Exercise of Algorithms

Problem 1

Two paths in a graph are considered **distinct** if they differ in any edge. Given two nodes in a graph, there could be multiple (namely, distinct) shortest paths between them. Now consider the following problem.

Input: An undirected graph $G = (V, E)$, where all edges have the same length 1. Let $s, t \in V$ be two nodes in G.

Output: The number of distinct shortest paths from s to t.

Your task: present a linear-time algorithm for the above problem. (Remember to explain the main idea of your algorithm, show the pseudo code, prove its correctness, and analyze its time complexity.)