Desks of Eternity

A new startup, ChronoCorp has recently become the most valuable tech company in the world. They give credit to their in-house innovation, the Desk Matrix™. Each desk comes equipped with an additional computer that stores the identities of everyone who worked at that desk. Employees quit, new ones are hired, and sometimes they swap departments. Each time, The DeskMatrix™ also stores a new version of their employee evaluation scores. ChronoCorp wants to conduct group evaluations on sets of desks to see what their combined evaluation scores are and how they differ between versions.

Input

The first line of each input will be the number of employees employed by ChronoCorp $n \leq 10^5$ and the number of commands $c \leq 10^5$. The next line will contain n integers representing employee evaluation scores, in order of their desks. The next c lines will have a command in one of the following formats.

- S for swap, followed by two integers a and b. These employees swap desks.
- R for replacement, followed by two integers a and b. The employee at desk a has been replaced with a new employee with evaluation score b.
- Q for query, followed by an inclusive range [a,b] and two integers representing the different versions stored in the desk matrix. Both of these are 1 indexed.

Output

For each query, calculate the sum of the employee evaluations over the range, and output the absolute difference between them. The swap and replacement commands do not have any output.

Sample

Input	Output
6 4 3 5 7 2 4 9 S 1 4 Q 2 5 1 2 R 6 1 Q 4 6 1 3	1 7