Evacuation

Input file:	`standard input`
Output file:	`standard output`
Time limit:	6 seconds
Memory limit:	1024 megabytes

There are $N + 2$ towns in a straight line. The towns are numbered from 0 through $N + 1$ from left to right. Each town i ($1 \leq i \leq N$) has a shelter which can contain up to A_i people.

Currently, S people are traveling together and visiting one of the towns. However, you don't know which town they are visiting.

You just got to know that there are Q meteorites that can hit the towns. The i-th meteorite may strike towns $L_i, L_i + 1, \cdots, R_i$. To ensure the safety of the travelers, for each meteorite, you want to calculate the **evacuation cost**.

The evacuation cost for a meteorite is calculated as follows:

- The evacuation cost is the minimum total cost needed to make all travelers **safe** no matter which town they are visiting.
- A person is safe if he/she is in a shelter or a town outside the effect of the meteorite.
- It takes 1 unit cost to move one person to an adjacent town (two towns are adjacent iff their numbers differ by exactly 1).

Note that only moving people costs money, and other actions (like accommodating people in a shelter) don't. It is guaranteed that towns 0 and $N+1$ will never be affected by meteorites, so it is always possible to make all travelers safe.

Write a program that, for each meteorite, calculates the evacuation cost for that meteorite.

Input

Input is given from Standard Input in the following format:

$N\ S$

$A_1\ A_2\ \cdots\ A_N$

Q

$L_1\ R_1$

$L_2\ R_2$

$\vdots$

$L_Q\ R_Q$

Constraints:

- $1 \leq N \leq 2 \times 10^5$
- $1 \leq S \leq 10^{12}$
- $0 \leq A_i \leq S$
- $A_1 + A_2 + \cdots + A_N \leq 10^{12}$
- $1 \leq Q \leq 2 \times 10^5$
- $1 \leq L_i \leq R_i \leq N$

- All values in input are integers.

Output

Print Q lines. The i-th line should contain the evacuation cost for the meteorite i.

Example

standard input	standard output
5 10 3 1 1 4 1 3 1 4 3 5 2 5	14 10 13

Note

- For the first meteorite, it takes 14 unit costs when the travelers are visiting the town 2.
- For the second meteorite, it takes 10 unit costs when the travelers are visiting the town 4.
- For the third meteorite, it takes 13 unit costs when the travelers are visiting the town 3.