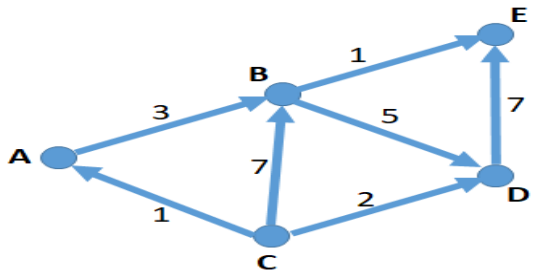
INTRODUCTION TO ALGORITHMS (CELEN086)
EXTRA PRACTICE PROBLEMS (6)

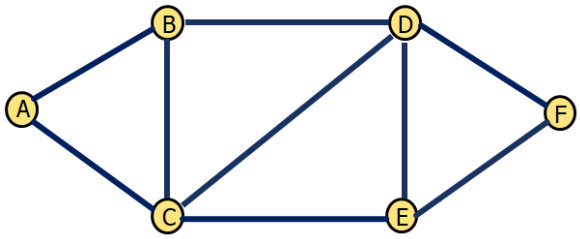
TOPIC: *Graphs*

University of Nottingham
UK | CHINA | MALAYSIA

1. Apply Dijkstra's algorithm to the graph given below to find the shortest path from vertex C to all other vertices. Show the steps carefully.

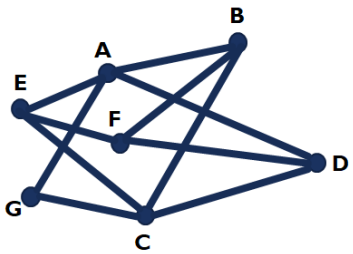


2. Consider the graph given below. Draw 4 different spanning trees obtained from the graph you see below. Then, carefully compute the total number of spanning trees that this graph can have.



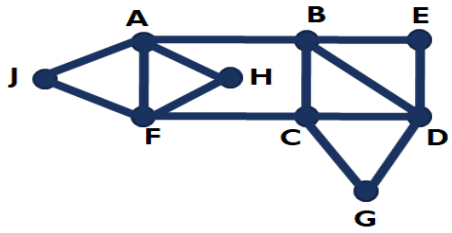
3. Reconsider the graph in Question 2. Does it have Eulerian Tour? Explain why or why not. Does it have Eulerian path? Explain why or why not. Is the graph in Question 2 bipartite? Give a reason why or why not.

4. By separating the vertices into two independent sets in the graph below, show that it is bipartite.

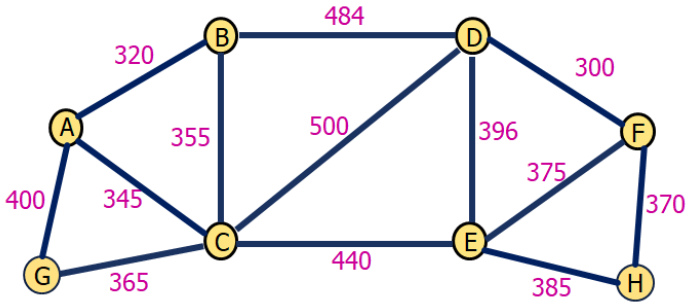


5. Draw a complete graph with 8 vertices. Use the formula to check the total number of edges of a complete graph with 8 vertices. What is the degree of each vertex?

6. Consider the following graph. Show that it has an Eulerian tour. Draw a tour that begins and ends at vertex J.



7. Apply Kruskal's algorithm to find the minimum spanning tree in the weighted graph below. Compute the minimum cost. Show steps clearly.



8. Apply Prim's algorithm to the graph above to find the minimum spanning tree. Show steps clearly.