

2016 Program Design Competition Problem

Irish Pot of Gold

The Game

The Irish Pot of Gold game consists of a group of squares where each square represents a region. Each region either contains an angry leprechaun or is blank.

The rules are simple:

- Uncover a leprechaun, and the game ends.
- Uncover an empty square, and you keep playing.
- Uncover a number, and it tells you how many leprechauns lay hidden in the eight surrounding squares—information you use to deduce which nearby squares are safe to click.

You open the region by left-clicking it, and mark a region by shift-clicking.











So, when starting your game, your first few clicks will depend on your luck (the luck of the Irish, so to speak) to find blank regions, but once you open a fair amount of blank regions, you can use logic to find the regions that contain those angry little Irish people.

Hints

- Mark the leprechauns. If you suspect a square conceals one, right-click it. This puts a pot of gold on the square.
- Study the patterns. For example, if three squares in a row display 2-3-2, then you know three leprechauns are probably lined up beside that row.
- Explore the unexplored. Not sure where to click next? Try clearing some unexplored territory. You're better off clicking in the middle of unmarked squares than in an area you suspect contains a leprechaun.

The minimum size of the playing field is 9 X 9, with 10 leprechauns. You can make the field bigger than 9 X 9, if you want. In a larger field, the number of leprechauns will be 10% of the total number of regions, with the number rounded up in case of a number with a remainder. For example, an 11 X 11 field would have 121 regions and 13 leprechauns.

The playing field on the next page shows 9 leprechauns successfully marked, but one region clicked on to by mistake to reveal the angry leprechaun. The numbers represent the total number of leprechauns that each region touches. NOTE: the field on the next page is only 8 X 8 and is for demonstration purposes.

1		2		3			2
1	1	2	1	3			2
		1	2	2	2	2	1
		2		2			
		3		3			
		2		2			
		1	1	1		1	1
						1	

The Instruction

The second part of the challenge is to write a lesson that instructs others how to create the game you just made. The methods for teaching can include, but are not limited to, Power Point presentations and mini-programs that demonstrate key parts of the code behind the game. You will not be able to give instructions on the entire code. Therefore, choose one or two main components of the code for your explanation, such as a loop or an IF function.

You can make your explanations very practical and straight-forward or you can make them a bit more fun, perhaps for a younger audience.

Program Development

You can develop this game using any software tools available to you. You may create a web based application, a C/C++ program, a Visual Basic/C++/C# program, Java, some other programming environment, or a combination of multiple programming languages. Your program MUST be able to run on at least one Window platform: a Windows 7, Windows 8 or Windows 10 computer using standard installation. If you choose a browser-based solution, it MUST work on at least one Web browser: Internet Explorer, Firefox or Google Chrome.

It is recommended you bring your own laptop to SDSU for demonstration and presentation during the competition day.

Your work will be judged on:

1. Correctness of the solution
2. Uniqueness of the design
3. Completeness of solution
4. User-interface design
5. Effectiveness of the teaching tool

All team members are encouraged to participate during the presentation. All parts of the presentation and source code should be burned to a clearly-labeled CD and submitted to the program design competition committee on the day of the competition.

If you have any questions regarding the problem, please do not hesitate to ask us at myounggyu.won@sdstate.edu.

Good luck and have fun!