DMPG '17 G2 - Holy Grail War

Time limit: 1.0s **Memory limit:** 256M

Arthuria is preparing to fight Gilgamesh for the Holy Grail! Unfortunately, Gilgamesh activates his Noble Phantasm, *Gate of Babylon*, and summons N swords, and the i^{th} has destructive power d_i. Luckily for Arthuria, her Noble Phantasm, *Excalibur*, is capable of destroying any contiguous subsequence of Gilgamesh's swords. As such, Arthuria gives you Q queries of two possible forms:

1. `S i x`: Gilgamesh swaps out the i^{th} sword for one of destructive value x.
2. `Q l r`: Arthuria simulates destroying the contiguous subsequence **with the maximum sum** in the range $[l, r]$ containing at least 1 sword. Note that **she does not actually destroy these swords**.

As Arthuria's master, you wish to know the answer to all of the queries of the form `Q l r`. Help win the Holy Grail!

Input Specification

Line 1: Two space separated integers, N and Q.
Line 2: N space separated integers, d_i, the destructive power of Gilgamesh's **original** N swords.
Lines $3 \ldots Q+2$: Q valid queries.

Output Specification

Print the answer to each query of the form `Q l r`.

Constraints

For all subtasks:

$1 \leq i \leq N$

$1 \leq l \leq r \leq N$

Subtask 1 [5%]

$1 \leq N, Q \leq 100$

$-10^9 \leq d_i \leq 10^9$

Subtask 2 [5%]

$1 \leq N, Q \leq 10^5$

$1 \leq d_i \leq 10^9$

Subtask 3 [30%]

$1 \leq N \leq 1\,000$

$1 \leq Q \leq 10^5$

$-10^9 \leq d_i \leq 10^9$

All Q queries will be of the form `Q l r`.

Subtask 4 [60%]

$1 \leq N, Q \leq 10^5$

$-10^9 \leq d_i \leq 10^9$

Sample Input

```
8 2
1 2 3 4 5 6 7 8
S 1 2
Q 1 3
```

Sample Output

```
7
```