

Problem J  
**Messy Query**

In this problem you have to deal with operations in a dataset A, where A initially is an empty array which index starts from 0. Two operations you have to deal are:

- $+ a b k c d$  : insert d at index  $(f(a, b, k) + c) \bmod (X + 1)$  where X is the current size of A, mod is the modulo (remainder) operation and  $f(a, b, k)$  is the summation of all multiplication of all subsequence of length k in A which starts from index a and ends at index b. If  $b > (X - 1)$  then  $f(a, b, k) = 0$ .  
Inserting an element d at index p means to shift all elements in A from index  $p \dots X-1$  to  $p+1 \dots X$  and insert d at index p. If  $p = X$ , then just put d in the last element of A.
- $- p$  : remove an element at index p from A and shift all elements from index  $p+1 \dots X-1$  to  $p \dots X-2$ , i.e., concatenate the remaining elements. There will be no remove operation when the array is empty.

To have a clear idea of what  $f(a, b, k)$  does, pay attention to this example. Supposed A contains 6 elements (which means  $X = 6$ ).

$A_{\text{index}}$	2	5	1	6	4	5
index	0	1	2	3	4	5

$f(1, 4, 3)$  will do: the elements between index 1 and 4 inclusive are 5, 1, 6, 4 and subsequences of length 3 of those elements are:

- 5 1 6, which multiplied to:  $5 * 1 * 6 = 30$ ,
- 5 1 4, which multiplied to:  $5 * 1 * 4 = 20$ ,
- 5 6 4, which multiplied to:  $5 * 6 * 4 = 120$ ,
- 1 6 4, which multiplied to:  $1 * 6 * 4 = 24$ ,

The sum of all those multiplication is  $30 + 20 + 120 + 24 = 194$ . As you might notice, there are  $C(b-a+1, k)$  subsequences of length k over a and b, where  $C(x, y)$  is the number of way to choose y out of x elements.

So, let say there is an operation  $+ 1 4 3 5 9$ , it will insert 9 at index  $(f(1, 4, 3) + 5) \bmod 7$ , i.e., at index 3, thus, the resulting A would be:

$A_{\text{index}}$	2	5	1	<b>9</b>	6	4	5
index	0	1	2	<b>3</b>	4	5	6

**Input**

Input begins with an integer T ( $T \leq 100$ ) denoting the number of cases. Each case begins with an integer N denoting the number of operations. The next N lines each is either one of these two operations:

- $+ a b k c d$  : insert d at index  $(f(a, b, k) + c) \bmod (X + 1)$  where X is the current size of A.
- $- p$  : remove an element at index p from A.



Constraint:

$$1 \leq N \leq 20,000$$

$$0 \leq a \leq b < N$$

$$1 \leq k \leq \min(5, b - a + 1)$$

$$0 \leq p < X$$

$$0 \leq c \leq 10^9$$

$$0 \leq d \leq 100$$

*Warning:* This problem possibly contains huge input. You might want to avoid `cin` in C/C++ or `Scanner` class in Java.

### Output

For each case, output "Case #X: M a<sub>1</sub> a<sub>2</sub> ... a<sub>M</sub>" where X is the case number, starting from 1, M is the size of A and a<sub>1</sub> a<sub>2</sub> ... a<sub>M</sub> is the list of element in A. Each number is separated by a single space.

Sample Input	Output for Sample Input
2 7 + 0 0 1 10 5 + 0 1 1 30 5 + 0 1 2 25 7 - 0 - 1 + 0 0 1 56 0 + 0 0 1 81 7 6 + 0 0 1 98 3 - 0 + 0 0 1 826 6 + 1 1 1 55 8 + 0 2 3 9 1 - 1	Case #1: 3 5 0 7 Case #2: 2 1 8