CS250 Intro to CS II
Assignment 7 - Blackjack

Date Assigned: Friday, May 1, 2009
Assignment Due: Wednesday, May 13, 2009
Total Points: 50 pts

Rules for Blackjack

1. Start by shuffling a deck of 52 cards.
2. Deal one card to each player face down.
3. Deal one card to each player face up.
4. Beginning with the player to the dealer's left, each player tries to make a hand as close to 21 as possible without going over. Face cards are 10, while an ace is 1 or 11 (making the best possible hand without going over), and all other cards are their respective values.
5. Each player decides to draw another card or stay with the hand they have. If a player draws a card such that the total exceeds 21, they have gone bust and lose their bet.
6. Play continues around the table until all players have decided to stay with their cards or have gone bust.
7. The dealer completes the house hand by taking a card with a hand that totals 16 or less and staying on any hand over 16.
8. Winning and losing hands are determined where ties go to the dealer.

Rules for Betting

1. All bets are in dollars.
2. The minimum bet is $1.
3. The maximum bet is all of the money in your hand.
4. A winning hand doubles the player's money.
5. A losing hand causes the player to lose their bet.

Rules for Players

1. There is exactly one dealer for the game. The dealer's name is Dealer and at the beginning of the game an initial amount of money goes into the dealer's bank account. This money is distributed to winning players and collected from losing players.
2. Any number of Human players can play the game. To get into the game, a player pays the dealer an amount of money that goes into the dealer's bank account and is given as credit to the player. Each player provides a name and an amount of money to play the game.
3. Any number of Computer players can be added to the game. Computer players have names chosen from a list of random names and each begins with $100. There are two types of random player:
    a. Meek: The Meek computer player is a rather meek soul. He usually bets just $2 every round. However, he goes a little crazy when he starts winning. Each time he wins 3 rounds in a row, he doubles his current betting amount. So

after a string of 3 wins, he would start betting $4 a round. After 3 more wins, he would start betting $8. However, the first time he busts (i.e. his card total goes over 21), he goes back to his $2 bet. His card choosing strategy is a little bizarre, he draws a card whenever he has an even number of points, he stays whenever he has an odd amount. However if he has the seven of clubs in his hand, no matter what his total, he draws.

    b. Random: Random players place a random bet each time between $1 and half their credit. Further, random players always hit on 18 or less if the dealer shows a card value of 10 or more and hit on 14 or less if the dealer shows a 9 or less.

4. Assume there will be no more than 10 total players including the Dealer, Human & Random players.

Notes:

1. Save your project as 07PUnetBlackjack and place them in the CS250 Drop Box by 9:15am on the day that it is due.
2. Remember, each class that you decide to use needs to have a separate .h file and .cpp. Do not let this fact keep you from using multiple classes in your solution. If you do not break your solution up using multiple classes, you will lose significant points.
3. Use inheritance, pointers, virtual functions, abstraction, and dynamic memory allocation properly in this assignment.
4. On the day the assignment is due, bring a hard coded copy of the source listing to class printed and stapled in the following order: 1) main.cpp, 2) each .h/.cpp file combination.
5. You must use the C++ coding standards.
6. For a properly designed and correctly working program only on assignment 7, you will receive 4 points of extra credit for each full day your program is turned in before the due date.

Goals for assignment:

1. Implement a program that utilizes most of the concepts covered in class.
2. Utilize dynamic memory allocation.
3. Emphasize programming with Inheritance and Polymorphism.

Output for assignment 7:

```
*******************************
*         Blackjack           *
*******************************
```

Welcome to blackjack!

```
Setup phase:
------------
How many human players are there? 2
How many computer players are there? 1

What is the name of the first player? Harry
How much money does Harry have? $100
What is the name of the second player? Ron
How much money does Ron have? $50

The players are:
----------------
Harry, $100
Ron, $50
Kermit, $90
Dealer, $10000

Game 1:
-------
Harry, how much would you like to bet? $15
Ron, how much would you like to bet? $2

Harry bets $15
Ron bets $2
Kermit bets $3

Initial starting cards:
-----------------------
Harry's current hand: [??][10♦]
Ron's current hand: [??][9♥]
Kermit's current hand: [??][5♦]
Dealer's current hand: [??][3♣]

Harry's turn:
-------------
Harry's current hand: [9♣][10♦] (19 points)
Would you like to draw another card? (Y or N): N
Harry chooses to stay
```

```
Ron's turn:
-------------
Ron's current hand: [6♥][9♥] (15 points)
Ron chooses to stay

Kermit's turn:
-------------
Kermit's current hand: [8♥][5♦] (13 points)
Kermit chooses to draw
Kermit's current hand: [8♥][5♦][4♥] (17 points)
Kermit chooses to draw
Kermit busted at 27!

Dealer's turn:
-------------
Dealer's current hand: [3♠][3♣] (6 points)
Dealer chooses to draw
Dealer's current hand: [3♠][3♣][4♣] (10 points)
Dealer chooses to draw
Dealer's current hand: [3♠][3♣][4♣][8♦] (18 points)
Dealer chooses to stay

Results:
--------
Harry wins $15
Ron loses $2
Kermit loses $3

The standings so far:
---------------------
Harry, $115
Ron, $48
Kermit, $87
Dealer, $99985

Another round (Y or N)? N
```