The paper guillotine is a rather limited tool for cutting out shapes, so we will now replace it with a pair of scissors. This tool can still only cut straight lines, but does not need to cut across the entire length of a piece of paper. Note that a scissor cut must start from a point on an external edge.

Write a new program which determines how to cut shapes out of a piece of paper using scissor cuts. The input to the program will be the same, and your output should follow the same rules as before. [NB. Since direction is important for a scissor cut, remember to put the start co-ordinates on the left.]

**Sample Input**

4 3
akxz
akxz
aaaz

**Sample Output**

(3,0) (3,3)
(1,3) (1,4)
(3,1) (1,4)

**Sample Input**

3 2
jnj
jjj

**Sample Output**

Impossible