

## Homework VIII: Graph Connectivity and Structural Similarity

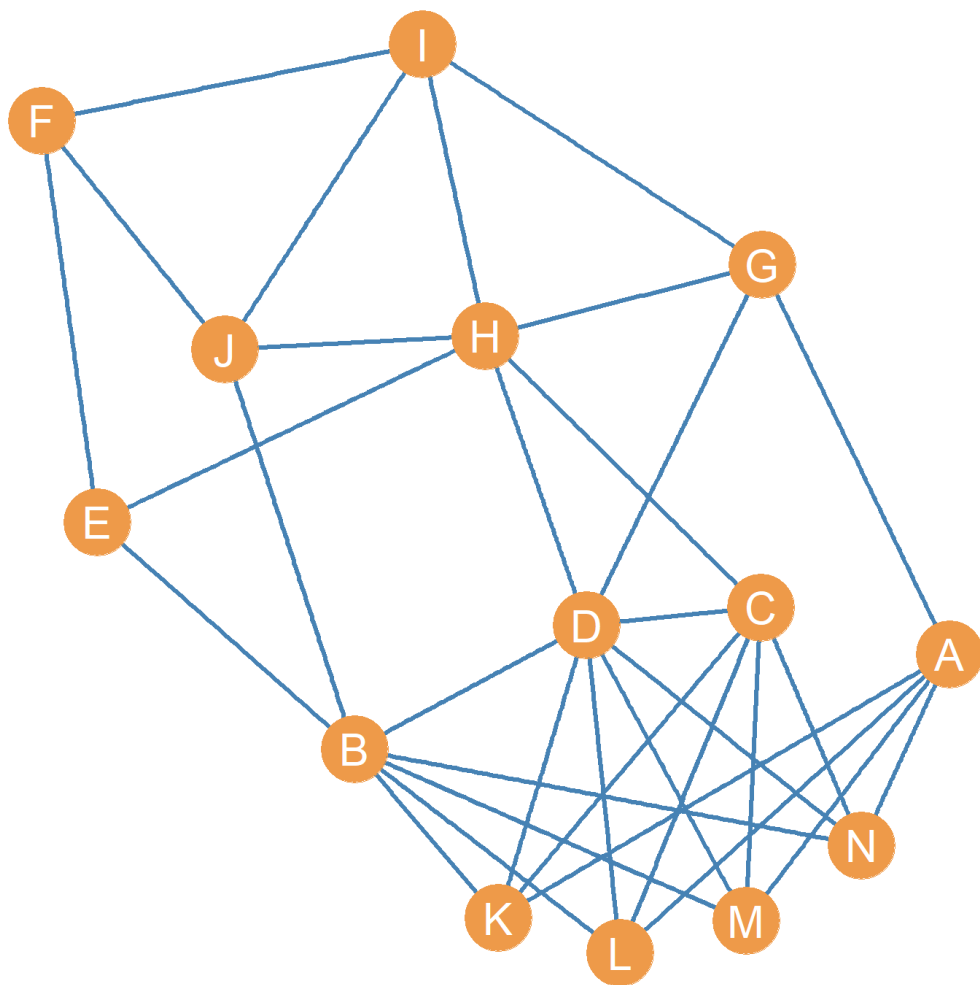


Figure 1: An undirected graph.

In the matrix below, write down the cell entries for the **adjacency matrix** corresponding to the graph shown in [Figure 1](#):

[illegible]

Using the information from the previous matrix, in the matrix below, write down the cell entries for the **structural similarity matrix** corresponding to the graph shown in [Figure 1](#) using the **Euclidean Distance**:

[illegible]

1. Using the Information in the previous matrix, write down the set of nodes that are **structurally equivalent** (e.g., connected to the same set of neighbors) in the graph shown in [Figure 1](#).
2. Out of the nodes that are not structurally equivalent, which pairs of nodes have the highest **structural similarity** in the graph shown in [Figure 1](#)?
3. Using the **Jaccard Similarity** metric, compute the structural similarity between nodes *B* and *D* in the graph shown in [Figure 1](#).
4. Using the **Dice Similarity** metric, compute the structural similarity between nodes *C* and *D* in the graph shown in [Figure 1](#).
5. Using the **Cosine Similarity** metric, compute the structural similarity between nodes *A* and *C* in the graph shown in [Figure 1](#).
6. Write down a **node cut set** for the graph shown in [Figure 1](#).
7. Write down an **edge cut set** for the graph shown in [Figure 1](#).

8. What is the **k-connectivity** of the graph?
9. What is the **edge connectivity** of the graph?
10. What is the **pairwise k-connectivity** between nodes  $E$  and  $G$ ?