



K: Folding Code

Time Limit: 1 second(s)

Members of the Paperless University programming contest team were used to doing all their work digitally. Imagine their surprise at the end of a programming contest when the organisers asked them to fill in an evaluation form on paper!!! What were they to do? Of course they didn't carry pens or pencils, and circumstances were such that borrowing was not an option. They did wish to submit evaluations. Fortunately, the evaluation form was multi-choice, so all they needed to do was to indicate their preferred option for each question. The team worked out a way of 'filling' in the form.

To answer a question they folded over one of the corners of the page to put it in the preferred answer square and creased the paper along the (straight) fold line. Choice of corner was arbitrary. After answering a question the paper was flattened again. The process was repeated for each answer they wished to 'tick'. The result was a sheet of paper with one fold line for each answer the coder chose to provide.

Reading back the code was easy - make each fold and see where it pointed. Except ... the organisers of the programming contest were digital enthusiasts too. Their process was to scan and destroy all evaluation forms, then analyse the scans. Luckily the scanned forms showed shadows on the fold lines. The organisers wrote a program that allowed an operator to note the points at which fold lines intersected the edge of the paper.

Your task, given a list of fold line intersection points and information about the locations and sizes of question answer options, is to complete the decoding of the evaluation forms. Here is an example evaluation form. In the right image the top right corner has been folded over to provide the answer "Perfect" to the first question.

Rate your contest experience
Terrible <input type="checkbox"/> Neutral <input type="checkbox"/> OK <input type="checkbox"/> Perfect <input type="checkbox"/>
How hard did you find the problems?
Very hard <input type="checkbox"/> Hard <input type="checkbox"/> Easy <input type="checkbox"/> Trivial <input type="checkbox"/>
Would you attend another contest?
No <input type="checkbox"/> Yes <input type="checkbox"/> Maybe <input type="checkbox"/>
Which programming languages did you use?
Java <input type="checkbox"/> C <input type="checkbox"/> C++ <input type="checkbox"/> Python <input type="checkbox"/> C# <input type="checkbox"/>

Rate your contest experience
Terrible <input type="checkbox"/> Neutral <input type="checkbox"/> OK <input type="checkbox"/> Perfect <input checked="" type="checkbox"/>
How hard did you find the problems?
Very hard <input type="checkbox"/> Hard <input type="checkbox"/> Easy <input type="checkbox"/> Trivial <input type="checkbox"/>
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Input

The input contains a single test case.

The first line of input has four integers: W , H ($100 \leq W, H \leq 1\,000$), Q ($0 < Q \leq 10$) and F ($0 < F \leq 100$): the width and height of the form in mm; the number of questions on the form; and the number of folds to decode, respectively.

This is followed by Q question descriptions. The first line of each question description has 5 integers, A , x , y , w and h , followed by the text of the question. A is the number of answers to the question ($0 < A \leq 10$). The four values x , y , w and h are the coordinates of the top left corner and the width and height of an enclosing rectangle for the question text ($0 < x + w < W$) and ($0 < y + h < H$).