Project 1

Game of Nim Blueprint

Overview

* Nim is a strategy game believed to have originated in China, however this is inconclusive of evidence, so technically the origin is a mystery. How cool!
* Nim itself has been referenced as far back as the 16th century. That means civilization has been playing this game for 500 years!
* The first mention of the game “Rock Paper Scissors” was in the same century as well. I guess we will never know which one came first!
* The great thing about Nim is that it’s strategy, meaning it’s heavily rooted in mathematics, meaning if you can notice the patterns and take advantage of the underlying formula’s you can win EVERY time!
* Now that you’ve learned about the history, time to get into the details:
* Nim can only be played with 2 players at any time and the objective is to be the last to remove all pieces from the board/pile/piles. (Normal Play)

Setting up

* Pieces
  + Pieces are the medium by which the game is played. Pieces are removed from the pile, also known as being nimmed. This process is the core functionality of the game as it is all that is needed to lead to a winner/loser
  + In essence, the pieces are arbitrary. You can play using shells, dominoes, etc.
  + You can even decide not to use physical pieces and use numbers in you head and subtract from the number to represent the “pieces being removed”. When using this method, it would be best to have a third-party keeping count of how many “pieces” are left as well as whose turn it is
* Number of piles
  + Both players remove (Nim) from the same pile/piles.
  + Again, the number of piles is arbitrary. You can have one pile, multiple piles, or use a mental imagine, although this becomes harder to track as the pile number increases
  + The play of Nim seems to be evenly split between those who play with multiple piles and those who play with one pile

Gameplay

Each of the two players take pieces from the pile/piles alternatively. Who goes first is determined by an agreement between the two players or an independent, intermediary party.

* What You Do on A Turn
  + Multiple Piles: On your turn, remove any number of pieces from a pile. You can only remove pieces from one pile each turn.
  + One Pile: When playing one pile you must restrict the maximum amount a player can remove per turn, represented by N. On your turn, remove between 1 and the maximum amount allowed (1 < n) per turn
  + You can only remove from a pile/piles. You cannot add to a pile unless playing a different variation of the game. Once a removal from the pile/piles has been confirmed, your turn is ended
* Getting Started
  + Step 1: Determine the style of play
  + Step 2: Determine which player goes first
  + Step 3: Take turns (see What to do on a turn above)
  + Step 4: Repeat step 3 until the condition for the style of play is met (Someone wins/losses)

Variations (Different Styles of Play)

* + In some variations of the game you can add pieces to an empty pile instead of removing them.
    - For example, we can play a game that starts at 0 in the pile and each player can add a maximum of n pieces on their turn. The first one to 100 wins.
  + Another variation involves Misère play. This means the last player to remove the remaining pieces loses rather than wins like in normal play.
  + Bounded Nim – Players cannot take more than N pieces per turn. This is somewhat as common as Misère and Normal Play
  + Double Nim – Each turn, your opponent takes pieces from two different piles
  + Large Nim – Must take pieces from the largest pile first until it is exhausted
  + Small Nim – Must take pieces from the smallest pile first until it is exhausted