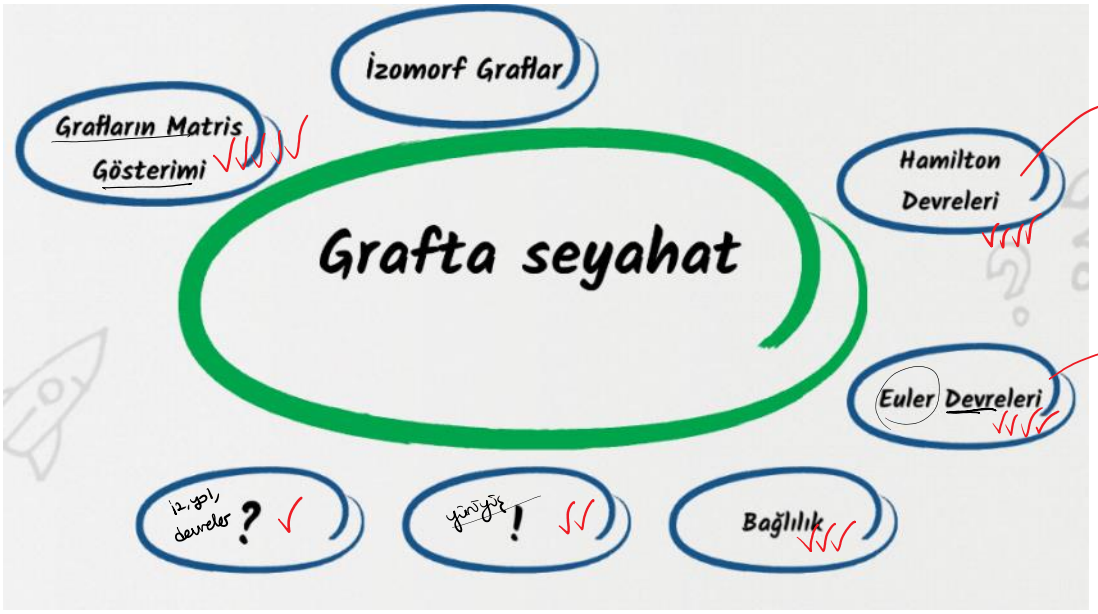
13. Hafta

15 Aralık 2022 Perşembe 18:33



→ başl. düğümü = bitiş düğümü
→ graftaki tüm düğümleri içerir.
→ tekrarlı ayrıt X
→ tekrarlı düğüm X

→ başl. düğümü = bitiş düğümü
→ graftaki tüm ayrıtları tüm düğümleri içerir.
→ tekrarlı ayrıt X

Ör

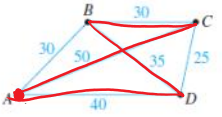
Example 10.2.9 A Traveling Salesman Problem (Gezici Satıcı Problemi)

Imagine that the drawing below is a map showing four cities and the distances in kilometers between them. Suppose that a salesman must travel to each city exactly once, starting and ending in city A. Which route from city to city will minimize the total distance that must be traveled?

→ aynı ayrıttan tekrar geçme

her düğümden sadece 1 ker geç

→ Hamilton Devrelerini bul.



Toplam Yol

A - B - C - D - A (A-D-C-B-A) → 30 + 30 + 25 + 40 → en kısa toplam yol

A - B - D - C - A (A-C-D-B-A) → 30 + 35 + 25 + 50

A - D - B - C - A (A-C-B-D-A) → 40 + 35 + 30 + 50

Ör

20. The following is an adjacency matrix for a graph:

$$A = \begin{array}{c} \\ v_1 \\ v_2 \\ v_3 \\ v_4 \end{array} \begin{array}{c} \begin{array}{cccc} v_1 & v_2 & v_3 & v_4 \end{array} \\ \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 2 & 1 \\ 1 & 2 & 0 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix} \end{array}$$

Answer the following questions by examining the matrix and its powers only, not by drawing the graph:

a. How many walks of length 2 are there from v_2 to v_3? 2
b. How many walks of length 2 are there from v_3 to v_4? 3
c. How many walks of length 3 are there from v_1 to v_4?
d. How many walks of length 3 are there from v_2 to v_3?

Kaç döngü var? 1 tane

Kaç ayrıt var? 1 + 1 + 2 + 1 + 1 + 1 = 7 ayrıt var.

Grafın derecesi kaçtır? $Deg(G) = 2.N(e) = 2.7 = 14$

Graf basit graf mıdır? Basit değil, döngü, paralel ayrıt var.

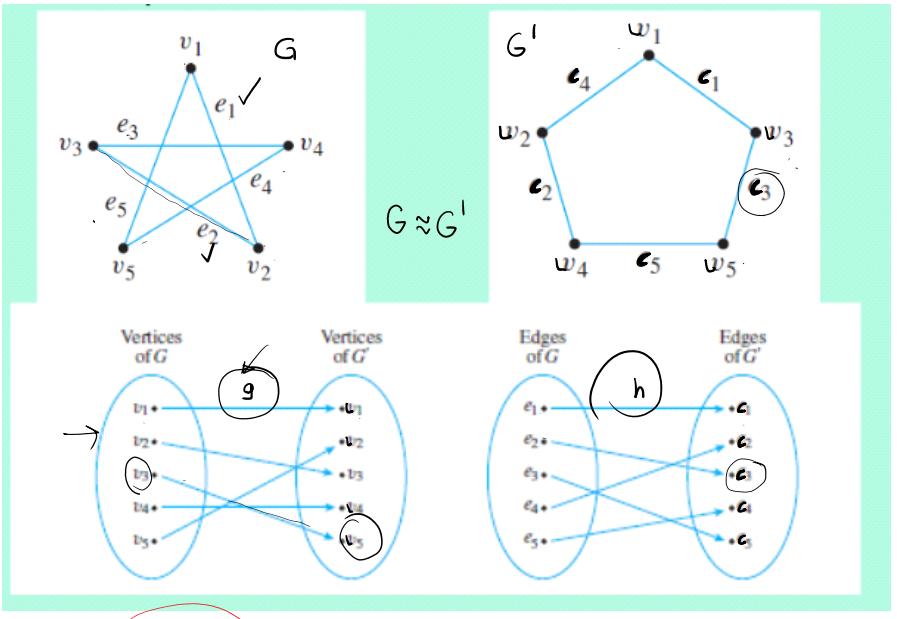
2-uzunluklu yürüyüş → A^2

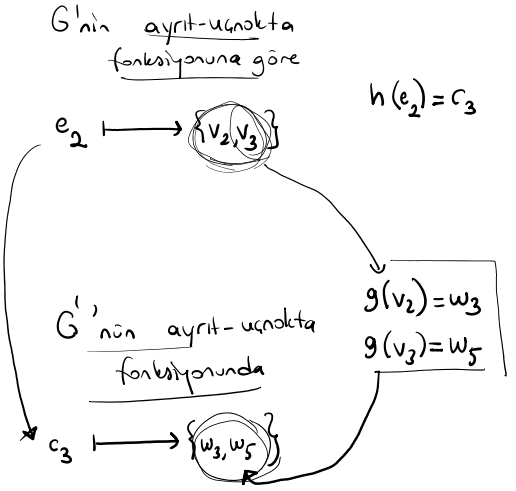
3-uzunluklu yürüyüş → A^3

$$A^2 = \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 2 & 1 \\ 1 & 2 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 2 & 1 \\ 1 & 2 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 2 & 2 & 2 & 2 \\ 2 & 6 & 2 & 3 \\ 2 & 2 & 6 & 3 \end{bmatrix}$$

$A^3 = \begin{bmatrix} \\ \\ \end{bmatrix}$

$A^2 =$ $\begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 2 & 1 \\ 1 & 2 & 0 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 2 & 1 \\ 1 & 2 & 0 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix} = \begin{bmatrix} 2 & 2 & 2 & 2 \\ 2 & 6 & 2 & 3 \\ 2 & 2 & 6 & 3 \\ 2 & 3 & 3 & 3 \end{bmatrix}$ $= \begin{bmatrix} \\ \\ \\ \end{bmatrix}$

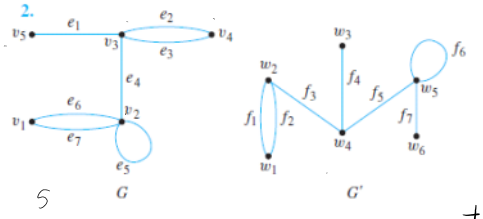




$G \approx G' \Rightarrow$

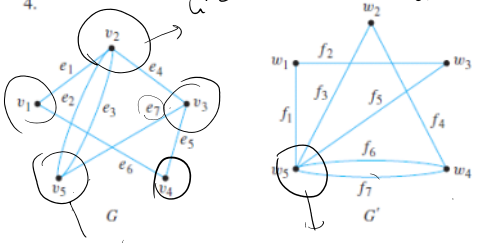
- Düğüm sayıları eşittir ✓
- Ayrıt sayıları eşittir ✓
- Bağlılık
- k dereceli düğümlerin sayısı ✓ (ayrıt-uçnokta fonk. korumak için)

Ex



$\frac{G}{5 \text{ düğüm}} \neq \frac{G'}{6 \text{ düğüm}}$ $\quad G \not\approx G'$

Ex



$\Rightarrow G \not\approx G'$