# Final Project: Conniption


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# Project Overview

- Entire project written in Java.
  - ConniptionBoard - All operations pertaining to the board
  - ConniptionMiniMax - Utility to perform MiniMax
  - Driver - Driver for example program
- Command line interface.
- MiniMax with Alpha-Beta pruning.
- Each team member wrote their own evaluation function.
- All numbers shown in the presentation are 3-ply.

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*Rather than building in the functionality to play against a human, we focused on creating unique evaluation functions to pit against one another.*

# Morgan's Evaluation Function

Calculates a score for each player by the following formula:

$$Seq(n) \cdot \infty + \sum_{i=1}^{n-1} Seq(i) \cdot 10^{i-1} \text{ where } n = \text{win amount}$$

or, in this case $(n = 4)$

$$Seq(4) \cdot \infty + Seq(3) \cdot 100 + Seq(2) \cdot 10 + Seq(1) \cdot 1$$

Take the difference between my score and the opponents score.

# Clay's Evaluation Function

- Prioritizes lowest center of gravity.
- Plays defensively until an opportunity to strike presents itself.
- Variations:
  - Prioritizing center of the board (10% decrease).
  - Prioritizing both top and bottom of the board (10% increase).
  - Conservative with flips where possible (Insignificant).

# Everett's Evaluation Function

- Prioritizes the center of the board.
- Plays defensively until an opportunity to strike presents itself.
- Plays conservatively with flips.

# Results

3-ply over 100 iterations.

Results interpretation: *COLUMN* beat *ROW* about *LOOKUP* percentage of the time.

| | Random | Morgan | Clay | Everett |
|---|---|---|---|---|
| Random | - | 73% — 46% | 67% — 40% | 73% — 51% |
| Morgan | 56% — 27% | - | 57% — 36% | 53% — 24% |
| Clay | 60% — 33% | 64% — 43% | - | 53% — 14% |
| Everett | 49% — 27% | 76% — 47% | 86% — 47% | - |

# Demo

# Questions?