No Speeding

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

The English statement was translated by AI and may be slightly different from the original Chinese statement. Please refer to the Chinese statement if you have any questions.

Given a road of length l kilometers. The road is divided into n segments, each with its own speed limit. The i-th segment starts at distance a_{i-1} kilometers from the road's start, ends at distance a_i kilometers from the road's start, and has a speed limit of v_i kilometers per hour.

Bob drove through the entire road. There are m cameras on the road; the i-th camera is located at position x_i kilometers from the road's start, and recorded Bob passing it at time t_i hours after Bob departed from the start. Bob finally took t_{end} hours to reach the end of the road.

Cameras themselves do not measure speed, but by combining Bob's passing times at multiple cameras, the traffic police may deduce that Bob must have sped on some segments. Suppose there are two cameras at positions x_a and x_b. If driving from x_a to x_b while always traveling at the maximum allowed speed takes t_0 hours, and $t_b - t_a < t_0$, then Bob must have sped on some part of the road between them. (Ignore time spent accelerating or decelerating.)

Now Bob wants to know the minimum number of camera records that must be removed so that the police cannot deduce that Bob definitely sped on any segment. Note: the records at the road's start and end cannot be removed; the police always know when Bob entered and left the road.

Input

Each test file contains multiple test cases. The first line contains the number of test cases T ($1 \le T \le 10^4$). The description of the test cases follows.

The first line of each test case contains four integers n, m, l and t_{end} ($1 \le n, m \le 2 \times 10^5$, $2 \le l \le 10^9$, $2 \le t_{end} \le 10^9$), denoting the number of speed-limit segments, the number of cameras, the total length of the road, and the total time Bob took to pass the road, respectively.

The second line contains $n-1$ integers $a_1, a_2, \ldots, a_{n-1}$ ($0 < a_i < l$), representing the boundaries of the segments. In particular, $a_0 = 0$ and $a_n = l$ always hold. When $n = 1$, this line is empty.

The third line contains n integers $v_1, v_2, \ldots, v_n$ ($v_i \in \{5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120\}$), representing the speed limit of each segment.

The next m lines each contain two integers x_i and t_i ($0 < x_i < l$, $0 < t_i < t_{end}$), representing the position of the i-th camera and the time Bob passed it. It is guaranteed that $x_1 < x_2 < \cdots < x_m$ and $t_1 < t_2 < \cdots < t_m$.

For each test file, it is guaranteed that the sum of n over all test cases does not exceed 2×10^5, and the sum of m over all test cases does not exceed 2×10^5.

Output

For each test case, output a single integer on one line — the minimum number of camera records that must be removed so that the police cannot deduce that Bob definitely sped. If the police will definitely find that Bob sped regardless, output "-1".

Examples

standard input	standard output
4 1 1 60 2 30 20 1 1 1 60 2 30 30 1 1 1 60 2 30 40 1 1 1 120 2 30 60 1	1 0 1 -1
3 5 5 949 953 359 506 602 861 110 110 10 40 20 38 80 327 245 790 333 861 455 921 915 5 5 615 8 113 193 206 350 60 100 80 25 60 3 3 285 4 318 5 348 6 402 7 5 5 824 179 51 354 656 674 60 15 90 20 5 479 4 482 21 573 22 679 78 730 97	0 -1 3

Note

Speeding is illegal, dangerous, and subject to legal penalties. This problem is a contest programming exercise and describes a fictional scenario; do not attempt to evade traffic surveillance in real life. Also do not attempt to tamper with or delete camera records, as that may constitute serious criminal offenses such as damaging computer information systems. Please program responsibly and prioritize safety.