Lazy, but honest

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

Somewhere in the world, there is a lazy programmer Batyr. He recently started a new job and wants to make a work plan for the next N days. On the i-th day, Batyr gets new b_i tasks that need to be completed. The company has a regular release etiquette, so all tasks that Batyr receives on the i-th day must be completed no later than day $min(N, i + D - 1)$ for a known integer D.

Batyr calculated that if he focuses and works on the i-th day, he can complete a_i tasks on that day, but no more. Alternatively, if Batyr decides not to work on the i-th day, he will not complete any tasks on that day. It should be noted that on the i-th day, Batyr can only perform tasks from days $j \leq i$.

Although Batyr is a lazy programmer, he is honest. Therefore, he must complete all his tasks. What is the minimum number of days Batyr needs to work in order to complete all his tasks?

Input

The first line contains a single integer t — the number of test cases.

The first line of each test case contains two integers N and D ($1 \leq D \leq N \leq 5 \cdot 10^5$).

The second line of the test case contains N integers $a_1, a_2, ..., a_N$ ($0 \leq a_i \leq 10^9$) — the maximum number of tasks Batyr can complete on the i-th day.

The third line of the test case contains N integers $b_1, b_2, ..., b_N$ ($0 \leq b_i \leq 10^9$) — the number of new tasks appearing on the i-th day.

It is guaranteed that the sum of N over all test cases does not exceed $5 \cdot 10^5$.

Output

For each test case, output a single integer — the minimum number of days Batyr needs to complete all tasks. If this is not possible, output -1.

Scoring

This task contains 6 subtasks.

Subtask	Additional constraints	Points
0	Examples	0
1	$D = 1$	5
2	$N \leq 18, T = 1$	7
3	All a_i equal	18
4	$D = N$	18
5	$N \leq 2000$, $sumN \leq 2000$	16
6	—	36

$sumN$ — sum of N over all test cases.

Example

standard input	standard output
2 5 3 6 8 7 20 6 8 3 1 5 2 5 5 5 3 4 10 3 2 5 3 4 0	3 2

Note

In the first example, Batyr will work on days $2, 4, 5$.

In the second example, Batyr works on days $3, 4$.