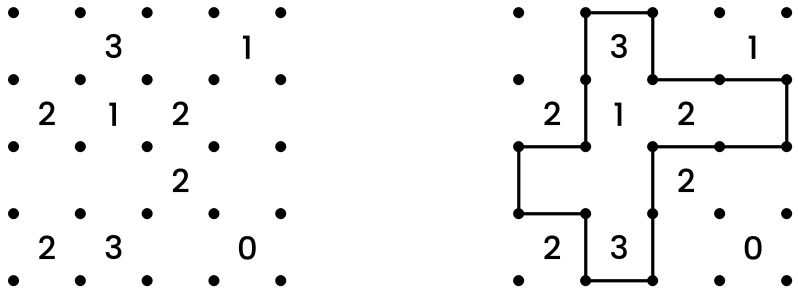
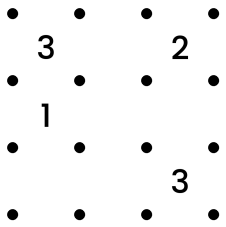
UW Math Circle

Week 1 – Slitherlink

Slitherlink is a puzzle where the goal is to draw **one loop** on a grid, with no self-intersections. If a grid cell has a number in it, that indicates how many sides of that cell should be in the loop. Take a look at an example puzzle (on the left), and the sample solution (on the right).



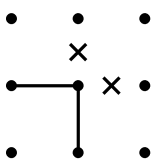
1. Give it a try! Try to solve this puzzle.



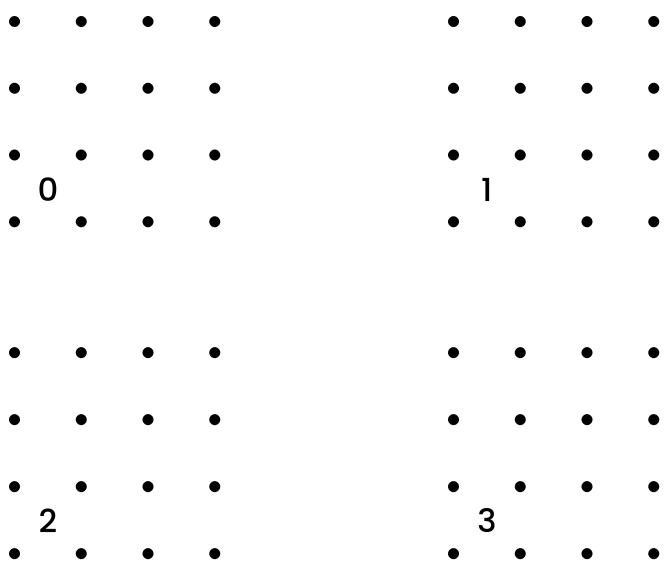
Let's try to devise some strategies for Slitherlink.

2. (a) Explain why in any Slitherlink solution, every grid dot must have either 2 edges or 0 edges drawn to it.

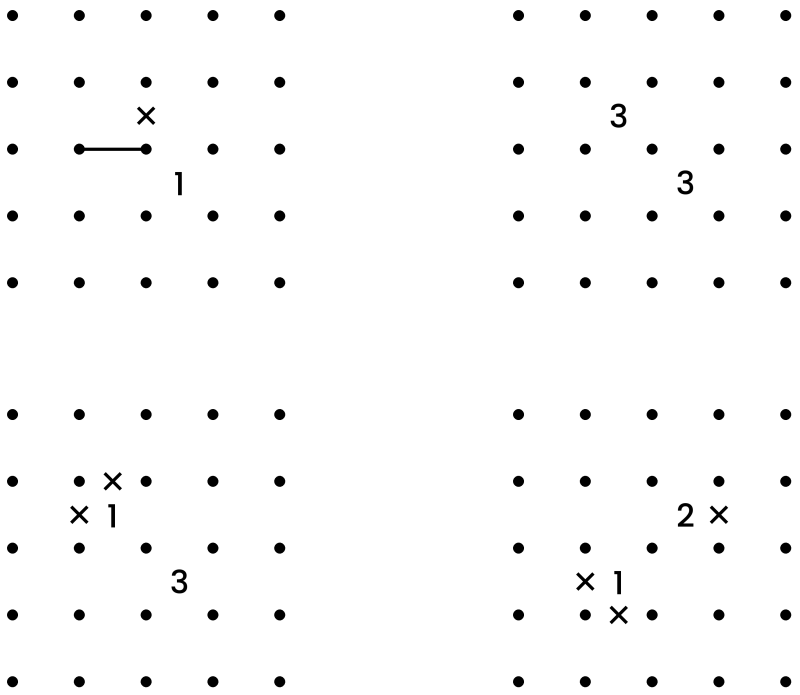
   (b) A common notation is draw a small X where you know it's not possible to put an edge. For example, if you have the following two edges, by the above observation, you can draw the following two X's.



   Using the above observation, in the below situations, draw all edges that must exist in any solution, and all X's where no edge can exist an any solution.

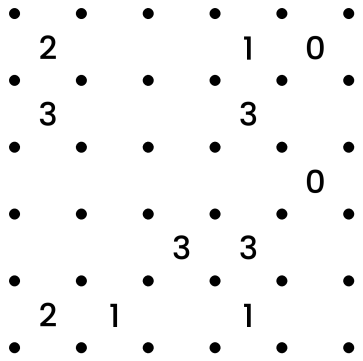


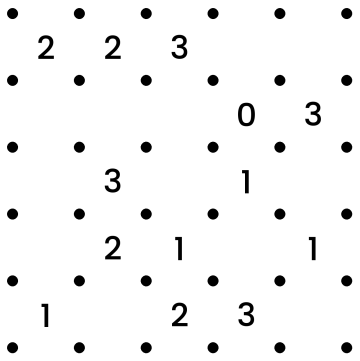
(c) Use the same observation to mark the following situations.



There are tons more tricks like these that you can learn. But even just practicing this kind of reasoning makes solving Slitherlink much easier!

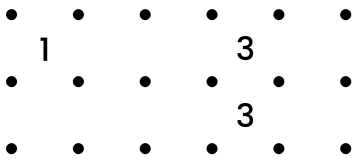
3. Try your hand at some harder puzzles!





4. (a) Explain why in any Slitherlink solution, every row (of vertical edges) and every column (of horizontal edges) must have an even number of edges.

(b) Use this observation, explain why the following puzzle has no solution.

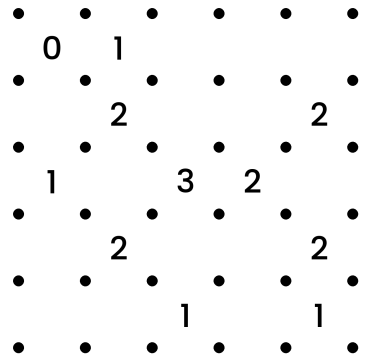


5. Make your own Slitherlink puzzles, then give them to a friend to try! (Hint: when making a puzzle, it's usually easier to start by drawing the loop you want as the solution, and then decide which pieces of information you want to give.)

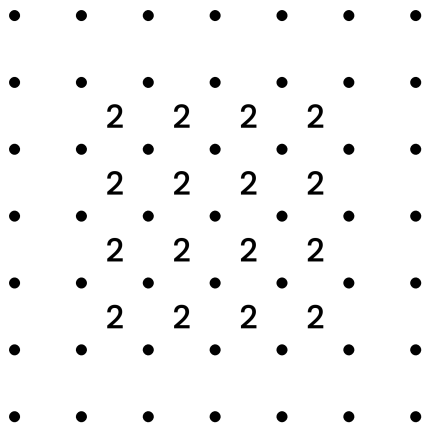
Challenge Problems

6. Is it possible to have a Slitherlink puzzle where every cell has a number, but there are still at least two solutions?

7. Try this even harder puzzle!



8. (a) Explain why the following puzzle has no solution.



   (b) Find a way to change one of the 2's into a 1, so that the puzzle has a solution.

9. Imagine the problem from 4(b) was wrapped around a cylinder, so that one grid space to the left of the leftmost 3 dots, it wraps around to the rightmost 3 dots (like in the world of Pac-Man). Show that on a cylinder, the puzzle does have a solution! (You're still looking to draw a single loop—something that you can draw on the cylinder without lifting your pencil and ending where you began—with no self-intersections.)