Problem G
Longest Chain

Input: Standard Input
Time Limit: 60 seconds

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 $a_1 \prec a_2 \prec \cdots \prec a_k$.

Input

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

$$\begin{array}{llll} m & n & A & B \\ x_1 & y_1 & z_1 & \\ x_2 & y_2 & z_2 & \\ \vdots & & & \\ x_m & y_m & z_m & \end{array}$$

Here, m, n, A and B in the first line, and all of x_i, y_i and z_i $(i = 1, \ldots, m)$ 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}, ..., x_{m+n}, y_{m+n}, and z_{m+n}, in this order.

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

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

Output

For each dataset, output the length of the longest ascending series of triples in the specified set. If $p_{i_1} \prec p_{i_2} \prec \cdots \prec p_{i_k}$ 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
```

Output for the Sample Input

```
3
5
1
3
```