Problem 31: Secret Message

Difficulty: Medium

Originally Published: Code Quest 2016

Problem Background

The villains of the 90s action thriller Con Air cleverly planned their escape by communicating through hidden messages disguised in a plain letter. Only with the cover image could the invisible message be revealed. Their plan was fool proof until Agent Larkin discovered a photo of the Last Supper with holes mysteriously cut into it. When he placed it on top of the letter the secret rendezvous location was revealed. This is a form of *steganography*, a means of hiding a message without actually encrypting the information.

Problem Description

You will be given a paragraph of text. Somewhere inside the text is an invisible message. Your task is to expose the message from this inconspicuous text by laying a cover paper on top, revealing the correct letters.

The cover paper will be represented as a series of dashes and uppercase O's; the dashes represent solid paper, and the O's represent holes in the paper through which letters can be viewed. When the cover paper is laid over the original text in the proper position, the characters visible through the holes will represent the message when read in the usual left-to-right, top-to-bottom order. The cover paper may be smaller than the original text, but will fit inside it. Each dash or O within the cover paper represents the width of a single character in the original message.

Sample Input

The first line of your program's input, received from the standard input channel, will contain a positive integer representing the number of test cases. Each test case will include:

- A line containing a positive integer, M, representing the number of lines contained in the original message
- M lines containing the seemingly innocent message. This text may contain any printable character.
- A line containing the positive integer coordinates, in Y,X format, at which the top left corner of the cover paper should be placed in order to read the secret message. X represents the horizontal position (column), and Y represents the vertical position (row). The top left corner of the original message is 0,0.
- A line containing a positive integer, C, representing the number of lines covered by the cover paper.

- C lines representing the layout of the cover paper. A dash (-) represents solid paper, covering the characters in the original message. An uppercase O represents a hole, through which a single character in the original message may be read.

```
1
9
We hold these truths to be self-evident, that all men are created equal,
that they are endowed by their Creator with certain unalienable Rights,
that among these are Life, Liberty and the pursuit of Happiness. That to
secure these rights, Governments are instituted among Men, deriving their
just powers from the consent of the governed, --That whenever any Form of
Government becomes destructive of these ends, it is the Right of the
People to alter or to abolish it, and to institute new Government, laying
its foundation on such principles and organizing its powers in such form,
as to them shall seem most likely to affect their Safety and Happiness.
2,5
7
-O------O-----O-------------------------
--O----O-------------------O------O----
------O---O-----------------------------
----------------------O--------------O--
-------------------------------O-----O---
-----------------------------------O----
-------O---------------------O----------
```

Sample Output

For each test case, your program should print a single line containing the secret message. Retain the original casing of letters and any spaces.

```
meet at midnight
```