



Solve the board (partially)

Now you will generate a (partial) solution for a given board. You will generate paths by executing moves.

The input will be the same as in the last level. There are certain situations where a path can only be extended in a single direction. Such a situation is called a "sure move". Your task is to find all sure moves and create or extend partial paths. After executing a sure move the board changes and it is possible that new sure moves are available. Execute all sure moves until the board is completed or no sure moves can be found.

Partial path

A partial path starts at a point and ends at a position without a point.

All invalidity rules (except that it does not end at the corresponding point) of regular paths apply.

Partial paths are also not allowed to overlap.

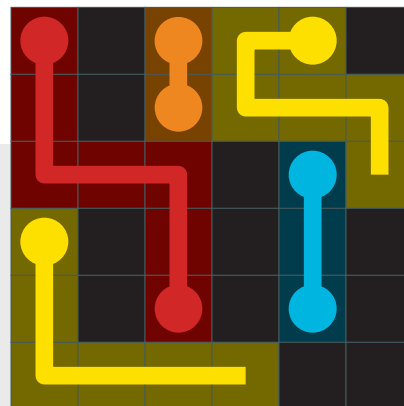
The example to the right has two partial paths

1. partial path

2 2 5 5 W S E E S

2. partial path

2 16 5 S S E E E



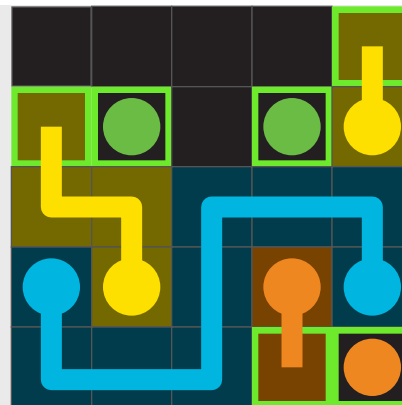
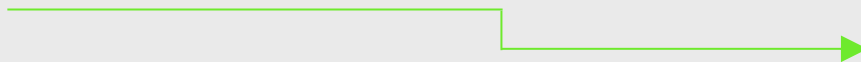


Open position

Every position of a point without a path is an open position. Also every end position of a partial path is an open position.

Example

open position





Move

A move is the pair (open position, step)

Executing a move means:

if the open position is the position of a point:

create a new (partial) path of length 1 that starts at the open position and has one step

if the open position is the end position of partial path:



extend the partial path with the step. If the new end position is the same as the end position of an existing partial path with the same color, they will merge into one regular path.

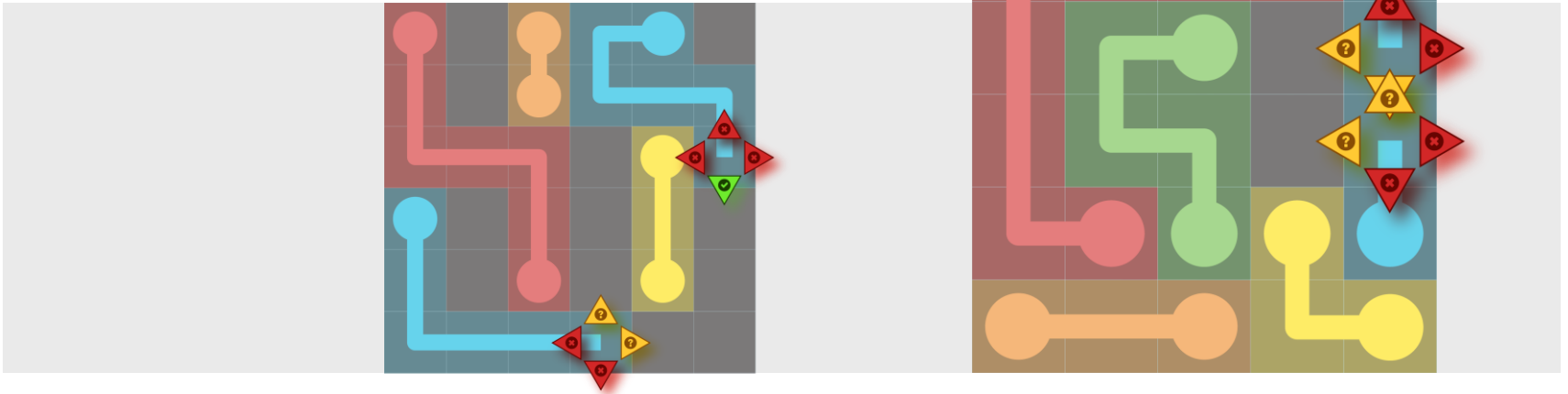
- If the new end position is the same as the position of the corresponding point of the path, the path will be converted to a regular path. A regular path starts always at the point that has the lower position index.
- A move is only valid if all paths are still valid after the move is executed. For every open position there are 4 moves one for every direction (N|E|S|W).



Sure Move

A move is a **sure**  move when

- the move is **valid** 
- and all other moves with the same open position are **invalid** .





► Input

numberOfTests test₁ test₂ ... test_{numberOfTests}

test: rows cols numberOfPoints Point₁ Point₂ ... Point_{numberOfPoints} numberOfInputPaths

numberOfPaths will always be 0 (for this level)

input format is the same as for level 5

Output ►

numberOfTests numberOfPaths_{test1} path_{1, test1} path_{2, test1} ... path_{numberOfPaths, test1} numberOfPaths_{test2} ...

the (partial) paths need to be sorted by their color (in ascending order) and then by the position

of the starting point (also in ascending order)



There is only one valid solution for each test case.

Example input

tests	number of points																											
2	5	5	10	4	1	5	2	7	1	8	3	18	3	19	4	20	2	21	5	23	5	25	4	0	5	5	...	
size of board																		number of paths										
test 1															test 2													

Example output

number of tests																				
2	4	2	5	1	S	2	20	1	N	4	19	2	S	E	5	23	1	W	3	...
number of paths																				
test 1															test 2					

