HW #6. Graph (Binary Input)

(Due: 6/16/2017)

Revised (2017/06/02)

Correct the range of rows and columns.

Objective

Try to find the optimal solution.

Introduction

"*Two Dots*", a game which is similar to "*Candy Crush*" is aimed at eliminating dots to achieve the goal in limited moves (each move can only create one path). Players eliminate dots by connecting them to their neighbor dots, and the goal of this game is to eliminate enough number of dots. Since there is a limit of moves, it is better to eliminate as many dots as possible in a move.

In this homework, you are asked to find a longest path or an existing cycle of each type of dots by using input graphs you have.

Rules

There are some rules you should know before you play the game:

1. A cycle can only be made by connecting to the dots you have met (except for the parent dot) in the same path.
2. You can only connect to the dots in four directions: up, down, left, and right.

input.txt

Please note that the input is given in binary format, you are expected to **DECODE THE BINARY FORMAT OF THE INPUT USING MSGPACK**.

Following is the format of decoded input:

{N: an **integer-type object** indicating the number of test cases in the input file},

{R_1: an **integer-type object** indicating the number of rows in the 1st input graph},

{C_1: an **integer-type object** indicating the number of columns in the 1st input graph},

{T_1: an **integer-type object** indicating the number of dot types in the 1st input graph},

{$GRAPH_1$: an **array-type object** corresponding to the 1st input graph},

…

{R_N: an **integer-type object** indicating the number of rows in the Nth input graph},

{C_N: an **integer-type object** indicating the number of columns in the Nth input graph},

{T_N: an **integer-type object** indicating the number of dot types in the Nth input graph},

{$GRAPH_N$: an **array-type object** corresponding to the Nth input graph}

P.S. $1 \leqq N \leqq 10$, $\mathbf{1 \leqq R \leqq 1{,}000}$, $\mathbf{1 \leqq C \leqq 1{,}000}$, $1 \leqq T \leqq 100{,}000$

The data type of each element in graph arrays is int and the graph is stored in a one dimensional array.

Following is the format of a NxN graph stored in a 1D graph array:

[<dot_{11}> , <dot_{12}>, <dot_{13}>, …, <dot_{1n}>,

…

<dot_{k1}>, <dot_{k2}>, <dot_{k3}>, …, <dot_{kn}>,

…

<dot_{n1}>, <dot_{n2}>, <dot_{n3}>, …, <dot_{nn}>]

output.txt

Please note that your output answer should be given in binary format, you are expected to **ENCODE YOUR ANSWER TO THE BINARY FORMAT USING MSGPACK**.

Following is the format of encoded output:

{SEQ_1: an **array-type object** indicating the maximum length / existing cycle of each dot type in the 1st input graph},

…

{SEQ_N: an **array-type object** indicating the maximum length / existing cycle of each dot type in the Nth input graph},

Note: Each output array is a vector<string> type array.

Note: You should output your array in the order of dot types. (from dot type 1 to dot type T)

Example

Input (after decode)

```
2
2 3 1
1 1 1 1 1 1
2 2 2
1 2 1 2
```

Note: If dot type=3, the set of dot type is {1, 2, 3}

Note: The input graph is stored in a 1D array, the space above just for readability.

Output (before encode)

```
cycle
1 1
```

Note: If there exists any cycle in the dot type k, just output the word “cycle”.

Note: The output of maximum length needs to be converted to string type.

Discussion Board

If you have any problem regard this homework, please post your question in our discussion board.
You are encouraged to post the question on discussion board as others might have the similar question as you do.