
Question 1:

Given two strings S and T, and an integer n, find the number of times S occurs as a subsequence of T^n (T concatenated with itself n times).

$1 \leq |S| \leq 50$, $1 \leq |T| \leq 1000$, $1 \leq n \leq 10^{18}$, and S and T only contain characters from `a` through `e`.

Question 2:

For a weighted, undirected graph G with n nodes, for all $1 \leq i, j \leq n$, define $D(G, i, j)$ as the shortest path in G between nodes i and j. Also, define $S(G) = \sum_{1 \leq i < j \leq n} D(G, i, j)$; i.e. the sum of shortest distances between all (unordered) pairs of nodes in G.

Given a weighted, undirected G with n nodes, find the smallest possible of $S(T)$, where T is a spanning tree of G.

$1 \leq n \leq 15$.