**Aim:**

**Program:**

//Object cloning

class Exp57 implements Cloneable{

int rollno;

String name;

Exp57(int rollno,String name){

this.rollno=rollno;

this.name=name;

}

public Object clone()throws CloneNotSupportedException{

return super.clone();

}

public static void main(String args[]){

try{

Exp57 s1=new Exp57(101,"amit");

Exp57 s2=(Exp57)s1.clone();

System.out.println(s1.rollno+" "+s1.name);

System.out.println(s2.rollno+" "+s2.name);

}catch(CloneNotSupportedException c){}

}

}

**Output:**

101 amit

101 amit

**Result:**

**Aim:**

**Program:**

//single dimensional java array

class Exp58{

public static void main(String args[]){

int a[]=new int[5];//declaration and instantiation

a[0]=10;//initialization

a[1]=20;

a[2]=70;

a[3]=40;

a[4]=50;

//printing array

for(int i=0;i<a.length;i++)//length is the property of array

System.out.println(a[i]);

}}

**Output:**

10

20

70

40

50

**Result:**

**Aim:**

**Program:**

//Passing Array to method in java

class Exp59{

static void min(int arr[]){

int min=arr[0];

for(int i=1;i<arr.length;i++)

if(min>arr[i])

min=arr[i];

System.out.println(min);

}

public static void main(String args[]){

int a[]={33,3,4,5};

min(a);//passing array to method

}}

**Output:**

3

**Result:**

**Aim:**

**Program:**

//Multidimensional java array

class Exp60{

public static void main(String args[]){

//declaring and initializing 2D array

int arr[][]={{1,2,3},{2,4,5},{4,4,5}};

//printing 2D array

for(int i=0;i<3;i++){

for(int j=0;j<3;j++){

System.out.print(arr[i][j]+" ");

}

System.out.println();

}

}}

**Output:**

1 2 3

2 4 5

4 4 5

**Result:**

**Aim:**

**Program:**

//Copying a java array

class Exp61 {

public static void main(String[] args) {

char[] copyFrom = { 'd', 'e', 'c', 'a', 'f', 'f', 'e',

'i', 'n', 'a', 't', 'e', 'd' };

char[] copyTo = new char[7];

System.arraycopy(copyFrom, 2, copyTo, 0, 7);

System.out.println(new String(copyTo));

}

}

**Output:**

caffein

**Result:**

**Aim:**

**Program:**

//Addition of 2 matrices in java

class Exp62{

public static void main(String args[]){

//creating two matrices

int a[][]={{1,3,4},{3,4,5}};

int b[][]={{1,3,4},{3,4,5}};

//creating another matrix to store the sum of two matrices

int c[][]=new int[2][3];

//adding and printing addition of 2 matrices

for(int i=0;i<2;i++){

for(int j=0;j<3;j++){

c[i][j]=a[i][j]+b[i][j];

System.out.print(c[i][j]+" ");

}

System.out.println();//new line

} }}

**Output:**

2 6 8

6 8 10

**Result:**

**Aim:**

**Program:**

//Wrapper class Example: Primitive to Wrapper

public class Exp63{

public static void main(String args[]){

//Converting int into Integer

int a=20;

Integer i=Integer.valueOf(a);//converting int into Integer

Integer j=a;//autoboxing, now compiler will write Integer.valueOf(a) internally

System.out.println(a+" "+i+" "+j);

}}

**Output:**

20 20 20

**Result:**

**Aim:**

**Program:**

//Wrapper class Example: Wrapper to Primitive

public class Exp64{

public static void main(String args[]){

//Converting Integer to int

Integer a=new Integer(3);

int i=a.intValue();//converting Integer to int

int j=a;//unboxing, now compiler will write a.intValue() internally

System.out.println(a+" "+i+" "+j);

}}

**Output:**

3 3 3

**Result:**

**Aim:**

**Program:**

//call by value in java

class Exp65{

int data=50;

void change(int data){

data=data+100;//changes will be in the local variable only

}

public static void main(String args[]){

Exp65 op=new Exp65();

System.out.println("before change "+op.data);

op.change(500);

System.out.println("after change "+op.data);

}

}

**Output:**

before change 50

after change 50

**Result:**

Aim:

**Program:**

//Java String

public class Exp67{

public static void main(String args[]){

String s1="java";//creating string by java string literal

char ch[]={'s','t','r','i','n','g','s'};

String s2=new String(ch);//converting char array to string

String s3=new String("example");//creating java string by new keyword

System.out.println(s1);

System.out.println(s2);

System.out.println(s3);

}}

**Output:**

java

strings

example

**Result:**

**Aim:**

**Program:**

//Immutable String

class Exp68{

public static void main(String args[]){

String s="Sachin";

s.concat(" Tendulkar");//concat() method appends the string at the end

System.out.println(s);//will print Sachin because strings are immutable objects

}

}

**Output:**

Sachin

**Result:**

**Aim:**

**Program:**

//equals()

class Exp682{

public static void main(String args[]){

String s1="Sachin";

String s2="Sachin";

String s3=new String("Sachin");

String s4="Saurav";

System.out.println(s1.equals(s2));//true

System.out.println(s1.equals(s3));//true

System.out.println(s1.equals(s4));//false

}

}

class Teststringcomparison2{

public static void main(String args[]){

String s1="Sachin";

String s2="SACHIN";

System.out.println(s1.equals(s2));//false

System.out.println(s1.equalsIgnoreCase(s3));//true

}

}

**Output:**

true

true

false

**Result:**

**Aim:**

**Program:**

//== operator

class Exp69{

public static void main(String args[]){

String s1="Sachin";

String s2="Sachin";

String s3=new String("Sachin");

System.out.println(s1==s2);//true (because both refer to same instance)

System.out.println(s1==s3);//false(because s3 refers to instance created in nonpool)

}

}

**Output:**

true

false

**Result:**

**Aim:**

**Program:**

//compareTo()

class Exp70{

public static void main(String args[]){

String s1="Sachin";

String s2="Sachin";

String s3="Ratan";

System.out.println(s1.compareTo(s2));//0

System.out.println(s1.compareTo(s3));//1(because s1>s3)

System.out.println(s3.compareTo(s1));//-1(because s3 < s1 )

}

}

**Output:**

0

1

-1

**Result:**

**Aim:**

**Program:**

//String Concatenation by +

class Exp71{

public static void main(String args[]){

String s="Sachin"+" Tendulkar";

System.out.println(s);//Sachin Tendulkar

}

}

**Output:**

Sachin Tendulkar

**Result:**

**Aim:**

**Program:**

//String Concatenation by concat()

class Exp72{

public static void main(String args[]){

String s1="Sachin ";

String s2="Tendulkar";

String s3=s1.concat(s2);

System.out.println(s3);//Sachin Tendulkar

}

}

**Output:**

Sachin Tendulkar

**Result:**

**Aim:**

**Program:**

//substring

public class Exp73{

public static void main(String args[]){

String s="Sachin Tendulkar";

System.out.println(s.substring(6));//Tendulkar

System.out.println(s.substring(0,6));//Sachin

}

}

**Output:**

Tendulkar

Sachin

**Result:**

Aim:

**Program:**

//toUpperCase() and toLowerCase()

public class Exp74{

public static void main(String args[]){

String s="Sachin";

System.out.println(s.toUpperCase());//SACHIN

System.out.println(s.toLowerCase());//sachin

System.out.println(s);//Sachin(no change in original)

}

}

**Output:**

SACHIN

sachin

Sachin

**Result:**

Aim:

**Program:**

//startsWith() and endsWith()public

class Exp76{

public static void main(String args[]){

String s="Sachin";

System.out.println(s.startsWith("Sa"));//true

System.out.println(s.endsWith("n"));//true

}

}

**Output:**

true

true

**Result:**

**Aim:**

**Program:**

//charAt()

class Exp77{

public static void main(String args[]){

String s="Sachin";

System.out.println(s.charAt(0));//S

System.out.println(s.charAt(3));//h

}

}

**Output:**

S

h

**Result:**

**Aim:**

**Program:**

//length()

class Exp78{

public static void main(String args[]){

String s="Sachin";

System.out.println(s.length());//6

}

}

**Output:**

6

**Result:**

**Aim:**

**Program:**

//intern()

class Exp79{

public static void main(String args[]){

String s=new String("Sachin");

String s2=s.intern();

System.out.println(s2);//Sachin

}

}

**Output:**

Sachin

**Result:**

**Aim:**

**Program:**

//valueOf()

class Exp80{

public static void main(String args[]){

int a=10;

String s=String.valueOf(a);

System.out.println(s+10);

}

}

**Output:**

1010

**Result:**

**Aim:**

**Program:**

//replace()

class Exp801{

public static void main(String args[]){

String s1="Java is a programming language. Java is a platform. Java is an Island.";

String replaceString=s1.replace("Java","Mava");//replaces all occurrences of "Java" to "Mava"

System.out.println(replaceString);

}

}

**Output:**

Mava is a programming language. Mava is a platform. Mava is an Island.

**Result:**

**Aim:**

**Program:**

//append()

class Exp81{

public static void main(String args[]){

StringBuffer sb=new StringBuffer("Hello ");

sb.append("Java");//now original string is changed

System.out.println(sb);//prints Hello Java

}

}

**Output:**

Hello Java

**Result:**

**Aim:**

**Program:**

//insert()

class Exp82{

public static void main(String args[]){

StringBuffer sb=new StringBuffer("Hello ");

sb.insert(1,"Java");//now original string is changed

System.out.println(sb);//prints HJavaello

}

}

**Output:**

HJavaello

**Result:**

**Aim:**

**Program:**

//replace()

class Exp83{

public static void main(String args[]){

StringBuffer sb=new StringBuffer("Hello");

sb.replace(1,3,"Java");

System.out.println(sb);//prints HJavalo

}

}

**Output:**

HJavalo

**Result:**

**Aim:**

**Program:**

//delete()

class Exp84{

public static void main(String args[]){

StringBuffer sb=new StringBuffer("Hello");

sb.delete(1,3);

System.out.println(sb);//prints Hlo

}

}

**Output:**

Hlo

**Result:**

**Aim:**

**Program:**

//reverse()

class Exp85{

public static void main(String args[]){

StringBuffer sb=new StringBuffer("Hello");

sb.reverse();

System.out.println(sb);//prints olleH

}

}

**Output:**

olleH

**Result:**

**Aim:**

**Program:**

// capacity()

class Exp86{

public static void main(String args[]){

StringBuffer sb=new StringBuffer();

System.out.println(sb.capacity());//default 16

sb.append("Hello");

System.out.println(sb.capacity());//now 16

sb.append("java is my favourite language");

System.out.println(sb.capacity());//now (16\*2)+2=34 i.e (oldcapacity\*2)+2

}

}

**Output:**

16

16

34

**Result:**

**Aim:**

**Program:**

//ensureCapacity()

class Exp87{

public static void main(String args[]){

StringBuffer sb=new StringBuffer();

System.out.println(sb.capacity());//default 16

sb.append("Hello");

System.out.println(sb.capacity());//now 16

sb.append("java is my favourite language");

System.out.println(sb.capacity());//now (16\*2)+2=34 i.e (oldcapacity\*2)+2

sb.ensureCapacity(10);//now no change

System.out.println(sb.capacity());//now 34

sb.ensureCapacity(50);//now (34\*2)+2

System.out.println(sb.capacity());//now 70

}

}

**Output:**

16

16

34

34

70

**Result:**

**Aim:**

**Program:**

//append()

class Exp88{

public static void main(String args[]){

StringBuilder sb=new StringBuilder("Hello ");

sb.append("Java");//now original string is changed

System.out.println(sb);//prints Hello Java

}

}

**Output:**

Hello Java

**Result:**

Aim:

**Program:**

//insert()

class Exp89{

public static void main(String args[]){

StringBuilder sb=new StringBuilder("Hello ");

sb.insert(1,"Java");//now original string is changed

System.out.println(sb);//prints HJavaello

}

}

**Output:**

HJavaello

**Result:**

**Aim:**

**Program:**

//replace()

class Exp90{

public static void main(String args[]){

StringBuilder sb=new StringBuilder("Hello");

sb.replace(1,3,"Java");

System.out.println(sb);//prints HJavalo

}

}

**Output:**

HJavalo

**Result:**

**Aim:**

**Program:**

//delete()

class Exp91{

public static void main(String args[]){

StringBuilder sb=new StringBuilder("Hello");

sb.delete(1,3);

System.out.println(sb);//prints Hlo

}

}

**Output:**

Hlo

**Result:**

**Aim:**

**Program:**

//reverse()

class Exp92{

public static void main(String args[]){

StringBuilder sb=new StringBuilder("Hello");

sb.reverse();

System.out.println(sb);//prints olleH

}

}

**Output:**

olleH

**Result:**

**Aim:**

**Program:**

//capacity()

class Exp93{

public static void main(String args[]){

StringBuilder sb=new StringBuilder();

System.out.println(sb.capacity());//default 16

sb.append("Hello");

System.out.println(sb.capacity());//now 16

sb.append("java is my favourite language");

System.out.println(sb.capacity());//now (16\*2)+2=34 i.e (oldcapacity\*2)+2

}

}

**Output:**

16

16

34

**Result:**

**Aim:**

**Program:**

//ensureCapacity()

class Exp94{

public static void main(String args[]){

StringBuilder sb=new StringBuilder();

System.out.println(sb.capacity());//default 16

sb.append("Hello");

System.out.println(sb.capacity());//now 16

sb.append("java is my favourite language");

System.out.println(sb.capacity());//now (16\*2)+2=34 i.e (oldcapacity\*2)+2

sb.ensureCapacity(10);//now no change

System.out.println(sb.capacity());//now 34

sb.ensureCapacity(50);//now (34\*2)+2

System.out.println(sb.capacity());//now 70

}

}

**Output:**

16

16

34

34

70

**Result:**