



# Memories

*It's the Happy New Year.*

You are browsing through all your pictures from last year. You have chosen some of your favorites from all your images. Now you want to make a collage out of them. But you are worried about how and where to fit the images on the screen.

You can think of your screen as a  $n \times n$  grid where each cell denotes a pixel on the screen. The rows and columns are numbered from 1 to  $n$ . Rows are numbered from top to bottom and columns are numbered from left to right. You have  $k$  images to collage on the screen. To do that, you have to fill the grid with  $k$  rectangles such that the following restrictions are fulfilled:

- Each cell of the grid is covered by one and only one rectangle.
- Both sides of each rectangle covers at least 5 cells.
- The ratio of the maximum area of a rectangle to the minimum area of a rectangle is at most  $r$ .  
Here  $r$  is a ratio fixed for each subtask (see “Scoring” and “Examples” section for details).

## Input

Read the input from the standard input in the following format:

- line 1:  $t \ r$
- line  $1 + i$  ( $1 \leq i \leq t$ ):  $n[i] \ k[i]$

Here,  $t$  is the number of testcases and  $n[i], k[i]$  are the parameters for testcase  $i$  ( $1 \leq i \leq t$ ).

## Output

Write the output to the standard output in the following format:

For testcase  $i$  ( $1 \leq i \leq t$ ), print  $k[i]$  lines each containing four integers:  $x_1 \ y_1 \ x_2 \ y_2$

Here,  $(x_1, y_1)$  and  $(x_2, y_2)$  are the upper-left and lower-right cells of the rectangle respectively, and must also satisfy  $1 \leq x_1 \leq x_2 \leq n[i], 1 \leq y_1 \leq y_2 \leq n[i]$ .

## Constraints

- $1 \leq t \leq 100$

## Subtasks

1. (9 points)  $n = 500, 1 \leq k \leq 100, r = 10^9$
2. (11 points)  $n = 499, 1 \leq k \leq 2500, r = 10^9$
3. (40 points)  $450 \leq n \leq 499, 1 \leq k \leq 2500, r = 2.2$
4. (40 points)  $n = 499, 1 \leq k \leq 8000, r = 1.4$

## Scoring

In subtask 4, even if your solution doesn't meet the required ratio constraint, you may get a partial score determined by the following algorithm:

1. We calculate the ratio of the maximum area of a rectangle to the minimum area of a rectangle for each testcase that are part of the subtask.
2. Let  $X$  be the maximum of the calculated ratios.
3. Depending on  $X$ , we assign the score as follows:

Range of $X$	Score
$X < 1.4$	40
$1.4 \leq X \leq 2.1$	$40 \times e^{5(1.4-X)}$
$X > 2.1$	0

## Examples

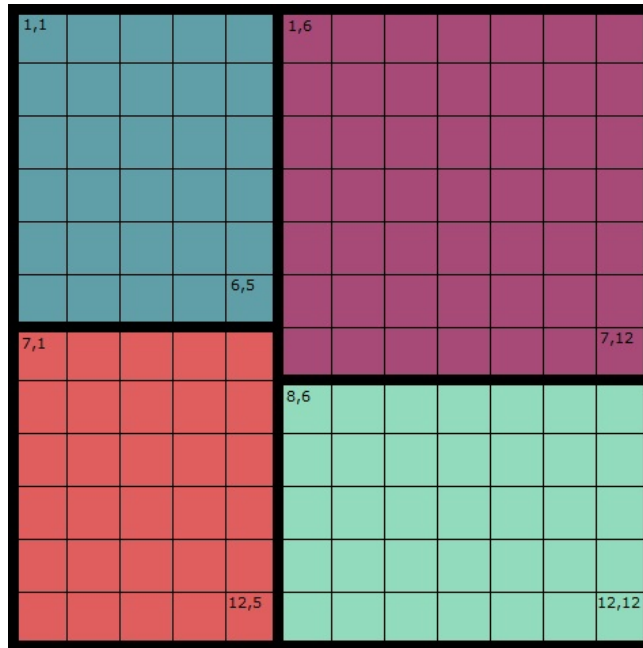
### Example 1

```
1 2.2
12 4
```

One acceptable output is:

```
1 1 6 5
8 6 12 12
7 1 12 5
1 6 7 12
```

This example is illustrated bellow:



Here the maximum area of a rectangle is 49 and minimum area of a rectangle is 30. The ratio comes out to be  $\frac{49}{30} \approx 1.63$ , which is less than 2.2. above.

## Example 2

```
2 1000000000
12 1
12 2
```

One acceptable output is:

```
1 1 12 12
1 1 12 5
1 6 12 12
```

**Note that, these two examples are not part of any subtask. These are shown here only for illustration.**