

MA111: Contemporary mathematics

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Entrance Slip (due 5 min past the hour):



Today we investigate last diminisher.

Exam and HW is Nov 19.

Context: How to make a pile file

- Suppose a judge tries to tell the players that a pile is “fair”
- Some players think it is too small, some think it is too big, some think it is just right
- Which player should get the pile?
- If a player thinks it is too small, he will be mad if he gets it
- Just right: won't care either way
- Too big: will be made if someone else gets it
- So if two people think it is too big, then the judge has ruined it!

Activity: Last diminisher

- We'll play last diminisher in front of the class
- We'll cover the “sandwich” model
- Make sure you understand how to play
- Make sure you understand how to protect yourself against cheaters!

Fast: Last diminisher

- Requirements: Any number N of players; loot that can be divided arbitrarily and recombined without loss of value
- Overview: Each player one player (the least greedy) will leave “happy”
- Rules:
 - ① Randomly order the remaining players. The initial piece is the whole loot.
 - ② In order, each player declares the pile too small, just right, or too big.
 - ③ If too big: they also make the pile smaller until they declare it is just right.
 - ④ After everyone is done, the last player who didn't say too small gets the pile.
 - ⑤ Repeat until everyone has left
- 1 is important, because the very last player has an advantage

Fast: strategy for everyone but last

- Be honest!
- If it is too small, say so, so you won't get stuck with it
- If it is just right, you can say "too small" without any real harm to yourself, but you'll have to wait until next round
- If it is too big, you need to say so to prevent the next player from taking more than his fair share
- Sad part: you can only get exactly your fair share.

Fast: strategy for the last player

- Only change: If it is too big, take it!
- There is no “next player” to worry about
- If you are greedy and patient, you can reject “just right” pieces

Assignment and exit slip

- Read and understand 3.1-3.5. Skim 3.6.
- Homework due Nov 19.
- **Exit slip:** You are third player in Last diminisher

There are five players

The current pile is 40% of the loot

- What percentage of the loot should you make the pile? [Or should you just say “too small” and pass?]