NANYANG TECHNOLOGICAL UNIVERSITY
School of Electrical & Electronic Engineering

IE2108 Data Structures and Algorithms

Tutorial No. 09 (Sem 1, AY2022-2023)

1. Draw a simple undirected graph G that has 12 vertices, 18 edges, and 3 connected components.

2. If G is a simple undirected graph with n vertices and 2 connected components, what is the largest number of edges G might have? Explain how you derive the largest number of edges.

3. If G is a simple undirected graph with n vertices and c ($1 \leq c \leq n$) connected components, what is the largest number of edges G might have? Explain how you derive the largest number of edges.

4. Would you use the adjacency matrix or the adjacency list in each of the following cases? Justify your choice.
   a. The graph has 10,000 vertices and 20,000 edges, and it is important to use as little space as possible.
   b. The graph has 10,000 vertices and 20,000,000 edges, and it is important to use as little space as possible.

5. Draw adjacency lists (using singly linked lists) for the graph shown in Figure 1.

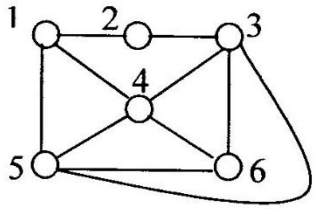

Figure 1

6. Draw adjacency lists (using singly linked lists) for the digraph shown in Figure 2.

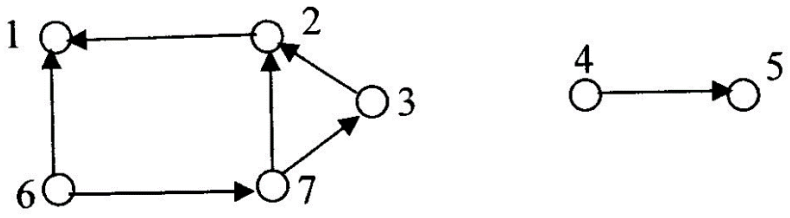

Figure 2