Winning The Chalkdust Coin Game (And Other Games)

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AlphaGo

Figure: A completed game of Go.
Google’s AlphaGo used state-of-the-art machine learning and computational power to beat Lee Sedol.

One feature was that AlphaGo played to win, not to maximise its score.
Play To Win, Not To Maximise Your Expected Score

- If the result of a game is win/lose then the margin of victory/defeat is not important.
- A common mistake is to play to maximise expected score.
- If you are in the lead, avoid risk.
- If you are losing, take risks to improve your chances.
Chalkdust Coin Game

- Game played over 10 turns.
- Each turn you choose a number of fair coins to flip that turn, up to a maximum of 10 (you can choose to flip none).
- You flip some coins, then you add the number of heads minus the number of tails to your score.
- Your opponent’s score increases by $\frac{1}{2}$ each turn, so will be 5 at the end of 10 turns.
- A recursive formula gives the optimal strategy.
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The figure illustrates the distribution of final scores following the optimal strategy. The expectation of this distribution is 0.

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If you’re behind, gamble!

Applicable in real life?