JVJ

Big-O Analysis

Main Operation: The program initializes a NxN grid that performs a breadth first search in which we searched the graph from the source to the sink. The main feature of this program is to constantly check the current cell's neighbors. Once it finds the current cell's neighbors, it randomly selects a neighbor and adds it to the path. Consequently, the program continuously checks for neighbors and randomly selects a neighbor until the graph reaches the sink cell. Additionally, the program also computes the max flow of the path.

Analysis: Since this is a breadth-first search, each iteration checks 8 potential neighbors. Because of this, N is multiplied 8 times. Afterwards, the algorithm traverses through the path found and finds the max capacity available, adding N to the complexity.

Complexity: The highest power of N is the most important part of the equation in terms of Big-O. Therefore, all lower forms of N and constants become irrelevant and become zero. The coefficient of the largest N is also irrelevant and therefore reduces to 1.

$O(8N + N)$

$= O(\cancel{16}N)$

$=O(N)$