Black Jack Project

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Black Jack is a card game based on 52 cards with 4 Colors. As our first projected with Java we created a basic chat based Black Jack game. During this process we implemented some features which worth noticing:

CREATING THE DECK

When creating a card deck you have to consider every card possible. And because we are lazy we wrote some code which creates the deck for us:

```java
String[] deck = new String[52];//Init the deck
        String[] suit = new String[4];//Init the 4 colors
        int[] card = new int[13];//Every deck has 13 cards

        for (int i=0; i<card.length; i++){//Setting cards to their numbers
            card[i]=i+1;}
        String cardName;//sets Color of card
        suit[0] = "Clubs";
        suit[1] = "Diamonds";
        suit[2] = "Hearts" ;
        suit[3] = "Spades";


        for(int i=0; i<4; i++){//For each color
            for(int j=0; j<13; j++){//Add a card of the color of every value ir with a name
                if(j==0){cardName="Ace";}//Add Ace
                else if(j==10){cardName="Jack";}//Add jacks
                else if(j==11){cardName="Queen";}//Add queens
                else if(j==12){cardName="King";}//Add Kings
                else {cardName=Integer.toString(card[j]);}//Else the card is just a number
                deck[ 13*i+j ]= cardName + "_" +suit[i];//Add the card to the deck
            }
        }
```

SHUFFLING A DECK

In order to play a gambling game you need to add some random events. We did that with the shuffling method:

```
public static void shuffle(String[] the_deck, int switches){//Shuffles a string deck for switches times
        String temp;
        int a; int b;
        for(int i=0; i<switches; i++){//For the number of switches change one card with another
            a = rand(52);//Card 1 to change
            b = rand(52);//Card 2 to change
            temp = the_deck[a-1];//Set a value to the value of a card so we can override it
            the_deck[a-1] = the_deck[b-1];//change the cards
            the_deck[b-1] = temp;
        }
    }
```

THE PLAYERS AND DEALERS HAND

A game round goes until the players dont want new cards anymore. Because we add each players cards to an Array we switched to use an Arraylist. The advantage of this is that it is automatically extending its size and is not fixed like normal arrays.

```
ArrayList hand = new ArrayList();//The players hand
ArrayList dealer_hand = new ArrayList();//The dealers hand
```

In order to play the game we also need a deal method which gives cards to player:

```
public static String deal(String[] the_deck){//Deals the top card of a deck
        count=count-1;
        return the_deck[count];}
```

GAME LOGICS

In Black Jack an Ace can count for either 1 or 11. In order to determine for
which number it counts in our hand we added a logic where first the total
score of a hand is checked. If its greater than 21 then the programm takes a
look if a Ace can be changed to one so that the 21 is not exceeded.

```java
public static int value(String the_card){//Gets the value of a single card
        char first = the_card.charAt(0);
        if (first=='1'|first=='J'|first=='Q'|first=='K'){//Is it a special card?
            return 10;
        }
        else if(first=='A'){//Is it an Ace
            return 11;}
        else{//Return the normal number
            return Character.getNumericValue(first);
        }
    }


public static int aces(String the_card){//Cheks if the card is an ace, if yes return 1
        if(the_card.charAt(0)=='A'){
            return 1;}
        else{
            return 0;}



public static int aces(ArrayList the_hand){
        int sum=0;
        for(int i=0; i<the_hand.size();i++){//For every element in the hand
            sum = sum + aces(the_hand.get(i).toString());//Check if its an ace
        }
        return sum;
    }
```

THE MAIN METHOD

In the main method we are using the methods explained before to make
our game up and running:

```java
public static void main(String[] args){//Main stuff

        Scanner scan = new Scanner(System.in);//Register the scanner

        String[] deck = new String[52];//Init the deck
        String[] suit = new String[4];//Init the 4 colors
        int[] card = new int[13];//Every deck has 13 cards

        for (int i=0; i<card.length; i++){//Setting cards to their numbers
            card[i]=i+1;}
        String cardName;//sets Color of card
        suit[0] = "Clubs";
        suit[1] = "Diamonds";
        suit[2] = "Hearts" ;
        suit[3] = "Spades";


        for(int i=0; i<4; i++){//For each color
            for(int j=0; j<13; j++){//Add a card of the color of every value ir with a name
                if(j==0){cardName="Ace";}//Add Ace
                else if(j==10){cardName="Jack";}//Add jacks
                else if(j==11){cardName="Queen";}//Add queens
                else if(j==12){cardName="King";}//Add Kings
                else {cardName=Integer.toString(card[j]);}//Else the card is just a number
                deck[ 13*i+j ]= cardName + "_" +suit[i];//Add the card to the deck
            }
        }


        shuffle(deck, 1000);//Shuffle the deck for 1000 times

        String say;
        boolean state=true;
        // Starting up the game...
        ArrayList hand = new ArrayList();//The players hand
        ArrayList dealer_hand = new ArrayList();//The dealers hand
        dealer_hand.add( deal(deck) );//Give the dealer and us some cards
        dealer_hand.add( deal(deck) );
        hand.add( deal(deck) );
```

```java
    while(state){//Run this until we lost or we stop getting new cards

        hand.add( deal(deck) );

        System.out.println("Dealer showing: " + dealer_hand.get(1));//Whats shows the dealer?
        System.out.println("Contents of hand: " + hand);//Our hand
        System.out.println("Your score is: " + value(hand));//And our score

        if(value(hand)>21){//If our score is more than 21 we are BUST
            System.out.println("BUST!!!!");
            break;
        }

        System.out.println( "hit[H] or stand[S]?");//If not bust do we want to hit or stand?
        say=scan.nextLine();
        if(say.equals("H")){state=true;}
        else{state=false;}
    }

    while( value(dealer_hand)<17 ){//If the dealers hand is less than 17 he takes a card
        dealer_hand.add( deal(deck) );
    }


    System.out.println("Dealer has: " + dealer_hand);//The dealers cards
    System.out.println("Dealer score is: " + value(dealer_hand));

    if( (value(hand)>value(dealer_hand) && value(hand)<22) | (value(dealer_hand) > 21) ){// We have a
        System.out.println( "YOU WIN !!!!");
    }
    else{System.out.println( "YOU LOSE. BOO !!!!");}//Or we have less so we LOSE


}
```

The following is the whole code. Some methods are doubled because
they take different inputs and are remainders of an earlier version of the
game. Most of the times the old methods take arrays instead of ArrayLists.
On those methods you can see how the game developed.The code is also
commented for explaination. But see for yourself.

```java
import java.util.*;
import java.util.Scanner;

public class Cards{

    static int count=52; //the count represents the number of cards remaining in the deck

    public static int rand(int high){
        return (int) (high*Math.random()+1);
    }//returns a random integer with max of high

    public static void shuffle(String[] the_deck, int switches){//Shuffles a string deck for switches time
        String temp;
        int a; int b;
        for(int i=0; i<switches; i++){//For the number of switches change one card with another
            a = rand(52);//Card 1 to change
            b = rand(52);//Card 2 to change
            temp = the_deck[a-1];//Set a value to the value of a card so we can override it
            the_deck[a-1] = the_deck[b-1];//change the cards
            the_deck[b-1] = temp;
        }
    }

    public static String deal(String[] the_deck){//Deals the top card of a deck
        count=count-1;
        return the_deck[count];}

    public static int aces(String the_card){//Cheks if the card is an ace, if yes return 1
        if(the_card.charAt(0)=='A'){
            return 1;}
        else{
            return 0;}
    }

    public static int aces(String[] the_hand){//Gets the count of aces in a hand
        int sum=0;
        for(int i=0; i<the_hand.length;i++){
```

```
            sum = sum + aces(the_hand[i]);
        }
        return sum;
    }


    public static int aces(ArrayList the_hand){//The same as above only with an ArrayList
        int sum=0;
        for(int i=0; i<the_hand.size();i++){//For every element in the hand
            sum = sum + aces(the_hand.get(i).toString());//Check if its an ace
        }
        return sum;
    }


    public static int value(String the_card){//Gets the value of a single card
        char first = the_card.charAt(0);
        if (first=='1'|first=='J'|first=='Q'|first=='K'){//Is it a special card?
            return 10;
        }
        else if(first=='A'){//Is it an Ace
            return 11;}
        else{//Return the normal number
            return Character.getNumericValue(first);
        }
    }


    public static int value(String[] the_hand){//Returns the value of the hand as an Array
        int sum=0;
        for(int i=0; i<the_hand.length;i++){
            sum = sum + value(the_hand[i]);
        }
        return sum;
    }


    public static int value(ArrayList the_hand){//Returns the value of the hand as an ArrayList
        int sum=0;
        int num_aces=aces(the_hand);//Get how many aces are in the hand
        for(int i=0; i<the_hand.size();i++){
            sum = sum + value(the_hand.get(i).toString());//Add the cards together
        }
        while(num_aces>0 && sum>21){//If our score is greater than 21 make an ace to 1
            sum=sum-10;
            num_aces=num_aces-1;
        }
        return sum;
```

```java
}


public static void main(String[] args){//Main stuff

    Scanner scan = new Scanner(System.in);//Register the scanner

    String[] deck = new String[52];//Init the deck
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    for (int i=0; i<card.length; i++){//Setting cards to their numbers
        card[i]=i+1;}
    String cardName;//sets Color of card
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            else {cardName=Integer.toString(card[j]);}//Else the card is just a number
            deck[ 13*i+j ]= cardName + "_" +suit[i];//Add the card to the deck
        }
    }


    shuffle(deck, 1000);//Shuffle the deck for 1000 times

    String say;
    boolean state=true;
    // Starting up the game...
    ArrayList hand = new ArrayList();//The players hand
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```java
        while(state){//Run this until we lost or we stop getting new cards

            hand.add( deal(deck) );

            System.out.println("Dealer showing: " + dealer_hand.get(1));//Whats shows the dealer?
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            if(value(hand)>21){//If our score is more than 21 we are BUST
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            System.out.println( "hit[H] or stand[S]?");//If not bust do we want to hit or stand?
            say=scan.nextLine();
            if(say.equals("H")){state=true;}
            else{state=false;}
        }

        while( value(dealer_hand)<17 ){//If the dealers hand is less than 17 he takes a card
            dealer_hand.add( deal(deck) );
        }


        System.out.println("Dealer has: " + dealer_hand);//The dealers cards
        System.out.println("Dealer score is: " + value(dealer_hand));

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    }
}
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