SUMMARY OF BLACKJACK STRATEGY PAPER

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In "The Optimum Strategy in Blackjack" (published in 1956 and available online at `http://www.bjmath.com/bjmath/basic/cantey.pdf`), the authors attempt to analyze the expected value of possible decisions in certain situations in a game of blackjack in order to determine the best possible strategy. The authors begin with a description of blackjack and its place as one of the four most popular casino games (along with poker, roulette, and craps), and state that little statistical analysis had been done with blackjack at that point in time. The rules used in their analysis are also stated, with the important point being that the dealer must hit on 16 and stand on 17.

The authors next build a "decision equation" for the player, which models the players expected gain from hitting or standing pat. In this equation a distinction must be made between "unique" and "soft" values of a player's hand. Since an ace can count for either 1 or 11, a soft hand is one in which there are two possible values, which can make the evaluation a little tricky. Within this equation, the authors define two random variables: one for the final total obtained by the dealer, and one for the total obtained by the player after drawing exactly one card. The expectation can then be calculated based on a comparison of these values.

In order to evaluate the probabilities for the dealer, the authors determined the probabilities of a dealer reaching a certain total after three cards, and the probabilities of the dealer reaching a certain final total given a certain partial total. They then discuss special cases that can arise in a game (such as soft hands, doubling down, and splitting a pair) and build models for these situations.

The authors next give the final expectation of the player, which is based on the card the dealer is showing. Using this expectation, a strategy is built based on every possible situation that can arise during a game. The author concludes that their strategy results in the house having a .006 advantage, which comes from the fact that the dealer wins if both he and the player bust. They also state that their strategy yields a lower house advantage than in other popular games like craps and roulette.