F. Lena and Queries

time limit per test: 4 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Lena is a programmer. She got a task to solve at work.

There is an empty set of pairs of integers and n queries to process. Each query is one of three types:

1. Add a pair (a, b) to the set.
2. Remove a pair added in the query number i. All queries are numbered with integers from 1 to n.
3. For a given integer q find the maximal value $x \cdot q + y$ over all pairs (x, y) from the set.

Help Lena to process the queries.

Input

The first line of input contains integer n ($1 \le n \le 3 \cdot 10^5$) — the number of queries.

Each of the next n lines starts with integer t ($1 \le t \le 3$) — the type of the query.

A pair of integers a and b ($-10^9 \le a, b \le 10^9$) follows in the query of the first type.

An integer i ($1 \le i \le n$) follows in the query of the second type. It is guaranteed that i is less than the number of the query, the query number i has the first type and the pair from the i-th query is not already removed.

An integer q ($-10^9 \le q \le 10^9$) follows in the query of the third type.

Output

For the queries of the third type print on a separate line the desired maximal value of $x \cdot q + y$.

If there are no pairs in the set print "`EMPTY SET`".

Example

input
7 3 1 1 2 3 3 1 1 -1 100 3 1 2 4 3 1

output
EMPTY SET 5 99 5