

## **Practical work 1 ( 2 weeks)**

The goal of this lab is to write a program in C programming language to calculate the Chromatic Number of a graph and to color the vertices of this graph using Welsh-Powell algorithm.

- The graph is connected, undirected and represented by the adjacency matrix.
- Develop a data structure to represent graphs.
- Create a set of sample input graphs of varying sizes and complexities to test the algorithm

### **Algorithm : Welsh-Powell**

1. Arrange the vertices in descending order of their degrees.
2. Choose a color.
3. Assign this color to the first uncolored vertex in the list.
4. Continue down the list, assigning the same color to any vertex that:
  - \* is not yet colored.
  - \* is not adjacent to a vertex colored with this color.

Continue until the list is completed.

If not all vertices are colored, choose a color that has not been used yet and repeat steps 3 and 4.

**Note:** By changing the order of the vertices in the list, you can sometimes achieve a lower number of colors.