

Problem 9: Detecting Explosives

There are many different kinds of explosives, each having slightly different properties. One method of detecting concealed explosives in luggage is to take an X-ray and look for areas where the density of the image falls into the appropriate range for a recognized explosive signature. Your job is to automate this detection, given the signatures of the explosives and an X-ray image.

The X-ray image will be provided as a two-dimensional array of integers in the range 0 to 2000, each representing the density of a small region. Each explosive signature is a triple (L, H, M) , where L and H represent the lowest and highest values in the image that can appear in a particular explosive type, and M represents the minimum total "mass" (or cumulative density) of a connected region that could possibly contain that type of explosive. "Connected" means that the cells in the X-ray image of the explosive are adjacent horizontally or vertically, but not diagonally.

For example, assume we have two explosive signatures $(2, 4, 12)$ and $(4, 6, 22)$, and part of an X-ray image as shown in the three illustrations below. In the left and middle illustrations explosives of type one $(2, 4, 12)$ have been detected (as shown by the shaded cells). An explosive of type two $(4, 6, 22)$ was detected in the third illustration. Note that the cells occupied by different types of explosives may overlap.

	4	5	6	4
	2	2	1	4
	1	2	0	4
	1	2	0	2

	4	5	6	4
	2	2	1	4
	1	2	0	4
	1	2	0	2

	4	5	6	4
	2	2	1	4
	1	2	0	4
	1	2	0	2

Each time an explosive is detected, an "alarm" is generated. You are to process images to determine how many alarms for each explosive type will be generated, if any.

Input

The input will contain multiple cases. Each case will begin with a series of no more than 10 integer triples, each giving the L , H , and M values for a type of explosive to be detected; this is followed by three integer zeroes. Then there will appear 100 integers representing a 10-row, 10-column X-ray image, in row-major order (the first 10 integers are the first row, the second 10 are the second row, and so forth). The last case is followed by three integer zeroes.

Output

The output for each case should begin with a line giving the input case number (starting with 1 and increasing sequentially). If there are no alarms for an input case, the output should then contain a line containing the text "No alarms generated." If, however, the X-ray image does trigger one or more alarms, you should display one line for each type of alarm generated indicating the type and number of such alarms. These should be displayed in increasing order of alarm type. All lines except the line giving the case number should be indented four columns, and the output for consecutive cases must be separated by a blank line. Use the sample as a guide to the desired output format.

Sample Input

Output for the Sample Input

<pre> 2 4 12 4 6 22 0 0 0 4 5 6 4 0 0 0 0 0 0 2 2 1 4 0 0 0 0 0 0 1 2 0 4 0 0 0 0 0 0 1 2 0 2 0 9 9 27 20 20 40 1 9 15 0 1 5 0 0 0 0 0 5 1 1 10 0 0 0 0 0 0 0 0 1 5 0 0 0 9 9 0 0 0 0 0 0 0 0 5 5 0 0 0 0 0 0 0 0 9 9 0 9 9 9 1 5 8 3 10 4 0 0 0 1 1 0 1 1 1 0 1 0 7 1 1 0 1 1 1 0 1 0 1 1 1 0 1 1 1 0 1 1 1 1 1 0 1 1 1 0 0 0 0 0 0 0 1 0 0 0 1 1 1 1 1 1 1 0 9 0 1 1 1 1 1 1 1 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 </pre>	<pre> Case 1: 2 alarms of type 1 1 alarm of type 2 Case 2: 1 alarm of type 1 3 alarms of type 3 Case 3: 2 alarms of type 1 2 alarms of type 2 </pre>
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