Alice and Bob has just learned how to find average of some numbers. They got really excited and decided to come up with a game about finding average.

The game works like this, at the start of game a sequence of numbers is written.

Then there will be several rounds in the game. In first round Alice will say a number x and Bob has to select two index i and j. Let's say the average of the unique numbers between i-th number and j-th number is y. Then Alice gets $abs(x-y)$ points in that round. In next round Alice and Bob switch the role. The game continues this way.

While Alice and Bob enjoy playing this game, they hate calculating average of unique numbers. So, they are asking you, their only programmer friend, to write a program that calculates the average for them.

Input

First line of input is a number T ($T \leq 100$). T test cases follow.

First line of each test case is an integer n ($0 < n < 10^4$) representing the length of number sequence. Next line consists n space separated integer representing the sequence. Each of these integers has absolute value less than 10^9. Next line has an integer q ($q < 10^5$). q lines follow, each representing a query. Each query has two space separated integer i, j ($1 \leq i \leq j \leq n$).

Output

For each case output q lines representing average of unique elements of corresponding range rounded 6 digits after decimal points. No case will have output whose rounding changes if the 10^{-9} is added to or subtracted from answer.

Notes:

Explanation for second query in first sample

The range is (1,10) which includes ten numbers (1, 2, 3, 4, 4, 3, 2, 1, -1, 0). Unique numbers in this ranges are (1, 2, 3, 4, -1, 0) whose average is 1.5

Explanation for third query in first sample

The range is (3,5) which includes three numbers (3, 4, 4). Unique numbers in this ranges are 3 and 4 whose average is 3.5

Sample Input

```
2
10
1 2 3 4 4 3 2 1 1 0
4
1 4
1 10
3 5
8 10
3
1 1 0
1
1 3
```

Sample Output

```
Case 1:
2.500000
1.500000
3.500000
0.000000
Case 2:
0.500000
```