2167   Faking Mondrian

Piet Mondrian (1872-1944) was one of the best abstract artists of the century. His simple yet elegant designs were intentionally restricted to use only straight lines and a few colors. His artwork reflects an idealized view of reality, one which has perfect harmony and balance.

Armando, a Latin American businessman, wants to create and sell fake Mondrian pictures. Since Mondrian's designs are based on a few simple rules, he hopes to build a machine that can mass-produce different Mondrian pictures and sell them as originals.

Mondrian's rules are very simple:

1. only black, white, red, blue and yellow colors can be used.

2. the painting can only contain rectangles, with sides parallel to the borders of the canvas. Lines that are not part of the border of a rectangle are not allowed. The following four examples do not fulfill this rule:
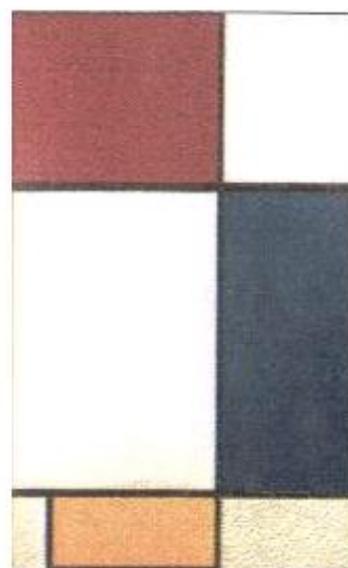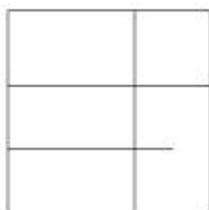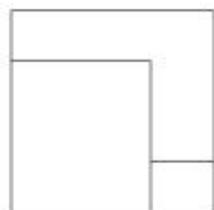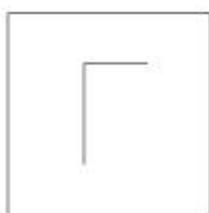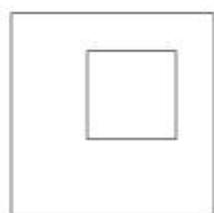
The top-left painting contains a shape that is not a rectangle (the shape that is outside the central square). In the top-right painting every shape is a rectangle, but there are lines that are not part of the border of any rectangle. Bottom-left painting contains a shape that is not a rectangle (the inverted L). Bottom-right painting contains a line that is not part of the border of any rectangle. In the figure we also include a real (well, sort of) Mondrian (Composition with red, yellow, and blue, 1928).

3. Borders of the rectangles can only be painted in black. Rectangles can only be painted in white, red, blue or yellow. The borders of the canvas are considered to be already painted in black.

4. Two adjacent rectangles (that is, two rectangles that share a segment of their borders) cannot have the same color, unless they are painted in white.

The machine Armando has devised receives a set of instructions to draw the painting. Your task is to program an algorithm that will tell (before the machine begins to perform Armando's instructions) whether these instructions correspond to a picture that fulfills Mondrian's rules, and how much paint he will need.

Input

The input file contains a set of test cases. Each test case is described in several lines, and contains Armando's instructions for one painting. There are two types of instructions: instructions that indicate the drawing of a line, and instructions that indicate the painting of a rectangle. Each test case of the input file starts with a line containing four integer values w, h, n, m. The values w and h represent the width and height of the canvas, respectively; these values are between 1 and 10000. The value n is the number of instructions for drawing lines, while m is the number of instructions for painting rectangles; these values are between 0 and 1000. The test case continues with n lines containing the instructions for drawing lines, each instruction in a separate line of the file.

Each instruction consists of four integer values x_1, x_2, x_3 and x_4, where (x_1, x_2) and (x_3, x_4) are the coordinates of the end points of the line. Lines are always horizontal or vertical. The lower left corner of the canvas has coordinates (0,0). Instructions can result in a line or part of a line being drawn more than once. The test case ends with m lines containing the instructions for painting rectangles, each one in a separate line of the input file. Each instruction specifies two integer values x and y, as well as a letter c in the set {r, b, y} ('r' means red, 'b' is blue and 'y' is yellow). The instruction indicates the machine to paint the rectangle containing the point with coordinates (x, y) with color c. All rectangles not painted with a color in this set are assumed to be painted in white. The input file ends with a test case in which w has a value of 0; this test case should not be processed. Every pair of consecutive values in a same line of the input file is separated by an arbitrary number of blank spaces.

Output

Your program must produce one output line for each test case. If the instructions follow Mondrian's rules, you must write the line 'Mondrian r b y', where r, b and y are total areas painted in red, blue and yellow, respectively. Otherwise, you must write the line 'Error!'.

Sample Input

```
100 100 3 3
0 50 60 50
20 50 100 50
50 0 50 100
25 25 r
75 75 r
25 75 y
610 987 2 3
0 50 305 50
305 0 305 987
1 1 r
1 400 r
400 100 y
1000 1000 3 2
0 200 500 200
500 0 500 400
500 400 1000 400
200 800 r
```

```
700 200 y
0 0 0 0
```

Sample Output

```
Mondrian 5000 0 2500
Error!
Error!
```