01.PROGRAM TO READ THE RADIUS OF A CIRCLE AND TO FIND AREA AND CIRCUMFERENCE OF CIRCLE

```
import java.util.Scanner;

public class CircleCalculator

{

	public static void main(String[] args)

	{

		Scanner scanner=new Scanner(System.in);

		System.out.print("Enter the radius of the circle:");

		double radius=scanner.nextDouble();

		double area=Math.PI*radius*radius;

		double circumference=2*Math.PI*radius;

		System.out.printf("Area of the circle:%.2f\n", area);

		System.out.printf("Circumference of the circlr:%2f\n",circumference);

		Scanner.close();

	}

}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac CircleCalculator.java

C:\Users\gfgc\Desktop\laxman>java CircleCalculator
Enter the radius of the circle:3
Area of the circle:28.27
Circumference of the circlr:18.849556
```

02.WRITE A JAVA PROGRAM DEMONSTRATING STRING OPERATIONS

```
import java.util.Scanner;
public class SimpleStringOperations
{
	public static void main(String[] args)
	{
		Scanner scanner=new Scanner(System.in);
		System.out.print("Enter a string:");
		String input=scanner.nextLine();
		System.out.println("Original String:"+input);
		System.out.println("Length:"+input.length());
		System.out.println("Uppercase:"+input.toUpperCase());
		String concatenated=input+"-Appended text";
		System.out.println("Concatenated String:"+concatenated);
		scanner.close();
	}
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac SimpleStringOperations.java

C:\Users\gfgc\Desktop\laxman>java SimpleStringOperations
Enter a string:Hello World
Original String:Hello World
Length:11
Uppercase:HELLO WORLD
Concatenated String:Hello World-Appended text
```

03.WRITE A JAVA PROGRAM TO DISPLAY THE N PRIME NUMBERS USING COMMAND LINE ARGUMENTS

```
public class PrimeNumbers
{
	public static void main(String[] args)
	{
		int n=Integer.parseInt(args[0]);
		for(int count=0, number=2; count<n; number++)
		{
			boolean isPrime=true;
			for(int i=2; i*i<=number; i++)
			{
				if(number%i==0)
				{
					isPrime=false;
					break;
				}
			}
			if(isPrime)
			{
				System.out.print(number+"  ");
				count++;
			}
		}
	}
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac PrimeNumbers.java

C:\Users\gfgc\Desktop\laxman>java PrimeNumbers 10
2  3  5  7  11  13  17  19  23  29
```

04.WRITE A JAVA PROGRAM TO FIND THE FACTORIAL OF N NUMBERS USING COMMAND LINE ARGUMENTS

```
public class Factorial
{
	public static void main(String[] args)
	{
		int n=Integer.parseInt(args[0]);
		long factorial=1;
		for(int i=1; i<=n; i++)
		{
			factorial*=i;
		}
		System.out.println("Factorial of "+n+" is " +factorial);
	}
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac Factorial.java

C:\Users\gfgc\Desktop\laxman>java Factorial 5
Factorial of 5 is 120
```

05.WRITE A JAVA PROGRAM TO READ N NUMBERS AND SORT THEM USING ONE-DIMENSIONAL ARRAY

```
import java.util.Scanner;
public class SortNumbers
{
	public static void main(String[] args)
	{
		Scanner scanner=new Scanner(System.in);
		System.out.print("Enter the number of elements:");
		int n=scanner.nextInt();
		int[] numbers=new int[n];
		System.out.println("Enter "+n+" numbers");
		for(int i=0; i<n; i++)
		{
			numbers[i]=scanner.nextInt();
		}
		for(int i=0; i<n-1; i++)
		{
			for( int j=0; j<n-1-i; j++)
			{
				if(numbers[j]>numbers[j+1])
				{
					int temp=numbers[j];
					numbers[j]=numbers[j+1];
					numbers[j+1]=temp;
				}
			}
		}
```

```
                System.out.println("Sorted numbers:");
                for(int num:numbers)
                {
                        System.out.print(num +"");
                }
        }
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac SortNumbers.java

C:\Users\gfgc\Desktop\laxman>java SortNumbers
Enter the number of elements:5
Enter 5 numbers
23
5
13
87
90
Sorted numbers:
513238790
```

06.WRITE A JAVA PROGRAM TO ILLUSTRATE METHOD OVERLOADING

```
class OverloadExample
{
	int add(int a, int b)
	{
		return a+b;
	}
	double add(double a, double b)
	{
		return a+b;
	}
	public static void main(String[] args)
	{
		OverloadExample example=new OverloadExample();
		System.out.println(example.add(5, 10));
		System.out.println(example.add(5.5, 10.5));
	}
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac OverloadExample.java

C:\Users\gfgc\Desktop\laxman>java OverloadExample
15
16.0
```

07.WRITE A JAVA PROGRAM TO ILLUSTRATE INTERFACE

```
interface Animal
{
	void sound();
}
class Dog implements Animal
{
	public void sound()
	{
		System.out.println("Woof!");
	}
}
public class Main
{
	public static void main(String[] args)
	{
		Animal myDog=new Dog();
		myDog.sound();
	}
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac Main.java

C:\Users\gfgc\Desktop\laxman>java Main
Woof!
```

08.WRITE A PROGRAM TO DEMONSTRATE SINGLE INHERITANCE

```
class Vehicle
{
	void drive()
	{
		System.out.println("Vehicle is driving");
	}
}
class Car extends Vehicle
{
	void honk()
	{
		System.out.println("Car is honking");
	}
}
public class Plane
{
	public static void main(String[] args)
	{
		Car myCar=new Car();
		myCar.drive();
		myCar.honk();
	}
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac Plane.java

C:\Users\gfgc\Desktop\laxman>java Plane
Vehicle is driving
Car is honking
```

09.WRITE A PROGRAM TO ILLUSTRATE CONSTRUCTOR OVERLOADING

```
class Car
{
	String model;
	int year;
	Car()
	{
		model="Unknowm"; year=2000;
	}
	Car(String model)
	{
		this.model=model; year=2000;
	}
	Car(String model, int year)
	{
		this.model=model; this.year=year;
	}
	void display()
	{
		System.out.println(model+ "," +year);
	}
	public static void main(String[] args)
	{
		new Car().display();
		new Car("Toyota").display();
		new Car("Honda",2021).display();
	}}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac Car.java

C:\Users\gfgc\Desktop\laxman>java Car
Unknowm,2000
Toyota,2000
Honda,2021
```

10.WRITE A PROGRAM TO ILLUSTRATE METHOD OVERRIDING

```
class Shape
{
	void draw()
	{
		System.out.println("Drawing a shape");
	}
}
class Circle extends Shape
{
	@Override
	void draw()
	{
		System.out.println("Drawing a circle");
	}
}
public class Overriding
{
	public static void main(String[] args)
	{
		Shape myShape=new Shape();
		Shape myCircle=new Circle();
		myShape.draw();
		myCircle.draw();
	}
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac Overriding.java

C:\Users\gfgc\Desktop\laxman>java Overriding
Drawing a shape
Drawing a circle
```

11:WRITE A JAVA PROGRAM DEMONSTRATING MULTITHREADING

```
class SimpleThread extends Thread
{
	public void run()
	{
		for(int i=1; i<=5; i++)
		{
			System.out.println(i);
			try
			{
				Thread.sleep(500);
			}
			catch (InterruptedException e)
			{
				e.printStackTrace();
			}
		}
	}
}
public class MultiThreadingDemo
{
	public static void main(String[] args)
	{
		new SimpleThread().start();
		new SimpleThread().start();
	}
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac MultiThreadingDemo.java

C:\Users\gfgc\Desktop\laxman>java MultiThreadingDemo
1
1
2
2
3
3
4
4
5
5
```

12.WRITE A JAVA PROGRAM TO DEMONSTRATING EXCEPTION

```
import java.util.Scanner;
public class ShortExceptionDemo
{
	public static void main(String[] args)
	{
		Scanner scanner=new Scanner(System.in);
		try
		{
			System.out.print("Enter a number:");
			int number=Integer.parseInt(scanner.nextLine());
			System.out.println("You entered:" +number);
		}
		catch(NumberFormatException e)
		{
			System.out.println("Error:That's not a valid number!");
		}
		finally
		{
			scanner.close();
		}
	}
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac ShortExceptionDemo.java

C:\Users\gfgc\Desktop\laxman>java ShortExceptionDemo
Enter a number:42
You entered:42

C:\Users\gfgc\Desktop\laxman>java ShortExceptionDemo
Enter a number:qbc
Error:That's not a valid number!
```

13:WRITE A JAVA PROGRAM FOR USER DEFINED

```
package T;

class pac

{

	public static void main(String[] args)

	{

		System.out.println("In user defined package program");

	}

}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac -d . T.java

C:\Users\gfgc\Desktop\laxman>java T.pac
In user defined package program
```

14.WRITE A JAVA PROGRAM TO DEMONSTRATING GEOMETRICAL

```
public class ShortestGeometricExample
{
	public static void main(String[] args)
	{
		double radius=5;
		double area=Math.PI*radius*radius;
		double perimeter=2*Math.PI*radius;
		System.out.printf("Circle with radius%.2f:\n",radius);
		System.out.printf("Area:%.2f\nPerimeter:%.2f\n", area, perimeter);
	}
}
```

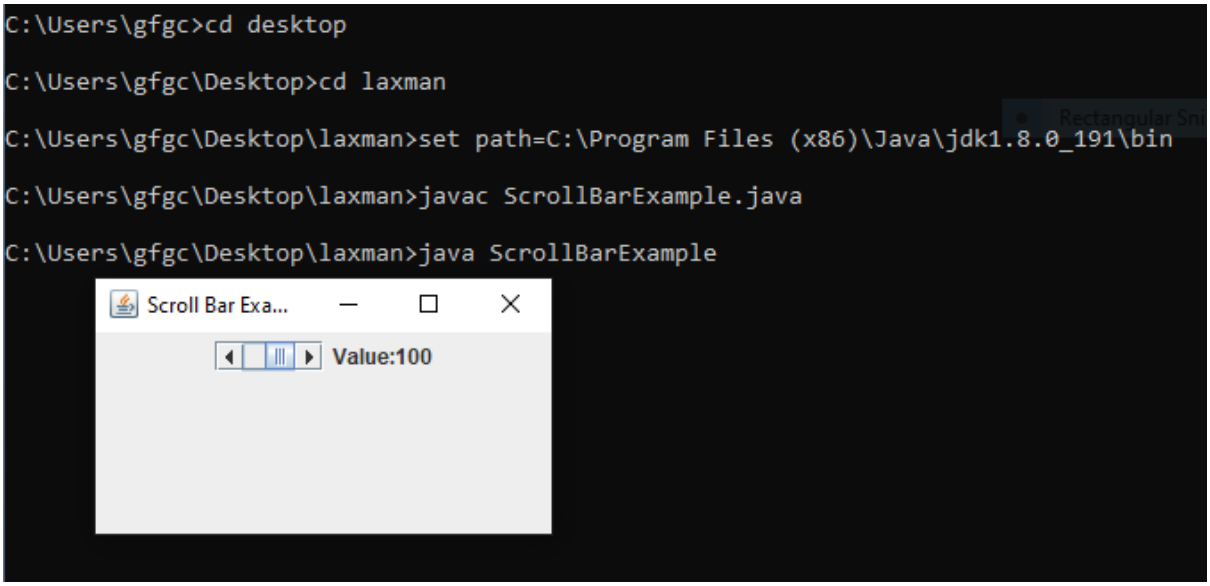
OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac ShortestGeometricExample.java

C:\Users\gfgc\Desktop\laxman>java ShortestGeometricExample
Circle with radius5.00:
Area:78.54
Perimeter:31.42
```

15.WRITE AN APPLET PROGRAM WHICH ILLUSTRATE SCROLL BAR OBJECT

```
import javax.swing.*;
import java.awt.event.*;
public class ScrollBarExample
{
	public static void main(String[] args)
	{
		JFrame frame=new JFrame("Scroll Bar Example");
		JScrollBar scrollBar=new JScrollBar(JScrollBar.HORIZONTAL,50,1,0,101);
		JLabel label=new JLabel("Value:50");
		scrollBar.addAdjustmentListener(e-> label.setText("Value:"+scrollBar.getValue()));
		frame.setLayout(new java.awt.FlowLayout());
		frame.add(scrollBar);
		frame.add(label);
		frame.setSize(300, 100);
		frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
		frame.setVisible(true);
	}
}
```

OUTPUT:

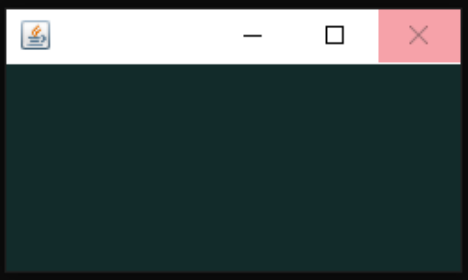

C:\Users\gfgc>cd desktop
C:\Users\gfgc\Desktop>cd laxman
C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin
C:\Users\gfgc\Desktop\laxman>javac ScrollBarExample.java
C:\Users\gfgc\Desktop\laxman>java ScrollBarExample
Scroll Bar Exa...
Value:100

16.WRITE AN APPLET PROGRAM TO CHANGE THE BACKGROUND COLOR RANDOMLY

```
import javax.swing.*;
import java.awt.*;
import java.util.Random;
public class RandomColorFrame extends JFrame
{
   public RandomColorFrame()
   {
      setSize(400, 300);
      setDefaultCloseOperation(EXIT_ON_CLOSE);
      setVisible(true);
      new Timer(1000, e ->
      {
         getContentPane().setBackground(new Color(new Random().nextInt(0xFFFFFF)));
      }).start();
   }
   public static void main(String[] args)
   {
      SwingUtilities.invokeLater(RandomColorFrame::new);
   }
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac RandomColorFrame.java

C:\Users\gfgc\Desktop\laxman>java RandomColorFrame
```

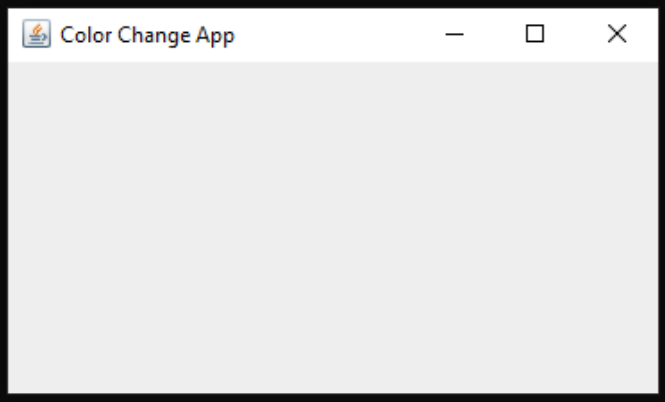


17.WRITE AN APPLET PROGRAM TO CHANGE THE COLOR OF APPLET USING COMBO BOX

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
public class ColorChangeApp extends JFrame
{
	public ColorChangeApp()
	{
		setTitle("Color Change App");
		setSize(400, 300);
		setDefaultCloseOperation(EXIT_ON_CLOSE);
		addMouseListener(new MouseAdapter()
		{
			public void mouseClicked(MouseEvent e)
			{
				getContentPane().setBackground(new Color((int)(Math.random()
*0x1000000)));
			}
		});
	}
	public static void main(String[] args)
	{
		SwingUtilities.invokeLater(()->
		{
			new ColorChangeApp().setVisible(true);
		});
	}
}
```

OUTPUT:

```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac ColorChangeApp.java

C:\Users\gfgc\Desktop\laxman>java ColorChangeApp
```

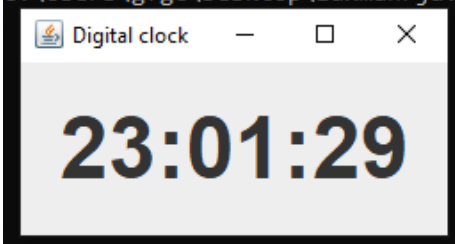


18.WRITE AN APPLET PROGRAM TO IMPLEMENT DIGITAL CLOCK USING THREAD

```
import javax.swing.*;
import java.awt.*;
import java.util.Calendar;
public class SimpleClock extends JFrame
{
	public SimpleClock()
	{
		setTitle("Digital clock");
		setSize(300, 100);
		setDefaultCloseOperation(EXIT_ON_CLOSE);
		JLabel label=new JLabel("",SwingConstants.CENTER);
		label.setFont(new Font("Arial",Font.BOLD, 48));
		add(label);
		setVisible(true);
		new Timer(1000, e->
		label.setText(Calendar.getInstance().getTime().toString().substring(11, 19))).start();
	}
	public static void main(String[] args)
	{
		SwingUtilities.invokeLater(SimpleClock::new);
	}
}
```

OUTPUT:

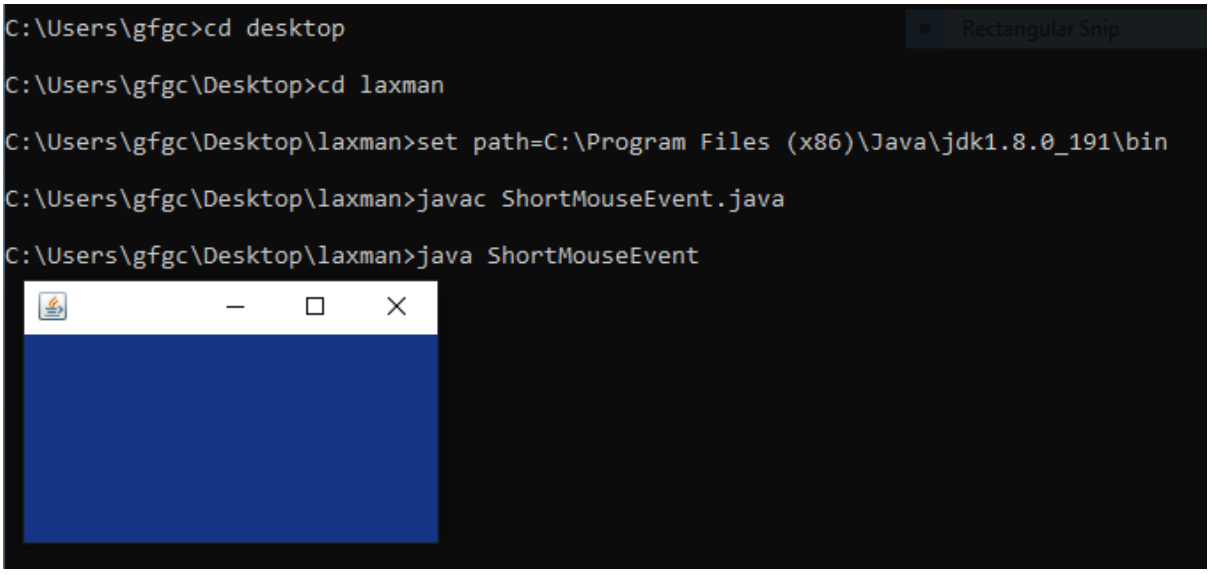
```
C:\Users\gfgc>cd desktop

C:\Users\gfgc\Desktop>cd laxman

C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin

C:\Users\gfgc\Desktop\laxman>javac SimpleClock.java

C:\Users\gfgc\Desktop\laxman>java SimpleClock
```



19.WRITE AN APPLET PROGRAM TO IMPLEMENT MOUSE EVENT

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
public class ShortMouseEvent extends JFrame
{
	public ShortMouseEvent()
	{
		setSize(400, 300);
		setDefaultCloseOperation(EXIT_ON_CLOSE);
		addMouseListener(new MouseAdapter()
		{
			public void mouseClicked(MouseEvent e)
			{
				getContentPane().setBackground(new Color((int)(Math.random()
*0x1000000)));
			}
		});
		setVisible(true);
	}
	public static void main(String[] args)
	{
		SwingUtilities.invokeLater(ShortMouseEvent::new);
	}
}
```

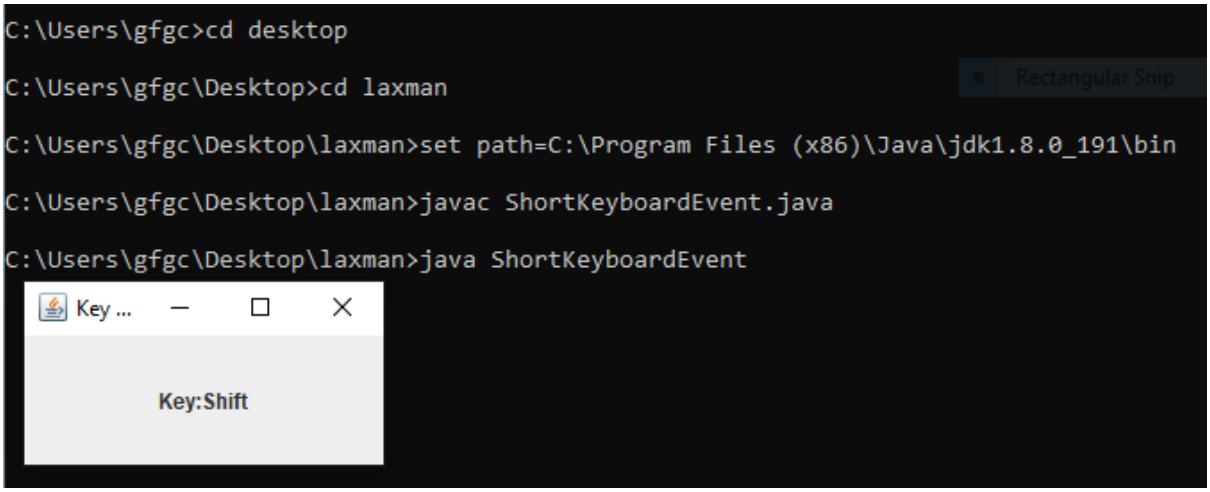
OUTPUT:


C:\Users\gfgc>cd desktop
C:\Users\gfgc\Desktop>cd laxman
C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin
C:\Users\gfgc\Desktop\laxman>javac ShortMouseEvent.java
C:\Users\gfgc\Desktop\laxman>java ShortMouseEvent

20.WRITE A APPLET PROGRAM TO IMPLEMENT KEYBOARD EVENT

```
import javax.swing.*;
import java.awt.event.*;
public class ShortKeyboardEvent extends JFrame
{
	public ShortKeyboardEvent()
	{
		setTitle("Key Event");
		setSize(300, 100);
		setDefaultCloseOperation(EXIT_ON_CLOSE);
		JLabel label=new JLabel("Press a key",SwingConstants.CENTER);
		add(label);
		addKeyListener(new KeyAdapter()
		{
			public void keyPressed(KeyEvent e)
			{
				label.setText("Key:"+KeyEvent.getKeyText(e.getKeyCode()));
			}
		});
		setVisible(true);
		setFocusable(true);
		requestFocusInWindow();
	}
	public static void main(String[] args)
	{
		SwingUtilities.invokeLater(ShortKeyboardEvent::new);
	}}
```

OUTPUT:


C:\Users\gfgc>cd desktop
C:\Users\gfgc\Desktop>cd laxman
C:\Users\gfgc\Desktop\laxman>set path=C:\Program Files (x86)\Java\jdk1.8.0_191\bin
C:\Users\gfgc\Desktop\laxman>javac ShortKeyboardEvent.java
C:\Users\gfgc\Desktop\laxman>java ShortKeyboardEvent
Key ...
Key:Shift