Problem E
Roundabout

Time limit: **3 seconds**
Memory limit: **1024 megabytes**

Problem Description

Mayor Chiang is reviewing the city's roundabout traffic data together with the government's transportation department. He discovers an interesting phenomenon: the roundabouts can be divided into two categories.

One category follows the First In First Out (FIFO) principle, meaning the earliest vehicle entering the roundabout will also be the first to exit.

The other category follows the First In Last Out (FILO) principle, where the earliest vehicle entering will be the last to leave.

Now he wants to determine the average time vehicles stay inside each roundabout over a certain period. He has decided to assign this statistical analysis task to you. But you're not sure how to determine it, so you sent an email to the transportation department asking for clarification, and received the following reply:

Regardless of the type of roundabout, the time interval between each pair of consecutive vehicles entering the roundabout is fixed. Similarly, the time interval between each pair of consecutive vehicles exiting the roundabout is also fixed.

For example, if the roundabout follows the FIFO principle, and three vehicles enter in the order ABC-123, UTCS-118, JAVA-114, then they will exit in the order ABC-123, UTCS-118, JAVA-114. If the first vehicle entered at the 3rd second and the entry interval is 1 second, and the first vehicle exited at the 9th second with an exit interval of 2 seconds, then the average time spent in the roundabout is $((9-3)+(11-4)+(13-5))/3 = 7$.

As another example, if the roundabout follows the FILO principle, and four vehicles enter in the order ALLEN-1106, EVA-0417, JIM-0916, MOMO-0318, then they will exit in the order MOMO-0318, JIM-0916, EVA-0417, ALLEN-1106. If the first vehicle entered at the 1st second and the entry interval is 1 second, and the first vehicle exited at the 11th second with an exit interval of 2 seconds, then the average time spent in the roundabout is $((17-1)+(15-2)+(13-3)+(11-4))/4 = 11.5$.

Input Format

Your program is to read from standard input. The input consists of several test cases.

Each test case, the first line contains an integer C, the category of the roundabout, `1` means FIFO, `2` means FILO. The second line contains four integers $T_{enter}, I_{enter}, T_{exit}, I_{exit}$, which represent the time the first vehicle entered, the time interval between each pair of consecutive vehicles entering

the roundabout, the time the first vehicle exited, the time interval between each pair of consecutive vehicles exiting the roundabout, respectively. The third line contains an integer N, representing the number of vehicles. The next N lines are the order of vehicles entering the roundabout, each line containing a string, representing the license plate number. The program ends when C is `0`.

Output Format

Your program is to write to standard output. For each test case, print the order of vehicles exiting the roundabout first. Then, print the average time spent in the roundabout. The average time should be rounded to two decimal places. Two consecutive test case is separated by a blank line. Please see the sample output.

Technical Specification

- $C \in \{1, 2\}$
- $1 \leq N \leq 10$
- $1 \leq T_{enter}, I_{enter} \leq 5$
- $T_{enter} + N \times I_{enter} \leq T_{exit} \leq T_{enter} + N \times I_{enter} + 60$
- $1 \leq I_{exit} \leq 20$
- The license plate number consists of multiple characters and a dash symbol. The characters will only be upper case alphabet A–Z or number 0–9.

Sample Input 1

```
1
3 1 9 2
3
ABC-123
UTCS-118
JAVA-114
2
1 1 11 2
4
ALLEN-1106
EVA-0417
JIM-0916
MOMO-0318
0
```

Sample Output 1

```
ABC-123
UTCS-118
JAVA-114
7.00

MOMO-0318
JIM-0916
EVA-0417
ALLEN-1106
11.50
```