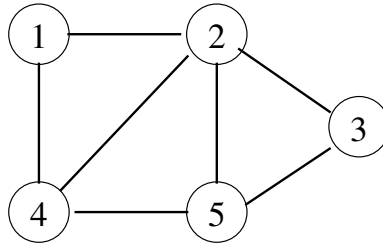


Graph Representation Worksheet



1. What are the storage requirements assuming an adjacency matrix is used. Assume each element of the adjacency matrix requires four bytes.

The size of the adjacency matrix is $n^2 = 25$, so if each element takes 4 bytes, the whole adjacency matrix takes up $25 \times 4 = 100$ bytes.

2. Repeat for an adjacency list representation. Assume that an **int** requires 4 bytes and that a pointer also requires 4 bytes.

If each item in the adjacency lists takes up 8 bytes, and there are $2m = 14$ adjacencies, then the whole adjacency list takes up $8 \times 14 = 112$ bytes.

3. Now, consider an undirected graph with 100 vertices and 1000 edges. What are the storage requirements for the adjacent matrix and adjacency list data structures?

Matrix:

$$4 \times n^2 = 4(10,000) = 40,000 \text{ bytes}$$

List:

$$8 \times 2m = 16(1,000) = 16,000 \text{ bytes}$$