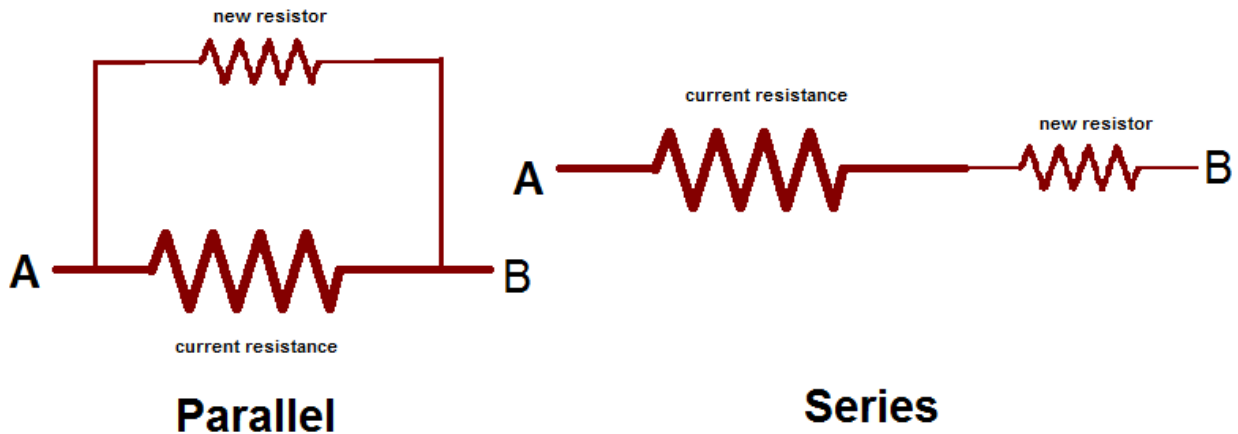


Proper Resistance

Filename: resistor

The Problem

Arup gave Dan Gau a set of resistors to use in a circuit board for his new robot. However, Dan foolishly mixed up how he was supposed to arrange the resistors to give him the proper resistance. He did, however copy down the order they are supposed to go in. So each new resistor can go in one of two positions: Parallel to the current configuration, or in series with the current configuration. See below for the two possible formations each resistor can go in.



The formula for parallel resistance between A and B is $R_{\text{equivalent}} = (R_{\text{current}} * R_{\text{new}}) / (R_{\text{current}} + R_{\text{new}})$

The formula for series resistance between A and B is $R_{\text{equivalent}} = R_{\text{current}} + R_{\text{new}}$

Help Dan evaluate the effective resistance of several designs. In particular, given a list of resistors and how to connect each of them, calculate the effective resistance of the given arrangement. You'll have several arrangements to evaluate.

The Input

The input starts with an integer n ($1 \leq n \leq 100$) describing the number of sets of resistors to test. Each set of resistors will be described in three lines. The first line of each set will contain a single integer, r ($2 \leq r \leq 10$), representing the number of resistors in the set. The second line of each set will contain the r resistance values (in Ohms) each separated by spaces, in the order that the resistors should be considered in building the circuit. These values are all guaranteed to be positive integers less than 100. The third line of each set will contain a single string of exactly $r-1$ letters, where each letter is either 'S' or 'P'. The k^{th} letter in this string indicates how to connect the current circuit design of $k-1$ resistors to the $(k+1)^{\text{st}}$ resistor.

The Output

For each circuit board, output a single line with the following format:

```
Circuit Board #m: X Ohms
```

where m is the circuit board number, starting with 1, and X is the effective resistance for that arrangement. X can be printed to any number of decimals and will be considered correct if it's within 10^{-6} of the accurate answer.

Sample Input

```
2
10
1 2 1 2 1 1 1 1 1 2
PSPSSSSSP
2
4 6
P
```

Sample Output

```
Circuit Board #1: 1.4942528735632183 Ohms
Circuit Board #2: 2.4 Ohms
```