# Discrete mathematics - Chapter Graph theory practical work

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ATTENTIONS

- Practical work duration: *13:30 - 16:00.*

- Using your own laptop to complete the code, then writing down your solution to paper with your full name, student ID and your signature. Submit your paper work to teacher before getting out of the class.

Computer Projects: write programs with these inputs and outputs.

## 1  PROBLEM 1

Given the list of edges of a simple graph, determine whether the graph is bipartite.

## 2  PROBLEM 2

Given an adjacency matrix of a graph, list the edges of this graph and give the number of times each edge appears.

## 3  PROBLEM 3

Given an incidence matrix of an undirected graph, list its edges and give the number of times each edge appears

# 4 PROBLEM 4

Given the list of edges and weights of these edges of a weighted connected simple graph and two vertices in this graph, find the length of a shortest path between them using Dijkstra algorithm. Also, find a shortest path.

# 5 PROBLEM 5

Given the list of edges of a simple graph, determine whether it is connected and find the number of connected components if it is not connected.