

Graph Theory

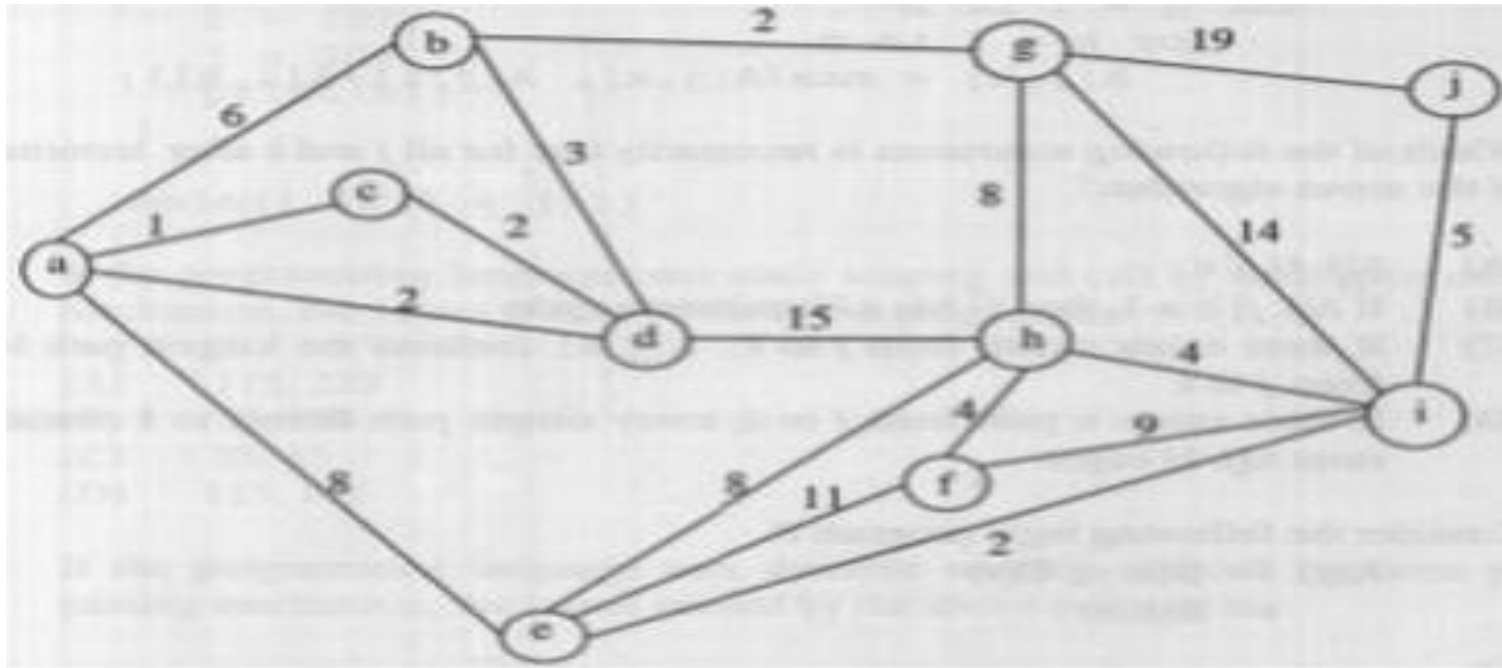
Class Exercise 1

Consider a complete undirected graph with vertex set $\{0, 1, 2, 3, 4\}$. Entry W_{ij} in the matrix W below is the weight of the edge $\{i, j\}$. What is the minimum possible weight of a spanning tree T in this graph such that vertex 0 is a leaf node in the tree T ?

$$W = \begin{pmatrix} 0 & 1 & 8 & 1 & 4 \\ 1 & 0 & 12 & 4 & 9 \\ 8 & 12 & 0 & 7 & 3 \\ 1 & 4 & 7 & 0 & 2 \\ 4 & 9 & 3 & 2 & 0 \end{pmatrix}$$

Class Exercise 2

What is the weight of a minimum spanning tree of the following graph?



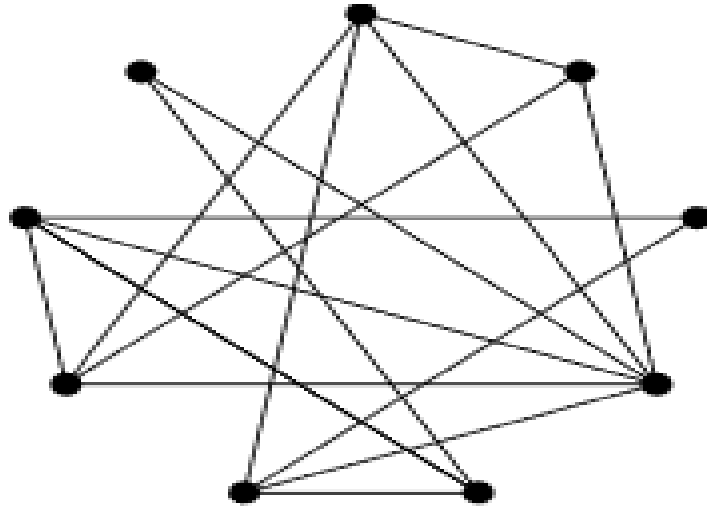
Class Exercise 3

Which of the following graphs contain an Euler path? Which contain an Euler circuit?

1. K_4
2. K_5
3. $K_{5,7}$
4. $K_{2,7}$
5. C_7

Class Exercise 4

Below is a graph representing friendships between a group of students (each vertex is a student and each edge is a friendship). Is it possible for the students to sit around a round table in such a way that every student sits between two friends? What does this question have to do with paths?



Class Exercise 5

use Prim's algorithm to find a minimum spanning tree for the given weighted graph.

