

Problem

Let $CONNECTED = \{ \langle G \rangle \mid G \text{ is a connected undirected graph} \}$. Analyze the algorithm given on page 185 to show that this language is in P.

Step-by-step solution

Step 1 of 1

Consider the algorithm given on the page 185 in the textbook. A problem is said to be in P when method for solving the problem runs in time n^k where k is a constant.

- In the first line, first node is selected and marked. This will require a constant time.
- In second line and third line, the nodes are marked until all the nodes are marked. If there are n nodes, then scanning of the nodes is there from the list 2, 3, 4, up to $n-1$. For every node, the order of neighbors will be order of n . This will result into the order of n^3 inspections.
- In line 4, all the nodes are scanned for determining whether all the nodes are marked or not. This will take time equal to order of n .

As the order is equal to n^3 , so this algorithm belongs to P .

[Comments \(1\)](#)