5694 Adding New Machine

Incredible Crazily Progressing Company (ICPC) suffered a lot with the low speed of procedure. After investigation, they found that the bottleneck was at Absolutely Crowded Manufactory (ACM). In order to accelerate the procedure, they bought a new machine for ACM. But a new problem comes, how to place the new machine into ACM?

ACM is a rectangular factor and can be divided into $W * H$ cells. There are N retangular old machines in ACM and the new machine can not occupy any cell where there is old machines. The new machine needs M consecutive cells. Consecutive cells means some adjacent cells in a line. You are asked to calculate the number of ways to choose the place for the new machine.

Input

There are multiple test cases (no more than 50). The first line of each test case contains 4 integers W, H, N, M ($1 \leq W, H \leq 10^7$, $0 \leq N \leq 50000$, $1 \leq M \leq 1000$), indicating the width and the length of the room, the number of old machines and the size of the new machine. Then N lines follow, each of which contains 4 integers X_{i1}, Y_{i1}, X_{i2} and Y_{i2} ($1 \leq X_{i1} \leq X_{i2} \leq W$, $1 \leq Y_{i1} \leq Y_{i2} \leq H$), indicating the coordinates of the i-th old machine. It is guarantees that no cell is occupied by two old machines.

Output

Output the number of ways to choose the cells to place the new machine in one line.

Sample Input

```
3 3 1 2
2 2 2 2
3 3 1 3
2 2 2 2
2 3 2 2
1 1 1 1
2 3 2 3
```

Sample Output

```
8
4
3
```