Topcoder Problems

Instructions at
https://github.com/vsee/uoe_programmingclub/raw/master/slides/TopCoderGuide.pdf

SRM 685 – Div 2

- Through the applet: Practice Rooms → SRMs → 1101 – 1104 → SRM 685 Div 2
- Through the web arena: Practice Problems, Search for the problem name

A) MultiplicationTable2Easy

Fox Ciel is creating a new binary operation.

The operation will be denoted $ and it will be defined on the finite set S = {0, 1, 2, ..., n-1}. I.e., for each ordered pair (i, j) of elements of S the operation (i $ j) will return some element of S.

For example, we can have S = {0, 1}, and we can define that (0 $ 0) = 0, (0 $ 1) = 1, (1 $ 0) = 0, and (1 $ 1) = 0.

Note that Ciel's operation is not necessarily symmetric. In other words, it is possible that for some i and j the operations (i $ j) and (j $ i) return two different values.

A nice concise description of the operation $ is its "multiplication table": a square table where in row i and column j we have the value (i $ j). You are given this "multiplication table" encoded as a table with n^2 elements. For each valid i and j the operation (i $ j) returns the value table[i*n+j].

A subset T of S is called good if it has the following property: for any two elements i and j in T, (i $ j) is also in T.

You are given a t. The elements of t form a subset of the set S. Return "Good" (quotes for clarity) if this subset is good. Otherwise, return "Not Good". Note that the return value is case-sensitive.

B) RGBTree

You are given a simple undirected graph with n nodes, labeled 0 through n-1. Each edge of this graph is red, green, or blue. You are given a description of the graph in a G. For each pair of nodes (i, j) there are four possibilities:
G[i][j] = 'R', meaning that i and j are connected by a red edge.
G[i][j] = 'G', meaning that i and j are connected by a green edge.
G[i][j] = 'B', meaning that i and j are connected by a blue edge.
G[i][j] = '.', meaning that i and j are not connected by an edge.

A spanning tree of our graph is any set S of exactly k = n-1 edges such that it is possible to travel from any node to any other node by only using edges from S. Does our graph have a spanning tree that has exactly k/3 edges of each color (red, green, blue)? If it does, return "Exists". Otherwise, return "Does not exist".