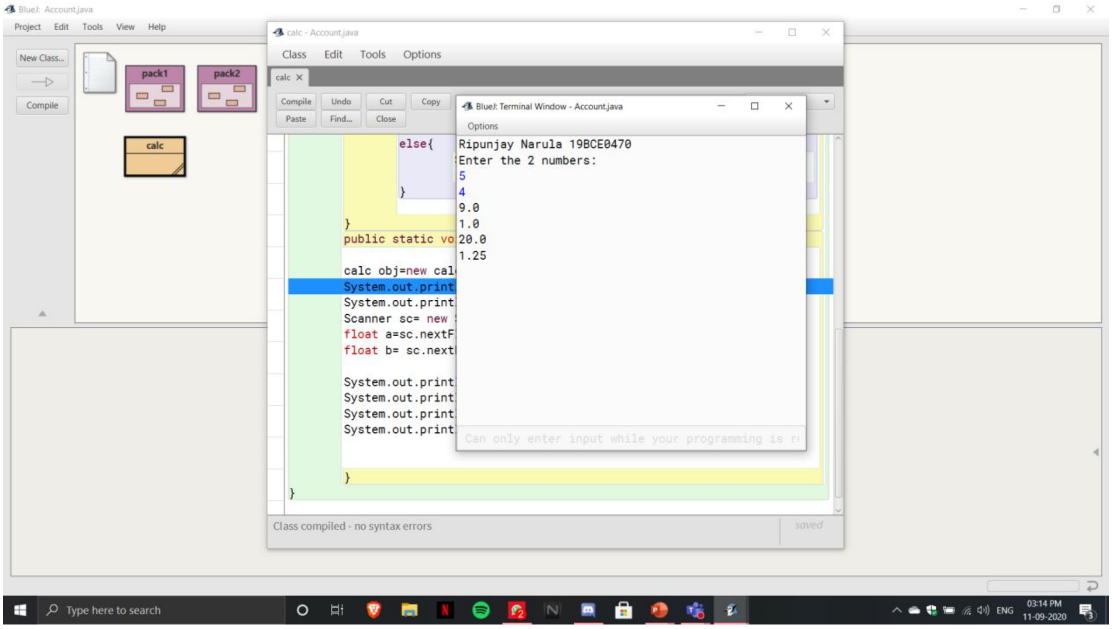
Ripunjay Narula 19BCE0470
Java Lab Digital Assignment

Packages:

```
1.package pack1;

public interface inter1{

public float add(float a, float b);
public float sub(float a, float b);

}
package pack2;



public interface inter2{

public float mul(float a, float b);
public float div(float a, float b);

}

import pack1.inter1;
import pack2.inter2;
import java.util.*;
public class calc implements inter1,inter2{

    public float add(float a, float b){

        return (a+b);

    }
    public float sub(float a, float b){

        return (a-b);

    }

    public float mul(float a, float b){

        return (a*b);

    }
    public float div(float a, float b){

        if(b!=0){
            return (a/b);
            }
            else{
                System.out.println("Denominator cannot be 0");
                return 0;
            }

        }
        public static void main(){

        calc obj=new calc();
        System.out.println("Enter the 2 numbers:");
        Scanner sc= new Scanner(System.in);
        float a=sc.nextFloat();
        float b= sc.nextFloat();

        System.out.println(obj.add(a,b));
        System.out.println(obj.sub(a,b));
        System.out.println(obj.mul(a,b));
        System.out.println(obj.div(a,b));


        }
    }
```



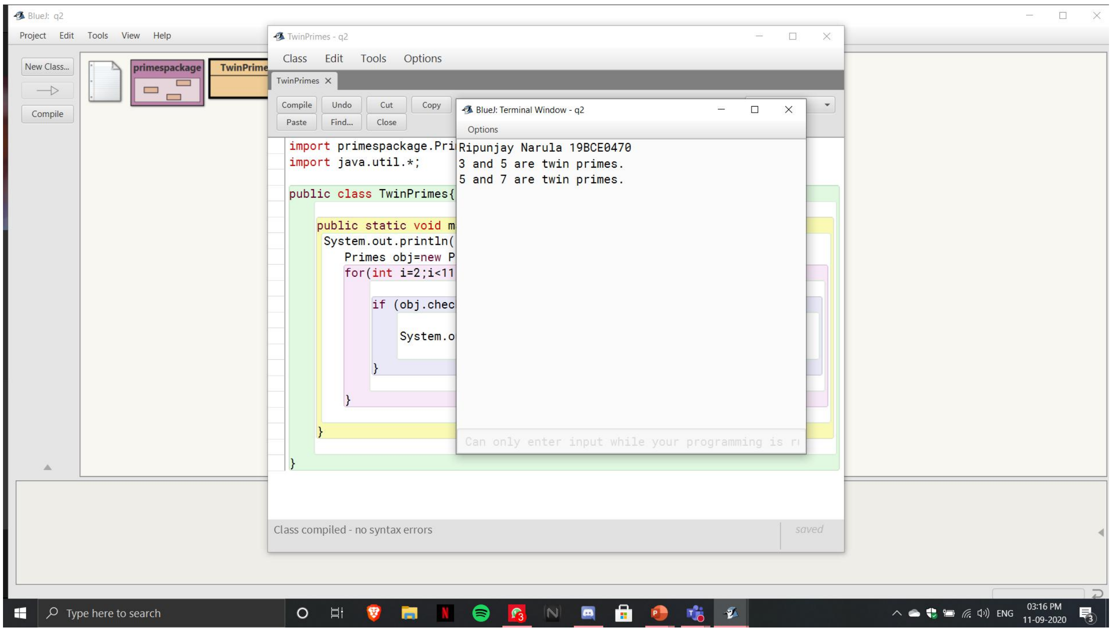
```
        else{
        }
    }
    public static vo

    calc obj=new cal
    System.out.print
    System.out.print
    Scanner sc= new
    float a=sc.nextF
    float b= sc.next

    System.out.print
    System.out.print
    System.out.print
    System.out.print

    }
}
```

```
Ripunjay Narula 19BCE0470
Enter the 2 numbers:
5
4
9.0
1.0
20.0
1.25
```

Can only enter input while your programming is r

Class compiled - no syntax errors

```
2.package primespackage;


public    class Primes{

    public boolean checkForPrime(int n){

    int c=0,i;

    for(i=1;i<n;i++)
    {
        if(n%i==0)
        c++;
    }
    return (c==1);
    }

}

import primespackage.Primes;
import java.util.*;

public class TwinPrimes{

    public static void main(){

        Primes obj=new Primes();
        for(int i=2;i<11;i++){

            if (obj.checkForPrime(i) && obj.checkForPrime(i+2)){

                System.out.println(i+" and "+(i+2)+" are twin primes. ");

            }

        }

    }

}
```



```
import primespackage.Pri
import java.util.*;

public class TwinPrimes{

    public static void m
     System.out.println(
        Primes obj=new P
        for(int i=2;i<11

            if (obj.chec

                System.o

            }

        }

    }

}
```

```
Ripunjay Narula 19BCE0470
3 and 5 are twin primes.
5 and 7 are twin primes.
```

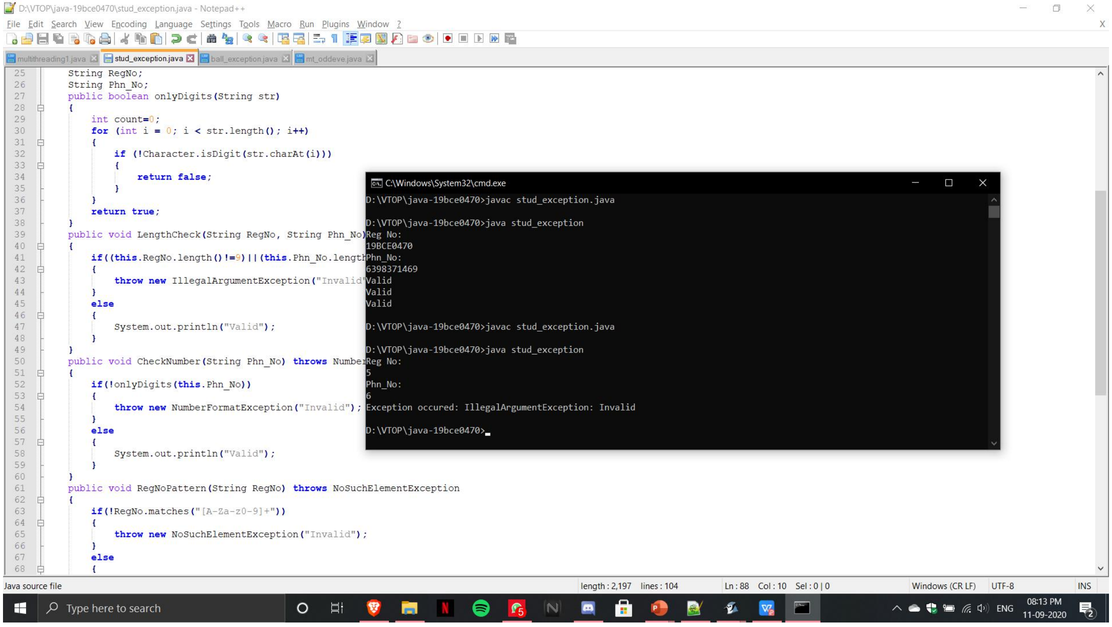
Can only enter input while your programming is r

Class compiled - no syntax errors

saved

Exception Handling:

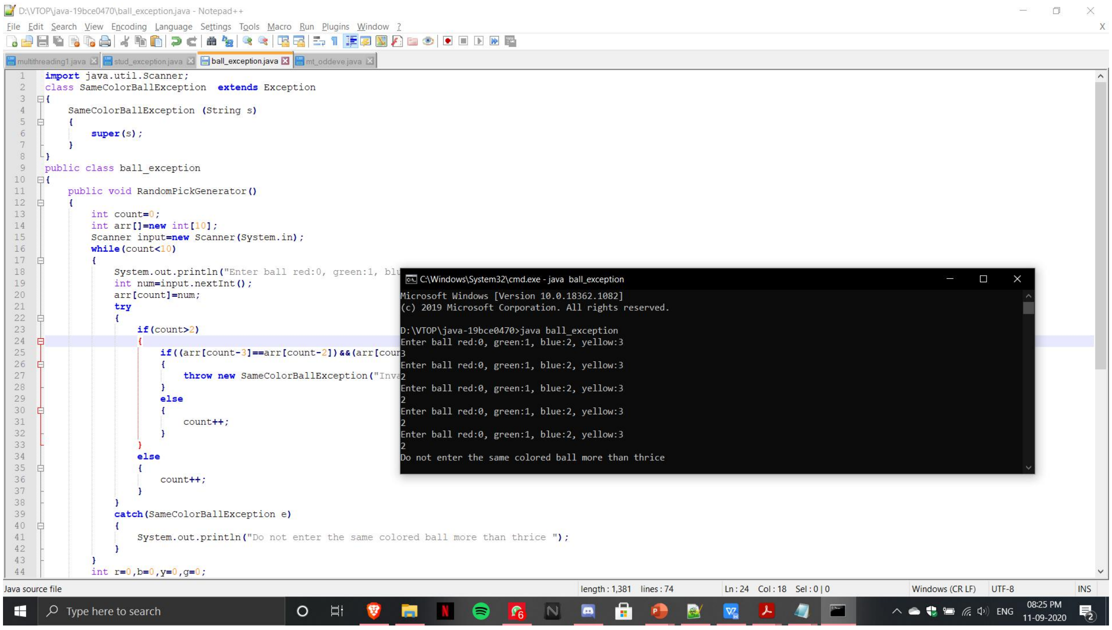
```
1.import java.util.Scanner;
class IllegalArgumentException extends Exception
{
        IllegalArgumentException(String s)
        {
                super(s);
        }
}
class NumberFormatException extends Exception
{
        NumberFormatException(String s)
        {
                super(s);
        }
}
class NoSuchElementException extends Exception
{
        NoSuchElementException(String s)
        {
                super(s);
        }
}
public class stud_exception
{
        String RegNo;
        String Phn_No;
        public boolean onlyDigits(String str)
         {
                int count=0;
        for (int i = 0; i < str.length(); i++)
        {
             if (!Character.isDigit(str.charAt(i)))
            {
                  return false;
             }
         }
         return true;
     }
    public void LengthCheck(String RegNo, String Phn_No) throws
IllegalArgumentException
    {
        if((this.RegNo.length()!=9)||(this.Phn_No.length()!=10))
        {
            throw new IllegalArgumentException("Invalid");
        }
        else
        {
            System.out.println("Valid");
        }
    }
    public void CheckNumber(String Phn_No) throws NumberFormatException
    {
        if(!onlyDigits(this.Phn_No))
        {
            throw new NumberFormatException("Invalid");
        }
        else
        {
            System.out.println("Valid");
        }
    }
    public void RegNoPattern(String RegNo) throws NoSuchElementException
    {
        if(!RegNo.matches("[A-Za-z0-9]+"))
        {
            throw new NoSuchElementException("Invalid");
        }
        else
        {
            System.out.println("Valid");
        }
    }
    stud_exception(String RegNo, String Phn_No)
    {
        this.RegNo =RegNo;
        this.Phn_No=Phn_No;
        try{
            LengthCheck(this.RegNo,this.Phn_No);
            CheckNumber(this.Phn_No);
            RegNoPattern(this.RegNo);
        }
        catch(NoSuchElementException e)
        {
            System.out.println("Exception occured: "+e);
        }
        catch(NumberFormatException e)
        {
            System.out.println("Exception occured: "+e);
        }
        catch(IllegalArgumentException e)
        {
            System.out.println("Exception occured: "+e);
        }
    }
    public static void main(String args[])
    {
        Scanner input= new Scanner(System.in);
        System.out.println("Reg No:");
        String RegNo= input.nextLine();
        System.out.println("Phn_No:");
        String Phn_No= input.nextLine();
        stud_exception s= new stud_exception(RegNo,Phn_No);

    }
}
```


D:\VTOP\java-19bce0470\stud_exception.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
multithreading1.java
stud_exception.java
ball_exception.java
mt_oddeve.java
C:\Windows\System32\cmd.exe
Java source file
length : 2,197 lines : 104
Ln : 88 Col : 10 Sel : 0 | 0
Windows (CR LF)
UTF-8
INS
Type here to search
ENG
08:13 PM
11-09-2020

```
    String RegNo;
    String Phn_No;
    public boolean onlyDigits(String str)
    {
        int count=0;
        for (int i = 0; i < str.length(); i++)
        {
            if (!Character.isDigit(str.charAt(i)))
            {
                return false;
            }
        }
        return true;
    }
    public void LengthCheck(String RegNo, String Phn_No)
    {
        if((this.RegNo.length()!=9)||(this.Phn_No.length
        {
            throw new IllegalArgumentException("Invalid"
        }
        else
        {
            System.out.println("Valid");
        }
    }
    public void CheckNumber(String Phn_No) throws Number
    {
        if(!onlyDigits(this.Phn_No))
        {
            throw new NumberFormatException("Invalid");
        }
        else
        {
            System.out.println("Valid");
        }
    }
    public void RegNoPattern(String RegNo) throws NoSuchElementException
    {
        if(!RegNo.matches("[A-Za-z0-9]+"))
        {
            throw new NoSuchElementException("Invalid");
        }
        else
        {
```

```
D:\VTOP\java-19bce0470>javac stud_exception.java

D:\VTOP\java-19bce0470>java stud_exception
Reg No:
19BCE0470
Phn_No:
6398371469
Valid
Valid
Valid

D:\VTOP\java-19bce0470>javac stud_exception.java

D:\VTOP\java-19bce0470>java stud_exception
Reg No:
5
Phn_No:
6
Exception occured: IllegalArgumentException: Invalid

D:\VTOP\java-19bce0470>
```

```
2.import java.util.Scanner;
class SameColorBallException    extends Exception
{
    SameColorBallException (String s)
    {
        super(s);
    }
}
public class ball_exception
{
    public void RandomPickGenerator()
    {
        int count=0;
        int arr[]=new int[10];
        Scanner input=new Scanner(System.in);
        while(count<10)
        {
            System.out.println("Enter ball red:0, green:1, blue:2, yellow:3");
            int num=input.nextInt();
            arr[count]=num;
            try
            {
                if(count>2)
                {

    if((arr[count-3]==arr[count-2])&&(arr[count-2]==arr[count-1])&&(arr[count-1]=
=arr[count]))
                    {
                        throw new SameColorBallException("Invalid");
                    }
                    else
                    {
                        count++;
                    }
                }
                else
                {
                    count++;
                }
            }
            catch(SameColorBallException e)
            {
                System.out.println("Do not enter the same colored ball more than
thrice ");
            }
        }
        int r=0,b=0,y=0,g=0;
        for(int i=0;i<10;i++)
        {
            if(arr[i]==0)
            {
                r++;
            }
            else if(arr[i]==1)
            {
                g++;
            }
            else if(arr[i]==2)
            {
                b++;
            }
            else
            {
                y++;
            }
        }
        System.out.println("Red balls: "+r);
        System.out.println("Blue balls: "+b);
        System.out.println("Green balls: "+g);
        System.out.println("Yellow balls: "+y);
    }
    public static void main(String args[])
    {
        ball_exception r= new ball_exception();
        r.RandomPickGenerator();
    }
}
```


D:\VTOP\java-19bce0470\ball_exception.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
multithreading1.java
stud_exception.java
ball_exception.java
mt_oddeve.java
Java source file
length : 1,381 lines : 74
Ln : 24 Col : 18 Sel : 0 | 0
Windows (CR LF)
UTF-8
INS
Type here to search
08:25 PM
11-09-2020
ENG

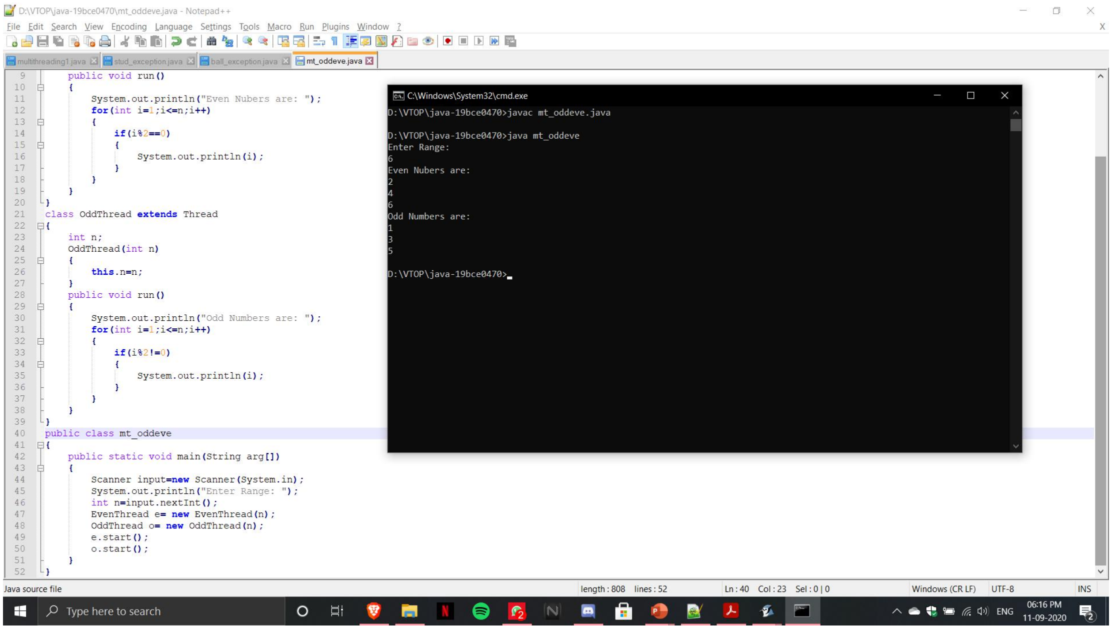
```
import java.util.Scanner;
class SameColorBallException  extends Exception
{
    SameColorBallException (String s)
    {
        super(s);
    }
}
public class ball_exception
{
    public void RandomPickGenerator()
    {
        int count=0;
        int arr[]=new int[10];
        Scanner input=new Scanner(System.in);
        while(count<10)
        {
            System.out.println("Enter ball red:0, green:1, blu
            int num=input.nextInt();
            arr[count]=num;
            try
            {
                if(count>2)
                {
                    if((arr[count-3]==arr[count-2])&&(arr[cour
                    {
                        throw new SameColorBallException("Inva
                    }
                    else
                    {
                        count++;
                    }
                }
                else
                {
                    count++;
                }
            }
            catch(SameColorBallException e)
            {
                System.out.println("Do not enter the same colored ball more than thrice ");
            }
        }
        int r=0,b=0,y=0,g=0;
```

C:\Windows\System32\cmd.exe - java ball_exception

```
Microsoft Windows [Version 10.0.18362.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

D:\VTOP\java-19bce0470>java ball_exception
Enter ball red:0, green:1, blue:2, yellow:3
3
Enter ball red:0, green:1, blue:2, yellow:3
2
Enter ball red:0, green:1, blue:2, yellow:3
2
Enter ball red:0, green:1, blue:2, yellow:3
2
Enter ball red:0, green:1, blue:2, yellow:3
2
Do not enter the same colored ball more than thrice
```

Multithreading:

```
1.import java.util.Scanner;
class EvenThread extends Thread
{
    int n;
    EvenThread(int n)
    {
        this.n=n;
    }
    public void run()
    {
        System.out.println("Even Nubers are: ");
        for(int i=1;i<=n;i++)
        {
            if(i%2==0)
            {
                System.out.println(i);
            }
        }
    }
}
class OddThread extends Thread
{
    int n;
    OddThread(int n)
    {
        this.n=n;
    }
    public void run()
    {
        System.out.println("Odd Numbers are: ");
        for(int i=1;i<=n;i++)
        {
            if(i%2!=0)
            {
                System.out.println(i);
            }
        }
    }
}
public class mt_oddeve
{
    public static void main(String arg[])
    {
        Scanner input=new Scanner(System.in);
        System.out.println("Enter Range: ");
        int n=input.nextInt();
        EvenThread e= new EvenThread(n);
        OddThread o= new OddThread(n);
        e.start();
        o.start();
    }
}
```



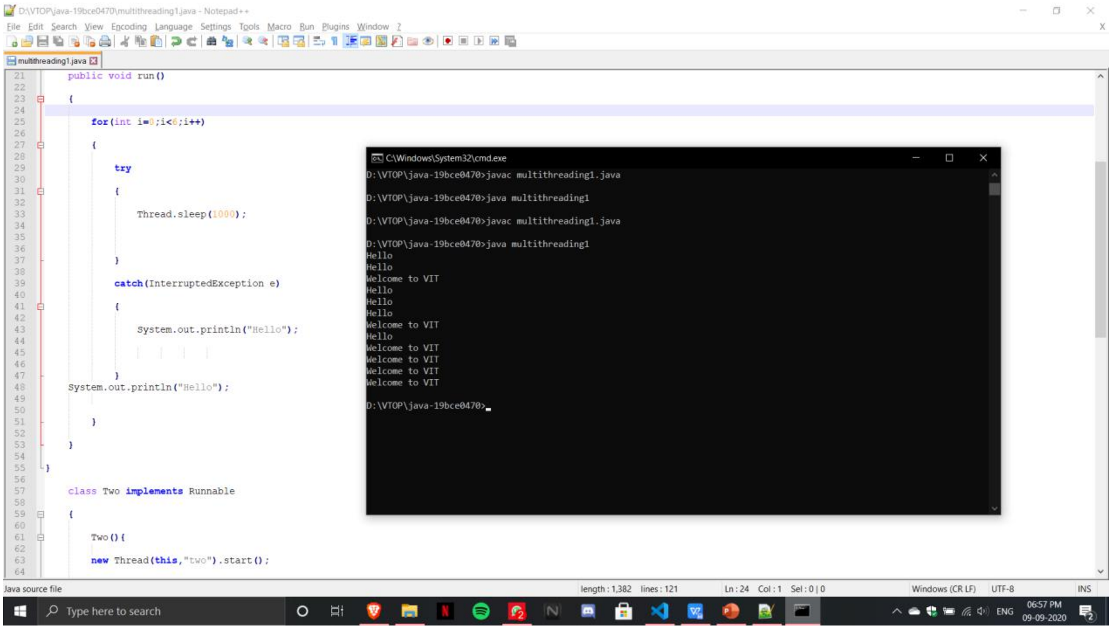
D:\VTOP\java-19bce0470\mt_oddeve.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
multithreading1.java
stud_exception.java
ball_exception.java
mt_oddeve.java
Java source file
length : 808 lines : 52
Ln : 40 Col : 23 Sel : 0 | 0
Windows (CR LF)
UTF-8
INS
Type here to search
ENG
06:16 PM
11-09-2020
C:\Windows\System32\cmd.exe

```
    public void run()
    {
        System.out.println("Even Nubers are: ");
        for(int i=1;i<=n;i++)
        {
            if(i%2==0)
            {
                System.out.println(i);
            }
        }
    }
}
class OddThread extends Thread
{
    int n;
    OddThread(int n)
    {
        this.n=n;
    }
    public void run()
    {
        System.out.println("Odd Numbers are: ");
        for(int i=1;i<=n;i++)
        {
            if(i%2!=0)
            {
                System.out.println(i);
            }
        }
    }
}
public class mt_oddeve
{
    public static void main(String arg[])
    {
        Scanner input=new Scanner(System.in);
        System.out.println("Enter Range: ");
        int n=input.nextInt();
        EvenThread e= new EvenThread(n);
        OddThread o= new OddThread(n);
        e.start();
        o.start();
    }
}
```

```
D:\VTOP\java-19bce0470>javac mt_oddeve.java

D:\VTOP\java-19bce0470>java mt_oddeve
Enter Range:
6
Even Nubers are:
2
4
6
Odd Numbers are:
1
3
5

D:\VTOP\java-19bce0470>_
```

```
2.import java.util.*;

import java.awt.*;

class One implements Runnable

{

    One()

    {

        new Thread(this,"one").start();



    }
    public void run()
    {
        for(int i=0;i<6;i++)
        {
            try
            {
                Thread.sleep(1000);

            }
            catch(InterruptedException e)
            {
                System.out.println("Hello");

            }
   System.out.println("Hello");

        }
    }
}
    class Two implements Runnable
    {
        Two(){
        new Thread(this,"two").start();

    }
    public void run()
    {
```

```
    for(int i=0;i<6;i++)
    {
        try
        {
            Thread.sleep(3000);

        }
        catch(InterruptedException e)
        {
            System.out.println("Welcome to VIT");

        }
      System.out.println("Welcome to VIT");

    }
}
}
public class multithreading1
{
    public static void main(String args[])
    {
        One o1 = new One();
        Two t1 = new Two();
    }
}
```


D:\VTOP\java-19bce0470\multithreading1.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
multithreading1.java
Java source file
length : 1,382 lines : 121
Ln : 24 Col : 1 Sel : 0 | 0
Windows (CR LF) UTF-8 INS
Type here to search
ENG
06:57 PM
09-09-2020
C:\Windows\System32\cmd.exe

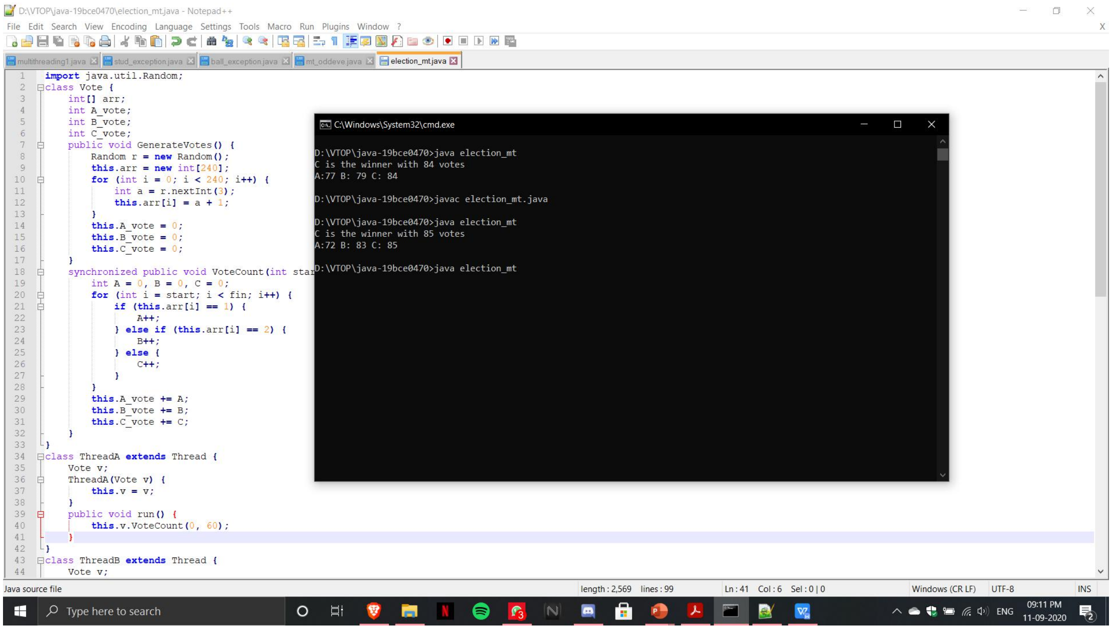
```
    public void run()

    {

        for(int i=0;i<6;i++)

        {

            try

            {

                Thread.sleep(1000);



            }

            catch(InterruptedException e)

            {

                System.out.println("Hello");



            }
    System.out.println("Hello");


        }

    }

}


    class Two implements Runnable

    {

        Two(){

        new Thread(this,"two").start();

```

```
D:\VTOP\java-19bce0470>javac multithreading1.java

D:\VTOP\java-19bce0470>java multithreading1

D:\VTOP\java-19bce0470>javac multithreading1.java

D:\VTOP\java-19bce0470>java multithreading1
Hello
Hello
Welcome to VIT
Hello
Hello
Hello
Welcome to VIT
Hello
Welcome to VIT
Welcome to VIT
Welcome to VIT
Welcome to VIT

D:\VTOP\java-19bce0470>_
```

```
3.import java.util.Random;
class Vote {
	int[] arr;
	int A_vote;
	int B_vote;
	int C_vote;
	public void GenerateVotes() {
		Random r = new Random();
		this.arr = new int[240];
		for (int i = 0; i < 240; i++) {
			int a = r.nextInt(3);
			this.arr[i] = a + 1;
		}
		this.A_vote = 0;
		this.B_vote = 0;
		this.C_vote = 0;
	}
	synchronized public void VoteCount(int start, int fin) {
		int A = 0, B = 0, C = 0;
		for (int i = start; i < fin; i++) {
			if (this.arr[i] == 1) {
				A++;
			} else if (this.arr[i] == 2) {
				B++;
			} else {
				C++;
			}
		}
		this.A_vote += A;
		this.B_vote += B;
		this.C_vote += C;
	}
```

```
}
class ThreadA extends Thread {
    Vote v;
    ThreadA(Vote v) {
        this.v = v;
    }
    public void run() {
        this.v.VoteCount(0, 60);
    }
}
class ThreadB extends Thread {
    Vote v;
    ThreadB(Vote v) {
        this.v = v;
    }
    public void run() {
        this.v.VoteCount(60, 120);
    }
}
class ThreadC extends Thread {
    Vote v;
    ThreadC(Vote v) {
        this.v = v;
    }
    public void run() {
        this.v.VoteCount(120, 180);
    }
}
class ThreadD extends Thread {
    Vote v;
    ThreadD(Vote v) {
        this.v = v;
    }
    public void run() {
        this.v.VoteCount(180, 240);
    }
}
public class election_mt {
    public static void main(String args[]) {
        Vote v = new Vote();
        v.GenerateVotes();
        ThreadA a = new ThreadA(v);
        ThreadB b = new ThreadB(v);
        ThreadC c = new ThreadC(v);
        ThreadD d = new ThreadD(v);
        a.start();
        b.start();
        c.start();
        d.start();
        try {
```

```
                        a.join();
                        b.join();
                        c.join();
                        d.join();
                } catch (Exception e) {
                        System.out.println("Exception has " + e);
                }
                if (v.A_vote >= v.B_vote && v.A_vote >= v.C_vote) {
                        System.out.println("A is the winner with " + v.A_vote + " votes");
                } else if (v.B_vote >= v.A_vote && v.B_vote >= v.C_vote) {
                        System.out.println("B is the winner with " + v.B_vote + " votes");
                } else {
                        System.out.println("C is the winner with " + v.C_vote + " votes");
                }
                System.out.println("A:" + v.A_vote + " B: " + v.B_vote + " C: " +
v.C_vote);
        }
}
```


D:\VTOP\java-19bce0470\election_mt.java - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
multithreading1.java
stud_exception.java
ball_exception.java
mt_oddeve.java
election_mt.java
C:\Windows\System32\cmd.exe
Java source file
length : 2,569 lines : 99
Ln : 41 Col : 6 Sel : 0 | 0
Windows (CR LF) UTF-8 INS
Type here to search
09:11 PM
11-09-2020

```
import java.util.Random;
class Vote {
    int[] arr;
    int A_vote;
    int B_vote;
    int C_vote;
    public void GenerateVotes() {
        Random r = new Random();
        this.arr = new int[240];
        for (int i = 0; i < 240; i++) {
            int a = r.nextInt(3);
            this.arr[i] = a + 1;
        }
        this.A_vote = 0;
        this.B_vote = 0;
        this.C_vote = 0;
    }
    synchronized public void VoteCount(int star
        int A = 0, B = 0, C = 0;
        for (int i = start; i < fin; i++) {
            if (this.arr[i] == 1) {
                A++;
            } else if (this.arr[i] == 2) {
                B++;
            } else {
                C++;
            }
        }
        this.A_vote += A;
        this.B_vote += B;
        this.C_vote += C;
    }
}
class ThreadA extends Thread {
    Vote v;
    ThreadA(Vote v) {
        this.v = v;
    }
    public void run() {
        this.v.VoteCount(0, 60);
    }
}
class ThreadB extends Thread {
    Vote v;
```

```
D:\VTOP\java-19bce0470>java election_mt
C is the winner with 84 votes
A:77 B: 79 C: 84

D:\VTOP\java-19bce0470>javac election_mt.java

D:\VTOP\java-19bce0470>java election_mt
C is the winner with 85 votes
A:72 B: 83 C: 85

D:\VTOP\java-19bce0470>java election_mt
```