Painter

Input file:	standard input
Output file:	standard output
Time limit:	1.5 seconds
Memory limit:	256 megabytes

Little G is a painter and is painting on a 2D plane. Each integral point has a color character and the initial color characters for all integral points are "."(ASCII = 46). Now Little G is planning to do some operations one by one, where each operation is in one of the following three types:

1. "Circle $x\,y\,r\,col$", which means to draw a circle. Formally, change the color characters to col for these points (u, v) that $(u - x)^2 + (v - y)^2 \leq r^2$.

2. "Rectangle $x_1\,y_1\,x_2\,y_2\,col$", which means to draw a rectangle. Formally, change the color characters to col for these points (u, v) that $x_1 \leq u \leq x_2, y_1 \leq v \leq y_2$.

3. "Render $x_1\,y_1\,x_2\,y_2$", which means to render the image of given region. Formally, print the color characters for these points (u, v) that $x_1 \leq u \leq x_2, y_1 \leq v \leq y_2$.

But now, Little G is busy replying clarifications, so could you help him and be the painter?

Input

The first line contains one integers n $(1 \leq n \leq 2000)$, denoting the number of operations.

Following n lines each contains one operation, which is in one of the following three types:

1. "Circle $x\,y\,r\,col$ $(0 \leq |x|, |y|, r \leq 10^9)$", which means to draw a circle. Formally, change the color characters to col for these points (u, v) that $(u - x)^2 + (v - y)^2 \leq r^2$.

2. "Rectangle $x_1\,y_1\,x_2\,y_2\,col$ $(-10^9 \leq x_1 \leq x_2 \leq 10^9, -10^9 \leq y_1 \leq y_2 \leq 10^9)$", which means to draw a rectangle. Formally, change the color characters to col for these points (u, v) that $x_1 \leq u \leq x_2, y_1 \leq v \leq y_2$.

3. "Render $x_1\,y_1\,x_2\,y_2$ $(-10^9 \leq x_1 \leq x_2 \leq 10^9, -10^9 \leq y_1 \leq y_2 \leq 10^9)$", which means to render the image of given region. Formally, print the color characters for these points (u, v) that $x_1 \leq u \leq x_2, y_1 \leq v \leq y_2$.

It is guaranteed that all of the $x, y, r, x_1, y_1, x_2, y_2$ above are integers.

It is guaranteed that the sum of the rendering region areas(which equal $(x_2 - x_1 + 1) \times (y_2 - y_1 + 1)$) doesn't exceed 10^4, and that col denotes visible characters, whose ASCII codes are between 33 and 126.

Output

For each rendering operation "Render $x_1\,y_1\,x_2\,y_2$", print $y_2 - y_1 + 1$ lines each containing one string of length $x_2 - x_1 + 1$, denoting the region image(from row y_2 to row y_1).

Example

standard input	standard output
7 Circle 0 0 5 * Circle -2 2 1 @ Circle 2 2 1 @ Rectangle 0 -1 0 0 ^ Rectangle -2 -2 2 -2 _ Render -5 -5 5 5 Render -1 0 1 2	.....*..... ..*******.. .**@***@**. .*@@@*@@@*. .**@***@**. *****^***** .****^****. .**_____**. .*********. ..*******.. .....*..... @*@ *** *^*