CHAPTER 2 TASK

Why the House Always Wins

Work in groups of five: one "dealer" plus four "players". Each dealer has a standard deck of 52 cards. Each player starts with 20 chips. Each dealer has a supply of chips. There are three games that can be played: "Pick the suit", "Pick the value", or "Pick the card." One round consists of each player selecting *either* the suit, *or* the value, *or* the exact card that the dealer will reveal upon shuffling and then cutting the cards.

- A player wins at "Pick the suit" if the suit of the turned card is chosen, e.g., "diamonds". This game pays 2 chips for each chip wagered, that is, it pays 2:1.
- A player wins at "Pick the value" if the value of the turned card is chosen, e.g., "a Queen". This game pays 5 chips for each chip wagered, that is, it pays 5:1.
- A player wins at "Pick the card" if the suit and value of the turned card is chosen, e.g., "the seven of clubs". This game pays 10 chips for each chip wagered, that is, it pays 10:1.

A limit of 10 chips may be wagered on any round.

Play for 15 min then answer the following questions.

1. Count the number of chips that each of the four players has at the end of the game. What percent of the players at the table went up, what percent went down, and what percent still have exactly twenty chips?

2. Total the remaining chips of all four players at the table. By how many chips did the four players go up or go down? Calculate the percent increase or the percent decrease of the original eighty chips.

3. What percent of the players in the entire class went up, what percent went down, and what percent still have exactly twenty chips?

4. Total the remaining chips of the class. By how many chips did the entire class go up or go down? Calculate the percent increase or the percent decrease of the original number of chips.

5. **a)** Did the losses/winnings generated by the class as a whole surprise you? Explain.
b) Calculate the theoretical probability of winning at each of the three games.
c) Compare the theoretical probability of winning with the reward for winning each of the games. Does the reward for winning seem appropriate given the likelihood of winning?

6. Explain why the organizers of a game like this may want *a few* of the players to win.