2000 Paper 5 Question 1

Data Structures and Algorithms

Explain what is meant by the terms *directed graph*, *undirected graph* and *bipartite graph*.   [3 marks]

Given a bipartite graph, what is meant by a *matching*, and what is an *augmenting path* with respect to a matching?   [4 marks]

Prove that if no augmenting path exists for a given matching then that matching is maximal.   [6 marks]

Outline an algorithm based on this property to find a maximal matching, and estimate its cost in terms of the number of vertices n and edges e of the given bipartite graph.   [7 marks]