Title: Math Games

About Me

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I am currently pursuing BS in Data Science and Application from Indian Institute of Technology (IIT) Madras in 2nd year, this is an online degree so it's pretty flexible and I use my free time to improve myself.
I haven't contributed to Open Source but I have made some project to improve myself in coding and currently I'm getting familiar with Sugarlab codebase

Description

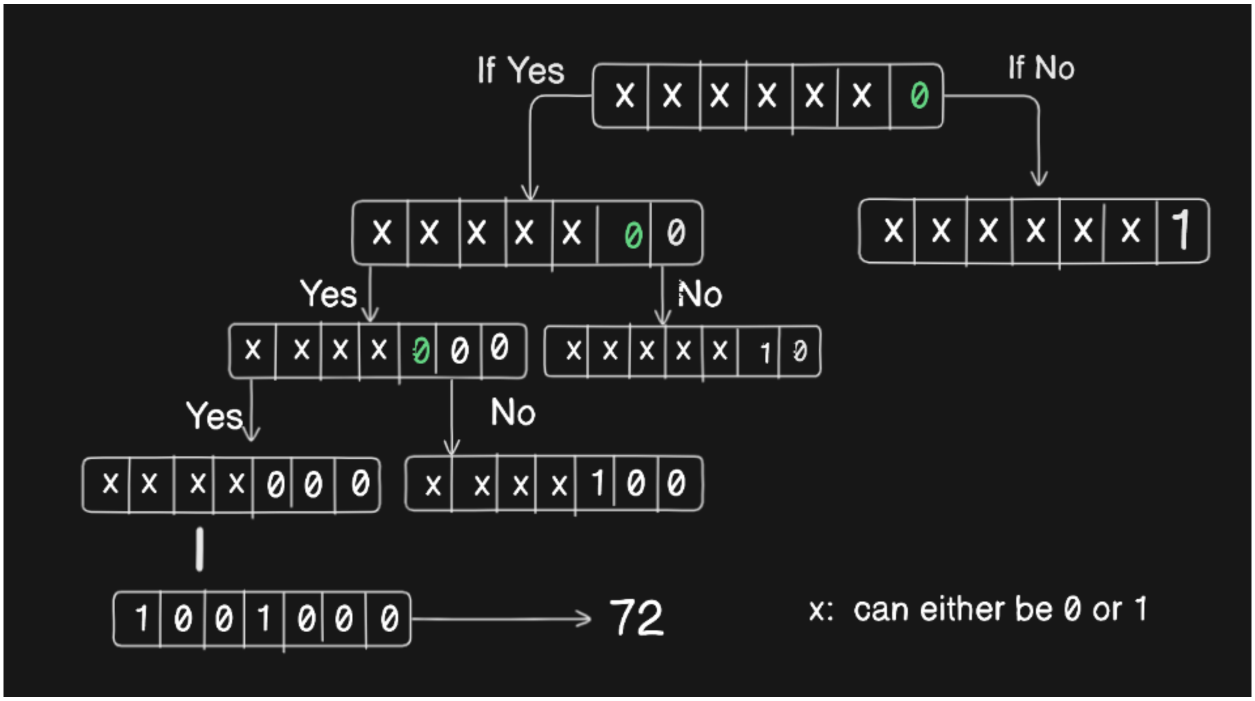
While Sugar has lots of activities, you can never have enough math games and puzzles. This project (either medium or large) would be do develop 4 to 8 new activities based on some of Bogomolny's ideas

The Games I'm Interested in:

❖ Number Guessing Game

In this game we need to think integers greater than 0 and less than 100 and the game will show us bunch of numbers if our thought number is there then we have to click "Yes" otherwise "no" after doing this 7 times we can see that the game correctly guess the number, but how's this done? Let's see

- We show the numbers according to binary format
- First we show number either 0 or 1 at the rightmost place and thenfrom user we get to know which one is right
- And we do this from right to left and after 7th iteration we will know what is the right number

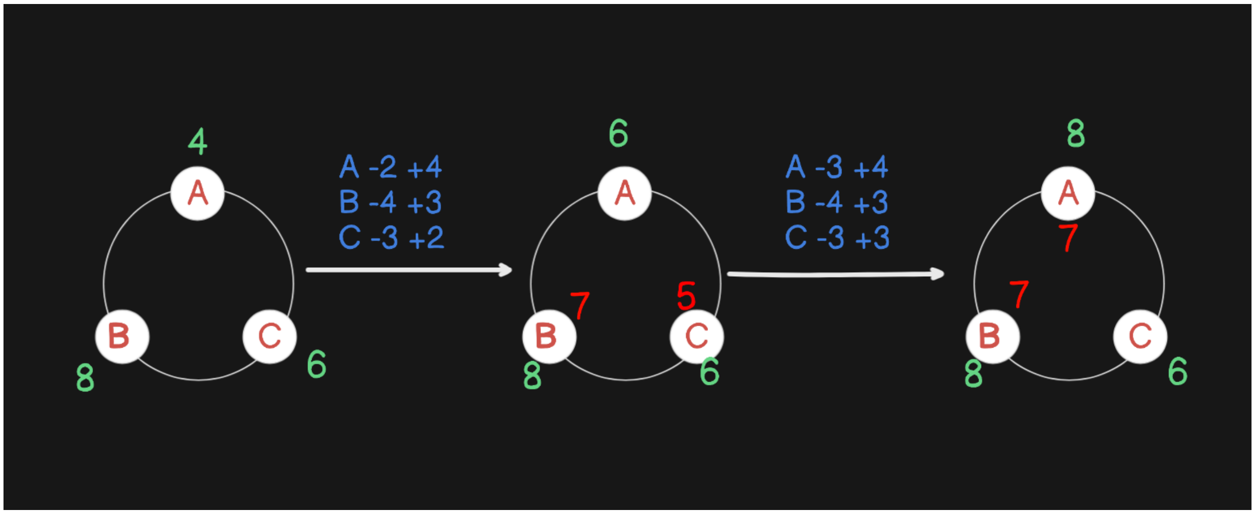


-This is how I approach this game and we can predict the number in 7th guess

❖ The Candy Game

In this game a number of students sit in a circle while their teacher gives them candy. Each student initially has an even number of pieces of candy. When the teacher blows a whistle, each student simultaneously gives half of his or her own candy to the neighbor on the right. Any student who ends up with an odd number of pieces of candy gets one more piece from the teacher. Show that no matter how many pieces of candy each student has at the beginning, after a finite number of iterations of this transformation all students have the same number of pieces of candy.

- The player number i will give his c/2 to player i *+1.* (c is candy)
- If anyone ha odd number of candy we will give him +1 candy
- This iteration will go on until all of the players has even numbers of the candy



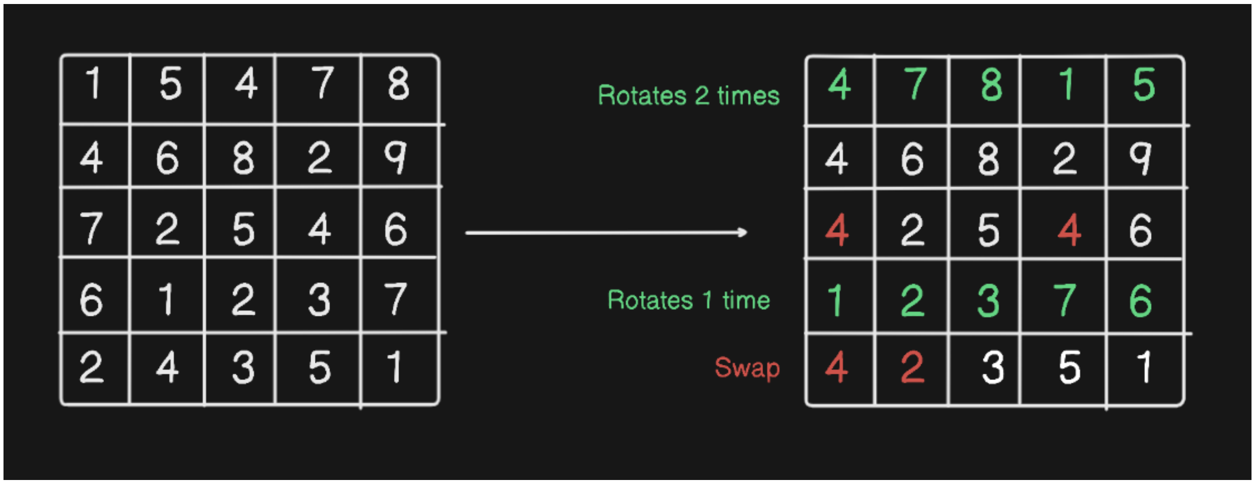
❖ Latin Squares

In this game we have given a square matrix of order n<=6 we have convert the matrix so that we get only unique number in each row and column, We can person only these two operations

1. We can cycle rows left or right
2. We can swap two squares in the same row

This is how I will approach this:

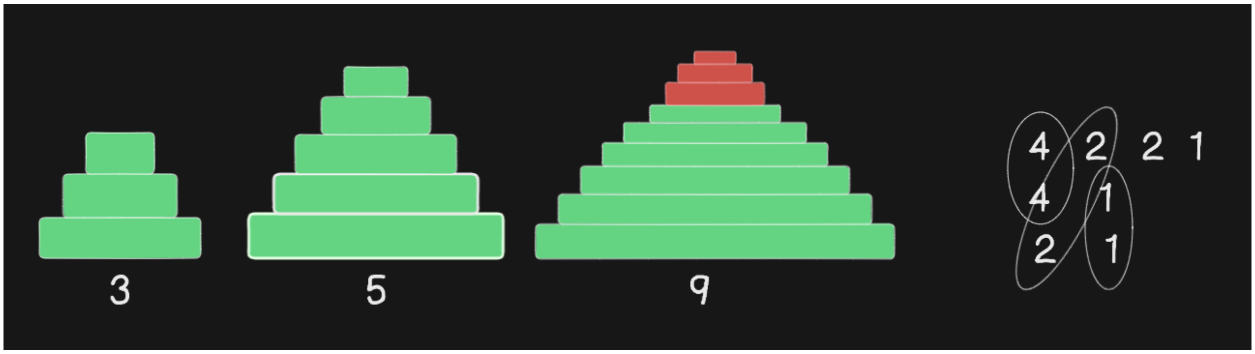
- First make a matrix which has distinct numbers each row and column
- Then change the matrix with the given operation
- The new Matrix is our main question that we will show the player



❖ Nim Game

In this game the game board consists of three(or more) rows of sticks (or any other things like a stack). Every time when we click on a stick, all sticks to the right are removed. It's we against our computer. The one who removes the last stick wins. This game looks simple but if we have to win we need to consider the nim sum which need to be equal to zero whoever first make the nim sum zero the victory is theirs. (I also has difficulties first beating the computer but after getting grasp of the concept it become easy)

- Players can select either they want three or more rows, then randomly we show the number of sticks, player will play first move
- The computer will play it's turn by calculating nim sum using XOR operation if nim sum is zero, the computer has no winning move on this turn. It can choose any valid pile and remove a random number of sticks
- We can also do this, that there is 3 different mode easy, medium, and hard
- In Easy mode, when there is a winning move for computer it has 60% (or higher) chance that it will make blunder
- And in Medium I will have 40% (or lower) chance that it will make blunder
- In Hard mode it has 0% chance to make blunder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