
Table of Contents

.....	1
Beginning	1
Drawing Card	2
Drawing a second card	2
Ace Value	3
Dealer function	3
Decision and Checking Player Hand	4
Remainder of Player Card Draws	4

```
%%%Blackjack%%%  
%%%Team A SDP%%%
```

Beginning

```
fprintf("****Welcome to Blackjack!****\nMay the odds be in your favor.  
\n\n")  
% Prints rules explaining how to play the game to players. ^^  
fprintf("Rules:\n");  
fprintf("1. The aim of blackjack is to beat the dealer's hand without  
going over 21.\n2. Each card is assigned a value that will be counted  
towards your hand total,\n   an Ace is worth either 1 or 11 whichever  
the player chooses,\n   a 10 or face card is worth 10,\n   and 2-9  
are assigned their respective number values.\n3. Both the player and  
dealer are dealt two cards with one of the cards of the\n   dealer  
being concealed until players are done drawing cards.\n")  
fprintf("4. Hit means to draw another card and Stick means to keep  
your current hand \n   and end your turn.\n5. If your hand goes over  
21, you bust and lose the amount you wagered.\n6. If you are dealt an  
Ace and any card with value of 10 you have a blackjack\n   and win  
3:2 whatever you wager, unless the Dealer also has a blackjack. \n  
   Then you break even.\n7. Dealer has to hit until they have a hand  
totaling 17 or higher.\n8. When you double down you can only hit one  
card and your wager is doubled.\n\n");  
% Asks the player/players to input how many will be playing. must be  
more  
% than zero players  
numPlayers = input('How many players: ');  
while numPlayers ~= int64(numPlayers)  
    numPlayers = input('How many players (input an integer above  
zero): ');  
    while numPlayers < 1  
        numPlayers = input('How many players (input an integer above  
zero): ');  
    end  
end  
% Creates an initial vector of zeros and then asks each player to  
input how
```

```

% many dollars they would like to wager. This value is assigned to a
zero
% in the vector respective to the players index number.
playerWager = zeros(1,numPlayers);
for player = 1:numPlayers
    fprintf("Player %i how much would you like to wager in dollars? ",
player)
    isInputOkay = false;
    while ~isInputOkay || playerWager(player) <= 0
        % Allows catching of errors for incorrect data type insertion.
        try
            playerWager(player) = input('');
            if playerWager(player) <= 0
                fprintf("Wager must be a number greater than 0. ");
            end
            isInputOkay = true;
        catch
            fprintf("Invalid expression. Please retry. ");
        end
    end
    % Prints message to player.
    fprintf("You have wagered $%.2f.\n", playerWager(player))
end

```

Drawing Card

```

fprintf("The 1st cards will now be dealt.\nPress any key to
continue...\n")
% Prints message to players. ^^
pause
% Matrix for first two cards of the player.
card1 = zeros(2,numPlayers);
cardValue1 = zeros(2,numPlayers);
% Function Player Card outputs the card drawn and the value of that
card
% for each player.
for player = 1:numPlayers
    [card1(1, player), cardValue1(1, player)] = PlayerCard(player);
end

```

Drawing a second card

```

fprintf("A second card will now be dealt.\nPress any key to
continue...\n")
% Prints message to players. ^^
pause
cardValueTotal = zeros(1, numPlayers);
% Function Player Card outputs the card drawn and the value of that
card
% for each player.
for player = 1:numPlayers
    [card1(2, player), cardValue1(2, player)] = PlayerCard(player);
    % Card Value of all cards are added together.
end

```

```

        cardValueTotal(player) = cardValue1(1, player) + cardValue1(2,
        player);
    end
end

```

Ace Value

```

playerResponse = strings(1,numPlayers);
% Checks players card value for their first drawn card. If it matches
the
% below integer, the player is asked to see what they would like their
Ace
% to be. ^^
for player = 1:numPlayers
    if (cardValue1(1, player) == 1 || cardValue1(1, player) == 11) &&
        (cardValueTotal(player) ~= 21)
        fprintf("Would you still like your Ace to be counted as %i?
\n", cardValue1(1, player))
        fprintf("Player %i ", player);
        playerResponse(player) = input('please enter yes or no (case
sensitive). ', 's');
        if playerResponse(player) == "no"
            cardValue1(1, player) = input('What will the Ace be
counted as? 1 or 11? ');
            while (cardValue1(1, player) ~= 1) && (cardValue1(1,
player) ~= 11)
                cardValue1(1, player) = input("That number is not
valid, input either 1 or 11. \n");
            end
            elseif playerResponse(player) == "yes"
            end
        end
    end
end
% Reevaluating the total value of the players' hand.
cardValueTotal = cardValue1(1, :) + cardValue1(2, :);
% Prints hand to total to each player.
for player = 1:numPlayers
    fprintf("Player %i, your card total is %i.\n", player,
cardValueTotal(player));
end
end

```

Dealer function

```

cardsDealt = randi(13,1,2);
% Dealer function outputs what card and the value of that card for the
% dealer.
% A random integer is used to "draw" a card for the dealer. ^^
cardValueDealer = zeros(1,length(cardsDealt));
stringCardType = strings(1,length(cardsDealt));
for cardNum = 1:length(cardsDealt)
    [cardValueDealer(cardNum), stringCardType(cardNum)] =
    DealerCard(cardsDealt(cardNum));
end
end
% Only the first card drawn is displayed to command window.

```

```

fprintf("Dealer has drawn 2 cards, a face up %s and one face down
card.\n", stringCardType(1));
cardTotValDealer = cardValueDealer(1) + cardValueDealer(2);

```

Decision and Checking Player Hand

```

blckjack = 0;
% Checks if any players have gotten a blackjack and resulting outcomes
if
% player has a blackjack. ^^
for player = 1:numPlayers
    if (card1(1, player) == 13 || card1(2, player) == 13) &&
        (cardValue1(1, player) == 10 || cardValue1(2, player) == 10)
        && (cardValueDealer(1) ~= 1 || cardValueDealer(2) ~= 10) &&
        (cardValueDealer(1) ~= 10 || cardValueDealer(2) ~= 1)
            fprintf("Player %i has gotten a blackjack!\nThe Dealer's
hand is a %s and %s.\nPlayer %i you win $%.2f!\n", player,
stringCardType(1), stringCardType(2), player, playerWager(player) *
1.5);
            blckjack = blckjack + 1;
        end
    end
end
if blckjack > 0
    fprintf("If you would like to restart type 'blackjack' into the
command window.\n");
    clear
    return;
end

```

Remainder of Player Card Draws

```

continueX = zeros(1,numPlayers);
% continueX and DoubleDown act to respond to player choice. ^^
doubleDown = zeros(1,numPlayers);
% Iterates for each player.
for player = 1:numPlayers
    cardNum = 2;
    % Defaults continueX to 1 and doubleDown to zero as the player has
not
    % explicitly chosen from their options yet.
    continueX(player) = 1;
    doubleDown(player) = 0;
    % Runs the while loop when the player has chosen to continue and
their
    % hand total is below 21 and they have not chosen to double down.
    while continueX(player) == 1 && cardValueTotal(player) < 21 &&
doubleDown(player) == 0
        cardNum = cardNum + 1;
        % Runs function HitStickDouble outputting new values for
continueX,
        % playerWager, and doubleDown.
        [continueX(player), playerWager(player), doubleDown(player)] =
HitStickDouble(player, cardValueTotal(player), playerWager(player));
    end
end

```

```

        if continueX(player) == 1
            % PlayerCard function output nth card value and card to
            player,
            % which is added to the players total.
            [card1(cardNum, player), cardValue1(cardNum, player)] =
            PlayerCard(player);
            cardValueTotal(player) = cardValue1(cardNum, player) +
            cardValueTotal(player);
            % Prints hand total to player.
            fprintf("Player %i, your card total is %i.\n", player,
            cardValueTotal(player));
        end
    end
end
% Checks if the dealer has gotten a blackjack.
dealerBlckJack = 0;
if cardValueDealer(1) == 1 && cardValueDealer(2) == 10
    dealerBlckJack = 1;
elseif cardValueDealer(1) == 10 && cardValueDealer(2) == 1
    dealerBlckJack = 1;
end
% Pauses game until player presses a key.
fprintf("Press any key to continue...\n");
pause
% Function DealerCheck check the dealer's hand total and output true
or
% false depending on whether the value is above or below 17.
isGreater17 = DealerCheck(cardTotValDealer);
% If the dealer's hand is above 17 the if statement is executed.
if isGreater17 == true
    fprintf("The Dealer's second card has been flipped.\nDealer's hand
    is a %s and %s.\nDealer's hand is worth %i.\n", stringCardType(1),
    stringCardType(2), cardTotValDealer);
% If the dealer's hand is below 17 the elseif statement is executed.
elseif isGreater17 == false
    % Call to Dealer function goes here.
    fprintf("The Dealer's second card has been flipped.\nDealer's hand
    is a %s and %s.\n", stringCardType(1), stringCardType(2));
    cardNum = 2;
    % Checks if the dealer has blackjack when the players don't.
    if (cardValueDealer(1) == 1 || cardValueDealer(1) == 10)
    && (cardValueDealer(2) == 10 || cardValueDealer(2) == 1) &&
    (blckJackHand < 1)
        fprintf("The Dealer's hand is a %s and %s. Dealer has
        gotten a blackjack. Player's lose their wager.\n", stringCardType(1),
        stringCardType(2));
        blckjack = blckjack + 1;
    % Evaluates when both the player and dealer do not have a
    blackjack.
    elseif (blckjack == 0) && (cardValueDealer(1) ~= 1 ||
    cardValueDealer(2) ~= 10) && (cardValueDealer(1) ~= 10 ||
    cardValueDealer(2) ~= 1)
        % Draws card for the Dealer until the have a hand total of 17
    or

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        % greater.
        while cardTotValDealer < 17
            cardNum = cardNum + 1;
            cardsDealt(cardNum) = randi(13);
            [cardValueDealer(cardNum), stringCardType(cardNum)] =
DealerCard(cardsDealt(cardNum));
            cardTotValDealer = cardTotValDealer +
cardValueDealer(cardNum);
            fprintf("Dealer has drawn a %s. Dealer's hand is worth %i.
\n", stringCardType(cardNum), cardTotValDealer);
            fprintf("Press any key to continue...\n");
            pause
        end
    end
end
playerResult = zeros(1,numPlayers);
% Executes if no one has a blackjack.
if blkjack == 0
    for player = 1:numPlayers
        % Function CheckCardVal compares player hands to the dealer
hand an
        % outputs win or lose scenario to the player.
        playerResult(player) = CheckCardVal(cardValueTotal(player),
cardTotValDealer, player, playerWager(player), card1(1, player),
card1(2, player), cardValue1(1, player), cardValue1(2, player),
dealerBlckJack);
    end
end
% Prompts player to type 'blackjack' if they would like to play again.
fprintf("If you would like to restart type 'blackjack' into the
command window.\n");
clear
return;

```

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