You are given n items, each of which could be of one of two types **A** or **B**. For each item i, you are given the probability $p_A(i)$ that it is of type **A**. Then $1-p_A(i)$ is the probability that it is of type **B**. For each pair of distinct items i, j, you are given a measure of similarity p_{ij} between the items i and j. Similar items are likely to be of the same type, but the converse may not hold. You have to find a "good" classification of the items. For a given partition of the items into two parts X, Y, let

$$cost(X,Y) = \sum_{x \in X} p_B(x) + \sum_{y \in Y} p_A(y) + \sum_{x \in X, y \in Y} p_{xy}$$

A good partition is defined to be one that minimizes $cost(X,Y)$. Intuitively, items in X are likely to be of type **A** and those in Y of type **B**. There is also a cost for putting similar items in different parts.

Input Format

The first line contains the number n of items, $n \leq 50$. The next line contains the n values $p_A(i)$, each of which is a real number between 0 and 1, with at most 4 decimal places. The value $p/10000$ is specified by the integer p where $0 \leq p \leq 10000$. The next $n-1$ lines specify the values of p_{ij} in the same way. The ith line contains $n-i$ values p_{ij} for $i+1 \leq j \leq n$, and $1 \leq i < n$.

Output Format

Output a single string with n characters, each of which is **A** or **B**, giving a possible minimum cost labeling. If there are multiple solutions, any one is okay.

Sample Input	Sample Output
4	
1000 4000 6000 9000	BBBA
5000 2000 0	
8000 1000	
1000	