Data Structures and Algorithms Laboratory		
Laboratory 2: Arrays	**School of Information Technology**	
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Date: 1 Feb 2023	**Due date: on LMS**	

Objective

- To create, access and modify arrays
- To apply arrays to be data structure for solving problems

Exercise 1 (In-class): Using arrays to be data structure of a Blackjack game and complete the missing codes to get results below.

Game conditions

- 2 players: you and computer
- Card values are from 1-11
- Two random cards for each player
    - If any player get 11 and 11, change the second card to 1
- Winning conditions
    - Sum of card values is higher
    - If both player get the same sum, computer wins

```
You: 10 2
Computer: 11 6

Sum of your cards = 12
Sum of computer cards = 17
The winner is Computer
```

```
You: 5 7
Computer: 2 9

Sum of your cards = 12
Sum of computer cards = 11
The winner is You
```

Paste your code here.

```
import java.util.Random;

public class Blackjack {

// TODO Auto-generated method stub

private int[] cardYou = new int [2];

private int[] cardComputer = new int [2];

private int sumYou , sumComputer = 0;

private String winner;

public Blackjack(){

//Initialize game data

Random rand = new Random();

//Player

cardYou[0] = rand.nextInt(11)+1;

cardYou[1] = rand.nextInt(11)+1;

//Dealer

cardComputer[0] = rand.nextInt(11)+1;

cardComputer[1] = rand.nextInt(11)+1;

//Sum

sumYou = cardYou[0] + cardYou[1];

sumComputer = cardComputer[0] + cardComputer[1];

//Check both 11

if(sumYou == 22){

sumYou = 12;

cardYou [1] = 1;

}
```

```
if(sumComputer == 22){
sumComputer = 12;
cardComputer[1] = 1;
}
}
public void showPlayerCard(){
System.out.print("You: ");
for(int value:cardYou) {
System.out.print(value + " ");
}
System.out.println();
}
public void showComputerCard(){
System.out.print("Computer: ");
for(int value:cardComputer) {
System.out.print(value + " ");
}
System.out.println();
}
public void showSumCard(){
System.out.println(sumYou);
System.out.println(sumComputer);
}
public void checkWinner(){
if(sumYou > sumComputer){
```

```
winner = "You";

}

else {

winner = "Computer";

}

}

public String showWinner(){

return winner;

}

public static void main(String args[]){

Blackjack bj = new Blackjack();

bj.showPlayerCard();

bj.showComputerCard();

System.out.println();

bj.showSumCard();

bj.checkWinner();

System.out.println("The winner is "+bj.showWinner());

}

}
```

Exercise 2 (Homework): Modify exercise 1 to get more functions as follows.

- You can ask for another card but max total number of cards is 5
- If you do not want more card, the game will end and the winner is the one who gets the higher sum
- Anytime if sum of values of your cards is greater than 21, the game ends and the winner is computer
- If sum of card values of any player is 21, the game ends and that player wins
- If both players get 21 at the beginning, computer wins

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```
You: 2 8 0 0 0
Computer: ? ?

Want another card? (y/n)...y
You: 2 8 9 0 0
Computer: ? ?

Want another card? (y/n)...n
You: 2 8 9 0 0
Computer: 8 2

Sum of your cards = 19
Sum of computer cards = 10
The winner is You
```

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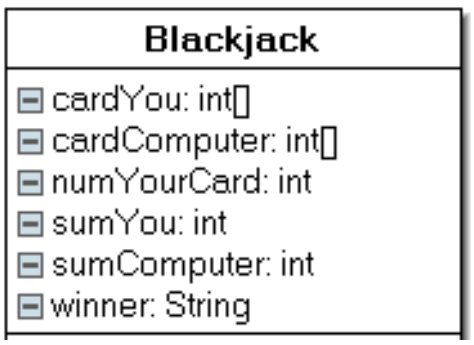
<td rowspan="2"> 
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```
You: 8 9 0 0 0
Computer: ? ?

Want another card? (y/n)...y
You: 8 9 9 0 0
Computer: 9 8

Sum of your cards = 26
Sum of computer cards = 17
The winner is Computer
```

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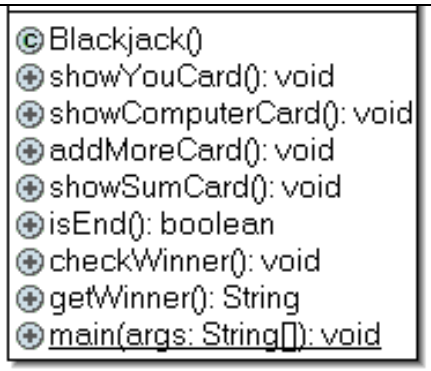
<td> 
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```
You: 7 1 0 0 0
Computer: ? ?

Want another card? (y/n)...n
You: 7 1 0 0 0
Computer: 3 10

Sum of your cards = 8
Sum of computer cards = 13
The winner is Computer
```

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```
You: 11 10 0 0 0
Computer: 11 7

Sum of your cards = 21
Sum of computer cards = 18
The winner is You
```

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```
You: 11 10 0 0 0
Computer: 11 10

Sum of your cards = 21
Sum of computer cards = 21
The winner is Computer
```

</td>
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</table>

Paste your code here.

```
package DSALab02;

import java.util.Random;

import java.util.Scanner;

import java.util.Arrays;

public class Blackjack {

private int [] cardYou = new int [5];

private int [] cardComputer = new int [2];

private int numYourCard = 1;

private int sumYou ,sumComputer = 0;

private String winner;

Scanner keyboard = new Scanner(System.in);

public Blackjack() {

Arrays.fill(cardYou,0);

Random rand = new Random();

//Player card random

cardYou [0] = rand.nextInt(11)+1;

cardYou [1] = rand.nextInt(11)+1;

sumYou = cardYou[0]+ cardYou[1];

//Computer card random

cardComputer [0] = rand.nextInt(11)+1;

cardComputer [1] = rand.nextInt(11)+1;

if (sumYou == 22) {

cardYou[0] = 1;
```

```
sumYou = 12;

}

if (sumComputer == 22) {

cardComputer[0] = 1;

sumComputer = 12;

}

}

//Show player card

public void showYoucard() {

System.out.print("You: ");

for(int value:cardYou) {

System.out.print(value + " ");

}

System.out.println();

}

//Show computer card

public void showComputerCard() {

System.out.print("Computer: ");

for (int value:cardComputer) {

System.out.print(value + " ");

}

System.out.println();

}

//Adding more card

public void addMoreCard() {
```

```
Random rand = new Random();

if (numYourCard <= 4) {

numYourCard += 1;

cardYou[numYourCard]= rand.nextInt(11)+1;

sumYou += cardYou[numYourCard];

}

}

public boolean isEnd() {

boolean isEnd = true;

if (sumYou == 21)

{

isEnd = false;

}

else {

isEnd = true;

}

return isEnd;

}

//Show Sum Card

public void showSumCard(){

sumComputer = cardComputer[0] + cardComputer [1];

System.out.println("Sum of Your cards = " + sumYou);

System.out.println("Sum of Computer cards = " + sumComputer);

}

public void checkWinner() {
```

```
if (sumYou > sumComputer) {

winner = "You";

}

else{

winner = "Computer";

}

}

public String getWinner() {

return winner;

}

public static void main(String args []){

Blackjack bj = new Blackjack();

Scanner input = new Scanner(System.in);

String answer;

while(bj.isEnd()) {

bj.showYoucard();

System.out.print("Computer: ? ? ");

System.out.println();

System.out.print("Want another card? <y/n>...");

answer = input.next();

if (answer.equals("y") ) {

bj.addMoreCard();

}

else {

break;
```

```
}

}

bj.showYoucard();

bj.showComputerCard();

System.out.println();

bj.showSumCard();

bj.checkWinner();

System.out.print("The winner is " + bj.getWinner());

}

}
```