



# Math Field Day

## California State University, Fresno

**The second game will be a variation of the first one.**

Below are some possible variations for you to try and think about. However, the second game may be a different variation.

- **Game A**

- The person who makes the last move loses (instead of wins).
- The number of chips that can be removed in each turn is 2, 3, or 4.
- The number of chips that can be removed in each turn is 1, 2, or 4.
- Choose any other subset of natural numbers. The number of chips removed in each turn must be in that subset.

- **Game B**

- The person who makes the last move loses (instead of wins).
- In each turn, you may remove only up to a certain number of coins.
- The players cannot remove the coins from any one pile 3 turns in a row.
- At each turn, you must remove coins from a different pile than your opponent on his/her last move.

- **Game C**

- The person who makes the last move loses (instead of wins).
- If at any point in the game the coins share a square, they are glued (and so, moved together) for the rest of the game.
- The coins are not allowed to share a square. In this case, the game ends when the coins are either in the two leftmost positions of the bottom row or in the two bottom position of the left column.
- You can move a coin only up to a certain number of squares.
- The coins are not allowed to pass each other.

- **Game D**

- The person who makes the last make loses (instead of wins).
- A coin can be moved by no more than 2 squares.
- Coins are allowed to share a square. In this case, the game stops when all the coins are in the leftmost square.
- You are playing on two strips at the same time. For each of your moves, you can choose the strip on which you want to move a coin. The game stops when no coin can be moved, i.e. all the coins on both strips are lined up on the left.

Note: our second game does not have to be one of these but it may be a different variation. The exact rules of the second game will be announced just before the second part of the tournament starts, so the contestants will have to think of a strategy fast.