

S.No: 1	Exp. Name: sample programs on operator precedence and associativity	Date: 2023-09-14
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Aim:

Write a java program to demonstrate operator precedence and associativity

Source Code:

OperatorPrecedence.java

```
import java.util.Scanner;
class OperatorPrecedence {
    public static void main(String[] args) {
        int x,result;
        System.out.print("Enter a num: ");
        Scanner sc=new Scanner(System.in);
        x=sc.nextInt();
        result=x++ +x++*--x/x++- --x+3>>1|2;
        System.out.println("The operation going is x++ + x++ * --x / x++ - -
-x + 3 >> 1 | 2");
        System.out.println("result = "+result);
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter a num:
4
The operation going is x++ + x++ * --x / x++ - --x + 3 >> 1 2
result = 3

Test Case - 2
User Output
Enter a num:
-3
The operation going is x++ + x++ * --x / x++ - --x + 3 >> 1 2
result = 2

S.No: 2	Exp. Name: Sample program on java to demonstrate Control structures	Date: 2023-09-14
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Aim:

write a java program that uses if-else control statement and print the result

Source Code:

Control.java

```
import java.util.Scanner;
class Control {
    public static void main(String args[])
    {
        int x,y,z;
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter first num : ");
        x=sc.nextInt();
        System.out.print("Enter second num : ");
        y=sc.nextInt();
        z=x+y;
        if(z<20)
            System.out.println("x + y is less than 20");
        else
            System.out.println("x + y is greater than 20");
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter first num :
13
Enter second num :
5
x + y is less than 20

Test Case - 2
User Output
Enter first num :
24
Enter second num :
10
x + y is greater than 20

S.No: 3	Exp. Name: Sample Program to demonstrate constructor	Date: 2023-10-18
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Aim:

Write a program to demonstrate constructor class

Source Code:

Student.java

```
import java.util.*;
public class Student {
    String name;
    int rollno;
    public static void main (String args[]) {
        Student s=new Student();
        System.out.print(s.rollno);
        System.out.print(" ");
        System.out.println(s.name);
        System.out.print(s.rollno);
        System.out.print(" ");
        System.out.println(s.name);
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
0 null
0 null

S.No: 4	Exp. Name: Sample program to demonstrate destructor	Date: 2023-10-18
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Aim:

Write a program to demonstrate destructor class

Source Code:

DestructorExample.java

```
import java.util.*;
public class DestructorExample {
    public void finalize() {
        System.out.println("Object is destroyed by the Garbage Collector");
        System.out.println("Inside the main() method");
        System.out.println("Object is destroyed by the Garbage Collector");
    }
    public static void main(String[] args) {
        DestructorExample d = new DestructorExample();
        d = null;
        System.gc();
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Object is destroyed by the Garbage Collector
Inside the main() method
Object is destroyed by the Garbage Collector

S.No: 5	Exp. Name: A program to print Half pyramid pattern	Date: 2023-10-18
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Aim:

Write a Java program to print Half Pyramid pattern.

Source Code:

HalfPyramid.java

```
import java.util.Scanner;
public class HalfPyramid {
    public static void main(String args[]) {
        int i,j;
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter no of rows : ");
        int n=sc.nextInt();
        for(i=0;i<n;i++) {
            for(j=0;j<=i;j++) {
                System.out.print("* ");
            }
            System.out.println();
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter no of rows :
5
*
* *
* * *
* * * *
* * * * *

Test Case - 2
User Output
Enter no of rows :
3
*
* *
* * *

Test Case - 3
User Output

10
*
* *
* * *
* * * *
* * * * *
* * * * * *
* * * * * * *
* * * * * * * *
* * * * * * * * *
* * * * * * * * * *
* * * * * * * * * *

S.No: 6	Exp. Name: A program to print Inverted Half pyramin pattern	Date: 2023-09-15
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Aim:

Write a Program to Print Inverted Half Pyramid Pattern

Source Code:

HalfPyramidRev.java

```
import java.util.Scanner;
public class HalfPyramidRev{
    public static void main(String args[])
    {
        int i,j;
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter no of rows : ");
        int n=sc.nextInt();
        for(i=n-1;i>=0;i--)
        {
            for(j=0;j<=i;j++)
            {
                System.out.print("* ");
            }
            System.out.println();
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter no of rows :
5
* * * * *
* * * *
* * *
* *
*

Test Case - 2
User Output
Enter no of rows :
3
* * *
* *
*

S.No: 7	Exp. Name: A program to print Hollow Inverted Half Pyramid Pattern	Date: 2023-09-15
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Aim:

Write a Program to Print Hollow Inverted half Pyramid Pattern

Source Code:

HollowHalfPyramidRev.java

```
import java.util.Scanner;
public class HollowHalfPyramidRev{
    public static void main(String args[])
    {
        int i,j;
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter no of rows : ");
        int n=sc.nextInt();
        for(i=0;i<n;i++)
        {
            int k=2*(n-i-1);
            for(j=0;j<=k;j=j+2)
            {
                if((i==0)||(j==0)||(j==k))
                    System.out.print("* ");
                else
                    System.out.print("  ");
            }
            System.out.println();
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter no of rows :
5
* * * * *
* *
* *
* *
*

Test Case - 2
User Output
Enter no of rows :
3
* * *

* *
*

S.No: 8	Exp. Name: A program to print Pyramid Pattern	Date: 2023-09-15
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Aim:

Write a Program to Print Pyramid Pattern

Source Code:

Pyramid.java

```
import java.util.Scanner;
public class Pyramid {
    public static void main(String args[]) {
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter no of rows : ");
        int n=sc.nextInt();
        for(int i=0;i<n;i++) {
            for(int j=1;j<n-i;j++)
                System.out.print(" ");
            for(int k=0;k<=i;k++)
                System.out.print("* ");
            System.out.print("\n");
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter no of rows :
5
*
* *
* * *
* * * *
* * * * *

Test Case - 2
User Output
Enter no of rows :
6
*
* *
* * *
* * * *
* * * * *
* * * * * *

S.No: 9	Exp. Name: A program to print Inverted Pyramid Pattern	Date: 2023-09-15
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Aim:

Write a Program to Print inverted Pyramid Pattern

Source Code:

PyramidRev.java

```
import java.util.Scanner;
public class PyramidRev{
    public static void main(String args[]) {
        Scanner input=new Scanner(System.in);
        System.out.print("Enter no of rows : ");
        int n=input.nextInt();
        for(int i=n;i>=1;i--) {
            for( int j=1;j<=n-i;j++)
                System.out.print(" ");
            for( int k=1;k<=i;k++)
                System.out.print("* ");
            System.out.print("\n");
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter no of rows :
5
* * * * *
* * * *
* * *
* *
*

Test Case - 2
User Output
Enter no of rows :
6
* * * * * *
* * * * *
* * * *
* * *
* *
*

S.No: 10	Exp. Name: A program to print Hollow Pyramid Pattern	Date: 2023-09-14
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Aim:

Write a Program to print the Hollow pyramid pattern

Source Code:

PyramidGap.java

```
import java.util.Scanner;
public class PyramidGap{
    public static void main (String args[])
    {
        int i, j;
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter no of rows : ");
        int n = sc.nextInt();
        for(i=1;i<=n;i++)
        {
            for(j=i;j<=n;j++)
            {
                System.out.print(" ");
            }
            for(j=1;j<=2*i;j++)
            {
                if(j==1||j==(2*i-1)||((i==n)&&(j%2==1)))
                    System.out.print("*");
                else
                    System.out.print(" ");
            }
            System.out.print(" ");
            System.out.println();
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter no of rows :
5
<pre> * * * * * * * * * * * * * * * *</pre>
Test Case - 2
User Output

6
*
* *
* *
* *
* *
* *
* * * * *

Aim:

Write Java program on use of Inheritance.

Create a classVehicle

- contains the data members **color** of String type and **speed** and **size** of integer data type.
- write a method**setVehicleAttributes()**to initialize the data members

Create another classCarwhich is derived from the classVehicle

- contains the data members**cc**and**gears**of**integer**data type
- write a method**setCarAttributes()**to initialize the data members
- write a method**displayCarAttributes()**which will display all the attributes.

Write another class InheritanceDemo with **main()** it receives five arguments **color**, **speed**, **size**, **cc** and **gears**.

Source Code:

InheritanceDemo.java

```
import java.util.*;
class Vehicle {
    String color;
    int speed,size;
    void setVehicleAttributes(String c,String sp,String s) {
        color=c;
        size=Integer.parseInt(s);
        speed=Integer.parseInt(sp);
    }
}
class Car extends Vehicle {
    int cc,gears;
    void setCarAttributes(String c,String sp,String s,String cce,String gear){
        setVehicleAttributes(c,sp,s);
        cc=Integer.parseInt(cce);
        gears=Integer.parseInt(gear);
    }
    void displayCarAttributes() {
        System.out.println("Color of Car : "+color);
        System.out.println("Speed of Car : "+speed);
        System.out.println("Size of Car : "+size);
        System.out.println("CC of Car : "+cc);
        System.out.println("No of gears of Car : "+gears);
    }
}
class InheritanceDemo {
    public static void main(String args[]){
        Car s= new Car();
        s.setCarAttributes(args[0],args[1],args[2],args[3],args[4]);
        s.displayCarAttributes();
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Color of Car : Blue
Speed of Car : 100
Size of Car : 20
CC of Car : 1000
No of gears of Car : 5

Test Case - 2
User Output
Color of Car : Orange
Speed of Car : 120
Size of Car : 25
CC of Car : 900
No of gears of Car : 5

S.No: 12	Exp. Name: write a java program to prevent inheritance using abstract class.	Date: 2023-10-18
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Aim:

write a java program to prevent inheritance using abstract class.

- Create an abstract class `Shape`
- Create a class `Rectangle` which extends the class `Shape`
- Class `Rectangle` contains a method **draw** which prints **drawing rectangle**
- Create another class `circle1` which extends `Shape`
- Class `circle1` contains a method **draw** which prints **drawing circle**
- Create a main class `TestAbstraction1`
- Create object for the class `circle1` and called the method `draw`

Source Code:

TestAbstraction1.java

```

abstract class Shape {
    abstract void draw();
}
class Rectangle extends Shape {
    void draw() {
        System.out.println("drawing rectangle");
    }
}
class Circle1 extends Shape {
    void draw() {
        System.out.println("drawing circle");
    }
}
class TestAbstraction1 {
    public static void main(String args[]) {
        Circle1 c=new Circle1();
        c.draw();
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
drawing circle

S.No: 13	Exp. Name: <i>program on dynamic binding</i>	Date: 2023-10-18
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Aim:

write a program on dynamic binding

Source Code:

Demo.java

```

class Human {
    public void walk() {
        System.out.println("Human walks");
    }
}
class Demo extends Human {
    public void walk() {
        System.out.println("Boy walks");
    }
    public static void main(String args[]) {
        Human obj1=new Demo();
        Human obj2=new Human();
        obj1.walk();
        obj2.walk();
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Boy walks
Human walks

S.No: 14	Exp. Name: <i>Sample program on method overloading</i>	Date: 2023-10-18
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Aim:

Write a program on method overloading

Source Code:

Sample.java

```

class DisplayOverloading {
    void display(char c) {
        System.out.println(c);
    }
    void display(char c, int num) {
        System.out.println(c+" "+num);
    }
}
class Sample {
    public static void main(String args[]) {
        DisplayOverloading obj=new DisplayOverloading();
        obj.display('a');
        obj.display('a',10);
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
a
a 10

S.No: 15	Exp. Name: <i>Sample program on method overriding</i>	Date: 2023-10-18
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Aim:

Write a program on method overriding

Source Code:

Bike.java

```

class Vehicle {
    void run() {
        System.out.println("Bike");
    }
}
class vehicle2 extends Vehicle {
    void run(){
        System.out.println("Bike is running");
    }
}
class Bike extends vehicle2 {
    void run(){
        System.out.println("Bike is running safely");
    }
    public static void main(String args[]) {
        Bike b=new Bike();
        b.run();
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Bike is running safely

S.No: 16	Exp. Name: <i>Write a Java program to implement Interface</i>	Date: 2023-10-18
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Aim:

Write a Java program that implements an **interface**.

Create an interface called `Car` with two abstract methods `String getName()` and `int getMaxSpeed()`. Also declare one **default** method `void applyBreak()` which has the code snippet

```
System.out.println("Applying break on " + getName());
```

In the same interface include a **static** method `Car getFastestCar(Car car1, Car car2)`, which returns **car1** if the **maxSpeed** of **car1** is greater than or equal to that of **car2**, else should return **car2**.

Create a class called `BMW` which implements the interface `Car` and provides the implementation for the abstract methods `getName()` and `getMaxSpeed()` (make sure to declare the appropriate fields to store **name** and **maxSpeed** and also the constructor to initialize them).

Similarly, create a class called `Audi` which implements the interface `Car` and provides the implementation for the abstract methods `getName()` and `getMaxSpeed()` (make sure to declare the appropriate fields to store **name** and **maxSpeed** and also the constructor to initialize them).

Create a **public** class called `MainApp` with the `main()` method.

Take the input from the command line arguments. Create objects for the classes `BMW` and `Audi` then print the fastest car.

Note:

Java 8 introduced a new feature called `default` methods or `defender` methods, which allow developers to add new methods to the interfaces without breaking the existing implementation of these interface. These **default** methods can also be overridden in the implementing classes or made abstract in the extending interfaces. If they are not overridden, their implementation will be shared by all the implementing classes or sub interfaces.

Below is the syntax for declaring a `default` method in an **interface** :

```
public default void methodName() {
    System.out.println("This is a default method in interface");
}
```

Similarly, **Java 8** also introduced `static` methods inside interfaces, which act as regular static methods in classes. These allow developers group the utility functions along with the interfaces instead of defining them in a separate helper class.

Below is the syntax for declaring a `static` method in an **interface** :

```
public static void methodName() {
    System.out.println("This is a static method in interface");
}
```

Note: Please don't change the package name.

Source Code:

q11284/MainApp.java

```
package q11284;
interface Car {
    public String getName();
    public int getMaxSpeed();
    public default void applyBreak() {
        System.out.println("Applying break on "+getName());
    }
    static Car getFastestCar(Car a,Car b) {
        if(a.getMaxSpeed()>b.getMaxSpeed())
            return a;
        else
            return b;
    }
}
class BMW implements Car {
    String name;
    int speed;
    BMW(String n,String s) {
        speed=Integer.parseInt(s);
        name= n;
    }
    public String getName() {
        return name;
    }
    public int getMaxSpeed() {
        return speed; }}
    class Audi implements Car {
        String name;
        int speed;
        Audi (String n,String s) {
            speed=Integer.parseInt(s);
            name=n;
        }
        public String getName() {
            return name;
        }
        public int getMaxSpeed() {
            return speed;
        }
    }
    public class MainApp {
        public static void main(String args[]) {
            BMW bmw=new BMW(args[0],args[1]);
            Audi audi=new Audi(args[2],args[3]);
            Car max=Car.getFastestCar(bmw,audi);
            System.out.println("Fastest car is :
"+max.getName());
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Fastest car is : BMW

Test Case - 2
User Output
Fastest car is : Maruthi

S.No: 17	Exp. Name: <i>Write the code to create an exception</i>	Date: 2023-10-18
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Aim:

Write a Java program to create an exception.

Source Code:

q221/Exception1.java

```
package q221;
class Exception1 {
    public static void main(String args[]) {
        int d=0;
        try {
            int a= 42/d;
        }
        catch (ArithmeticException e) {
            System.out.println("Exception caught : divide by zero
occurred");
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Exception caught : divide by zero occurred

S.No: 18	Exp. Name: <i>Write the code for handling the exception</i>	Date: 2023-10-18
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Aim:

Write a Java code for handling the exception.

Source Code:

q222/handleError.java

```

package q222;
import java.util.Random;
public class handleError {
    public static void main(String args[]) {
        int a = 0, b = 0, c = 0;
        Random r = new Random(100);
        for(int i=0;i<32;i++) {
            try{
                b= r.nextInt();
                c=r.nextInt();
                a=12345/(b/c);
            }
            catch( ArithmeticException e) {
                System.out.println("Division by zero.");
                a=0;
            }
            System.out.println("a: "+a);
        }
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
a: 12345
Division by zero.
a: 0
a: -1028
Division by zero.
a: 0
a: 12345
a: -12345
Division by zero.
a: 0
a: 3086
a: 12345
a: -12345
a: 12345
Division by zero.

a: -12345
a: 12345
a: 342
a: 12345
a: -12345
a: 12345
a: -12345
Division by zero.
a: 0
a: -4115
Division by zero.
a: 0
a: -4115
a: 6172
a: 6172
Division by zero.
a: 0
Division by zero.
a: 0
Division by zero.
a: 0
a: 12345
a: -280
a: -12345
Division by zero.
a: 0

S.No: 19	Exp. Name: <i>Write the code to create an exception using the predefined exception</i>	Date: 2023-10-18
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Aim:

Write a Java code to create an exception using the predefined exception

Source Code:

q223/exception2.java

```

package q223;
public class exception2{
    public static void main(String args[]){
        int d,a;
        try{
            d=0;
            a = 42/d;
        }
        catch(ArithmeticException e){
            System.out.println("Exception raised -Division by zero.");
        }
        System.out.println("After catch statement.");
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Exception raised -Division by zero.
After catch statement.

S.No: 20	Exp. Name: Write the code for creating your own exception	Date: 2023-10-18
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Aim:

Write a Java code for creating your own exception

Source Code:

q224/demo.java

```

package q224;
class MyException extends Exception{
    private int ex;
    MyException(int a){
        ex=a;
    }
    public String toString(){
        return "MyException["+ex+"] is less than zero";
    }
}
public class demo{
    static void sum(int a,int b)throws MyException {
        if(a<0)
            throw new MyException(a);
        else
            System.out.println(a+b);
    }
    public static void main(String args[]) {
        try{
            sum(-10,10);
        }
        catch(MyException e) {
            System.out.println(e);
        }
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
MyException[-10] is less than zero

S.No: 21	Exp. Name: program that takes inputs 5 numbers, each between 10 and 100	Date: 2023-12-12
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Aim:

Write java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read. Display the complete set of unique values input after the user enters new values

Source Code:

Duplicate.java

```
import java.util.Scanner;
public class Duplicate {
    public static void main(String[] args) {
        int a[]={0,0,0,0,0},t,i,j,s=0,r=0;
        Scanner z=new Scanner(System.in);
        System.out.println("Enter 5 unique values between 10 & 100 ");
        for(j=0;j<5;j++) {
            t=z.nextInt();
            if(t>10&&t<=100) {
                for(i=0;i<r;i++) {
                    if(a[i]==t)
                        s++;
                }
                if(s>0) {
                    System.out.println("Duplicate value found,
retry");
                    s--;
                    j--;
                    continue;
                }
                else {
                    a[j]=t;
                    r++;
                }
            }
            else {
                System.out.println("Entered value must be in between
10 & 100");
                j--;
            }
        }
        System.out.print("The five unique values are :");
        for(i=0;i<5;i++) {
            System.out.print(a[i]+" ");
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter 5 unique values between 10 & 100
25
15
30
0
Entered value must be in between 10 & 100
34
89
The five unique values are :25 15 30 34 89

Test Case - 2
User Output
Enter 5 unique values between 10 & 100
48
92
34
92
Duplicate value found, retry
39
23
The five unique values are :48 92 34 39 23

S.No: 22

Exp. Name: ***A program to illustrate threads***

Date: 2023-12-13

Aim:

Write Java program(s) on creating multiple threads, assigning priority to threads, synchronizing threads, suspend and resume threads

Source Code:

TestThread.java

Page No: 30

D:224G1A0596

2022-2026-CSE-B

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```

class RunnableDemo implements Runnable
{
    public Thread t;
    public String threadName;
    boolean suspended = false;
    RunnableDemo(String name)
    {
        threadName=name;
        System.out.println("Creating " +threadName);
    }
    public void run()
    {
        System.out.println("Running "+threadName);
        try
        {
            for(int i=10;i>0;i--)
            {
                System.out.println("Thread: "+threadName +", "+i);
                Thread.sleep(100);
                synchronized(this)
                {
                    while(suspended)
                    {
                        wait();
                    }
                }
            }
        }
        catch(InterruptedException e)
        {
            System.out.println("Thread "+threadName+"interrupted.");
        }
        System.out.println("Thread "+threadName+" exiting.");
    }
    public void start()
    {
        System.out.println("Starting "+ threadName);
        if(t==null)
        {
            t=new Thread(this,threadName);
            t.start();
        }
    }
    void suspend()
    {
        suspended = true;
    }
    synchronized void resume()
    {
        suspended = false;
        notify();
    }
}

public class TestThread
{

```

```

RunnableDemo R1= new RunnableDemo("Thread-1");
R1.start();
RunnableDemo R2 = new RunnableDemo("Thread-2");
R2.start();
try
{
    Thread.sleep(100);
    R1.suspend();
    System.out.println("Suspending First Thread");
    Thread.sleep(100);
    R1.resume();
    System.out.println("Resuming First Thread");
    System.out.println("Suspending thread Two");
    R2.suspend();
    Thread.sleep(100);
    System.out.println("Resuming thread Two");
    R2.resume();
}
catch(InterruptedException e)
{
    System.out.println("Caught: "+e);
}
try
{
    System.out.println("Waiting for threads to finish.");
    R1.t.join();
    R2.t.join();
}
catch(InterruptedException e)
{
    System.out.println(e);
}
System.out.println("Main thread exiting.");
}
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Creating Thread-1
Starting Thread-1
Creating Thread-2
Starting Thread-2
Running Thread-1
Running Thread-2
Thread: Thread-2, 10
Thread: Thread-1, 10
Suspending First Thread
Thread: Thread-2, 9
Thread: Thread-2, 8
Resuming First Thread

Suspending thread Two
Thread: Thread-1, 9
Thread: Thread-1, 8
Resuming thread Two
Waiting for threads to finish.
Thread: Thread-2, 7
Thread: Thread-1, 7
Thread: Thread-2, 6
Thread: Thread-1, 6
Thread: Thread-2, 5
Thread: Thread-1, 5
Thread: Thread-2, 4
Thread: Thread-1, 4
Thread: Thread-2, 3
Thread: Thread-1, 3
Thread: Thread-2, 2
Thread: Thread-1, 2
Thread: Thread-2, 1
Thread: Thread-1, 1
Thread Thread-2 exiting.
Thread Thread-1 exiting.
Main thread exiting.

S.No: 24	Exp. Name: <i>program to create a super class called Figure that it returns the area of a rectangle and triangle</i>	Date: 2023-12-14
----------	--	------------------

Aim:

Write a java program to create a super class called Figure that receives the dimensions of two dimensional objects. It also defines a method called area that computes the area of an object. The program derives two sub-classes from Figure. The first is Rectangle and second is Triangle. Each of the sub classes override area() so that it returns the area of a rectangle and triangle respectively

Source Code:

```
AbstractAreas.java
```

```

import java.util.*;
abstract class Figure
{
    double dim1;
    double dim2;
    double dim3;
    double dim4;
    Figure(double a,double b)
    {
        dim1=a;
        dim2=b;
        dim3=a;
        dim4=b;
    }
    abstract void area();
}
class Rectangle extends Figure
{
    Rectangle(double a,double b)
    {
        super(a,b);
    }
    void area()
    {
        double Area=dim1*dim2;
        System.out.println("Rectangle:");
        System.out.println("Area is "+Area);
    }
}
class Triangle extends Figure
{
    Triangle(double a,double b)
    {
        super(a,b);
    }
    void area()
    {
        double Area=(dim3*dim4)/2;
        System.out.println("Triangle:");
        System.out.println("Area is "+Area);
    }
}
class AbstractAreas
{
    public static void main(String args[])
    {
        System.out.println("Enter lenght and breadth of Rectangle :");
        Scanner input = new Scanner(System.in);
        double dim1=input.nextDouble();
        double dim2=input.nextDouble();
        System.out.println("Enter height and side of Triangle :");
        Scanner input1 = new Scanner(System.in);
        double dim3=input1.nextDouble();
        double dim4=input1.nextDouble();
        Rectangle r=new Rectangle(dim1,dim2);
    }
}

```

```

        figuref = r;
        figuref.area();
        figuref=t;
        figuref.area();
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter lenght and breadth of Rectangle :
12
14
Enter height and side of Triangle :
7
5
Rectangle:
Area is 168.0
Triangle:
Area is 17.5

Test Case - 2
User Output
Enter lenght and breadth of Rectangle :
4
8
Enter height and side of Triangle :
5
3
Rectangle:
Area is 32.0
Triangle:
Area is 7.5

S.No: 27	Exp. Name: <i>A java program to demonstrate that the catch block for type Exception A catches the exception of type Exception B and Exception C.</i>	Date: 2023-12-14
----------	---	------------------

Aim:

Use inheritance to create an exception superclass called Exception A and exception subclasses Exception B and Exception C, where Exception B inherits from Exception A and Exception C inherits from Exception B. Write a java program to demonstrate that the catch block for type Exception A catches the exception of type Exception B and Exception C.

Note: Please don't change the package name.

Source Code:

q29793/TestException.java

```

package q29793;
import java.lang.*;
@SuppressWarnings("serial")
class ExceptionA extends Exception {
    String message;
    public ExceptionA(String message) {
        this.message = message;
    }
}
@SuppressWarnings("serial")
class ExceptionB extends ExceptionA {
    //Write constructor of class ExceptionB with super()
    ExceptionB(String message)
{
    super(message);
}

}
@SuppressWarnings("serial")
class ExceptionC extends ExceptionB {
    //Write constructor of class ExceptionC with super()
    ExceptionC(String message)
{
    super(message);
}
}
@SuppressWarnings("serial")
public class TestException {
    public static void main(String[] args) {
        try {
            getExceptionB();
        }
        catch(ExceptionA ea) {
            System.out.println("Got exception from Exception B");
        }
        try {
            getExceptionC();
        }
        catch(ExceptionA ea) {
            System.out.println("Got exception from Exception C");
        }
    }
    public static void getExceptionB() throws ExceptionB {
        throw new ExceptionB("Exception B");
    }
    public static void getExceptionC() throws ExceptionC {
        throw new ExceptionC("Exception C");
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1

User Output
Got exception from Exception B
Got exception from Exception C

S.No: 30	Exp. Name: <i>Write java program(s) that use collection framework classes.(TreeMap class)</i>	Date: 2023-12-14
----------	---	------------------

Aim:

Write a java program(s) that use collection framework classes.(TreeMap class)

Source Code:

Treemap.java

```

import java.util.*;
public class Treemap
{
    public static void main(String[] args)
    {
        Scanner inp = new Scanner(System.in);
        TreeMap<Integer,String> treeMap = new TreeMap<Integer,String>();
        System.out.print("No.Of Mapping Elements in TreeMap:");
        int num = inp.nextInt();
        for(int i=0;i<num;i++)
        {
            System.out.print("Integer:");
            int key= inp.nextInt();
            inp.nextLine();
            System.out.print("String:");
            String value = inp.nextLine();
            treeMap.put(key,value);
        }
        for(Map.Entry m : treeMap.entrySet())
        {
            System.out.println(m.getKey()+"->" +m.getValue());
        }
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
No.Of Mapping Elements in TreeMap:
2
Integer:
1
String:
HELLO
Integer:
2
String:
WORLD
1->HELLO
2->WORLD

Test Case - 2
User Output
No.Of Mapping Elements in TreeMap:
3
Integer:
25
String:
UNIVERSITY
Integer:
26
String:
KNOWLEDGE
Integer:
27
String:
TECHNOLOGIES
25->UNIVERSITY
26->KNOWLEDGE
27->TECHNOLOGIES

S.No: 31	Exp. Name: Write java program(s) that use collection framework classes.(TreeSet class)	Date: 2023-12-14
----------	---	------------------

Aim:

Write java program(s) that use collection framework classes.(TreeSet class)

Source Code:

TreeSetclass.java

```
import java.util.*;
public class TreeSetclass
{
    public static void main(String[] args)
    {
        Scanner inp = new Scanner(System.in);
        TreeSet<String> treeSet = new TreeSet<String>();
        System.out.print("No.Of Elements in TreeSet:");
        int num = inp.nextInt();
        inp.nextLine();
        for(int i=0;i<num;i++)
        {
            System.out.print("String:");
            treeSet.add(inp.nextLine());
        }
        Iterator<String> itr = treeSet.iterator();
        System.out.println("TreeSet Elements by Iterating:");
        while(itr.hasNext())
        {
            System.out.println(itr.next());
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
No.Of Elements in TreeSet:
3
String:
Never
String:
Give
String:
Up
TreeSet Elements by Iterating:
Give
Never
Up

Test Case - 2
User Output
No.Of Elements in TreeSet:
2
String:
Hello
String:
There
TreeSet Elements by Iterating:
Hello
There

S.No: 32	Exp. Name: Write java program(s) that use collection framework classes.(LinkedList class)	Date: 2023-12-14
----------	--	------------------

Aim:

Write a java program(s) that use collection framework classes.(LinkedList class)

Source Code:

```

LinkedListclass.java

import java.util.*;
public class LinkedListclass
{
    public static void main(String[] args)
    {
        Scanner inp = new Scanner(System.in);
        LinkedList<String,String> linkedHashMap = new
LinkedList<String,String>();
        System.out.print("No.Of Mapping Elements in LinkedList:");
        int num = inp.nextInt();
        inp.nextLine();
        for(int i=0;i<num;i++)
        {
            System.out.print("String:");
            String key = inp.nextLine();
            System.out.print("Corresponding String:");
            String value = inp.nextLine();
            linkedHashMap.put(key,value);
        }
        System.out.println("LinkedList entries : ");
        for(Map.Entry m : linkedHashMap.entrySet())
        {
            System.out.println(m.getKey()+"="+m.getValue());
        }
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
No.Of Mapping Elements in LinkedList:
3
String:
ONE
Corresponding String:
hi
String:
TWO
Corresponding String:
hello

THREE
Corresponding String:
everyone
LinkedHashMap entries :
ONE=hi
TWO=hello
THREE=everyone

Test Case - 2	
User Output	
No.Of Mapping Elements in LinkedHashMap:	
4	
String:	
1x1	
Corresponding String:	
1	
String:	
1x2	
Corresponding String:	
2	
String:	
1x3	
Corresponding String:	
3	
String:	
1x4	
Corresponding String:	
4	
LinkedHashMap entries :	
1x1=1	
1x2=2	
1x3=3	
1x4=4	

S.No: 33	Exp. Name: Write java program(s) that use collection framework classes.(HashMap class)	Date: 2023-12-14
----------	---	------------------

Aim:

Write a java program(s) that use collection framework classes.(HashMap class)

Source Code:

HashMapclass.java

```
import java.util.*;
public class HashMapclass{
    public static void main(String args[])
    {
        Scanner inp = new Scanner(System.in);
        HashMap<String,Integer> hashMap = new HashMap<String,Integer>();
        System.out.print("No.Of Mapping Elements in HashMap:");
        int num = inp.nextInt();
        for(int i=0;i<num;i++){
            inp.nextLine();
            System.out.print("String:");
            String key = inp.nextLine();
            System.out.print("Integer:");
            int value = inp.nextInt();
            hashMap.put(key,value);
        }
        for(Map.Entry m : hashMap.entrySet())
        {
            System.out.println("Key = "+m.getKey()+" , Value = "+m.getValue());
        }
        System.out.println(hashMap);
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
No.Of Mapping Elements in HashMap:
3
String:
hi
Integer:
1
String:
hello
Integer:
2
String:
world

3
Key = hi, Value = 1
Key = world, Value = 3
Key = hello, Value = 2
{hi=1, world=3, hello=2}

Test Case - 2
User Output
No.Of Mapping Elements in HashMap:
3
String:
Students
Integer:
200
String:
Teachers
Integer:
5
String:
Principal
Integer:
1
Key = Teachers, Value = 5
Key = Students, Value = 200
Key = Principal, Value = 1
{Teachers=5, Students=200, Principal=1}

S.No: 34	Exp. Name: Write java program(s) that use collection framework classes.(LinkedList class)	Date: 2023-12-14
----------	--	------------------

Aim:

Write a java program(s) that use collection framework classes.(LinkedList class)

Source Code:

LinkedList.java

```
import java.util.*;
public class LinkedList
{
    public static void main(String args[])
    {
        Scanner inp = new Scanner(System.in);
        LinkedList<String> linkedList = new LinkedList<String>();
        System.out.println("No.Of Strings in LinkedList:");
        int num = inp.nextInt();
        inp.nextLine();
        for(int i=0;i<num;i++)
        {
            System.out.println("Enter the String:");
            linkedList.add(inp.nextLine());
        }
        System.out.println("LinkedList:"+linkedList);
        System.out.println("The List is as follows:");
        Iterator<String> itr = linkedList.iterator();
        while(itr.hasNext())
        {
            System.out.println(itr.next());
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
No.Of Strings in LinkedList:
3
Enter the String:
Hi
Enter the String:
Hello
Enter the String:
World
LinkedList:[Hi, Hello, World]
The List is as follows:
Hi
Hello

Test Case - 2
User Output
No.Of Strings in LinkedList:
2
Enter the String:
Human
Enter the String:
Being
LinkedList:[Human, Being]
The List is as follows:
Human
Being

S.No: 35	Exp. Name: Write java program(s) that use collection framework classes.(ArrayList class)	Date: 2023-12-14
----------	---	------------------

Aim:

Write a java program(s) that use collection framework classes.(ArrayList class)

Source Code:

ArraylistExample.java

```
import java.util.*;
public class ArraylistExample
{
    public static void main(String args[])
    {
        Scanner inp = new Scanner(System.in);
        ArrayList<Integer> arrayList = new ArrayList<Integer>();
        System.out.println("Enter ArrayList length: ");
        int num = inp.nextInt();
        for(int i=1;i<=num;i++)
        {
            arrayList.add(i);
        }
        System.out.println("ArrayList printing by using Iterator: ");
        Iterator<Integer> itr = arrayList.iterator();
        while(itr.hasNext())
        {
            System.out.println(itr.next());
        }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter ArrayList length:
5
ArrayList printing by using Iterator:
1
2
3
4
5

Test Case - 2
User Output
Enter ArrayList length:
3

1
2
3

S.No: 36	Exp. Name: Write java program(s) that use collection framework classes.(HashTable class)	Date: 2023-12-13
----------	---	------------------

Aim:

Write a java program(s) that use collection framework classes.(HashTable class)

Source Code:

HashTableclass.java

```

import java.util.*;
public class HashTableclass{
    public static void main(String[] args)
    {
        Scanner inp = new Scanner(System.in);
        Hashtable<Integer,String> hashTable = new Hashtable<Integer,String>
        ();
        System.out.print("No.Of Mapping Elements in HashTable:");
        int num = inp.nextInt();
        for(int i=0;i<num;i++){
            System.out.print("Rank:");
            int key = inp.nextInt();
            inp.nextLine();
            System.out.print("Name:");
            String value = inp.nextLine();
            hashTable.put(key,value);
        }
        for(Map.Entry<Integer,String> m : hashTable.entrySet())
        {
            System.out.println("Rank : "+m.getKey()+"
            Name : "+m.getValue());
        }
    }
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
No.Of Mapping Elements in HashTable:
3
Rank:
4
Name:
Robert
Rank:
5
Name:
John
Rank:
6

Jennifer	
Rank : 6	Name : Jennifer
Rank : 5	Name : John
Rank : 4	Name : Robert

Test Case - 2	
User Output	
No.Of Mapping Elements in HashTable:	
3	
Rank:	
1	
Name:	
Jon	
Rank:	
2	
Name:	
Robert	
Rank:	
3	
Name:	
Jennifer	
Rank : 3	Name : Jennifer
Rank : 2	Name : Robert
Rank : 1	Name : Jon

