1. Display Fibonacci series up to n terms using command line arguments.

```
class fibonacci{
    public static void main(String[] args){
    int n = Integer.parseInt(args[0]);
    int fib1 = 0;
    int fib2 = 1;
    for(int i = 1; i<=n; i++){
    System.out.println(fib1);
    int sum = fib1+fib2;
    fib1 = fib2;
    fib2 = sum;
    }

    }
    }
```

Output: PS C:\Users\Administrator\Desktop\javapracticals> java fibonacci 5
0
1
1
2
3

2. Demonstrate single inheritance.

```
class room {
    int length, breadth;
    {
        // instance initializer block
        length = 14;
        breadth = 12;
    }
    int area() {
        return length * breadth;
    }
}

class bedroom extends room {
    int height;
    {
        height = 10;
    }
    int volume() {
        return length * breadth * height;
    }
}

public class sinherit {
    public static void main(String[] args) {
        bedroom rm = new bedroom();
        System.out.println("Area= " + rm.area());
        System.out.println("Volume= " + rm.volume());
    }

}
```

Output:

Area= 168

Volume= 1680

3. Implement constructor overloading by passing different number of parameters of different types.

```
      class box{

    double width,height,depth;
    box(double w,double h, double d){
    width=w;
    height=h;
    depth=d;
    }
    box(int lenght){
        width=height=depth=lenght;

    }
    double volume(){
        return width*height*depth;
    }
}

 class conover {
public static void main(String[] args) {
    box ob1=new box(20,30,10);
    box ob2=new box(4);
    //double vol=ob1.volume();
    System.out.println("Volume of box="+ob1.volume());
    //vol=ob2.volume();
    System.out.println("Volume of cube is="+ob2.volume());

}

}
```

Output:
Volume of box=6000.0
Volume of cube is=64.0

3. Sort n elements using an array.

```
import java.util.Scanner;
```

```java
public class sorting
{
    public static void main(String[] args)
    {
        int n, temp;
        Scanner s = new Scanner(System.in);
        System.out.print("Enter no. of elements you want in array:");
        n = s.nextInt();
        int a[] = new int[n];
        System.out.println("Enter all the elements:");
        for (int i = 0; i < n; i++)
        {
            a[i] = s.nextInt();
        }
        for (int i = 0; i < n; i++)
        {
           for (int j = i + 1; j < n; j++)
            {
                if (a[i] > a[j])
                {
                    temp = a[i];
                    a[i] = a[j];
                    a[j] = temp;
                }
            }
        }
        System.out.print("Ascending Order:");
        for (int i = 0; i < n ; i++)
        {
            System.out.print(a[i]+"\t" );
        }
     }
}
```

Output:

Enter no. of elements you want in array:5

Enter all the elements:

12

54

34

10

Ascending Order:7 10 12 34 54

5. Demonstrate string methods

```
class stringmethods {
   public static void main(String[] args) {
       String st1=new String("welcome");
       String st2="java";

       System.out.println("The String st1 is: "+st1);
       System.out.println("The String st2 is: "+st2);

       System.out.println("The length of String is: "+st1.length());

       System.out.println("Character position is "+st1.indexOf('e'));

       System.out.println("The String in uppercase: "+st1.toUpperCase());
       System.out.println("The String in lowecase : "+st1.toLowerCase());

       System.out.println("st1 is equal to st2: "+st1.equals(st2));

       int result=st1.compareTo(st2);
       System.out.println("After compare: ");
       if(result==0)
       {
           System.out.println(st1+ "is equal to "+st2);
       }
       else if(result>0){
           System.out.println(st1+"is greater than" +st2);
       }
       else
       {
           System.out.println(st1+"is smaller than" +st2);
       }

       System.out.println("Character at an index of is is"+st1.charAt(3));

       String st3=st1.substring(2,5);
       System.out.println("Extracted substring is:"+st3);

       System.out.println("After replacing l with r in St1 is: "
+st1.replace('l','r'));

       String st4=" Welcome Java ";
       System.out.println("The string st4 is:" +st4.trim());

       System.out.println("Concatenated string:"+st1.concat(st2));

   }

}
```

Output:

```
The String st1 is: welcome
The String st2 is: java
The length of String is: 7
Character position is 1
The String in uppercase: WELCOME
The String in lowecase : welcome
st1 is equal to st2: false
After compare:
welcomeis greater thanjava
Character at an index of is: c
Extracted substring is:lco
After replacing l with r in St1 is: wercome
The string st4 is:Welcome Java
Concatenated string:welcomejava
```

7. Demonstrate concept of interface.

```
interface Area
{
    final static float pi=3.142f;
    float compute(float x, float y);

}
class rectangle implements Area
{
 public float compute(float x, float y)
{
    return x*y;
}
}

class circle implements Area{
    public float compute(float x,float y)
    {
        return(pi*x*x);
    }
}
public class interfacetest {

    public static void main(String[] args) {
        rectangle rect=new rectangle();
        circle cr=new circle();
        Area area;
        area=rect;
        System.out.println("Area of rectangle is="+area.compute(10,20));
        area=cr;
        System.out.println("Area of Circle=" +area.compute(10,0));
    }
}
```

Output:
Area of rectangle is=200.0
Area of Circle=314.2

7. Demonstrate concept of creating, accessing and using a package.

```
package mathpack;

public class add {
    public int addition(int a, int b){
    return a+b;
   }
}
```

Save as add.java

Compile: javac mathpack\add.java

```
package mathpack;

public class sub {
    public int diff(int a,int b){
    return a-b;
    }

}
```

Save as sub.java

Complile:javac mathpack\sub.java

```
import mathpack.*;
public class calculator {
    public static void main(String[] args) {
        add ob=new add();
        sub ob1=new sub();
        int sum=ob.addition(10,20);
        int difference=ob1.diff(50, 20);
        System.out.println("Addition :" +sum);
        System.out.println("Difference: "+difference);
    }

}
```

Save: calculator.java

Compile: calculator.java

Run:java calculator

9. Demonstrate multithreaded programming.

```
class FirstThread extends Thread
{
    public void run()
    {
        for(int i=0; i<4; i++)
        {

         System.out.println("FirstThread:" +i);
        }
        System.out.println(" First Thread Finished ");
    }
}
class SecondThread extends Thread
{
    public void run()
    {
        for(int i=0; i<4; i++)
        {
            System.out.println("Secondthread:" +i);

        }
        System.out.println(" Second Thread Finished ");
    }
}
class ThirdThread extends Thread
{
    public void run()
    {
        for(int i=0; i<4; i++)
        {
            System.out.println("Thirdthread:" +i);

        }
        System.out.println(" Third Thread Finished ");
    }
}
class multithread
{
    public static void main(String arg[])
    {
        FirstThread a1 = new FirstThread();
        SecondThread b1 = new SecondThread();
        ThirdThread c1 = new ThirdThread();
        a1.start();
        b1.start();
        c1.start();

    }
```

```
}
```

Output:

Secondthread:0
Secondthread:1
Thirdthread:0
FirstThread:0
FirstThread:1
Thirdthread:1
Secondthread:2
Thirdthread:2
FirstThread:2
Thirdthread:3
Secondthread:3
Third Thread Finished
FirstThread:3
Second Thread Finished
First Thread Finished

10. Demonstrate thread priority.

```
class FirstThread extends Thread
{
    public void run()
    {
        for(int i=0; i<4; i++)
        {
            System.out.println("FirstThread:" +i);

        }
        System.out.println(" First Thread Finished ");
    }
}
class SecondThread extends Thread
{
    public void run()
    {
        for(int i=0; i<4; i++)
        {
            System.out.println("Secondthread:" +i);

        }
        System.out.println(" Second Thread Finished ");
    }
}
```

```
class ThirdThread extends Thread
{
    public void run()
    {
        for(int i=0; i<4; i++)
        {
            System.out.println("Thirdthread:" +i);

        }
        System.out.println(" Third Thread Finished ");
    }
}
class threadpriority
{
    public static void main(String arg[])
    {
        FirstThread a1 = new FirstThread();
        SecondThread b1 = new SecondThread();
        ThirdThread c1 = new ThirdThread();
        c1.setPriority(Thread.MAX_PRIORITY);
        a1.setPriority(Thread.MIN_PRIORITY);
        b1.setPriority(Thread.NORM_PRIORITY);
        a1.start();
        b1.start();
        c1.start();


    }
}
```

Output:
Secondthread:0
Secondthread:1
FirstThread:1
Thirdthread:0
First Thread Finished
Secondthread:2
Thirdthread:1
Secondthread:3
Thirdthread:2
Second Thread Finished
Thirdthread:3
Third Thread Finished

6. Demonstrate vector methods.

```java
import java.util.Vector;

public class vectortest {
    public static void main(String[] args) {
        Vector<String> list = new Vector<>();

        list.addElement("JAVA");
        list.addElement("WEB TECH");
        list.addElement("ENGLISH");

        System.out.println("The list of elements are: " + list);

        int size = list.size();
        System.out.println("The size of the list is: " + size);

        String listarray[] = new String[size];
        list.copyInto(listarray);

        System.out.println("The copied list elements are:");
        for (int i = 0; i < size; i++) {
            System.out.println(listarray[i]);
        }

        list.insertElementAt("ARABIC", 2);
        System.out.println("After inserting: " + list);

        list.removeElement("ENGLISH");
        System.out.println("After removing 'ENGLISH': " + list);

        list.removeElementAt(0);
        System.out.println("After removing element at index 0: " + list);

        list.removeAllElements();
        System.out.println("After removing all elements: " + list);
    }
}
```

Output:
The list of elements are: [JAVA, WEB TECH, ENGLISH]
The size of the list is: 3
The copied list elements are:
JAVA
WEB TECH
ENGLISH
After inserting: [JAVA, WEB TECH, ARABIC, ENGLISH]
After removing 'ENGLISH': [JAVA, WEB TECH, ARABIC]
After removing element at index 0: [WEB TECH, ARABIC]
After removing all elements: []

13. Program to count number of strings, integers and float values through command line arguments.

```
public class argcount {
    public static void main(String[] args) {
        int stringCount = 0;
        int integerCount = 0;
        int floatCount = 0;

        for (String arg : args) {
           try {
                // Try to parse as an integer
              Integer.parseInt(arg);
                integerCount++;

          } catch (NumberFormatException e1) {
            try {
                    // If not an integer, try to parse as a float
                 Float.parseFloat(arg);
                    floatCount++;
              } catch (NumberFormatException e2) {
                    // If not an integer or a float, it's a string

                    stringCount++;
              }
            }
        }

        System.out.println("Number of Strings: " + stringCount);
        System.out.println("Number of Integers: " + integerCount);
        System.out.println("Number of Floats: " + floatCount);
    }
}
```

Output:

java argcount Aimca Bhatkal 2005 20.25

Number of Strings: 2

Number of Integers: 1

Number of Floats: 1

14. Program to accept a message from the keyboard and display the no. of words and non-alphabetical characters.

```java
import java.util.Scanner;
public class countstr {
    public static void main(String[] args) {
       Scanner scanner = new Scanner(System.in);
       System.out.println("Enter a message: ");
       String message = scanner.nextLine();
       count(message);
    }
    public static void count(String x) {
       char[] ch = x.toCharArray();
        int letter = 0;
        int space = 0;
        int num = 0;
        int other = 0;

        for (int i = 0; i < x.length(); i++) {
           if (Character.isLetter(ch[i])) {
                letter++;
            }
           else if (Character.isDigit(ch[i])) {
                num++;
            }
           else if (Character.isSpaceChar(ch[i])) {
                space++;
            }
            else {
                other++;
                  }
        }
        System.out.println("letter: " + letter);
        System.out.println("space: " + space);
        System.out.println("number: " + num);
        System.out.println("other: " + other);
    }
}
```

Output:

Enter a message:
hello Aimca 2025@
letter: 10
space: 2
number: 4
other: 1

12. Demonstrate simple banner applet.

```java
import java.applet.*;
```

```java
import java.awt.*;

/* <applet code="simplebanner" width=400 height=80></applet> */

public class simplebanner extends Applet implements Runnable {

    String msg = "A Simple Moving Banner";
    Thread t = null;
    boolean stopFlag;
    int x = 0;
    int y = 40;

    public void init() {
        setBackground(Color.magenta);
        setForeground(Color.yellow);
    }

    public void start() {
        t = new Thread(this);
        stopFlag = false;
        t.start();
    }

    public void run() {
        for( ; ; ) {
            try {
                repaint();
                Thread.sleep(50);

                x += 5;

                if (x > getWidth()) {
                    x = -msg.length() * 10;
                }

                if (stopFlag)
                    break;

            } catch(Exception e) {}
        }
    }

    public void stop() {
        stopFlag = true;
        t = null;
    }

    public void paint(Graphics g) {
        Font f = new Font("Serif", Font.BOLD, 24);  // Increased Font Size
        g.setFont(f);
```

```
        g.drawString(msg, x, y);
    }
}
```

Output:

15. Demonstrate creation of list using an applet.

```
import java.awt.*;
import java.applet.*;
/*<applet code="listitem" width=150 height=150></applet>*/
public class listitem extends Applet {
    List myList;

    public void init() {
        myList = new List(5, true);
        myList.add("JAVA");
        myList.add("Web Tech");
        myList.add("Eng");
        myList.add("WCM");
        myList.add("C");
        myList.add("Algo");
        add(myList);
        setBackground(Color.lightGray);
    }

    }
```

Output: