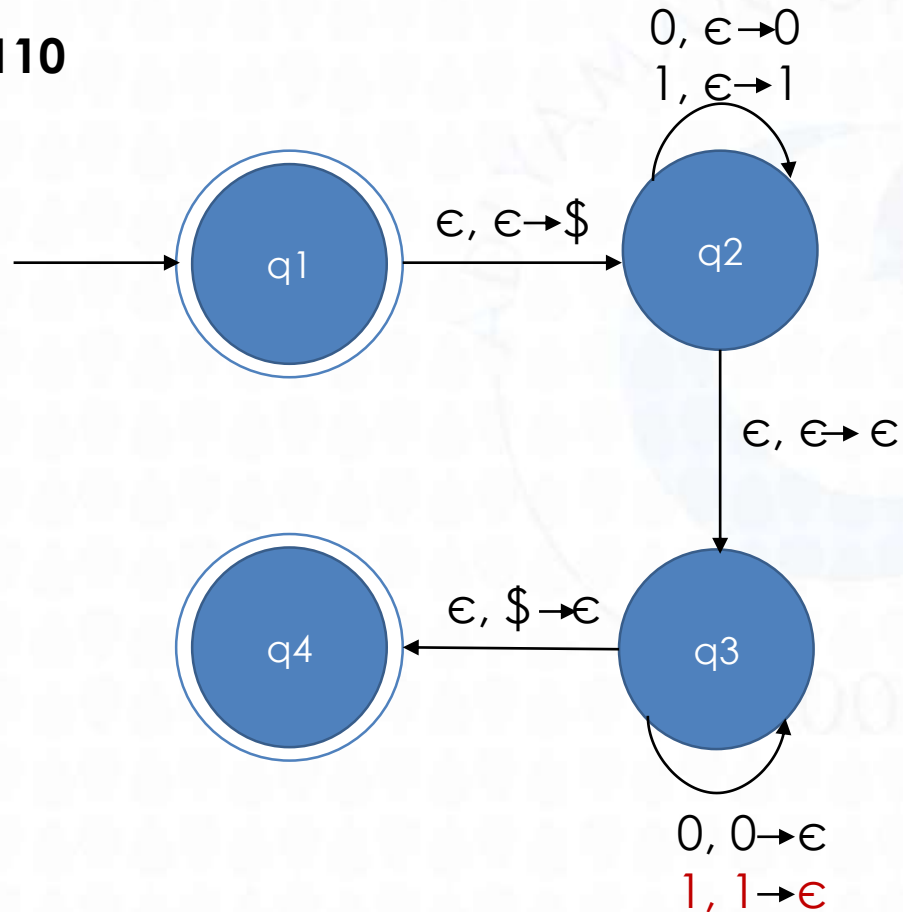
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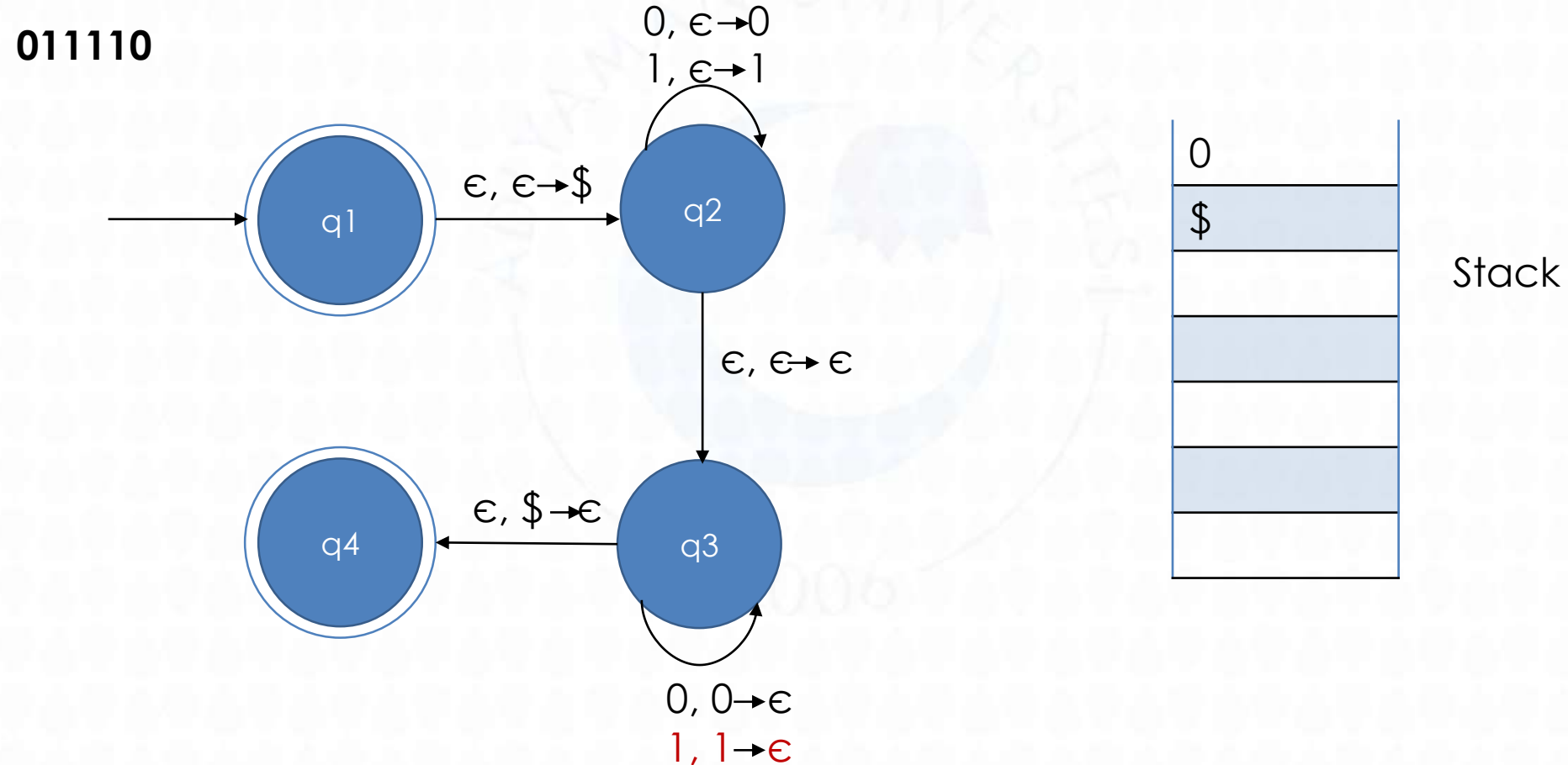
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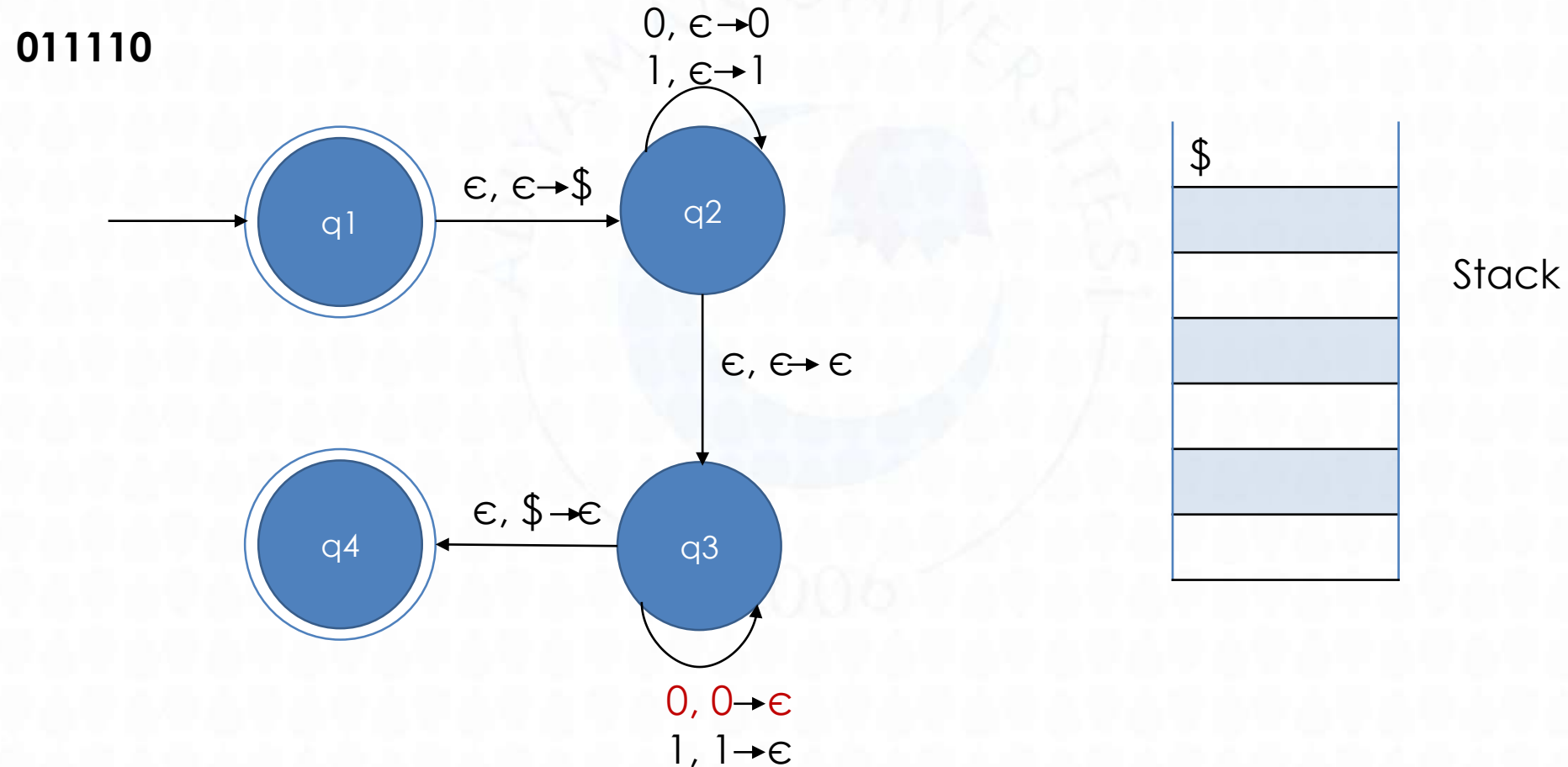
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