Problem 5: Fair Ferries Have Fair Ferry Fares
13 Points

Problem ID: `ferries`

Introduction

You're planning a road trip for your summer break, and you just can't wait! There's just one problem: in your world, cars do not exist. Instead, a large collection of roads and a robust ferry system is responsible for getting people where they need to go. However, ferries cost money, and you don't want to be wasteful. Can you plan a trip route that saves you the most money?

Your task is to create a program that will take in a map of roads and docks and output the minimum cost needed to complete a given trip.

Program Input

The first line of the input from STDIN will contain a positive integer `T` denoting the number of test cases that follow. Each test case will have the following input:

- A first line consisting of four values separated by spaces. The values are as follows:
  - A positive integer `n` denoting the total number of roads and docks.
  - A positive decimal amount `f` denoting the cost of one ferry ticket in dollars.
  - A name representing the starting location of your trip.
  - A name representing the destination of your trip.
- The next `n` lines each consist of either a road or dock.
  - Roads connect two locations by land and are denoted in the format:
    `ROAD <NAME1> <NAME2>`
  - Docks give a location ocean access and are denoted in the format:
    `DOCK <NAME>`
- A blank line separating individual test cases.

Example Input:

```
3
9 $1.00 Farica Zabril
ROAD Liche Zabril
ROAD Napama Zabril
ROAD Biseria Napama
DOCK Dorjan
ROAD Rausi-Daabia Dorjan
ROAD Biseria Rausi-Daabia
ROAD Rasiel Lapestine
ROAD Rasiel Farica
DOCK Lapestine

2 $12.00 Sursia Nicha
DOCK Sursia
ROAD Rani Nicha

6 $4.50 Fan-Sanfrisco Presno
ROAD Banta-Sarbara Cranta-Suz
ROAD Presno Cranta-Suz
DOCK Presno
DOCK Fan-Sanfrisco
ROAD Banta-Sarbara Fan-Sanfrisco
ROAD Frostand Fulicer
```

Program Output

For each test case, your program should output the minimum cost needed to complete the given trip. Your output should be created based on the following criteria:

- Your output should be in the format: `Bring $<MIN-COST> for the trip.`
  - `<MIN-COST>` should be rounded to two decimal places.
- Roads allow you to walk between locations freely without charge.
- Docks allow you to take a ferry to other docks for a fee `f`
- If the trip does not cost anything, your program should output `The trip's free!`
- If it is impossible to complete the given trip, your program should output `Just stay home`

Example Output:

```
Bring $1.00 for the trip.
Just stay home
The trip's free!
```

Problem Constraints

$T \le 50$

$1 \le n \le 2.0 \times 10^4$

$1.0 \le f \le 1.5 \times 10^5$

Assume the starting location and the ending location both appear in the input.

Assume the starting location and the ending location are different.

Assume there are no duplicate roads or docks.

Problem Author: Chris Liu