

题目 3-1:

PROBLEM: Express

Problem: Sunrise Express is an express enterprise. It has a lot of embranchments. Each embranchment is in different city and is responsible to send goods to clients in the city. The shipping between two embranchments is 'one-way'. That is, the first embranchment can ship goods to the second embranchment does not imply the second embranchment can ship goods to the first embranchment. In fact, even if both of these routes do happen to exist, they are distinct and are not necessarily the same shipping duration. The purpose of this problem is to help the express enterprise to figure out the possible paths. In particular, you will compute how long shipping goods from an embranchment to another embranchment, the number of different path between two embranchments, and the shortest shipping duration between two embranchments.

Input: A directed graph where a node represents an embranchment and an edge represents a path between two embranchments. The weighting of the edge represents the duration of shipping goods between the two embranchments. A given path will never appear more than once, and for a given path, the starting and ending embranchment will not be the same embranchment.

Output: For test input 1 through 5, if no such path exists, output 'NO SUCH PATH'.

Otherwise, follow the path as given; do not make any extra stops! For example, the first problem means to start at embranchment A, then travel directly to embranchment B (a distance of 5), then directly to embranchment C (a distance of 4).

1. The duration of the path A-B-C.
2. The duration of the path A-D.
3. The duration of the path A-D-C.
4. The duration of the path A-E-B-C-D.
5. The duration of the path A-E-D.
6. The duration of transfer starting at C and ending at C with a maximum of 3 stops. In the sample data below, there are two such path: C-D-C (2 stops) and C-E-B-C (3 stops).
7. The number of path starting at A and ending at C with exactly 4 stops. In the sample data below, there are three such paths: A to C (via B, C, D); A to C (via D, C, D); and A to C (via D, E, B).
8. The duration of the fastest path from A to C.
9. The duration of the fastest path from B to B.
10. The number of different path from C to C with duration of less than 30. In the sample data, the paths are: CDC, CEBC, CEBDC, CDCEBC, CDEBC, CEBCEBC, CEBCEBCEBC.

Test Input:

For the test input, the embranchments are named using the first few letters of the alphabet from A to E. A path between two embranchments (A to B) with the duration of 5 is represented as AB5.

Graph: AB5, BC4, CD8, DC8, DE6, AD5, CE2, EB3, AE7

Expected Output:

Output #1: 9

Output #2: 5

Output #3: 13

Output #4: 22

Output #5: NO SUCH ROUTE

Output #6: 2

Output #7: 3

Output #8: 9

Output #9: 9

Output #10: 7