Problem J. Jumping Cat

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

A city skyline is specified by n integers $d_1, d_2, \ldots, d_n$ ($0 < d_1 < d_2 < \ldots < d_n$) and n integers $h_1, h_2, \ldots, h_n$.

A skyline surface consists of n horizontal line segments, the i-th segment connects points (d_{i-1}, h_i) and (d_i, h_i), where $d_0 = 0$. Each segment is a roof of a building.

A cat (which is so small that can be considered a point) wants to get from the leftmost point of the skyline, $(0, h_1)$, to the rightmost point of the skyline, (d_n, h_n). To achieve that, the cat performs a sequence of moves. Each move is one of two types:

1. *Walk* from point (x_1, y_1) to point (x_2, y_2). Both points must belong to the same surface segment, i. e. there exists i such that $y_1 = y_2 = h_i$ and $d_{i-1} \le x_1, x_2 \le d_i$. A trajectory of a walk is a straight line segment.

2. *Jump* from point (x_1, y_1) to point (x_2, y_2). Points (x_1, y_1) and (x_2, y_2) must belong to different surface segments. A trajectory of a jump is a straight line segment and must satisfy the following constraints:
   - the distance between (x_1, y_1) and (x_2, y_2) is at most L;
   - the line segment between (x_1, y_1) and (x_2, y_2) does not intersect any of the buildings, i. e. there is no point (x, y) belonging to the segment and integer i such that $d_{i-1} < x < d_i$ and $y < h_i$.

The length of the cat's trajectory is the sum of lengths of all the moves in it. Find the shortest trajectory for the cat to get from $(0, h_1)$ to (d_n, h_n), or determine that the goal is unreachable.

Input

The first line contains two integers n and L ($1 \le n \le 50$; $1 \le L \le 100$).

The second line contains n integers $d_1, d_2, \ldots, d_n$ ($0 < d_1 < d_2 < \ldots < d_n \le 1000$).

The third line contains n integers $h_1, h_2, \ldots, h_n$ ($1 \le h_i \le 100$; $h_i \ne h_{i+1}$).

Output

Output a single floating-point number — the length of the shortest trajectory from point $(0, h_1)$ to point (d_n, h_n), or -1 if no valid trajectory exists.

Your answer will be considered correct if its absolute or relative error doesn't exceed 10^{-9}.

Examples

standard input	standard output
6 5 3 9 11 12 16 18 5 1 6 2 5 7	25.83095189484530047
6 4 3 9 11 12 16 18 5 1 6 2 5 7	-1

Note

The picture for the first sample is shown below.

