Do you like Texas hold 'em

STAT230 Real World Assignment 2024W

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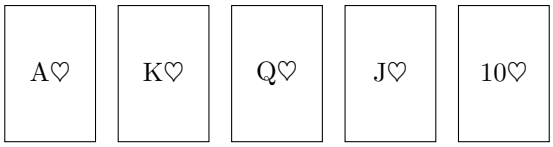
In this report, we consider the case a player uses the best five-card poker hand out of seven cards.

For a 7-card hand to contain a Royal Flush, i.e.



it must contain the specific set of 5 cards (Ace, King, Queen, Jack, 10 of the same suit), with the other 2 cards being any of the remaining 47 cards in the deck. Therefore, the probability of getting a Royal Flush in a group of seven cards can be evaluated as

$$P(\text{Royal Flush in 7-card poker}) = \frac{4 \times C(47, 2)}{C(52, 7)}$$

With the similar idea, we can get discover the following probabilities:

Table 1: Probabilities of Being Dealt Specific Hands in Texas Hold'em Poker (7 cards)

Hand Rank	Absolute Frequency
Royal Flush	$\binom{4}{1}\binom{47}{2}$
Straight Flush (non-Royal)	$\binom{9}{1}\binom{4}{1}\binom{46}{2}$
Four of a Kind	$\binom{13}{1}\binom{48}{3}$
Full House	0.1441
Flush	0.197
Straight	0.392
Three of a Kind	2.112
Two Pair	4.753
One Pair	42.256
High Card	50.117