

SPOJ Problem Set (classical)

1029. Matrix Summation

Problem code: MATSUM

A $N \times N$ matrix is filled with numbers. BuggyD is analyzing the matrix, and he wants the sum of certain submatrices every now and then, so he wants a system where he can get his results from a query. Also, the matrix is dynamic, and the value of any cell can be changed with a command in such a system.

Assume that initially, all the cells of the matrix are filled with 0. Design such a system for BuggyD. Read the input format for further details.

Input

The first line of the input contains an integer t , the number of test cases. t test cases follow.

The first line of each test case contains a single integer N ($1 \leq N \leq 1024$), denoting the size of the matrix.

A list of commands follows, which will be in one of the following three formats (quotes are for clarity):

1. "SET x y num " - Set the value at cell (x, y) to num ($0 \leq x, y < N$).
2. "SUM x_1 y_1 x_2 y_2 " - Find and print the sum of the values in the rectangle from (x_1, y_1) to (x_2, y_2) , inclusive. You may assume that $x_1 \leq x_2$ and $y_1 \leq y_2$, and that the result will fit in a signed 32-bit integer.
3. "END" - Indicates the end of the test case.

Output

For each test case, output one line for the answer to each "SUM" command. Print a blank line after each test case.

Example

Input :

```
1
4
SET 0 0 1
SUM 0 0 3 3
SET 2 2 12
SUM 2 2 2 2
SUM 2 2 3 3
SUM 0 0 2 2
END
```

Output :

1
12
12
13

Warning: large Input/Output data, be careful with certain languages

Added by: Matthew Reeder
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Time limit: 7s
Source limit:30000B
Languages: All
Resource: Al-Khawarizm 2006