Points and Threads

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	256 megabytes

There are n points on a line, numbered $1, 2, \ldots n$, where the point i is located at position x_i. Your aim is to connect these n points using $n-1$ threads, such that, one can go from any one of the points to any other point using these threads.

For each point i, you can buy a thread at a cost of a_i per unit length. To *directly* connect two points i and j, you need to buy a thread of length $|x_i - x_j|$, at either point i or point j. Hence, the cost of *directly* connecting points i and j with a thread equals $\min(a_i, a_j) \cdot |x_i - x_j|$.

Find the cost of connecting the n points using $n-1$ threads, as required.

Input

The first line contains t($1 \leq t \leq 1000$), the number of test cases. Then, the test cases follow, each consisting of three lines:

- The first line of each testcase contains n ($1 \leq n \leq 2 \cdot 10^5$), the number of points.
- The second line contains n space separated integers, $x_1, x_2, \ldots x_n$, where $1 \leq x_i \leq 10^9$ denotes the position of the i^{th} point for all i.
- The third line contains n space separated integers, $a_1, a_2, \ldots a_n$, where $1 \leq a_i \leq 10^9$ for all i denotes the cost per unit length of buying a thread at point i.

The sum of n over all testcases doesn't exceed $2 \cdot 10^5$.

Output

Print a single line per testcase, containing the minimum cost for connecting the n points.

Example

standard input	standard output
1 3 1 3 4 1 11 111	5

Note

There are three points. The cost of *directly* connecting points 1 and 2 equals $\min(1, 11) \cdot |3 - 1| = 2$. The cost of *directly* connecting point 2 and 3 equals $\min(11, 111) \cdot |4 - 3| = 11$, and the cost of *directly* connecting points 1 and 3 equals $\min(1, 111) \cdot |4 - 1| = 3$.

It is optimal to use two threads, one for a direct connection between points 1 and two, and another for a direct connection between points 1 and 3. Hence, the total optimal cost equals $2 + 3 = 5$.