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Project 1 Report

Abstract:

In this project, I made a simplified Blackjack game, which includes two players, the player and the dealer. Both of them have specific rules that they abide by in simulated games, and the project runs through these games to find the outcome of who wins, pushes (ties), or loses. This was achieved by creating objects such as the card, hand, and deck through their respective classes and using them together. I also employed ArrayLists to hold data about the cards, whether they were in the player's hand or in the deck. My results highlighted that the dealer always had higher odds of winning.

The purpose of this project was to develop concise code while familiarizing ourselves with the creation and interaction of classes and the ArrayList.

Results:

For my results, I ran the game 1000 times in 4 different simulations to see the odds between the player and dealer. The player hit from the deck of 52 cards (4 cards of each value 1-9 and 16 cards of value 10) until their hand reached a score of 16, and the dealer hit until their hand reached a total score of 17.

Table 1	Simulation #1	Simulation #2	Simulation #3	Simulation #4
Player Wins and %:	415 Wins and 41.5%	377 Wins and 37.7%	405 Wins and 40.5%	366 Wins and 36.6%
Dealer Wins and %:	501 Wins and 50.1%	548 Wins and 54.8%	514 Wins and 51.4%	550 Wins and 55.0%
Pushes (Ties) and %:	84 Wins and 8.4%	75 Wins and 7.5%	81 Wins and 8.1%	84 Wins and 8.4%

Output of the four simulations

In table 1, the simulation was run 4 times as shown in each column. The first row shows the player win count and percentage, the second shows the dealer win count and percentage, and the third shows the push (tie) count and percentage. The simulations show that the dealer always has higher odds. Although players' odds can fluctuate favorably when much fewer games are played, in the end, the house always wins.

Extension: No. 1

For my extension, I chose to make the game interactable, which allows a human to play my Blackjack game by controlling the player through the console. First, I created a playerTurnInteractive() method to control how the game could be played and a Interactive class to run it. In playerTurnInteractive(), the game was started with how the usual simulation was run, but then, I used the Scanner class to take Strings, "hit" or "stand" through the console to do exactly that with the player hand. This was put into a while loop and iterated until the player hand was over 21 or they standed. Then, the dealer had his turn with the same logic as the simulation. Lastly, I added more familiar user interface and returned whether the player won, lost, or pushed rather than 1, -1, or 0. The game was finally ran in the Interactive class.

```
Player Turn:
|Player Cards: [7, 10] total: 17| Dealer Cards: [9, 6] total: 15|
hit or stand?
hit
|Player Cards: [7, 10, 4] total: 21| Dealer Cards: [9, 6] total: 15|
hit or stand?
stand
```

Dealer Turn:
|Player Cards: [7, 10, 4] total: 21| Dealer Cards: [9, 6, 10] total: 25|
You Win!

Output of the interactive game

References/Acknowlegments:

I did not accept any help from another person. However, I did use a couple online resources.

https://docs.oracle.com/en/java

https://www.w3schools.com/java/