

# CCC '14 S4 - Tinted Glass Window

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## Canadian Computing Competition: 2014 Stage 1, Senior #4

You are laying  $N$  rectangular pieces of grey-tinted glass to make a stained glass window. Each piece of glass adds an integer value "tint-factor". Where two pieces of glass overlap, the tint-factor is the sum of their tint-factors.

You know the desired position for each piece of glass and these pieces of glass are placed such that the sides of each rectangle are parallel to either the  $x$ -axis or the  $y$ -axis (that is, there are no "diagonal" pieces of glass).

You would like to know the total area of the finished stained glass window with a tint-factor of at least  $T$ .

## Input Specification

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The first line of input is the integer  $N$  ( $1 \leq N \leq 1\,000$ ), the number of pieces of glass. The second line of input is the integer  $T$  ( $1 \leq T \leq 1\,000\,000\,000$ ), the threshold for the tint-factor. Each of the next  $N$  lines contain five integers, representing the position of the top-left and bottom-right corners of the  $i$ th piece of tinted glass followed by the tint-factor of that piece of glass. Specifically, the integers are placed in the order  $x_l\ y_t\ x_r\ y_b\ t_i$ , where the top-left corner is at  $(x_l, y_t)$  and the bottom-right corner is at  $(x_r, y_b)$ , and tint-factor is  $t_i$ . You can assume that  $1 \leq t_i \leq 1\,000\,000$ . The top-most, left-most co-ordinate where glass can be placed is  $(0, 0)$  and you may assume  $0 \leq x_l < x_r \leq K$  and  $0 < y_t < y_b \leq K$ , and

The following additional constraints will apply.

- At least 10% of the marks will be for test cases where  $N \leq 100$  and  $K \leq 100$ ;
- at least 30% of the marks will be for test cases where  $N \leq 1\,000$  and  $K \leq 1\,000$ ;
- at least 40% of the marks will be for test cases where  $N \leq 100$  and  $K \leq 1\,000\,000\,000$ ;
- the remaining marks will be for test cases where  $N \leq 1\,000$  and  $K \leq 1\,000\,000\,000$ .

## Output Specification

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Output the total area of the finished stained glass window which has a tint-factor of at least  $T$ . All output will be less than  $2^{64}$ , and the output for some test cases will be larger than  $2^{32}$ .

## Sample Input

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```
4
3
11 11 20 15 1
13 8 14 17 2
17 8 18 17 1
12 12 19 13 1
```

# Output for Sample Input

5

## Explanation of Output for Sample Input

There are 4 pieces of glass used. There are two regions of glass which have a tint-factor greater than or equal to 3: one region between (13, 11) and (14, 15) (which has tint-factor of 3, except for a unit square with tint-factor 4), and another region between (17, 12) and (18, 13) (with tint-factor 3). In total, these two regions have 5 square units of glass with tint-factor greater than or equal to 3, as shown on the diagram below.

