

# Dynamic Congruence Equation System

Consider the congruence equation system as the following form:

$$x[1] = k_1 x[p_1] + b_1 \pmod{10007}$$

$$x[2] = k_2 x[p_2] + b_2 \pmod{10007}$$

...

$$x[n] = k_n x[p_n] + b_n \pmod{10007}$$

We will ask you to achieve some instructions as the following form:

- A i: Ask the current  $x[i]$ 's value. (or "-1" for no solution, "-2" for multiply solution.)
- C i k p b: Modify the  $i$ th congruence equation to a new one.

## Input

The first two lines are N and Q.

Then following Q lines are the query above.

(..  $N \leq 30,000$ ,  $Q \leq 100,000$  ..)

## Output

For each query, print the result.

## Example

### Input 1:

```
5
2 2 1
2 3 2
2 4 3
2 5 4
2 3 5
5
A 1
A 2
C 5 3 1 1
A 4
A 5
```

### Output 1:

```
4276
7141
4256
2126
```

### Input 2:

```
4
0 1 0
1 3 0
1 4 0
1 2 0
```

6  
A 1  
A 2  
A 3  
A 4  
C 1 1 5 1  
A 1

**Output 2:**

0  
-2  
-2  
-2  
-1