Project 1

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Project 01 Write up.

The main goal of this project was to create program in java that allowed the user to play the game Blackjack. This game works by first taking a normal deck of 52 cards and randomly shuffling them. The two players (referred from here on as the player and dealer) are then dealt 2 cards one at a time. The object of the game is to have your cards total 21. A player wins by having a higher total value of cards than the opponent without going over 21. The details as to how getting extra cards will be discussed below. The program should also be able to simulate 1000 games, recording the statistics and presenting them to the user at the end.

My solution utilizes five classes: Card, Hand, Deck, Blackjack, GamePlay. The card class holds the value of each card as an integer. The Hand class holds the card objects each player has in the form of an ArrayList. The Deck class holds all the cards in the deck at a given moment and stores them all in an ArrayList. While the deck is initially built so that it has all the 1s on top followed by 2s and so on it can be shuffled using the shuffle method. The shuffle method works by creating a new deck and then picking a random card out of the old deck and adding it to the new deck in that order. This was done by running a for loop from an index of 52 to 0. A random number was then generated between 0 and the index, thus choosing a card from those remaining in the deck. After all the cards had been added to the new deck, the new deck was saved in place of the now empty old deck in the Deck object.]

The Blackjack class contains all of the methods necessary to play the game of blackjack, both as a simulation and interactively with the user. For simulation games, the deck is built, shuffled and then dealt to both the player and dealer one at a time. The player then automatically hits until the total of his cards are greater than or equal to 17 or the player goes bust. If the player does not go bust, then the dealer automatically hits until the total of his cards is greater than or equal to 16 or the dealer goes bust. If neither player goes bust the winner is then found by comparing the totals. This is done by simply subtracting the total of the dealers cards from the total of the players cards. If the resulting value is negative the dealer wins, 0 they tie, or positive the player wins.

As an extension I made the game of blackjack more interactive. This is what the GamePlay class does. The interactive part of the code was done using the Scanner class in Java.util. The input by the user is input as a string and then converted to an integer. When this is run the user is prompt to choose the type of game to play. A copy of the output to the terminal is printed below:

```
hip-435:copyWorking chris$ java GamePlay
**************************************
Welcome to the Blackjack Player!
**************************************

 This program has 5 options:
 Press 1 to play blackjack against the computer
 Press 2 to Simulate a game of blackjack against the computer
 Press 3 to simulate 1000 games against the computer
 Press 4 to display your stats against the computer
 Press 5 to exit

make Choice:    1
```

If the user presses 1 it will show you the state of the game, with the user having 2 cards and the dealer only showing 1 card. The user is then prompted to hit or pass. If the player hits, a new card will be added to the total and the user will be prompted again. The code will check to make sure the player does not go bust. A typical game may look as follows:

```
You chose to play against the computer
The state of the game is as follows:
 The player currently has 2 cards for a total of 20
 The dealer currently has 1 cards for a total of 8


 Your move.
    Press 1 to hit
    Press 2 to pass
2
The state of the game is as follows:
 The player currently has 2 cards for a total of 20
 The dealer currently has 2 cards for a total of 18
The Player Wins!!
```

Additionally from the start menu, the user can choose to simulate games (press 2). The user will be prompted to simulate a specific number of games. The program will then simulate the games and display the statistics as shown below:

```
You chose to simulate a game
How many games do you wish to simulate?
10000
Wins 4211, Losses 4908, Pushes 881
The win %: 42.11, Loss %: 49.08, push %: 8.81
```

Additionally from the start menu, the user can view his statistics against the computer (press 4). This feature will only show the stats from the interactive games played in this run of the program. The output would look something like the following:

```
**********
STATS
**********
Wins: 1
Losses: 1
Pushes: 0
```

Overall this program (GamePlay) allows the user to play blackjack in a variety of different ways from interactively versus the computer or to simply simulate some number of games. The program will also keep track of the statistics to allow the user to know how they did. This project allowed me to learn a lot about the basics of how java programming worked along with using ArrayLists and interactive input. The project also helping me understand how to use different classes to do each level of the game and then test each layer so that you know that your simple code works perfectly before moving on to the more complicated parts. This project also taught me about the difference between java and python and C.