**AP CS Lab Project – Blackjack Game**

**Description:**

In this lab project (which falls under the "Projects" category in our course syllabus), you will create a version of the (very popular!) card game **Blackjack!** Details can be found at <https://en.wikipedia.org/wiki/Blackjack> and <https://bicyclecards.com/how-to-play/blackjack/>

Listed below is a summary of the game and the rules our version will follow:

* One standard deck of cards is used
* There is one dealer (the computer), and one player
* Player goes first and keeps going until they either bust (exceed 21) or stand (decide to stop)
  + If player busts, dealer automatically stands (and thus wins)
* Dealer then goes and must continue to hit until their total is 17 or more (regardless of what player has)
  + Aces are counted as 11 in this calculation, unless doing so would cause dealer to bust (exceed 21)
  + If dealer has an Ace and a 6, their total is 17 and they stand (this is called “standing on soft 17”)
* If player is dealt a blackjack (an Ace and a card worth 10 points) and dealer does not have a blackjack, player is given 1.5 win points
  + All other wins are counted as 1 point
* There is no splitting and no doubling down
* Game will keep track of total win points for dealer and player
* The deck is reset and reshuffled after every 5 hands

**Additional requirements:**

* You must use an array to store your cards.
* You must be able to restart a game after it has completed without needing to restart the program.
* Your code must be robust. I will try and break it, don't let me succeed!
* You must provide adequate comments in your code such that I can quickly and easily see what each substantial method and block of code is meant to do.

**Grading rubric:**

|  |  |
| --- | --- |
| **Task** | **Points** |
| Output matches example | 10 |
| Dealer plays correctly | 10 |
| Player plays correctly | 10 |
| Blackjack case handled correctly | 5 |
| Deck is reshuffled after every 5 rounds | 5 |
| Code is adequately commented | 5 |
| Code is robust | 5 |
|  |  |
| **Total** | **50** |

**Schedule:**

Projects are due (submitted at usual) at 10:00PM on 2 December (Wednesday) for A-day classes and 3 December (Thursday) for B-day classes.

**Output:**

Your program must follow the format of the output shown below.

Welcome to Blackjack! (this is only for fun, no betting!!)

Dealer: NINE of CLUBS (9)

Player: [QUEEN of HEARTS (10), SIX of SPADES (6)] : 16

Player! What would you like to do? (H)it or (S)tand? s

\*\*\* THREE of CLUBS (3) \*\*\*

\*\*\* FIVE of HEARTS (5) \*\*\*

Dealer: [NINE of CLUBS (9), FOUR of DIAMONDS (4), THREE of CLUBS (3), FIVE of HEARTS (5)] : (21)

### Dealer wins! ###

Score is: P=0.0, D=1.0

Wow, that was fun! You want to play again? y

Dealer: EIGHT of SPADES (8)

Player: [FIVE of DIAMONDS (5), NINE of DIAMONDS (9)] : 14

Player! What would you like to do? (H)it or (S)tand? h

\*\*\* TWO of CLUBS (2) \*\*\*

Player: [FIVE of DIAMONDS (5), NINE of DIAMONDS (9), TWO of CLUBS (2)] : 16

Player! What would you like to do? (H)it or (S)tand? h

\*\*\* THREE of DIAMONDS (3) \*\*\*

Player: [FIVE of DIAMONDS (5), NINE of DIAMONDS (9), TWO of CLUBS (2), THREE of DIAMONDS (3)] : 19

Player! What would you like to do? (H)it or (S)tand? s

\*\*\* QUEEN of SPADES (10) \*\*\*

Dealer: [EIGHT of SPADES (8), FOUR of CLUBS (4), QUEEN of SPADES (10)] : (22)

### Dealer busted! Player wins! ###

Score is: P=1.0, D=1.0

Wow, that was fun! You want to play again? y

Dealer: ACE of SPADES (11)

Player: [KING of HEARTS (10), ACE of DIAMONDS (11)] : 21

!!! Player gets a blackjack and 1.5 points, nice! !!!

Score is: P=2.5, D=1.0

Wow, that was fun! You want to play again? y

Dealer: KING of SPADES (10)

Player: [JACK of CLUBS (10), SIX of DIAMONDS (6)] : 16

Player! What would you like to do? (H)it or (S)tand? h

\*\*\* NINE of CLUBS (9) \*\*\*

Player: [JACK of CLUBS (10), SIX of DIAMONDS (6), NINE of CLUBS (9)] : 25

### Player busted! Dealer wins! ###

Score is: P=2.5, D=2.0

Wow, that was fun! You want to play again? y

Dealer: SEVEN of SPADES (7)

Player: [QUEEN of DIAMONDS (10), JACK of DIAMONDS (10)] : 20

Player! What would you like to do? (H)it or (S)tand? s

Dealer: [SEVEN of SPADES (7), KING of DIAMONDS (10)] : (17)

$$$ Player wins! $$$

Score is: P=3.5, D=2.0

Wow, that was fun! You want to play again? y

@@@@@@ Wait a sec, shuffling deck @@@@@@

Dealer: EIGHT of SPADES (8)

Player: [EIGHT of HEARTS (8), JACK of SPADES (10)] : 18

Player! What would you like to do? (H)it or (S)tand? s

Dealer: [EIGHT of SPADES (8), QUEEN of HEARTS (10)] : (18)

^^^ Draw! ^^^

Score is: P=3.5, D=2.0

Wow, that was fun! You want to play again? y

Dealer: TEN of CLUBS (10)

Player: [FIVE of SPADES (5), THREE of HEARTS (3)] : 8

:( Dealer gets a blackjack, tough break! :(

Score is: P=3.5, D=3.0

Wow, that was fun! You want to play again? n

That was fun, come back if you want more practice!