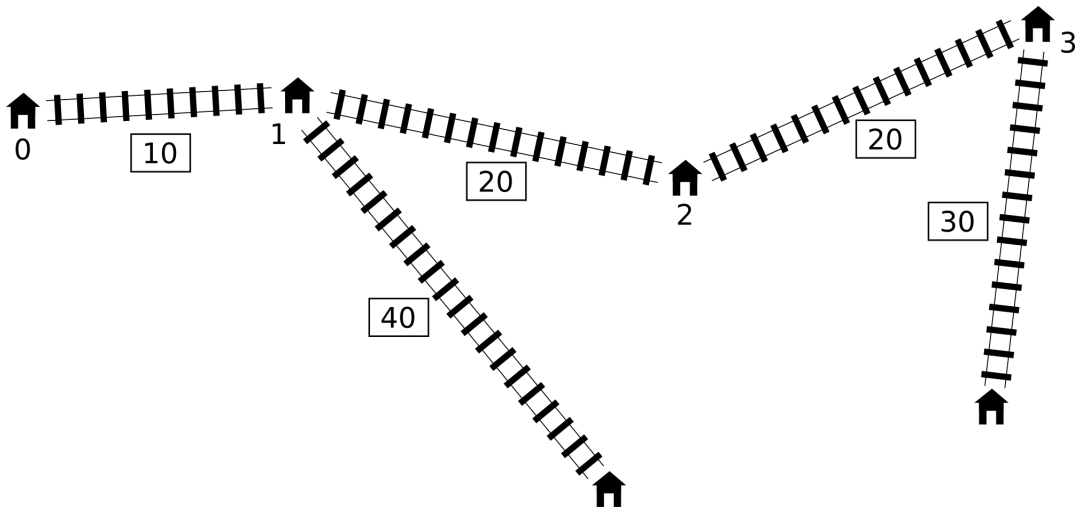
Shortcut

Pavel has a toy railway. It is very simple. There is a single main line consisting of n stations that are consecutively numbered from 0 to $n - 1$. Stations 0 and $n-1$ lie on the two ends of the main line. The distance between the stations i and $i+1$ is l_i centimeters ($0 \le i < n - 1$).

Apart from the main line there may be some secondary lines. Each secondary line is a railway line between a station on the main line and a new station that does not lie on the main line. (These new stations are not numbered.) At most one secondary line can start in each station of the main line. The length of the secondary line starting at station i is d_i centimeters. We use $d_i = 0$ to denote that there is no secondary line starting at station i.



Pavel is now planning to build one shortcut: an express line between two different (possibly neighbouring) stations of **the main line**. Express line will have length of exactly c centimeters, regardless of what two stations it will connect.

Each segment of the railway, including the new express line, can be used in both directions. The *distance* between two stations is the smallest length of a route that goes from one station to the other along the railways. The *diameter* of the whole railway network is the maximum distance among all pairs of stations. In other words, this is the smallest number t, such that the distance between each two stations is at most t.

Pavel wants to build the express line in such a way that the diameter of the resulting network is minimized.

Implementation details

You should implement the function

`int64 find_shortcut(int n, int[] l, int[] d, int c)`

- `n`: number of stations on the main line,
- `l`: distances between stations on the main line (array of length $n-1$),
- `d`: lengths of secondary lines (array of length n),
- `c`: length of the new express line.
- the function should return the smallest possible diameter of the railway network after adding the express line.

Please use the provided template files for details of implementation in your programming language.

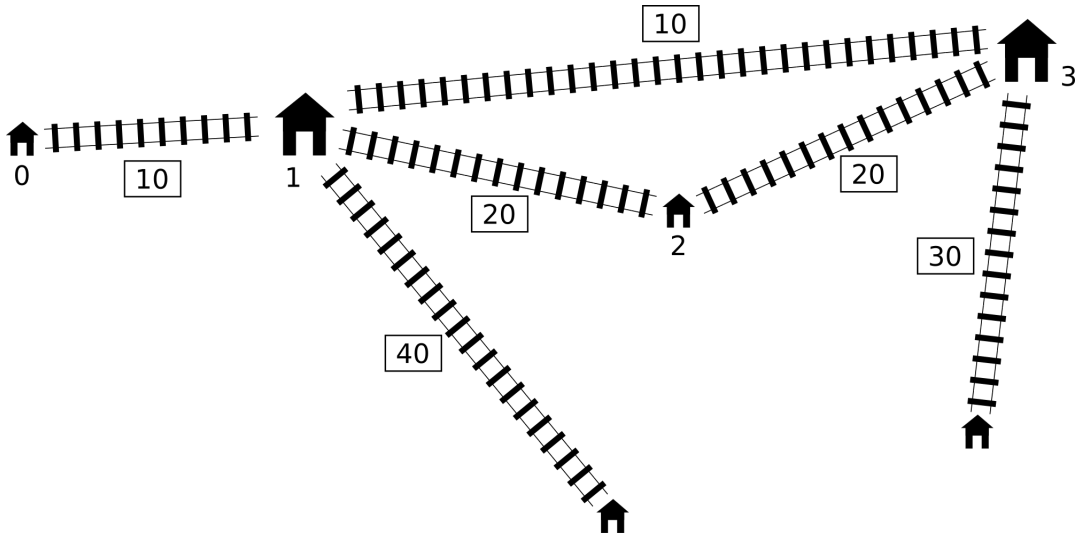
Examples

Example 1

For the railway network shown above, the grader would make the following function call:

`find_shortcut(4, [10, 20, 20], [0, 40, 0, 30], 10)`

The optimal solution is to build the express line between stations 1 and 3, as shown below.



The diameter of the new railway network is 80 centimeters, so the function should return 80.

Example 2

The grader makes the following function call:

```
find_shortcut(9, [10, 10, 10, 10, 10, 10, 10, 10],
  [20, 0, 30, 0, 0, 40, 0, 40, 0], 30)
```

The optimal solution is to connect stations 1 and 6, in which case the diameter

is 110.

Example 3

The grader makes the following function call:

```
find_shortcut(4, [2, 2, 2],
   [1, 10, 10, 1], 1)
```

The optimal solution is to connect stations 2 and 3, reducing the diameter to 21.

Example 4

The grader makes the following function call:

```
find_shortcut(3, [1, 1],
   [1, 1, 1], 3)
```

Connecting any two stations with the express line of length 2 does not improve the initial diameter of the railway network which is 4.

Subtasks

In all Subtasks $2 \le n \le 1{,}000{,}000$, $1 \le l_i \le 10^9$, $0 \le d_i \le 10^9$, $1 \le c \le 10^9$.

1. (9 points) $2 \le n \le 10$,
2. (14 points) $2 \le n \le 100$,
3. (8 points) $2 \le n \le 250$,
4. (7 points) $2 \le n \le 500$,
5. (33 points) $2 \le n \le 3000$,
6. (22 points) $2 \le n \le 100{,}000$,
7. (4 points) $2 \le n \le 300{,}000$.
8. (3 points) $2 \le n \le 1{,}000{,}000$.

Sample grader

The sample grader reads the input in the following format:

- line 1: integers n and c,
- line 2: integers $l_0, l_1, \ldots, l_{n-2}$,
- line 3: integers $d_0, d_1, \ldots, d_{n-1}$.