University of Colombo School of Computing
SCS 1208 - Data Structures and Algorithms II

Lab Sheet 10

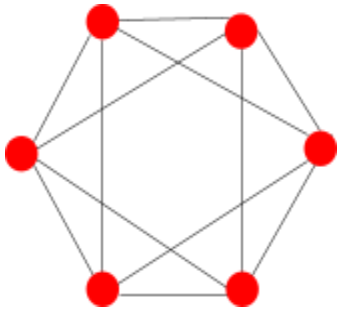
1. **Isomorphic Graphs**

(i) Write a C program to determine whether two given graphs are isomorphic or not. Provide user input to define the graphs and display the result.

(ii) Implement a function in C that checks if a given graph is isomorphic to its complement. Test the function with various input graphs.

2. **Regular Graphs**

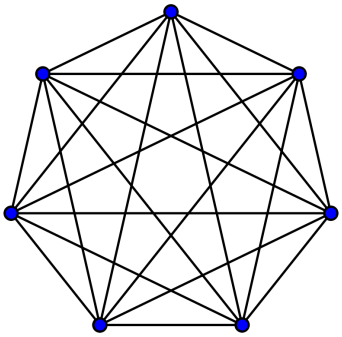
(i) Write a C program to determine whether the given graph is regular or not. Input the graph and display the degree of each vertex.



(ii) Create a function in C that generates a regular graph of a specified degree. Allow the user to input the number of vertices and the degree, then display the generated graph.

3. **Complete Graphs**

(i) Develop a C program to check if the given graph is a complete graph. Define the graph and display the result.

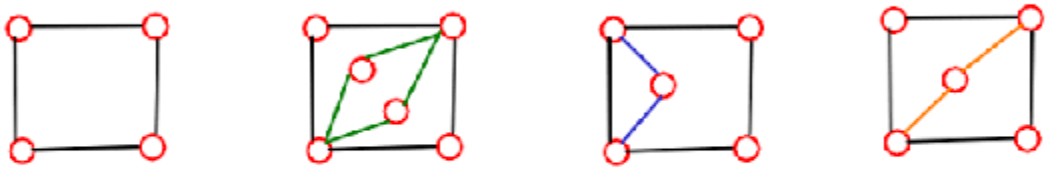


(ii) Implement a function in C that generates a complete graph with a specified number of vertices. Display the generated graph.

4. **Eulerian Graphs**

(i) Write a C function that finds an Eulerian circuit in a connected, undirected graph if one exists.

(ii) Develop a C program to check if the given 4 graphs are Eulerian or not. Test the function with these 4 different graphs. Display whether it has an Eulerian circuit or path.

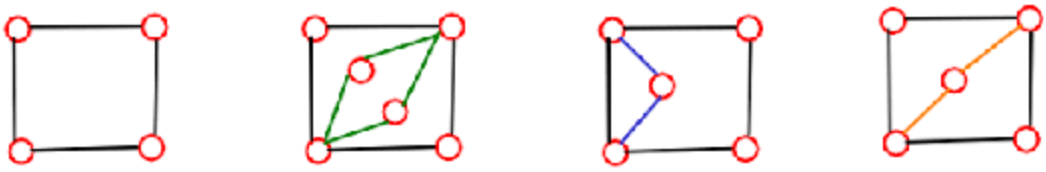


a. b. c. d.

5. **Hamiltonian Graphs**

(i) Implement a function in C to check if a given graph contains a Hamiltonian path.

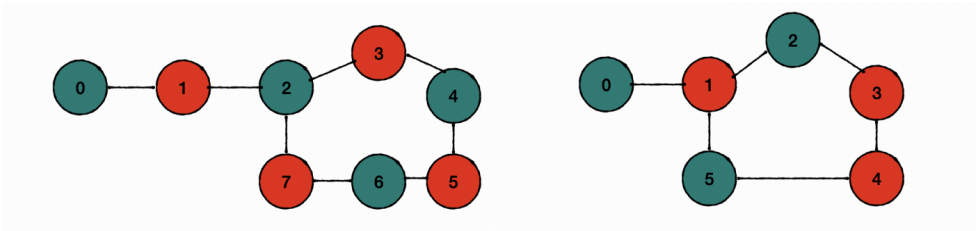
(ii) Write a C program to find a Hamiltonian cycle in the given graphs. Test the function with these 4 different graphs. Display the Hamiltonian cycle if it exists.



a. b. c. d.

6. **Bipartite Graphs**

(i) Write a C program to check whether the given graphs are bipartite. Input the graphs and display the results.



(ii) Create a function in C that determines the two sets of vertices in a bipartite graph if it exists. Allow the user to input the graph and display the sets.