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Bitaro the Brave 2

Bitaro, the brave hero, has set out on an adventure to defeat monsters.

Bitaro has a strength value, denoted as x , which starts at an initial value. There are N monsters, each labeled with a number from 1 to N . To defeat the i -th monster ($1 \leq i \leq N$), Bitaro must have a strength of at least A_i . Defeating the i -th monster increases Bitaro's strength by B_i .

Bitaro wants to defeat all the monsters using the following strategy:

1. Start with a specific monster j ($1 \leq j \leq N$) and defeat the monsters in order: $j, j + 1, \dots, N$.
2. If $j \geq 2$, go back and defeat the monsters $1, 2, \dots, j - 1$ in sequence.

Given the information about the monsters, write a program to determine the minimum initial strength x required for Bitaro to defeat all the monsters.

Input

Read the following data from the standard input.

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N
A1 A2 ... AN
B1 B2 ... BN
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Output

Output a single integer, the minimum initial strength x required for Bitaro to defeat all the monsters.

Constraints

- $2 \leq N \leq 500\,000$.
- $0 \leq A_i \leq 10^9$ ($1 \leq i \leq N$).
- $0 \leq B_i \leq 10^9$ ($1 \leq i \leq N$).
- Given values are all integers.



Subtasks

1. (10 points) $N \leq 2,000$, and the minimum initial strength x is 10 or less.
2. (21 points) $N \leq 2,000$.
3. (19 points) The minimum initial strength x is 10 or less.
4. (22 points) $B_i = 1$ ($1 \leq i \leq N$).
5. (28 points) No additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
5 1 3 2 8 6 4 3 1 1 2	1

- Start with an initial strength of 1.
- Defeat monsters in the following order:
 1. Defeat monster 1. Strength increases by 4 to 5.
 2. Defeat monster 2. Strength increases by 3 to 8.
 3. Defeat monster 3. Strength increases by 1 to 9.
 4. Defeat monster 4. Strength increases by 1 to 10.
 5. Defeat monster 5. Strength increases by 2 to 12.

This sample input satisfies the constraints of Subtasks 1, 2, 3 and 5.

Sample Input 2	Sample Output 2
5 1 6 3 3 2 1 2 1 0 1	3

- Start with an initial strength of 3.
- Defeat monsters in the following order:
 1. Defeat monster 3. Strength increases by 1 to 4.



2. Defeat monster 4. Strength increases by 0 to 4.
3. Defeat monster 5. Strength increases by 1 to 5.
4. Defeat monster 1. Strength increases by 1 to 6.
5. Defeat monster 2. Strength increases by 2 to 8.

This sample input satisfies the constraints of Subtasks 1, 2, 3 and 5.

Sample Input 3	Sample Output 3
10 11 9 8 12 7 7 8 12 9 10 1 1 1 1 1 1 1 1 1 1	9

This sample input satisfies the constraints of all the subtasks.

Sample Input 4	Sample Output 4
7 1125 638 0 37 737 820 1202 23 984 558 350 52 345 580	0

This sample input satisfies the constraints of Subtasks 1, 2, 3 and 5.