ECE 341 - Homework #2

Combinatorics & Card Games. Summer 2024

Combinatorics in Bridge

The card game *bridge* uses a 52-card deck. Each person is dealt 13 cards for their hand.

1a) How many different hands are possible? (order doesn't matter)

1b) What is the probability of having 6 cards of one suit in your hand?

2) What is the probability of having six face-cards (Jacks, Queens, Kings, or Aces)?

3) Check your answer using Matlab and a Monte-Carlo simulation with

- A 52-card deck
- 13-card hands, and
- 100,000 hands

In 6-card poker, you're dealt 6 cards

4) Compute the odds of a full-house in 6-card poker using combinatorics.

note: your answer should match what you founding using enumeration.

hand = (xxx yy a) or (xxx yyy)

5) Compute the odds being three of a kind using combinatorics

again, your answer should match what you founding using enumeration.

hand = xxx a b c

6) Determine the odds of a full-house and three-of-a-kind using Matlab and a Monte-Carlo simulation and 100,000 hands of 6-card poker

Conditional Probability in 6-Card Poker

7) Compute the probability of getting a full-house if there is a single draw step

• If you are dealt 3-of-a-kind, draw 3 cards	hand = xxx abc discard abc, draw 3
• If you are dealt 2-pair, draw 2 cards	hand = xx yy ab discard ab, draw 2
• If you are dealt 1-pair, draw 4 cards	hand = xx abcd discard abcd, draw 4
• If you are dealt no pairs, draw 5 cards.	hand = abcdef discard abcde, draw 5

8) Check your answers using a Monte Carlo simulation with 100,000 hands of 6-card draw poker