

## 6667 Longest Chain

Let us compare two triples  $a = (x_a, y_a, z_a)$  and  $b = (x_b, y_b, z_b)$  by a partial order  $\prec$  defined as follows.

$$a \prec b \iff x_a < x_b \text{ and } y_a < y_b \text{ and } z_a < z_b$$

Your mission is to find, in the given set of triples, the longest ascending series  $a_1 \prec a_2 \prec \dots \prec a_k$ .

### Input

The input is a sequence of datasets, each specifying a set of triples formatted as follows.

```
m n A B
x1 y1 z1
x2 y2 z2
⋮
xm ym zm
```

Here,  $m$ ,  $n$ ,  $A$  and  $B$  in the first line, and all of  $x_i$ ,  $y_i$  and  $z_i$  ( $i = 1, \dots, m$ ) in the following lines are non-negative integers.

Each dataset specifies a set of  $m + n$  triples. The triples  $p_1$  through  $p_m$  are explicitly specified in the dataset, the  $i$ -th triple  $p_i$  being  $(x_i, y_i, z_i)$ . The remaining  $n$  triples are specified by parameters  $A$  and  $B$  given to the following generator routine.

```
int a = A, b = B, C = ~(1<<31), M = (1<<16)-1;
int r() {
    a = 36969 * (a & M) + (a >> 16);
    b = 18000 * (b & M) + (b >> 16);
    return (C & ((a << 16) + b)) % 1000000;
}
```

Repeated  $3n$  calls of  $r()$  defined as above yield values of  $x_m + 1, y_m + 1, z_m + 1, x_m + 2, y_m + 2, z_m + 2, \dots, x_m + n, y_m + n, z_m + n$  in this order.

You can assume that  $1 \leq m+n \leq 3 \times 10^5$ ,  $1 \leq A, B \leq 2^{16}$ , and  $0 \leq x_k, y_k, z_k < 10^6$  for  $1 \leq k \leq m+n$ .

The input ends with a line containing four zeros. The total of  $m + n$  for all the datasets does not exceed  $2 \times 10^6$ .

### Output

For each dataset, output the length of the longest ascending series of triples in the specified set. If  $p_{i_1} \prec p_{i_2} \prec \dots \prec p_{i_k}$  is the longest, the answer should be  $k$ .

### Sample Input

```
6 0 1 1
0 0 0
0 2 2
1 1 1
2 0 2
```

```
2 2 0
2 2 2
5 0 1 1
0 0 0
1 1 1
2 2 2
3 3 3
4 4 4
10 0 1 1
3 0 0
2 1 0
2 0 1
1 2 0
1 1 1
1 0 2
0 3 0
0 2 1
0 1 2
0 0 3
0 10 1 1
0 0 0 0
```

### Sample Output

```
3
5
1
3
```