



Contenido: Tema 2 de la Unidad 3

Fecha de entrega: 07/12/09

EJERCICIO 8

De la edición 2 del libro texto los enunciados 24.3-4, 25.1-8 y 26.1-9.

24.3-4

We are given a directed graph $G = (V, E)$ on which each edge $(u, v) \in E$ has an associated value $r(u, v)$, which is a real number in the range $0 \leq r(u, v) \leq 1$ that represents the reliability of a communication channel from vertex u to vertex v . We interpret $r(u, v)$ as the probability that the channel from u to v will not fail, and we assume that these probabilities are independent. Give an efficient algorithm to find the most reliable path between two given vertices.

25.1-8

The FASTER-ALL-PAIRS-SHORTEST-PATHS procedure, as written, requires us to store $\lceil \lg(n - 1) \rceil$ matrices, each with n^2 elements, for a total space requirement of $\mathcal{O}(n^2 \lg n)$. Modify the procedure to require only $\mathcal{O}(n^2)$ space by using only two $n \times n$ matrices.

26.1-9

Professor Adam has two children who, unfortunately, dislike each other. The problem is so severe that not only do they refuse to walk to school together, but in fact each one refuses to walk on any block that the other child has stepped on that day. The children have no problem with their paths crossing at a corner. Fortunately both the professor's house and the school are on corners, but beyond that he is not sure if it is going to be possible to send both of his children to the same school. The professor has a map of his town. Show how to formulate the problem of determining if both his children can go to the same school as a maximum-flow problem.