

2009 Paper 6 Question 1

Complexity Theory

Consider the following decision problems.

1. (PROB1) Given a graph $G = (V, E)$, does it contain a path that visits every **edge** exactly once?
 2. (PROB2) Given a graph $G = (V, E)$, does it contain a path that visits every **node** exactly once?
- (a) Which of the two problems is in P and which is NP-complete? [2 marks]
- (b) Describe a polynomial time algorithm for the problem in P. [6 marks]
- (c) Prove that the other problem is in fact NP-complete. [12 marks]