Final Assignment

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Due: **before the final exam.**

- 52-card deck: {**A**,2,3,4,5,6,7,8,9,T,J,Q,K}×{S,H,D,C}.
- Total number of players: between 2 and 8.
- Each player starts with 3 (“hole”) cards:
  1 exposed (face up) and 2 covered (face down). Let’s call this Stage 0.
- In Stages 1, 2 and 3 each player receives 1 card face up.
- In Stage 4, each player receives 1 final card face down.
- For the purpose of this assignment, betting is NOT considered.
- The hand is ranked by selecting 5 out of the 7 cards.
- The **LOWEST** poker-ranked hand wins. The Ace (**A**) is the lowest ranked card.
- Poker straights and flushes do not count.

Rank	**Example**
High card	{ K,T,7,6,2 }<{K,T,7,2,A}<{ Q,T,7,2,A }
Pair	{ K,K,7,6,2 }<{T,7,2,A,A}<{ K,T,7,6,2 }
Two-Pair	{ K,K,T,T,A }<{K,K,9,9,A}<{ T,T,2,A,A }
Trips (Set)	{ K,K,K,T,A }<{T,2,A,A,A}<{K,K,Q,A,A}
Full House	{K,K,Q,Q,Q}<{ K,K,J,J,J }<{ Q,Q,J,J,J }
Four of a kind	{ K,K,K,K,3 }<{K,K,K,K,2}<{A,A,A,A,2}

Inputs:

- # of players: You plus 1–7 opponents.
- Your initial 3 cards.
- Each of the opponents' initial face-up card.

Output:

- The probability (through N simulations) that you will score a X, with $5 \leq X \leq K$.

Guidelines:

- All the initial knowledge (own cards and opponents' exposed cards) is an input.
- Simulate Stages 1–4 and determine the rank of your final hand.
- You are NOT asked to determine the winner of the hand.
- The goal is to perform as many simulations as possible. $N = 10^i$, with $i = 4, 5, \ldots$.
- Allowed languages: plain C, Matlab, Mathematica, Python.
- The code has to run on either my laptop or yours.
- You will show me the code as part of the exam.