Subtree Expectation

You are given a tree where each vertex, v, is assigned a weight, $w(v)$. We define a *subtree* to be a connected non-empty subgraph of a tree. The *weight of a subtree* is the sum of the weights of its vertices (note that this value may be zero).

Given $\sum w(v)$ integers describing the respective values of $a(0), \ldots, a(\sum w(v))$, choose a subtree uniformly at random (among all possible subtrees) and define x to be the weight of this tree. For each tree given as input, find and print the the expectation of $a(x)$ for that tree on a new line.

Input Format

The first line contains a single integer, q, denoting the number of queries. The subsequent lines describe each query in the following form:

- The first line of each query contains a single integer, n, denoting the number of vertices in the tree.
- The next line contains n space-separated integers describing the respective weights of each vertex ($w(1), \ldots, w(n)$) in the tree.
- The next line contains $1 + \sum w(v)$ space-separated integers describing the respective values of $a(0), \ldots, a(\sum w(v))$.
- Each of the $n-1$ subsequent lines contains two space-separated integers, u and v, describing an edge connecting vertices u and v.

Constraints

- $1 \leq q \leq 10$
- $1 \leq n \leq 200$
- $0 \leq a(i) \leq 10^4$
- $0 \leq w(v), \sum_v w(v) \leq 5 \times 10^4$
- $n \leq 100, \sum_v w(v) \leq 500$ for at least 33% of test cases.
- $\sum_v w(v) \leq 10^4$ for at least 66% of test cases.

Output Format

For each query, print a single floating-point number denoting the expectation of $a(x)$ on a new line; your answer is considered to be correct if it matches the correct answer with an absolute precision of 10^{-4}.

Sample Input

```
1
3
1 2 3
0 1 2 3 4 5 6
1 2
2 3
```

Sample Output

3.33333333

Explanation

The weights of the subtrees are:

1. $1 \to 1$
2. $2 \to 2$
3. $3 \to 3$
4. $1, 2 \to 3$
5. $2, 3 \to 5$
6. $1, 2, 3 \to 6$

So, the expectation of $a(x)$ is:

$$\frac{a(1)+a(2)+a(3)+a(3)+a(5)+a(6)}{6} = \frac{1+2+3+3+5+6}{6} = 3.\overline{33}$$