I	**Jumping Frogs II** **Input:** Standard Input **Output:** Standard Output	acm

At time 0, F frogs are sitting on a straight line. All the positions of the frogs are non-negative integer numbers. Every second, all the frogs jump. Each of the frogs has its own velocity, i.e., every second the $\mathbf{i^{th}}$ frog jumps $\mathbf{V_i}$ units. Every frog jumps to its right.
The line is divided into **N + 1** contiguous segment. The left end of the first segment is always 0 and the right end of the $\mathbf{(N+1)^{th}}$ segment is $\mathbf{10^9}$. The segments are denoted by a sequence of **N** positive integers, the right end point of first **N** segments. Every segment except the first one starts from the first point after the right endpoint of the last segment.

For example, if N = 1 and the sequence has 1 integer number 10, then there are two segments, one is from 0 to 10 and another is from 11 to 10^9, both inclusive.

You are given the initial positions of all the **F** frogs and a sequence of positive integers describing the segments. Find the minimum time it will take all the frogs to reach a single segment. A frog is said to be on a segment if and only if it's sitting on some points inside the segment (including the endpoints). Please note that a frog is not said to be inside a segment when it's jumping.

Input

Input starts with a single positive integer, **1 <= T <= 10**, on a single line, denoting the number of test cases. Each of the following T test cases has the following 5 lines,

1. Blank line. To separate cases.
2. Two non-negative positive integers **1 <= F <= 1000, 1 <= N <=100,000**.
3. F non negative integers, where the $\mathbf{i^{th}}$ integer represents the position of the $\mathbf{i^{th}}$ frog.
4. F non negative integers, where the $\mathbf{i^{th}}$ integer represents the velocity of the $\mathbf{i^{th}}$ frog.
5. A sequence of **N** positive integers describing the segments.

Note that, all the numbers in the input are greater than **0** and less than $\mathbf{10^9}$ where a limit is not specified.

Output

For each case, print the minimum time it takes all the frogs to reach a single segment. If it's impossible for all the frogs to be on a single segment, print **-1**. For every case print the output on a single line.

Sample Input	Output for Sample Input
2 1 1 10 10000 1000000 2 1 1 200 199 100 100	Case 1: 0 Case 2: 1

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