Problem one: Trains

The local commuter railroad services a number of towns in Kiwiland. Because of monetary concerns, all of the tracks are 'one-way.' That is, a route from Kaitaia to Invercargill does not imply the existence of a route from Invercargill to Kaitaia. In fact, even if both of these routes do happen to exist, they are distinct and are not necessarily the same distance!

The purpose of this problem is to help the railroad provide its customers with information about the routes. In particular, you will compute the distance along a certain route, the number of different routes between two towns, and the shortest route between two towns.

Input: A directed graph where a node represents a town and an edge represents a route between two towns. The weighting of the edge represents the distance between the two towns. A given route will never appear more than once, and for a given route, the starting and ending town will not be the same town.

Output: For test input 1 through 5, if no such route exists, output 'NO SUCH ROUTE'. Otherwise, follow the route as given; do not make any extra stops! For example, the first problem means to start at city A, then travel directly to city B (a distance of 5), then directly to city C (a distance of 4).

1. The distance of the route A-B-C.
2. The distance of the route A-D.
3. The distance of the route A-D-C.
4. The distance of the route A-E-B-C-D.
5. The distance of the route A-E-D.
6. The number of trips starting at C and ending at C with a maximum of 3 stops. In the sample data below, there are two such trips: C-D-C (2 stops). and C-E-B-C (3 stops).
7. The number of trips starting at A and ending at C with exactly 4 stops. In the sample data below, there are three such trips: A to C (via B,C,D); A to C (via D,C,D); and A to C (via D,E,B).
8. The length of the shortest route (in terms of distance to travel) from A to C.
9. The length of the shortest route (in terms of distance to travel) from B to B.
10. The number of different routes from C to C with a distance of less than 30. In the sample data, the trips are: CDC, CEBC, CEBCDC, CDCEBC, CDEBC, CEBCEBC, CEBCEBCEBC.

Test Input:
For the test input, the towns are named using the first few letters of the alphabet from A to D. A route between two towns (A to B) with a distance 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

Problem Two: Conference Track Management

You are planning a big programming conference and have received many proposals which have passed the initial screen process but you're having trouble fitting them into the time constraints of the day -- there are so many possibilities! So you write a program to do it for you.

- The conference has multiple tracks each of which has a morning and afternoon session.
- Each session contains multiple talks.
- Morning sessions begin at 9am and must finish before 12 noon, for lunch.
- Afternoon sessions begin at 1pm and must finish in time for the networking event.
- The networking event can start no earlier than 4:00 and no later than 5:00.
- No talk title has numbers in it.
- All talk lengths are either in minutes (not hours) or lightning (5 minutes).
- Presenters will be very punctual; there needs to be no gap between sessions.