Problem F5107
Grade For Your Class

Your teacher is a careless person. He put all the n records of student assignment grade on a slip of paper. Today k many visitors(parents of some students) come to the teacher because they want to know the average grade of the class. The teacher gives the slip of paper to them, but unfortunately they could only read part of the records(different person has different mindset). For the *i-th* visitor, he or she could only read the l_i-*th* record to r_i-*th* record. The average grade is computed in the following way:

1. For each student in the class, we compute the arithmetic average of all his or her assignment grades. This arithmetic average will be used as the grade for the student.

2. Compute the arithmetic average of grade of all students. This arithmetic average will be average grade of the class.

Consequently, if a visitor only reads *l-th* record to *r-th* record, he or she will think the names appear in those records are the complete list of names of students in this class. Thus the first step of the computation will be only for students who appear during *l-th* to *r-th* records. What are the average grades computed by each visitors?

By the way, you may notice for some of the inputs, different students have different total number of assignments submitted. This is because the course is carefully designed for each student, so each students will have their own set of assignments.

Input

The first line consist of two space separated integers $n(1 \leq n \leq 100)$ $k(1 \leq k \leq 10)$, denoting the total number of records and total number of visitors.

The second line consist of n space separated names $s_1, s_2, \ldots, s_n$, denoting the student name for *i-th* record. Each name consist of at least 1 and at most 10 many lower and upper case English Alphabet.

The third line consist of n space separated integers $a_1, a_2, \ldots, a_n$, denoting the grade of *i-th* record. Each integer is between 1 and 10.

The following k lines have the same format. The *i-th* line consist of two space separated integers l_i r_i, denoting the portion of records *i-th* visitor can read. Both integers are between 1 and n, and $l_i \leq r_i$ is always satisfied.

Output

Output k lines, each line consist of a single real number. The real number on the *i-th* line will be the average grade computed by *i-th* visitor. Your

solution will be considered correct if the absolute different between your output and judge's output is less than 10^{-6}.

Sample Input

```
5 3
Alice Bob Charlotte Bob Alice
7 8 9 6 10
1 5
2 4
3 5
```

Sample Output

```
8.1666667
8
8.3333333
```

Explanation of Sample Data

For first visitor :

1. Compute grade for each student
   (a) There are 2 grades for Alice, so the grade should be $\frac{7+10}{2} = 8.5$
   (b) There are 2 grades for Bob, so the grade should be $\frac{8+6}{2} = 7$
   (c) There is 1 grade for Charlotte, so the grade should be 9
2. There are 3 students, so the average should be $\frac{8.5+7+9}{3} \approx 8.1666667$

For the second visitor :

1. Compute grade for each student, and there are only 2 students' name on this part.
   (a) There are 2 grades for Bob, so the grade should be $\frac{8+6}{2} = 7$
   (b) There is 1 grade for Charlotte, so the grade should be 9
2. There are 2 students, so the average should be $\frac{7+9}{2} = 8$

For the last visitor :

1. Each student has 1 record, so the arithmetic average is just the grade.
2. There are 3 students, so the average should be $\frac{9+6+10}{3} \approx 8.3333333$