

## Kunle S Oguntoye

### Increasing $c$

- **Effect on Hardness:**
  - With higher  $c$  (I tried using  $\sqrt{5}$ ), the agent focuses more on exploration.
  - This means the agent might try less-optimal moves (for testing or exploration purposes) more frequently, making it appear less skilled in the short term.
- **Outcome:**
  - The agent played less predictably but also less optimally.
  - The agent took slightly longer to identify a strong strategy, so early moves felt "easier" for the opponent.
- **Game Hardness:**
  - Lower initially, as the agent explores a wider variety of moves.
  - Potentially higher in long-term gameplay if exploration uncovers strong, previously undiscovered strategies.

### 2. Decreasing $c$

- **Effect on Hardness:**
  - With lower  $c$  (I attempted 1), the agent prioritizes exploiting the known best moves rather than exploring alternatives.
  - It focuses heavily on maximizing immediate outcomes based on its past simulations.
- **Outcome:**
  - The agent becomes more deterministic and harder to defeat in known situations.
  - However, it might fail to adapt to unexpected strategies from the opponent due to insufficient exploration.
- **Game Hardness:**
  - Higher in the short term, as the agent exploits already known strong strategies.
  - Lower in the long term, as the agent may miss better moves that require exploration.

### 3. Keeping $c$ as the square root of 2

- **Effect on Hardness:**
  - This default value provides a balanced approach to exploration and exploitation.
- **Outcome:**
  - The agent strikes a balance between trying new strategies and optimizing known ones.
- **Game Hardness:**
  - Moderate and adaptable to both beginner and experienced opponents.