

Chapter 3

Chapter 3: Sequential Games

Class Game: Century Mark

- Played by fixed pairs of player taking turns.
- At each turn, each player chooses a number between 1 and 10 inclusive.
- This choice is added to sum all previous choices (initial sum is 0).
- The first player to take the cumulative sum to 100 or more, loses the game.

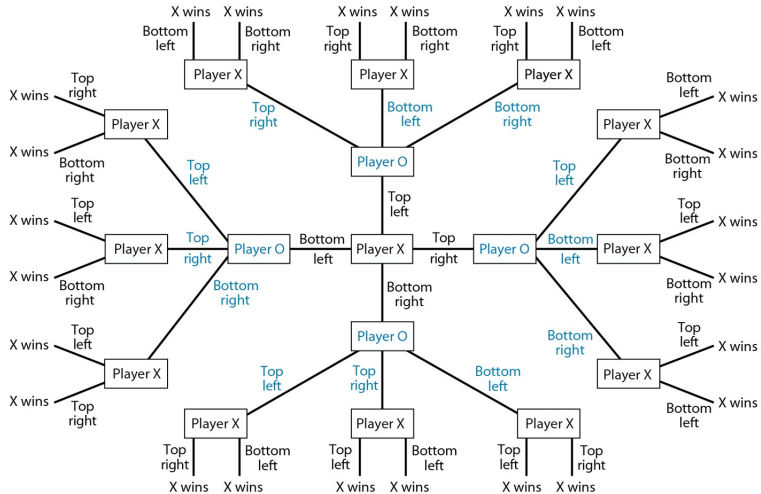
Class Game: Century Mark

- Broadly speaking, bring the total to 89. Then your opponent cannot possibly win and you can win for certain.
- The first mover can guarantee a win!
- How to do this: to get to 89, need to get to 78, which can be done by getting to 67, 56, 45, 34, 23, 12, etc.
- Choose 11 minus the number chosen by the second mover (this is a complete plan of action, or strategy).

Order Advantage

- First mover advantage-moving first gives the player the advantage in winning the game. People assume this is usually the case; however, there are many games where it is not the case.
- What games have a first mover advantage?
- Second mover advantage-the second player has the advantage. This is due to the flexibility to adapt oneself to the other's choices.
- What games have a second mover advantage?

Tic-Tac-Toe



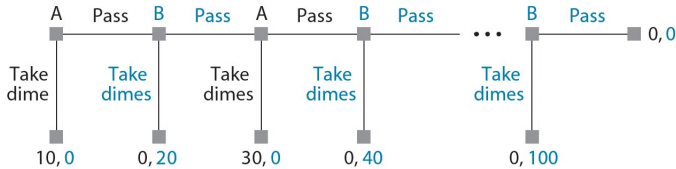
Evidence Concerning Rollback

- There is some experimental evidence that counters the predictions in game theory.
- In one game, experimenters have had subjects, A and B, choose how to split 1 dollar . A proposes a split, B either accepts or rejects the split. If B rejects, then neither player gets anything.
- B should accept any sum, because its better than zero. A can foresee this, and propose a split of 99 and 1.
- In fact, most people propose an equal split. Most B's reject anything that leaves them with 25% or less.

Why Do We Get These Results

- Some people argue that sum is too small, so people don't really care.
- People may just not have any prior knowledge of rollback equilibrium.
- People have an innate sense of fairness.
- In fact, most people propose an equal split.

Centipede Game



Centipede Game

- Clearly, player B would want to take the dimes at the end, so player A should take before that, and so on.
- Play A should then take the dime at the start of the game.
- Usually, when this experiment is done, people go a few rounds before taking any dimes.
- If player A does not take the dime in the first round, then he is not playing a rollback equilibrium, which makes the game unpredictable.