IOU Score

Time Limit: 1 Second
Memory Limit: 2048 MB

In image detection task, the accuracy of the model is often evaluated using intersection-over-union (IOU) score. Given a set of predictions $\hat{Y}$ and another set of ground-truth labels Y, IOU score is defined as $\frac{\hat{Y} \cap Y}{\hat{Y} \cup Y}$.

As part of the CS 444 assignment, you are asked to implement a function that calculates the IOU score given the prediction $\hat{Y}$ and the label Y.

Input

The first line of input contains two integers n and m ($1 \leq n, m \leq 1000$) - size of set $\hat{Y}$ and Y, respectively.

For the next n lines, each line contains four integers x_1, y_1, x_2, y_2 ($0 \leq x_1, y_1, x_2, y_2 \leq 10^9$), describing a rectangle in $\hat{Y}$ with lower left corner (x_1, y_1) and upper right corner (x_2, y_2).

For the next m lines, each line contains four integers x_1, y_1, x_2, y_2 ($0 \leq x_1, y_1, x_2, y_2 \leq 10^9$), describing a rectangle in Y with lower left corner (x_1, y_1) and upper right corner (x_2, y_2).

Output

Output two integers denoting the intersection and union of $\hat{Y}$ and Y.

Sample Inputs

```
2 2
2 2 12 10
6 6 14 14
10 8 14 12
4 4 16 8
```

Sample Outputs

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52 132
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