Week 06 Tutorial

## Shortest path and Subgraph Matching

Aims

This exercise aims to get you to:

- Review the concept of Dijkstra, A* and Floyd-Warshall algorithm
- Understand subgraph matching and triangle count
- Implement triangle counting

Exercise 1: Shortest path

1. Review Dijkstra and A* algorithm.
2. For the example graph G, find the shortest path of the following queries:

   i.   <A, H>
   ii.   <C, I>

3. Review Floyd-Warshall algorithm.
4. Find the shortest distance of all pair of vertices in the example graph G.
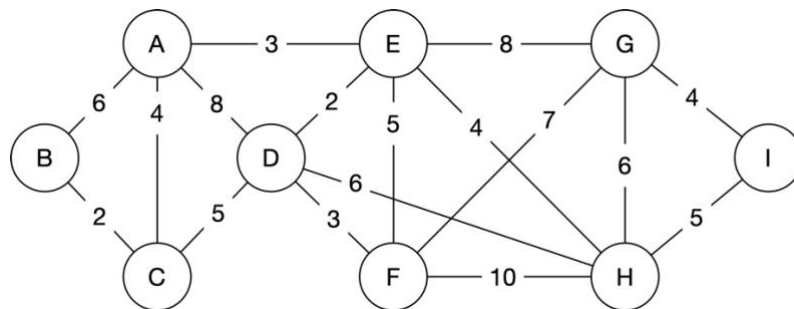
Example graph G

Exercise 2: Subgraph matching

1. Review the concept of graph homomorphism and isomorphism.
2. For the following graph in Figure 1 and Figure 2, determine whether they are isomorphic. If so, demonstrate the isomorphism between the set of vertices.
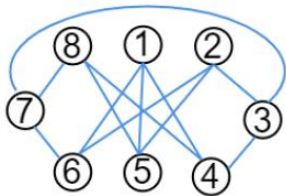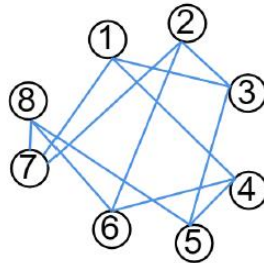

Figure 1   Figure 2

3. Review the concept of triangle count and compact forward(CF) algorithm.
4. Use CF algorithm to list the triangles in example graph G.
5. Load the graph G via class 'SimpleGraph' in tutorial_6.py. Implement CF algorithm to list all the triangles in the graph G.