

JAVA LAB

WEEK 1:

AIM: Accept two strings from the user and print it on console with concatenation of “and” in the middle of the strings.

a)Command line:

Program:

```
class Twostings
{
    public static void main(String args[])
    {
        String a=args[0];
        String b=args[1];
        System.out.println("2 arguments are "+a+" and "+b);
    }
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week1>javac Twostings.java

E:\books and pdfs\sem4 pdfs\java lab\week1>java Twostings.java hello world
2 arguments are hello and world

E:\books and pdfs\sem4 pdfs\java lab\week1>
```

b)scanner class

```
import java.util.Scanner;
class Twostrings_scanner
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        String a=sc.nextLine();
        String b=sc.nextLine();
        sc.close();
        System.out.println("2 strings are "+a+" and "+b);
    }
}
```

```
E:\books and pdfs\sem4 pdfs\java lab\week1>javac Twostrings_scanner.java

E:\books and pdfs\sem4 pdfs\java lab\week1>java Twostrings_scanner.java
hello world!
welcome to the world of java
2 strings are hello world! and welcome to the world of java
```

AIM:

Accept 12-hour time zone and convert into its corresponding 24-hour time zone.

Note: Accept hours, minutes and seconds separately from the user (e.g. 07 05 45 PM should be displayed as 19:05:45)

a)Command line:

Program:

```
class Time_conversion{
    public static void main(String args[]){
        int hr=Integer.parseInt(args[0]);
        int min=Integer.parseInt(args[1]);
        int sec=Integer.parseInt(args[2]);
        String ampm=args[3];
        if((ampm.equals("pm")||ampm.equals("PM")) && hr<12)
        {
            hr=hr+12;
        }
        if((ampm.equals("pm")||ampm.equals("PM")) && hr==12)
        {
            hr=0;
        }

        System.out.printf("time in 24 hrs is
"+String.format("%02d:%02d:%02d",hr,min,sec));
    }
}
```

```
E:\books and pdfs\sem4 pdfs\java lab\week1>javac Time_conversion.java
E:\books and pdfs\sem4 pdfs\java lab\week1>java Time_conversion.java 5 6 7 pm
time in 24 hrs is 17:06:07
E:\books and pdfs\sem4 pdfs\java lab\week1>
```

b)Scanner class

```
import java.util.*;
class Time_conversion_sc{
    public static void main(String args[]){
        Scanner sc=new Scanner(System.in);
        int hr=sc.nextInt();
        int min=sc.nextInt();
        int sec=sc.nextInt();
        String ampm=sc.next();
        if((ampm.equals("pm")||ampm.equals("PM")) && hr<12)
        {
            hr=hr+12;
        }
        if((ampm.equals("pm")||ampm.equals("PM")) && hr==12)
        {
            hr=0;
        }

        System.out.printf("time in 24 hrs is %02d: %02d : %02d
",hr,min,sec);
        System.out.println();
        System.out.format("time in 24 hrs is %02d: %02d : %02d
",hr,min,sec);
        System.out.println();
        System.out.printf("time in 24 hrs is
"+String.format("%02d:%02d:%02d",hr,min,sec));
    }
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week1>javac Time_conversion_sc.java
E:\books and pdfs\sem4 pdfs\java lab\week1>java Time_conversion_sc.java
4
12
55
pm
time in 24 hrs is 16:12:55
E:\books and pdfs\sem4 pdfs\java lab\week1>
```

Aim:

Accept a number „n” and print the list of „n” Fibonacci terms recursively.

a)command line:

Program:

```
class Fibrec{
    protected static int fibb(int a){
        if(a==1||a==0)
            return 1;
        else
            return fibb(a-1)+fibb(a-2);
    }
    public static void main(String args[])
    {
        int a=Integer.parseInt(args[0]);
        for(int i=0;i<a;i++){
            System.out.println(fibb(i)+" is "+(i+1)+" th term fibb series");
        }
    }
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week1>javac Fibrec.java

E:\books and pdfs\sem4 pdfs\java lab\week1>java Fibrec.java 10
1 is 1 th term fibb series
1 is 2 th term fibb series
2 is 3 th term fibb series
3 is 4 th term fibb series
5 is 5 th term fibb series
8 is 6 th term fibb series
13 is 7 th term fibb series
21 is 8 th term fibb series
34 is 9 th term fibb series
55 is 10 th term fibb series
```

b)scanner

```
import java.util.*;
class Fibbrec_sc{
    private static int fibbrec(int a){
        if(a==1||a==0)
            return 1;
        else
            return fibbrec(a-1)+fibbrec(a-2);
    }
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        int a=sc.nextInt();
        for(int i=0;i<a;i++){
            System.out.println(fibbrec(i)+" is "+(i+1)+" th term fibb series");
        }
    }
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week1>javac Fibbrec_sc.java

E:\books and pdfs\sem4 pdfs\java lab\week1>java Fibbrec_sc.java
10
1 is 1 th term fibb series
1 is 2 th term fibb series
2 is 3 th term fibb series
3 is 4 th term fibb series
5 is 5 th term fibb series
8 is 6 th term fibb series
13 is 7 th term fibb series
21 is 8 th term fibb series
34 is 9 th term fibb series
55 is 10 th term fibb series
```

WEEK 2:

1)AIM:

Write a program that accepts the set of inputs from the user of various integer data types and determines the primitive data type that is capable of properly storing that input.

PROGRAM:

```
import java.util.*;
import java.io.*;
public class Integer_data_types
{
    public static void main(String... arg)
    {
        int n;
        Scanner sc=new Scanner(System.in);
        n=sc.nextInt();
        for(int i=0;i<n;i++)
        {
            try{
                long num=sc.nextLong();
                if(num>=-127 && num<128){
                    System.out.println("BYTE");
                }
                if(num>Short.MIN_VALUE && num<Short.MAX_VALUE)
                {
                    System.out.println("SHORT");
                }
                if(num >= Integer.MIN_VALUE && num <= Integer.MAX_VALUE)
                    System.out.println("*int");
                if(num >= Long.MIN_VALUE && num <= Long.MAX_VALUE)
                    System.out.println("*long");
            }
            catch(Exception e){
                System.out.println("No integer databtype suits the input");
            }
        }
    }
}
```

```
}
```

```
E:\books and pdfs\sem4 pdfs\java lab\week2>javac Integer_data_types.java
E:\books and pdfs\sem4 pdfs\java lab\week2>java Integer_data_types.java
6
123
BYTE
1354
SHORT
235436536
*int
235436536655658
*long
343
SHORT
23423
SHORT
```

2)AIM:Write a program that accepts an array of integers and print those which are both odd and prime. If no such element in that array print “Not found”.

PROGRAM:

```
import java.util.Scanner;
class Oddprime{
    public static int prime(int n){
        int i;
        for(i=2;i<=n/2;i++)
        {
            if(n%i==0)
                return 0;
        }
        return 1;
    }
    public static void main(String args[])
    {
        int i,n;
        Scanner sc=new Scanner(System.in);
        n=sc.nextInt();
        int arr[]=new int[n];
```



```
for(i=0;i<n;i++){
    arr[i]=sc.nextInt();
    if(arr[i]%2!=0){
        int p=prime(arr[i]);

    }
}
System.out.println("ODD Prime numbers are ");
for(i=0;i<n;i++){

    if(arr[i]%2!=0){
        int p=prime(arr[i]);
        if(p==1)
        {
            System.out.print(arr[i]+" ");
        }
    }
}
}
```

OUTPUT:

```
E:\books and pdfs\sem4 pdfs\java lab\week2>javac Oddprime.java

E:\books and pdfs\sem4 pdfs\java lab\week2>java Oddprime.java
5
41 45 55 11 81
ODD Prime numbers are
41 11
E:\books and pdfs\sem4 pdfs\java lab\week2>
```

3)AIM: Write a program to accept contents into an Integer Array and print the frequency of each number in the order of their number of occurrences.

PROGRAM:

```
import java.util.Scanner;
class Frequency {
    public static void main(String[] args) {
        //Initialize array
        int n;
        Scanner sc=new Scanner(System.in);
        n=sc.nextInt();
        int arr[] = new int[n];
        for(int i=0;i<n;i++)
            arr[i]=sc.nextInt();
        //Array fr will store frequencies of element
        int [] fr = new int [n];
        int visited = -1;
        for(int i = 0; i < arr.length; i++){
            int count = 1;
            for(int j = i+1; j < arr.length; j++){
                if(arr[i] == arr[j]){
                    count++;//4
                    //To avoid counting same element again
                    fr[j] = visited;
                }
            }
            if(fr[i] != visited)
                fr[i] = count;
        }
        int i,j;
        for(i=0;i<arr.length;i++)
        {
            for(j=i+1;j<arr.length;j++)
            {
                if(fr[i]>fr[j])
                {
                    fr[i]=fr[i]+fr[j];
                    fr[j]=fr[i]-fr[j];
                    fr[i]=fr[i]-fr[j];

                    arr[i]=arr[i]+arr[j];
                    arr[j]=arr[i]-arr[j];
                    arr[i]=arr[i]-arr[j];
                }
            }
        }
        //Displays the frequency of each element present in array
```

```
System.out.println("-----");
System.out.println(" Element | Frequency");
System.out.println("-----");
for(i = 0; i < fr.length; i++){
    if(fr[i] != visited)
        System.out.println("    " + arr[i] + "    |    " + fr[i]);
}
System.out.println("-----");
}
```

```
E:\books and pdfs\sem4 pdfs\java lab\week2>java Frequency.java
10
23 42 22 23 33 42 22 22 10 10
-----
Element | Frequency
-----
    33   |    1
    23   |    2
    10   |    2
    42   |    2
    22   |    3
-----
```

WEEK 3:

1)AIM:

Write a program that accepts an „n“ ordered square matrix elements into a single dimension array and print the elements of leading diagonal (top left to bottom right).

Program:

```
import java.util.Scanner;
class Diagonal{
    public static void main(String... arg){
        int n,m,i,j;
        Scanner sc=new Scanner(System.in);
        n=sc.nextInt();
        m=sc.nextInt();
        int arr[][]=new int[n][m];
        for(i=0;i<n;i++)
        {
            for(j=0;j<m;j++)
            {
                arr[i][j]=sc.nextInt();
            }
        }
        for(i=0;i<n;i++){
            for(j=0;j<m;j++){
                if(i==j || (i+j)==n-1)
                    System.out.print(arr[i][j]);
                else
                    System.out.print("-");
            }
            System.out.println();
        }
    }
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week3>javac Diagonal.java
E:\books and pdfs\sem4 pdfs\java lab\week3>java Diagonal.java
3 3
1 2 3 4 5 6 7 8 9
1-3
-5-
7-9
```

2) Write a program that accepts an „m x n” double dimension array, where „m” represents financial years and „n” represents Ids of the items sold. Each element in the array represents the number of items sold in a particular year. Identify the year and id of the item which has more demand.

Program:

```
import java.util.Scanner;
class Week3_b{
    public static void main(String... arg){
        Scanner sc=new Scanner(System.in);
        int m=sc.nextInt();
        int n=sc.nextInt();
        int years[]=new int[m];
        int itemid[]=new int[n];
        System.out.println("enter the years");
        for(int i=0;i<m;i++){
            years[i]=sc.nextInt();
        }
        System.out.println("enter the years");
        for(int i=0;i<n;i++){
            itemid[i]=sc.nextInt();
        }
        int arr[][]=new int[2022][2022];
        System.out.println("enter the no of items sold");
        for(int i:years){
            for(int j:itemid){
                arr[i][j]=sc.nextInt();
            }
        }
        int mdemand=arr[m-1][n-1];
        int dyear=years[m-1];
        int did=itemid[n-1];
        for(int i:years){
            for(int j:itemid){
                if(arr[i][j]>mdemand){
                    mdemand=arr[i][j];
                    dyear=i;
                    did=j;
                }
            }
        }
        System.out.println("Item id "+did+" has max demand of "+mdemand+"
in year "+dyear);
    }
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week3>java Week3_b.java
5 5
enter the years
2016 2017 2018 2019 2020
enter the years
1000 1001 1002 1003 1004
enter the no of items sold
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Item id 1004 has max demand of 25 in year 2020

E:\books and pdfs\sem4 pdfs\java lab\week3>
```

3)AIM:

Write a program that accepts an „n” ordered square matrix and calculate the absolute difference between the sums of elements in their diagonals.

Program:

```
import java.util.scanner;
class Absdiff{
    public static void main(String... arg){
        int n,m,i,j;
        Scanner sc=new Scanner(System.in);
        n=sc.nextInt();
        m=sc.nextInt();
        int arr[][]=new int[n][m];
        for(i=0;i<n;i++)
        {
            for(j=0;j<m;j++)
            {
                arr[i][j]=sc.nextInt();
            }
        }
        int sum1=0,sum2=0;
        for(i=0;i<n;i++){
            for(j=0;j<m;j++)
```

```
{
    if(i==j)
    {
        sum1+=arr[i][j];
    }
    if((i+j)==n-1)
    {
        sum2+=arr[i][j];
    }
}
}
System.out.println(sum1+" "+sum2);
if((sum1-sum2)>0){
    System.out.println(sum1-sum2);
}
else
    System.out.println(sum2-sum1);
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week3>javac Absdiff.java
E:\books and pdfs\sem4 pdfs\java lab\week3>java Absdiff.java
3 3
1 2 3 4 5 6 7 8 9
diagonal sums are 15 15
difference is 0
```

WEEK 4:

- 1) AIM: Create a class Box that uses a parameterized constructor to initialize the dimensions of a box. The dimensions of the Box are width, height, depth. The class should have a method that can return the volume of the box. Create an object of the Box class and test the functionality.

Program:

```
import java.util.*;
class P4_1{
    static float height,depth,width;
    P4_1(float h,float w,float d){
        height=h;
        width=w;
        depth=d;
    }
    double volume(){
        return height*width*depth;
    }
    public static void main(String... arg){
        Scanner sc=new Scanner(System.in);
        float h=sc.nextFloat();
        float w=sc.nextFloat();
        float d=sc.nextFloat();
        P4_1 ob1=new P4_1(h,w,d);
        System.out.print("Volume is "+ob1.volume());
    }
}
```

OUTPUT:

```
E:\books and pdfs\sem4 pdfs\java lab\week4>javac P4_1.java
E:\books and pdfs\sem4 pdfs\java lab\week4>java P4_1.java
12.3
5.1
10.6
Volume is 664.9380493164062
E:\books and pdfs\sem4 pdfs\java lab\week4>
```

- 2) AIM: Create a new class called Calculator with the following methods: o A static method called powerInt(int num1,int num2) This method should return num1 to the power num2. o A static method called powerDouble(double num1,double num2). This method should return num1 to the power num2. o Invoke both the methods and test the functionality. Also count the number of objects created.

PROGRAM:

```
import java.util.*;
class P4_2{
    public static void main(String... arg){
        float a,b;
        int c,d;
        Scanner sc=new Scanner(System.in);
        a=sc.nextFloat();
        b=sc.nextFloat();
        c=sc.nextInt();
        d=sc.nextInt();
        Calculator mycal=new Calculator();
        System.out.println("Power double function "+mycal.powerDouble(a,b));
        System.out.println("Power int function "+mycal.powerInt(c,d));
        System.out.println("Number of times object is created "+mycal.count);
    }
}
class Calculator{
    int count=1;
    Calculator(){
        ++count;
    }
    public static double powerDouble(double num1,double num2){
        return Math.pow(num1,num2);
    }
    public static int powerInt(int num1,int num2){
        double k=Math.pow(num1,num2);
        int p=1;
```

```
        for(int i=1;i<=num1;i++){
            p*=num2;
        }
        return p;
    }
}
```

OUTPUT:

```
E:\books and pdfs\sem4 pdfs\java lab\week4>JAVAC P4_2.java

E:\books and pdfs\sem4 pdfs\java lab\week4>java P4_2.java
1.2
2.3
4
5
Power double function 1.5209568803356843
Power int function 625
Number of times object is created 2
```

WEEK 5

- 1) AIM: Accept a String and a number n from the user. Divide the given string into substrings each of size n and sort them lexicographically.

Program:

```
import java.util.*;
class Strdivide{
    public static String[] Lexicographic(String ele,int n){
        String[] arr=new String[ele.length()/n];
        int s=0,i=0;
        while(s<ele.length()){

            String val=ele.substring(s,s+n);
            arr[i]=val;
        }
    }
}
```

```
        i+=1;
        s+=n;
    }
    return arr;
}
public static void main(String... arg){
    Scanner sc=new Scanner(System.in);
    System.out.println("string:");
    String ele=sc.nextLine();
    System.out.println("size");
    int n=sc.nextInt();
    String[] arr=new String[ele.length()%n];
    ele=ele.replace(" ", "");
    if(ele.length()%n!=0){
        System.out.print("not possible");

    }

    else
    {
        arr=Lexicographic(ele,n);
        Arrays.sort(arr);
        System.out.println("substrings are");
        for(String i:arr){
            System.out.print(i+" ");
        }
    }
}
```

OUTPUT:

```
E:\books and pdfs\sem4 pdfs\java lab\week5>javac Strdivide.java
E:\books and pdfs\sem4 pdfs\java lab\week5>java Strdivide.java
string:
gayatri vidya parishad college of engineering autonomous
size
2
substrings are
ad au co ee eg eo fe ga id in iv ll mo ng ng no pa ri ri sh to tr us ya ya
E:\books and pdfs\sem4 pdfs\java lab\week5>
```

- 2) AIM: Accept an array of strings and display the number of vowels and consonants occurred in each string.

PROGRAM:

```
import java.util.*;
class Vowels_consonents{
    public static void vowels_con(String s){
        int s1=0,s2=0;
        int j=0,k=0;
        for(int i=0;i<s.length();i++){
            if(s.charAt(i)=='a' || s.charAt(i)=='e' || s.charAt(i)=='i' || s.charAt(i)=='o' ||
s.charAt(i)=='u' || s.charAt(i)=='A' || s.charAt(i)=='E' || s.charAt(i)=='I' || s.c
harAt(i)=='O' || s.charAt(i)=='U'){
                s1++;
                j++;
            }
            else{
                s2++;
                k++;
            }
        }
        System.out.println("string "+s+" number of vowels "+s1);
        System.out.println("string "+s+" number of consonents "+s2);
    }
}
```

```
        System.out.println();
    }
    public static void main(String... arg){
        int n;
        Scanner sc=new Scanner(System.in);
        n=sc.nextInt();
        sc.nextLine();
        String[] arr=new String[n+1];
        System.out.println(n);

        for(int i=0;i<n;i++){
            {
                arr[i]=sc.nextLine().trim();
            }
            System.out.println(arr[0]);
            System.out.println(arr[1]);
            for(int i=0;i<n;i++){
                if(arr[i]!=""){
                    vowels_con(arr[i]);
                }
            }
        }
    }
}
```

OUTPUT:

```
E:\books and pdfs\sem4 pdfs\java lab\week5>javac Vowels_consonents.java

E:\books and pdfs\sem4 pdfs\java lab\week5>java Vowels_consonents.java
3
3
gayatri vidya parishad college of engineering
vizag
andhra pradesh
string gayatri vidya parishad college of engineering number of vowels 17
string gayatri vidya parishad college of engineering number of consonents 28

string vizag number of vowels 2
string vizag number of consonents 3

string andhra pradesh number of vowels 4
string andhra pradesh number of consonents 10
```

- 3) AIM: Accept two strings from the user and determine if the strings are anagrams or not.

PROGRAM:

```
import java.util.*;
public class Anagrams
{
    public static void main(String... arg){
        String s1,s2;

        Scanner sc=new Scanner(System.in);
        s1=sc.nextLine();
        s2=sc.nextLine();
        char []c1=s1.toCharArray();
        char []c2=s2.toCharArray();
        if(s1.length()!=s2.length()){
            System.out.println("Strings "+s1+" and "+s2+" are not
anagrams");
            System.exit(0);
        }
        for(int i=0;i<s1.length();i++){
            c1[i]=s1.charAt(i);
```

```
        c2[i]=s2.charAt(i);
    }
    Arrays.sort(c1);
    Arrays.sort(c2);
    int flag=1;
    for(int i=0;i<s1.length();i++){
        if(c1[i]!=c2[i]){
            flag=0;
            break;
        }
    }
    if(flag==1){
        System.out.println("Strings "+s1+" and "+s2+" are anagrams");
    }
    else
    {
        System.out.println("Strings "+s1+" and "+s2+" are not
anagrams");
    }
}
}
```

OUTPUT:

```
E:\books and pdfs\sem4 pdfs\java lab\week5>javaC Anagrams.java

E:\books and pdfs\sem4 pdfs\java lab\week5>java Anagrams.java
apple
pleap
Strings apple and pleap are anagrams

E:\books and pdfs\sem4 pdfs\java lab\week5>java Anagrams.java
hello
heloo
Strings hello and heloo are not anagrams
```


Java week 6 to 10:

Week 6:

Program 1:

Code:

```
import java.util.*;
public class Week6__1{

    public static void main(String...arg){

        Cost c1=new Cost();
        c1.display_details();

    }

}

class vehicle {
    Scanner sc=new Scanner(System.in);
    String vehicle_type = sc.next();
}

class brand extends vehicle {
    Scanner sc=new Scanner(System.in);
    String brand_name = sc.next();

}

class Cost extends brand {
    Scanner sc=new Scanner(System.in);
    double cost1 = sc.nextDouble();

    Cost() {
        System.out.println("Constructor of cost class");
    }

    void display_details(){
        System.out.println("type of vehicle is "+vehicle_type);
    }
}
```

```
        System.out.println("type of brand is " + brand_name);
        System.out.println("cost of vehicle "+vehicle_type+" is "+cost1);

    }
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week6>javac Week6__1.java

E:\books and pdfs\sem4 pdfs\java lab\week6>java Week6__1.java
bike
royal enfield
170100
Constructor of cost class
type of vehicle is bike
type of brand is royal
cost of vehicle bike is 170100.0
```

Program 2:**Code:**

```
import java.util.*;
class Week6__2{
public static void main(String... arg){
    figure_3d f1[]=new figure_3d[4];
    f1[0]=new cylinder();
    f1[1]=new cone();
    f1[2]=new sphere();
    f1[3]=new cube();
    f1[0].surface_Area();
    f1[1].surface_Area();
    f1[2].surface_Area();
    f1[3].surface_Area();
}
}
```

```
class figure_3d{
    void surface_Area(){
        System.out.println("Total surface Area of the given 3d
figure");
    }
}

class cylinder extends figure_3d{
void surface_Area(){
    Scanner sc=new Scanner(System.in);
    System.out.println(" radius and height of cylinder ");
    double r=sc.nextDouble();
    double h=sc.nextDouble();
    System.out.println("Total surface area of cylinder is
"+(2*3.14*r*(r+h)));
}

}
class cone extends figure_3d{
void surface_Area(){
    Scanner sc=new Scanner(System.in);
    System.out.println(" radius and slant height of cone ");
    double r=sc.nextDouble();
    double h=sc.nextDouble();
    System.out.println("Total surface area of cylinder is
"+(3.14*r*(r+h)));
}

}
class sphere extends figure_3d{
void surface_Area(){
    Scanner sc=new Scanner(System.in);
    System.out.println(" radius of sphere ");
    double r=sc.nextDouble();
    System.out.println("Total surface area of cylinder is
"+(4*3.14*r*r));
}

}
class cube extends figure_3d{
void surface_Area(){
```

```
Scanner sc=new Scanner(System.in);
System.out.println(" side of cube ");
double a=sc.nextDouble();
System.out.println("Total surface area of cylinder is "+(6*a*a));
}

}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week6>javac Week6__2.java

E:\books and pdfs\sem4 pdfs\java lab\week6>java Week6__2.java
radius and height of cylinder
12 3
Total surface area of cylinder is 1130.4
radius and slant height of cone
4 2
Total surface area of cylinder is 75.36
radius of sphere
5
Total surface area of cylinder is 314.0
side of cube
6
Total surface area of cylinder is 216.0
```

Week 7:

Program 1:

Code:

Stud.java:

```
package pak1;
public class Stud {
    public int roll_num=12;
    public String name="gayathri";

}
```

Spts.java

```
package pak2;  
  
public interface Spts{  
    void display();  
}
```

Student_Report.java:

```
package report;  
import pak1.Stud;  
import pak2.Spts;  
  
class sport implements Spts{  
    public void display(){  
        System.out.println("Sports available : \n throwball\n table  
tennis\n basket ball\n cricket\n football");  
    }  
}  
  
class Student_Report{  
    public static void main(String... arg){  
        Stud s1=new Stud();  
        Spts s2=new sport();  
        System.out.println("Name of the student is "+s1.name);  
        System.out.println("Roll number of the student is  
"+s1.roll_num);  
        s2.display();  
    }  
}
```

```
E:\books and pdfs\sem4 pdfs\java lab\week7>javac -d . Spts.java  
E:\books and pdfs\sem4 pdfs\java lab\week7>javac -d . Stud.java  
E:\books and pdfs\sem4 pdfs\java lab\week7>javac -d . Student_Report.java
```

```
Name of the student is gayathri  
Roll number of the student is 12  
Sports available :  
  throwball  
  table tennis  
  basket ball  
  cricket  
  football
```

Program 2:

Code:

```
import java.util.*;  
import java.io.*;  
import java.lang.*;  
  
import java.util.*;  
class Week7_2{  
    public static void main(String... arg){  
        Scanner sc=new Scanner(System.in);  
  
        byte b=sc.nextByte();  
        short s=sc.nextShort();  
  
        int i=sc.nextInt();  
        long l=sc.nextLong();  
        float f=sc.nextFloat();  
        double d=sc.nextDouble();  
        char c='c';  
        boolean boo=true;
```

```
Byte byteobj=b;
Short shortobj=s;
Integer intobj=i;
Long longobj=l;
Float floatobj=f;
Double doubleobj=d;
Character charobj=c;
Boolean boolobj=boo;

Vector v1=new Vector();
v1.add(byteobj);
v1.add(shortobj);
v1.add(intobj);
v1.add(longobj);
v1.add(floatobj);
v1.add(doubleobj);
v1.add(charobj);
v1.add(boolobj);
System.out.println("---Printing primitive values---");
Iterator itr=v1.iterator();
while(itr.hasNext()){
    System.out.println(itr.next());
}

}

}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week7>java Week7_2.java
Note: Week7_2.java uses unchecked or unsafe operations.
Note: Recompile with -Xlint:unchecked for details.
1
23
123
32344345
223.4
2445.22
---Printing primitive values---
1
23
123
32344345
223.4
2445.22
c
true
```

Week 8:**Program 1:****Code:**

```
import java.util.*;
import java.lang.Math;
class Week8_1{
public static void main(String... arg){
    int x1=0,x2,r;
    Random random=new Random();
    x2=random.nextInt(200);

    while(x1==0){
        x1=random.nextInt(200);
    }

    if(x2>x1){
        x2=x2+x1;
    }
}
```



```
        x1=x2-x1;
        x2=x2-x1;
    }
    int n=0;
    while(n==0){
        n=random.nextInt(100);
    }
    System.out.println(x1);
    System.out.println(x2);
    System.out.println(n);
    for(int i=0;i<n;i++){
        r=random.nextInt(x1-x2+1)+x2;
        System.out.print(r+" ");
    }
}
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week8>javac Week8_1.java
E:\books and pdfs\sem4 pdfs\java lab\week8>java Week8_1.java
57
31
30
47 51 52 39 33 53 45 55 31 50 57 33 57 49 50 38 54 52 44 39 52 44 53 37 42 33 42 51 53 37
E:\books and pdfs\sem4 pdfs\java lab\week8>
```

Program 2:

Code:

```
import java.util.*;
class MyArrayList{
    private Object[] arrlist=new Object[1];
    private int size_=0;
    public void add(Object object){
        if(size_==arrlist.length){
            arrlist=Arrays.copyOf(arrlist,arrlist.length*2);
        }
    }
}
```

```
        arrlist[size_]=object;
        size_++;
    }
    public Object get(int ind){
        if(ind>=size_||ind<0){
            throw new ArrayIndexOutOfBoundsException("element not
found");
        }
        return arrlist[ind];
    }
    public void remove(int ind){
        if(ind>=size_||ind<0){
            throw new ArrayIndexOutOfBoundsException("cant delete");
        }
        for(int i=ind;i<size_;i++){
            arrlist[i]=arrlist[i+1];
        }
        size_--;
    }
    public int size(){
        return size_;
    }
    public static void main(String... ARG){

        Scanner sc=new Scanner(System.in);
        MyArrayList myArrayList1 = new MyArrayList();
        System.out.println("enter number of elements");
        int n=sc.nextInt();
            System.out.println("enter elements");

        for(int i=0;i<n;i++){
            myArrayList1.add(sc.nextInt());
        }
        System.out.println("\nSize: " + myArrayList1.size());
        for (int i = 0; i < myArrayList1.size(); i++) {
            System.out.print(myArrayList1.get(i)+" ");
        }

        System.out.println();

        System.out.println("enter element to be added");
```

```
        myArrayList1.add(sc.nextInt());
        System.out.println("\nSize: " + myArrayList1.size());
    for (int i = 0; i < myArrayList1.size(); i++) {
        System.out.print(myArrayList1.get(i)+" ");
    }
    System.out.println();

    System.out.println("enter element to be removed");

        myArrayList1.remove(sc.nextInt());

    System.out.println("\nSize: " + myArrayList1.size());

    for (int i = 0; i < myArrayList1.size(); i++) {
        System.out.print(myArrayList1.get(i)+" ");
    }
}
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week8>javac MyArrayList.java

E:\books and pdfs\sem4 pdfs\java lab\week8>java MyArrayList.java
enter number of elements
5
enter elements
1 2 3 4 5

Size: 5
1 2 3 4 5
enter element to be added
7

Size: 6
1 2 3 4 5 7
enter element to be removed
3

Size: 5
1 2 3 5 7
```

Program 3:**Code:**

```
import java.util.*;

class Week8_3{
public static void main(String... arg){
    Scanner sc=new Scanner(System.in);
    employee e1=new employee();
    employee e2=new employee();
    employee e3=new employee();
    e1.setter(sc.nextInt(),sc.next(),sc.nextInt());
    e2.setter(sc.nextInt(),sc.next(),sc.nextInt());
    e3.setter(sc.nextInt(),sc.next(),sc.nextInt());
    HashMap<Integer,employee> hash1=new HashMap<Integer,employee>();
    hash1.put(e1.getid(),e1);
```

```
        hash1.put(e2.getid(),e2);
        hash1.put(e3.getid(),e3);
        int search_key=sc.nextInt();
        if(hash1.containsKey(search_key)){
            System.out.println("Searched employee found\n employee id is "+
search_key+" employee name is "+hash1.get(search_key).getname()+" and age
is "+hash1.get(search_key).getage());
        }
        else{
            System.out.println("searched employee not found");
        }
    }
}

class employee{
    private int id;
    private String name;
    private int age;
    void setter(int i,String n,int a){
        id=i;
        name=n;
        age=a;
    }
    int getid(){
        return id;
    }
    String getname(){
        return name;
    }
    int getage(){
        return age;
    }
}
```

output:

```
E:\books and pdfs\sem4 pdfs\java lab\week8>javac Week8_3.java

E:\books and pdfs\sem4 pdfs\java lab\week8>java Week8_3.java
1 shiva 21
2 ravi 22
3 sandhya 20
2
Searched employee found
employee id is 2 employee name is ravi and age is 22
```

Week 9:

Program 1:

Code:

```
import java.io.*;
import java.lang.*;
import java.util.*;
public class Week9_1{
    public static void main(String[] args) throws IOException
    {
        File file1 = new File("E:\\books and pdfs\\sem4 pdfs\\java
lab\\week9\\sample.txt");
        FileInputStream fs = new FileInputStream(file1);
        InputStreamReader inp = new InputStreamReader(fs);

        BufferedReader reader = new BufferedReader(inp);
        String line;
        List<String> a1=new ArrayList<String>();
        // Initializing counters
        int terminating_symbols = 0;
        int alphabets=0;
        int numbers=0;
        int splsymbols=0;
        int data=inp.read();
```

```
while(data!=-1)
{
    char c = (char) data;
    if(c>='a' && c<='z' || c>='A' && c<='Z'){
        alphabets+=1;
    }
    else if(c>='0' && c<='9')
    {
        numbers+=1;
    }
    else if(c==' '||c=='\n' || c=='\t'){
        terminating_symbols+=1;
    }
    else{
        splsymbols+=1;
    }
    data=inp.read();
}

try{
    FileOutputStream obj1=new FileOutputStream("Statistic.txt");
    String s1=String.format("Total number of alphabets = %d \nTotal
number of numbers = %d \nTotal number of terminating_symbols = %d \nTotal
number of special symbols = %d \n
",alphabets,numbers,terminating_symbols,splsymbols);
    byte[] byteArray = s1.getBytes();

    obj1.write(byteArray);

}
catch (IOException e) {
    System.out.println("An error occurred."+e);
}
System.out.println("Total number of alphabets = " + alphabets);
System.out.println("Total number of numbers = " + numbers);
System.out.println("Total number of terminating_symbols = " +
terminating_symbols);
System.out.println("Total number of special symbols = " +
splsymbols);
}
```

Output:

Sample.txt:

```
sample.txt x
Stop words are available in abundance in any human language. By removing these words, we remove the
low-level information from our text in order to give more focus to the important information .
In order words , we can say that the removal of such words does not show any negative consequences
on the model we train for our task . Removal of stop words definitely reduces the dataset size and
thus reduces the training time due to the fewer number of tokens involved in the training .

English has developed over the course of more than 1,400 years. The earliest forms of English , a group of West Germanic
(Ingvaenonic) dialects brought to Great Britain by Anglo-Saxon settlers in the 5th century ,
are collectively called Old English. Middle English began in the late 11th century with
the Norman conquest of England; this was a period in which English was influenced by Old French ,
in particular through its Old Norman dialect.[ 9 ][ 10 ] Early Modern English began in the late
15th century with the introduction of the printing press to London, the printing of
the King James Bible and the start of the Great Vowel Shift .[ 11 ]
```

```
E:\books and pdfs\sem4 pdfs\java lab\week9>javac Week9_1.java

E:\books and pdfs\sem4 pdfs\java lab\week9>java Week9_1.java
Total number of alphabets = 889
Total number of numbers = 14
Total number of terminating_symbols = 215
Total number of special symbols = 40

E:\books and pdfs\sem4 pdfs\java lab\week9>
```

```
Statistic.txt x

Total number of alphabets = 889
Total number of numbers = 14
Total number of terminating_symbols = 215
Total number of special symbols = 40
```

Program 3:

Code:

```
import java.util.*;
import java.io.*;
class Week9_3{
```



```
    public static void main(String[] args) {
        File file = new File("sample.txt");
        File file1 = new File("stopwords.txt");
        ArrayList li1=new ArrayList();

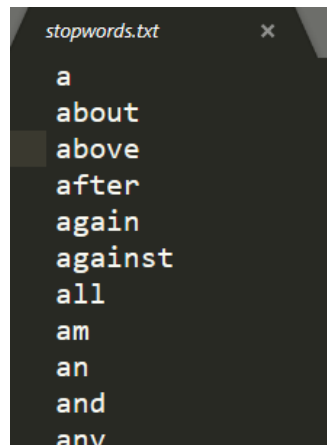
        try{
            Scanner input1 = new Scanner(file1);
            while (input1.hasNext()) {
                String a=input1.next();
                li1.add(a.toLowerCase());
            }

        }
        catch(FileNotFoundException e){
            System.out.println("file not found");
        }
        try{
            Scanner input = new Scanner(file);
            ArrayList li=new ArrayList();
            while (input.hasNext()) {
                String a=input.next().toLowerCase();
                if(li1.contains(a) ||li.contains(a))
                    continue;
                li.add(a);
            }
            Collections.sort(li);

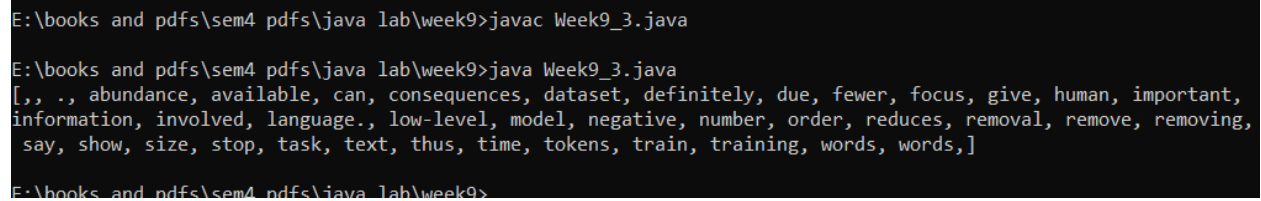
            System.out.println(li);
        }
        catch(FileNotFoundException e){
            System.out.println("file not found");
        }
    }
}
```

Output:

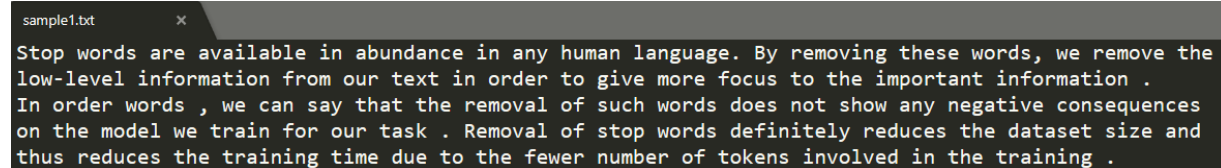
stopwords.txt contains all stop words,



```
stopwords.txt
a
about
above
after
again
against
all
am
an
and
any
```



```
E:\books and pdfs\sem4 pdfs\java lab\week9>javac Week9_3.java
E:\books and pdfs\sem4 pdfs\java lab\week9>java Week9_3.java
[, ., abundance, available, can, consequences, dataset, definitely, due, fewer, focus, give, human, important,
information, involved, language., low-level, model, negative, number, order, reduces, removal, remove, removing,
say, show, size, stop, task, text, thus, time, tokens, train, training, words, words,]
E:\books and pdfs\sem4 pdfs\java lab\week9>
```



```
sample1.txt
Stop words are available in abundance in any human language. By removing these words, we remove the
low-level information from our text in order to give more focus to the important information .
In order words , we can say that the removal of such words does not show any negative consequences
on the model we train for our task . Removal of stop words definitely reduces the dataset size and
thus reduces the training time due to the fewer number of tokens involved in the training .
```

Week 10:**Program 1:**

code:

```
import java.util.*;
class Week10_1{
    public static void main(String... arg){
        Scanner sc=new Scanner(System.in);
        int a,b,c;
        try{
            a=Integer.parseInt(sc.next());
            b=Integer.parseInt(sc.next());
            System.out.println(a/b);
        }
        catch(NumberFormatException e){
            System.out.println("number format error "+e);
        }
        catch(ArithmeticException e){
            System.out.println("Arithmetic expression error "+e);
        }
    }
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week10>javac Week10_1.java
E:\books and pdfs\sem4 pdfs\java lab\week10>java Week10_1.java
12 3
4
E:\books and pdfs\sem4 pdfs\java lab\week10>java Week10_1.java
12 0
Arithmetic expression error java.lang.ArithmeticException: / by zero
E:\books and pdfs\sem4 pdfs\java lab\week10>java Week10_1.java
sample 3
number format error java.lang.NumberFormatException: For input string: "sample"
```

Program 2:**Code:**

```
import java.util.*;
class Week10_2{

public static void main(String... arg){
    try
    {
        Scanner sc=new Scanner(System.in);
        divisible(sc.nextInt());

    }
    catch (Exception e)
    {
        System.out.println(e);
    }
}

public static void divisible(int a) throws divisiblebytwoException {
    if(a%2!=0){
        throw new divisiblebytwoException("not divisible by 2");
    }
    else{
        System.out.println(a+" is divisible by 2");
    }
}

}
}

class divisiblebytwoException extends Exception{
    divisiblebytwoException(String s){
        System.out.println(s);
    }
}
```

Output:

```
E:\books and pdfs\sem4 pdfs\java lab\week10>javac Week10_2.java  
  
E:\books and pdfs\sem4 pdfs\java lab\week10>java Week10_2.java  
12  
12 is divisible by 2  
  
E:\books and pdfs\sem4 pdfs\java lab\week10>java Week10_2.java  
11  
not divisible by 2  
divisiblebytwoException
```