

Krea - RAM Maths Circle - Session 1

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1 Overview

An introduction to thinking about game theory through payoff matrices and games.

2 Payoff Matrices

1. **Consider 2 companies. Each company chooses among 2 advertising options. Each selection has different outputs for each company. Play with a partner.**
 - Can you find a strategy for winning irrespective of what the other player chooses?
 - What happens if we change the rewards?
2. **Play the different scenarios with varied payoffs in the payoff matrix with a partner.**
 - What patterns do you notice when trying different payoff combinations?
 - Can we have a payoff matrix that has no dominant strategy?
3. **Try comparing pair-wise payoffs; one from each player.**
 - Can you discard some options you have based on these comparisons?
 - Do some of your moves depend on what the other person plays?

3 Key Definitions used in the class:

- **Dominant Strategy:** A strategy that is your best choice no matter what the other player does.
- **SDSE (Strictly Dominant Strategy Equilibrium):** The outcome when every player plays their dominant strategy. Not every game has one.
- **Iterated Elimination:** When no strategy dominates outright, cross out strategies that are always worse than some other strategy. Repeat in the reduced game until an answer appears.