# OBJECT ORIENTED PROGRAMMING LAB

## Co3 & Co4

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# Program 1

10/05/2021

**Aim:** Area of different shapes using overloaded functions

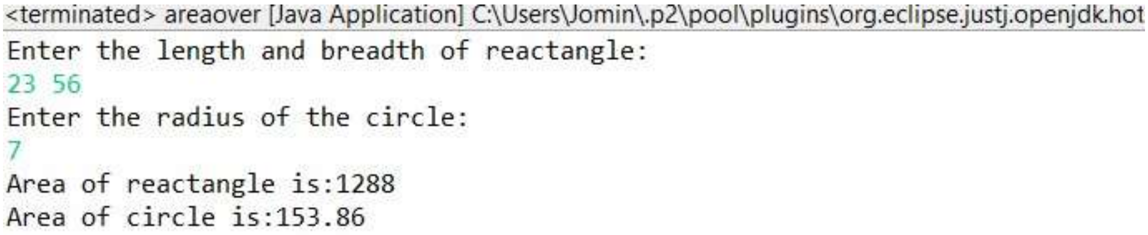
## Algorithm:

```
Step 1: Start
Step 2: Create a class called areaover.
Step 3: Create 2 member functions to calculate the area of
            rectangle and circle.
Step 4: Perform the area finding operations inside the
            functions.
Step 5: create object of the class area
Step 6: call the functions which is created using objects
Step 7: print the values of area of each shape
Step 8: Stop
```

## Source Code:

```
package packoops;
import java.util.Scanner;
public class areaover {
public void area(int l,int b) {
System.out.println("Area of reactangle is:"+l*b);
}
public void area(float r)
{
System.out.println("Area of circle is:"+3.14*r*r);
}
public static void main(String[] args) {
int l,b;
float r;
Scanner obk=new Scanner(System.in);
areaover obj=new areaover();
System.out.println("Enter the length and breadth of reactangle:");
l=obk.nextInt();
b=obk.nextInt();
System.out.println("Enter the radius of the circle:");
r=obk.nextInt();
obj.area(l,b);
obj.area(r);
}
}
```

## Output:



```
<terminated> areaover [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hot
Enter the length and breadth of reactangle:
23 56
Enter the radius of the circle:
7
Area of reactangle is:1288
Area of circle is:153.86
```

# Program 2

06/05/2021

**Aim:** Create a class ‘Employee’ with data members Empid, Name, Salary, Address and constructors to initialize the data members. Create another class ‘Teacher’ that inherit the properties of class employee and contain its own data members department, Subjects taught and constructors to initialize these data members and also include display function to display all the data members. Use array of objects to display details of N teachers.

## Algorithm:

```
Step 1: Start
Step 2: Create a class employees
Step 3: Create data members for empid, name salary, address
Step 4: Create a constructor to initialize these data members
Step 5: Create another class teacher which is inherited from
Step 6: Create teacher class’s data members and initialize it
with constructor
Step 7: Create function to display ala datamembers
Step 8: Create array of objects
Step 9: call the display function to print all the data members
Step 10: Stop
```

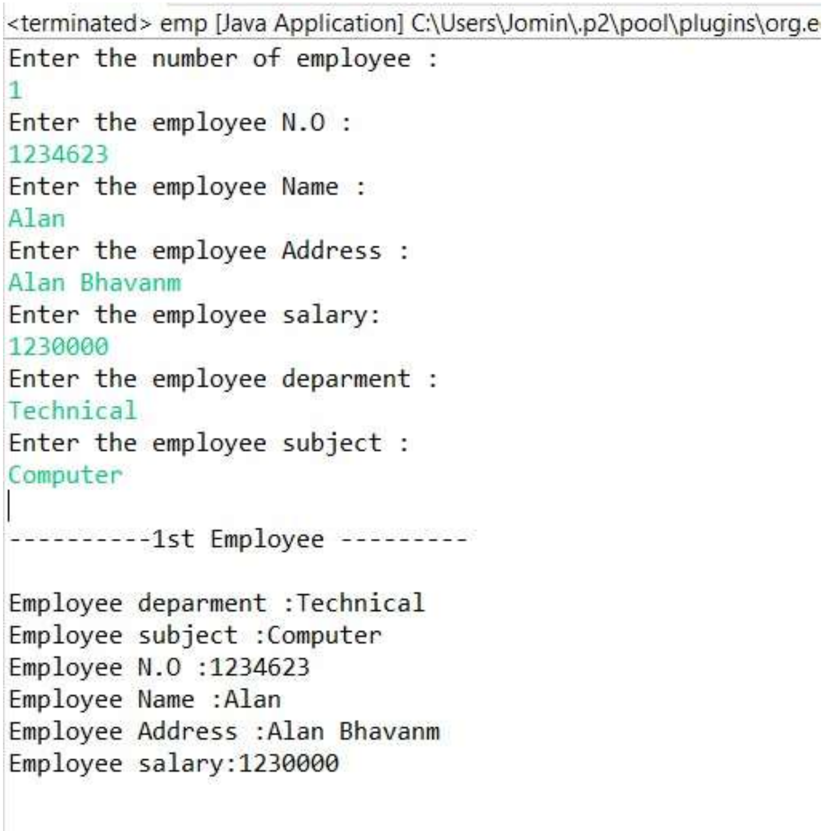
**Source Code:**

```
package Graphics;
import java.util.Scanner;
class  employees{
int b;
String c;
String a;
int s;
public employees() {
Scanner obq=new Scanner(System.in);
Scanner obq1=new Scanner(System.in);Scanner obq2=new
Scanner(System.in);
System.out.println("Enter the employee N.O :");
b=obq.nextInt();
System.out.println("Enter the employee Name :");
c=obq1.nextLine();
System.out.println("Enter the employee Address :");
a=obq2.nextLine();
System.out.println("Enter the employee salary:");
s=obq.nextInt();
}
public void edisplay() {
System.out.println("Employee N.O :"+b);
System.out.println("Employee Name :"+c);
System.out.println("Employee Address :"+a);
System.out.println("Employee salary:"+s);
}
}
class teachers extends employees {
String c,a;
public teachers() {
Scanner obq1=new Scanner(System.in);
Scanner obq2=new Scanner(System.in);
```

```
System.out.println("Enter the employee deparment :");
c=obq1.nextLine();
System.out.println("Enter the employee subject :");
a=obq2.nextLine();
}
void tdisplay() {
System.out.println("Employee deparment :"+c);
System.out.println("Employee subject :"+a);
}
}
class data extends teachers{
public data() {
}
public void display(int i) {
System.out.println("\n"+"----------"+i+"st Employee ---------
"+"\n");
tdisplay();
edisplay();
}
}
public class  emp{
public static void main(String[] args) {
int a;
Scanner obq=new Scanner(System.in);
System.out.println("Enter the number of employee :");
a=obq.nextInt();
data[] obj=new data[a];
for(int i=0;i<a;i++)
{
obj[i]=new data();
}
for(int i=0;i<a;i++)
{
```

```
obj[i].display(i+1);
}
}
}
```

## Output:



```
<terminated> emp [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.e
Enter the number of employee :
1
Enter the employee N.O :
1234623
Enter the employee Name :
Alan
Enter the employee Address :
Alan Bhavanm
Enter the employee salary:
1230000
Enter the employee deparment :
Technical
Enter the employee subject :
Computer

----------1st Employee ---------

Employee deparment :Technical
Employee subject :Computer
Employee N.O :1234623
Employee Name :Alan
Employee Address :Alan Bhavanm
Employee salary:1230000
```

# Program 3

06/05/2021

**Aim:** Create a class 'Person' with data members Name, Gender, Address, Age  and a constructor to initialize the data members and another class 'Employee' that inherits the properties of class Person and also contains its own data members like Empid, Company_name, Qualification, Salary and its own constructor. Create another class 'Teacher' that inherits the properties of class Employee and contains its own data members like Subject, Department, Teacherid and also contain constructors and methods to display the data members. Use array of objects to display details of N teachers.

## Algorithm:

```
Step 1: Start
Step 2: Create a class person with data members for name,
        gender, address, age
Step 3: Create constructor to initialize these object
Step 4: Create another class Employee that inherited the
        properties of class person and also creates its data
        members like empid, companyname , qualification,
        salary and its constructor
Step 5: Create another class Teacher that inherits the
        properties of class employee and creates its data
        members
```

Step 6: Creates array of object
Step 7: Using these arrays of objects print the values
Step 8: Stop

**Source Code:**

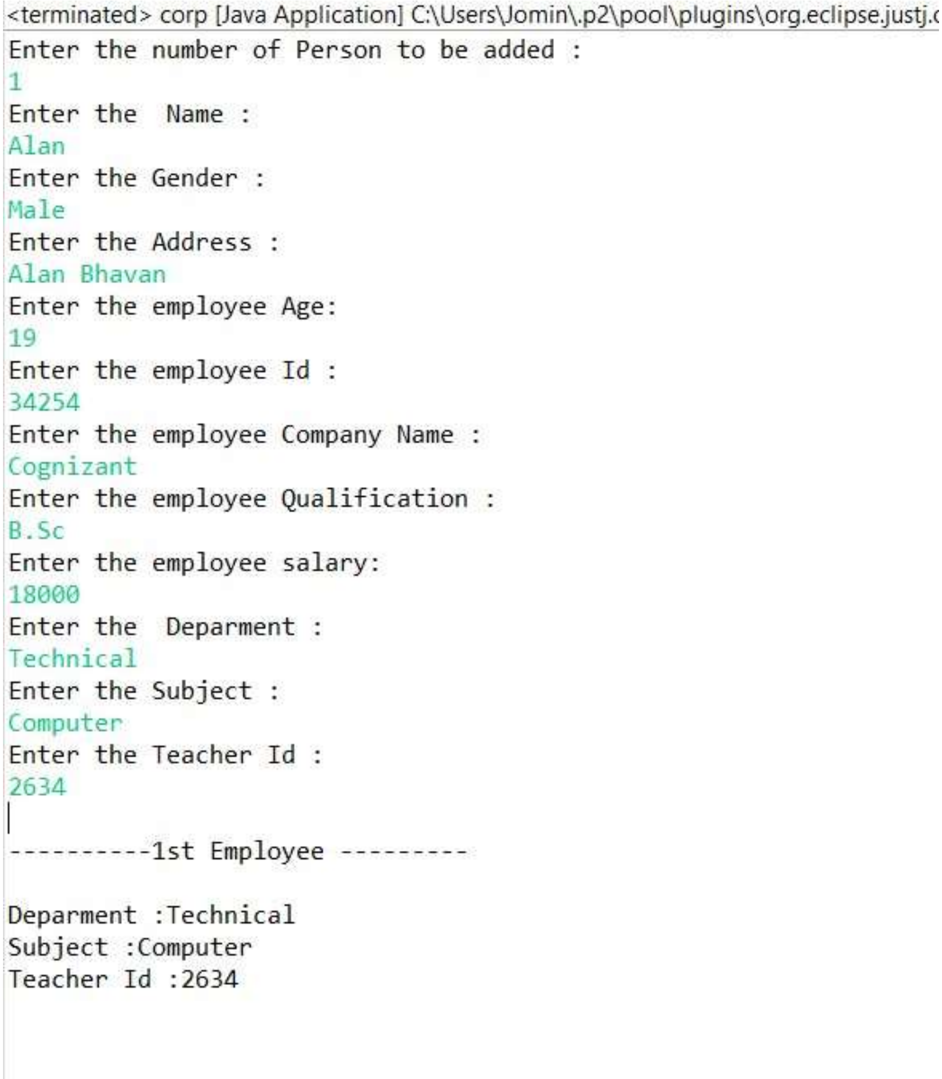
```
package packoops;
import java.util.Scanner;
class person{
String x,y,z;
int v;
public person() {
Scanner obq=new Scanner(System.in);
Scanner obq1=new Scanner(System.in);
Scanner obq2=new Scanner(System.in);
Scanner obq3=new Scanner(System.in);

System.out.println("Enter the  Name :");
x=obq1.nextLine();
System.out.println("Enter the Gender :");
y=obq2.nextLine();
System.out.println("Enter the Address :");
z=obq3.nextLine();
System.out.println("Enter the employee Age:");
v=obq.nextInt();
}
}
class  employees extends person {
int b;
String c;
String a;
int s;
```

```
public employees() {
Scanner obq=new Scanner(System.in);
Scanner obq1=new Scanner(System.in);Scanner obq2=new
Scanner(System.in);
System.out.println("Enter the employee Id :");
b=obq.nextInt();
System.out.println("Enter the employee Company Name :");
c=obq1.nextLine();
System.out.println("Enter the employee Qualification :");
a=obq2.nextLine();
System.out.println("Enter the employee salary:");
s=obq.nextInt();
}
}
class teachers extends employees {
String c,a;
int p;
public teachers() {
Scanner obq1=new Scanner(System.in);
Scanner obq2=new Scanner(System.in);
Scanner obq3=new Scanner(System.in);
System.out.println("Enter the  Deparment :");
c=obq1.nextLine();
System.out.println("Enter the Subject :");
a=obq2.nextLine();
System.out.println("Enter the Teacher Id :");
p=obq3.nextInt();
}
public void tdisplay() {
System.out.println("Deparment :"+c);
System.out.println("Subject :"+a);
System.out.println("Teacher Id :"+p);
}
```

```
}
class data extends teachers{
public data() {
}
public void display(int i) {
System.out.println("\n"+"----------"+i+"st Employee ---------"+"\n");
tdisplay();
}
}
public class corp{
public static void main(String[] args) {
int a;
Scanner obq=new Scanner(System.in);
System.out.println("Enter the number of Person to be added :");
a=obq.nextInt();
data[] obj=new data[a];
for(int i=0;i<a;i++)
{
obj[i]=new data();
}
for(int j=0;j<a;j++)
{
obj[j].display(j+1);
}
}
}
```

# Output:



```
<terminated> corp [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.
Enter the number of Person to be added :
1
Enter the  Name :
Alan
Enter the Gender :
Male
Enter the Address :
Alan Bhavan
Enter the employee Age:
19
Enter the employee Id :
34254
Enter the employee Company Name :
Cognizant
Enter the employee Qualification :
B.Sc
Enter the employee salary:
18000
Enter the  Deparment :
Technical
Enter the Subject :
Computer
Enter the Teacher Id :
2634

----------1st Employee ---------

Deparment :Technical
Subject :Computer
Teacher Id :2634
```

# Program 4

06/05/2021

**Aim:** Write a program has class Publisher, Book, Literature and Fiction. Read the information and print the details of books from either the category, using inheritance.

## Algorithm:

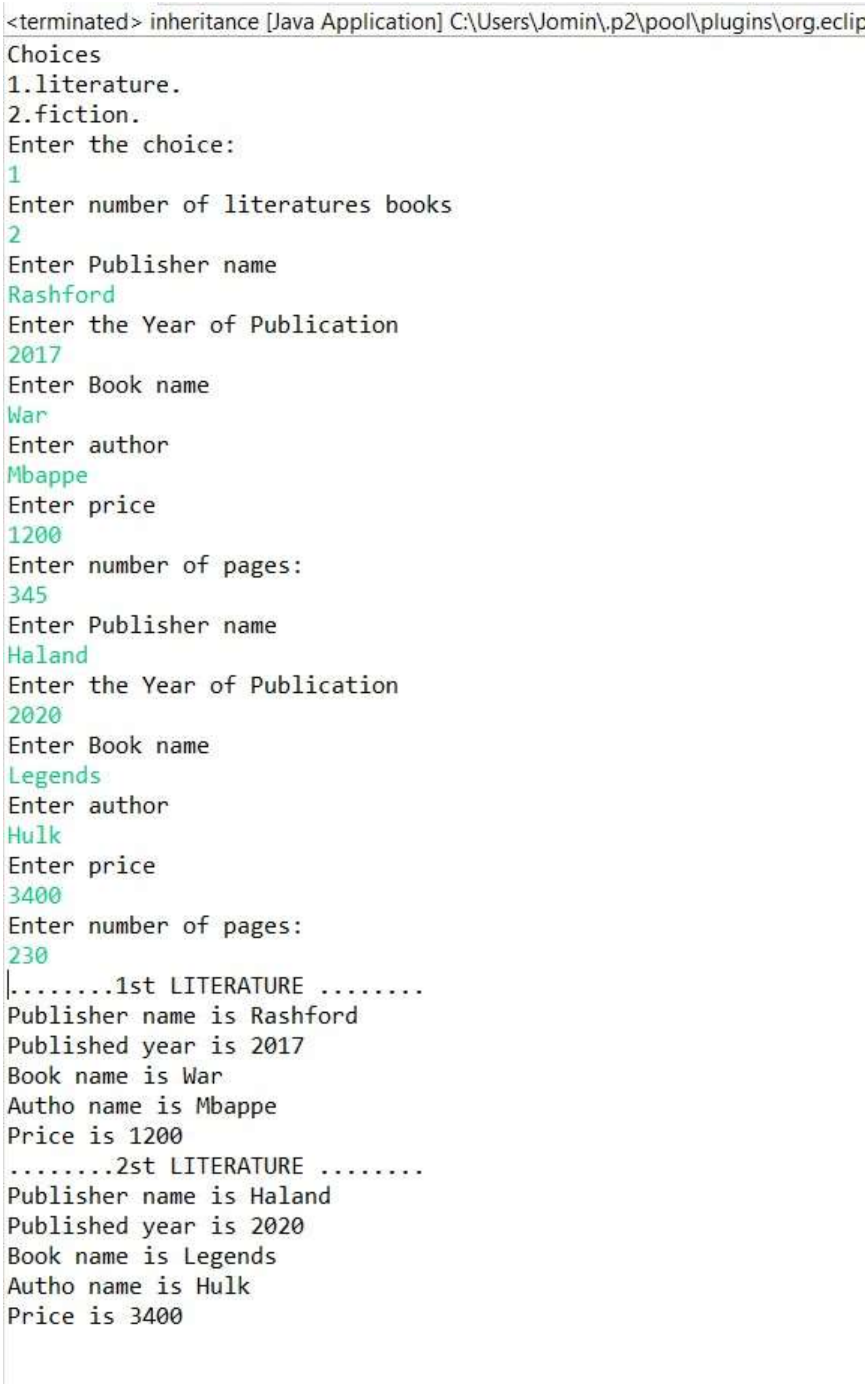
```
Step 1: Start
Step 2: Create a class publisher, Book, Literature and Fiction using inheritance
Step 3: Create each class's data members and member functions.
Step 4: Read this information from the user
Step 5: Print the details of book from the category
Step 6: Stop.
```

## Source Code:

```
package packoops;
import java.util.Scanner;
class publisher {
String p_name;
int p_year;
Scanner sc=new Scanner(System.in);
publisher()
{
System.out.println("Enter Publisher name");
p_name=sc.next();
System.out.println("Enter the Year of Publication");
p_year=sc.nextInt();
}
}
class book extends publisher {
String b_name,b_author;
int b_price;
Scanner sc=new Scanner(System.in);
book() {
System.out.println("Enter Book name");
b_name=sc.next();
System.out.println("Enter author");
b_author=sc.next();
System.out.println("Enter price");
b_price=sc.nextInt();
}
}
class literature extends book {
int page;
Scanner sc=new Scanner(System.in);
literature() {
System.out.println("Enter number of pages: ");
page=sc.nextInt();
}
void display(int i)
{
System.out.println("........"+i+"st LITERATURE ........");
System.out.println("Publisher name is "+p_name);
System.out.println("Published year is "+p_year);
System.out.println("Book name is "+b_name);
System.out.println("Autho name is "+b_author);
System.out.println("Price is "+b_price);
}
}
class fictions extends book {
```

```
int page;
Scanner sc=new Scanner(System.in);
fictions() {
System.out.println("Enter number of pages");
page=sc.nextInt();
}
void display(int i)
{
System.out.println("......... "+i+"st FICTION BOOK .........");
System.out.println("Publisher name is "+p_name);
System.out.println("Published year is "+p_year);
System.out.println("Book name is "+b_name);
System.out.println("Autho name is "+b_author);
System.out.println("Price is "+b_price);
}
}
public class inheritance {
public static void main(String[] args) {
int n,m,c,choice;
Scanner sc=new Scanner(System.in);
System.out.println("Choices");
System.out.println("1.literature.");
System.out.println("2.fiction.");
System.out.println("Enter the choice:");
choice=sc.nextInt();
switch(choice)
{
case 1:
System.out.println("Enter number of literatures books");
n=sc.nextInt();
literature l[]=new literature[n];
for(int i=0;i<n;i++) {
l[i]=new literature();
}
for(int i=0;i<n;i++) {
l[i].display(i+1);
}
break;
case 2:
System.out.println("Enter number of fictions books");
m=sc.nextInt();
fictions f[]=new fictions[m];
for(int i=0;i<m;i++) {
f[i]=new fictions();
}
for(int i=0;i<m;i++) {
f[i].display(i+1);
}
break;
default:
System.out.println("invalid choice");
break;
}
}
}
```

# Output:



```
<terminated> inheritance [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclip
Choices
1.literature.
2.fiction.
Enter the choice:
1
Enter number of literatures books
2
Enter Publisher name
Rashford
Enter the Year of Publication
2017
Enter Book name
War
Enter author
Mbappe
Enter price
1200
Enter number of pages:
345
Enter Publisher name
Haland
Enter the Year of Publication
2020
Enter Book name
Legends
Enter author
Hulk
Enter price
3400
Enter number of pages:
230
........1st LITERATURE ........
Publisher name is Rashford
Published year is 2017
Book name is War
Autho name is Mbappe
Price is 1200
........2st LITERATURE ........
Publisher name is Haland
Published year is 2020
Book name is Legends
Autho name is Hulk
Price is 3400
```

# Program 5

06/05/2021

**Aim:** Create classes Student and Sports. Create another class Result inherited from Student and Sports. Display the academic and sports score of a student.

## Algorithm:

```
Step 1: Start
Step 2: Create classes student and sports
Step 3: Create another class Result inherited from Student and
        Sports
Step 4: Create a function called display to print
Step 5: Display academic and sports score of student
Step 6: Stop
```

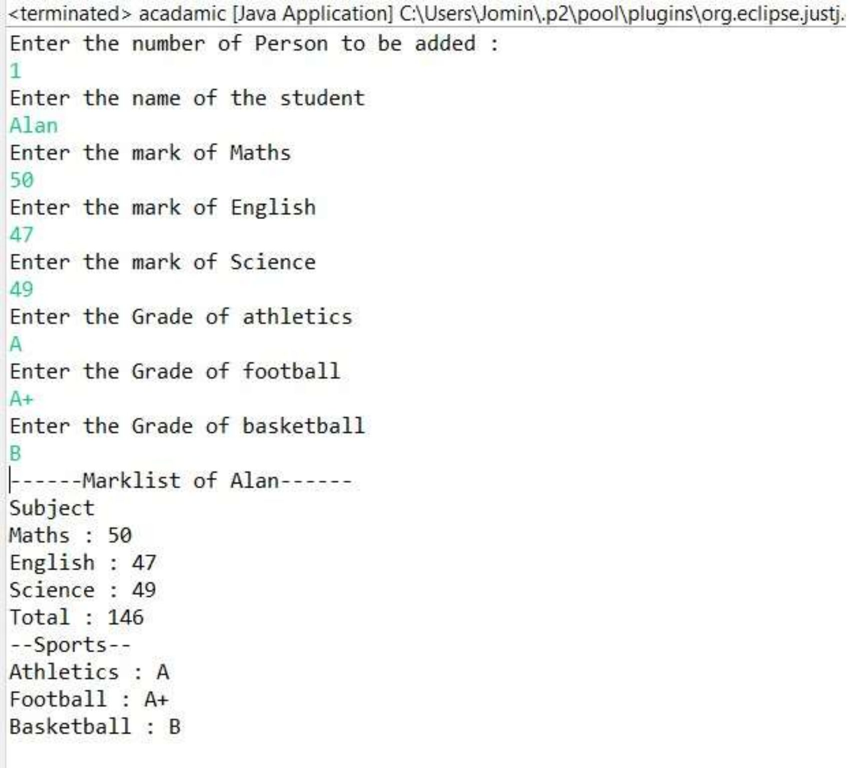
## Source Code:

```
package packoops;
import java.util.Scanner;
class student {
String name;
int maths,english,science;
Scanner sc=new Scanner(System.in);
public student() {
System.out.println("Enter the name of the student");
name=sc.next();
System.out.println("Enter the mark of Maths");
maths=sc.nextInt();
System.out.println("Enter the mark of English");
english=sc.nextInt();
System.out.println("Enter the mark of Science");
```

```
science=sc.nextInt();
}
}
class sports extends student{
String athletics,football,basketball;
public sports() {
System.out.println("Enter the Grade of athletics");
athletics=sc.next();
System.out.println("Enter the Grade of football");
football=sc.next();
System.out.println("Enter the Grade of basketball");
basketball=sc.next();
}
}
class result extends sports{
public result() {
}
int total=maths+english+science;
void display(){
System.out.println("------Marklist of "+name+"------");
System.out.println("Subject ");
System.out.println("Maths : "+maths);
System.out.println("English : "+english);
System.out.println("Science : "+science);
System.out.println("Total : "+total);
System.out.println("--Sports-- ");
System.out.println("Athletics : "+athletics);
System.out.println("Football : "+football);
System.out.println("Basketball : "+basketball);
}
}
public class acadamic {
public static void main(String[] args) {
```

```
int b;
Scanner obj1=new Scanner(System.in);
System.out.println("Enter the number of Person to be added
:");
b=obj1.nextInt();
result[] obj=new result[b];
for(int i=0;i<b;i++)
{
obj[i]=new result();
}
for(int j=0;j<b;j++)
{
obj[j].display();
}
}
}
```

**Output:**



```
<terminated> acadamic [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.
Enter the number of Person to be added :
1
Enter the name of the student
Alan
Enter the mark of Maths
50
Enter the mark of English
47
Enter the mark of Science
49
Enter the Grade of athletics
A
Enter the Grade of football
A+
Enter the Grade of basketball
B
------Marklist of Alan------
Subject
Maths : 50
English : 47
Science : 49
Total : 146
--Sports--
Athletics : A
Football : A+
Basketball : B
```

# Program 6

06/05/2021

**Aim:** Create an interface having prototypes of functions area() and perimeter(). Create two classes Circle and Rectangle which implements the above interface. Create a menu driven program to find area and perimeter of objects.

**Algorithm:**

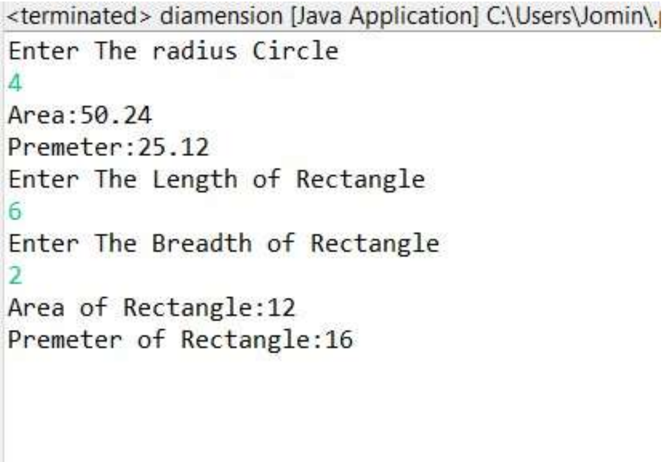
```
Step 1: Start
Step 2: Create an interface having prototypes of function
            area() and perimeter()
Step 3: Create classes that implements the interface
Step 4: Create two classes circle and rectangle
Step 5: find the perimeter and area of rectangle and circle
Step 6: Print the results
Step 7: Stop
```

**Source Code:**

```
package packoops;
import java.util.Scanner;
interface process{
void data();
void area();
void premeter();
}
class Circle implements process{
float r;
double area1,premeter1;
public void data()
```

```
{
Scanner obj=new Scanner(System.in);
System.out.println("Enter The radius Circle");
r=obj.nextInt();
}
public void  area() {
area1=3.14*r*r;
System.out.println("Area:"+area1);
}
public void premeter() {
premeter1=2*3.14*r;
System.out.println("Premeter:"+premeter1);
}
}
class Rectangle implements process{
int l,b,area1,premeter1;
public void data()
{
Scanner obj=new Scanner(System.in);
System.out.println("Enter The Length of Rectangle");
l=obj.nextInt();
System.out.println("Enter The Breadth of Rectangle");
b=obj.nextInt();
//area1=l*b;
//premeter1=2*(l+b);
}
public void  area() {
area1=l*b;
System.out.println("Area of Rectangle:"+area1);
}
public void premeter() {
premeter1=2*(l+b);
System.out.println("Premeter of Rectangle:"+premeter1);
}
}
public class diamension {
public static void main(String[] args) {
Rectangle obj1=new Rectangle();
Circle obj2=new Circle();
int r;
obj2.data();
obj2.area();
obj2.premeter();
obj1.data();
obj1.area();
obj1.premeter();
}
}
```

## Output:



```
<terminated> diamension [Java Application] C:\Users\Jomin\.
Enter The radius Circle
4
Area:50.24
Premeter:25.12
Enter The Length of Rectangle
6
Enter The Breadth of Rectangle
2
Area of Rectangle:12
Premeter of Rectangle:16
```

# Program 7

06/05/2021

**Aim:** Prepare bill with the given format using calculate method from interface. Order No.

Date :

| Product Id | Name | Quantity | unit price | Total |
|---|---|---|---|---|
| 101 | A | 2 | 25 | 50 |
| 102 | B | 1 | 100 | 100 |
| | | | Net. Amount | 150 |

## Algorithm:

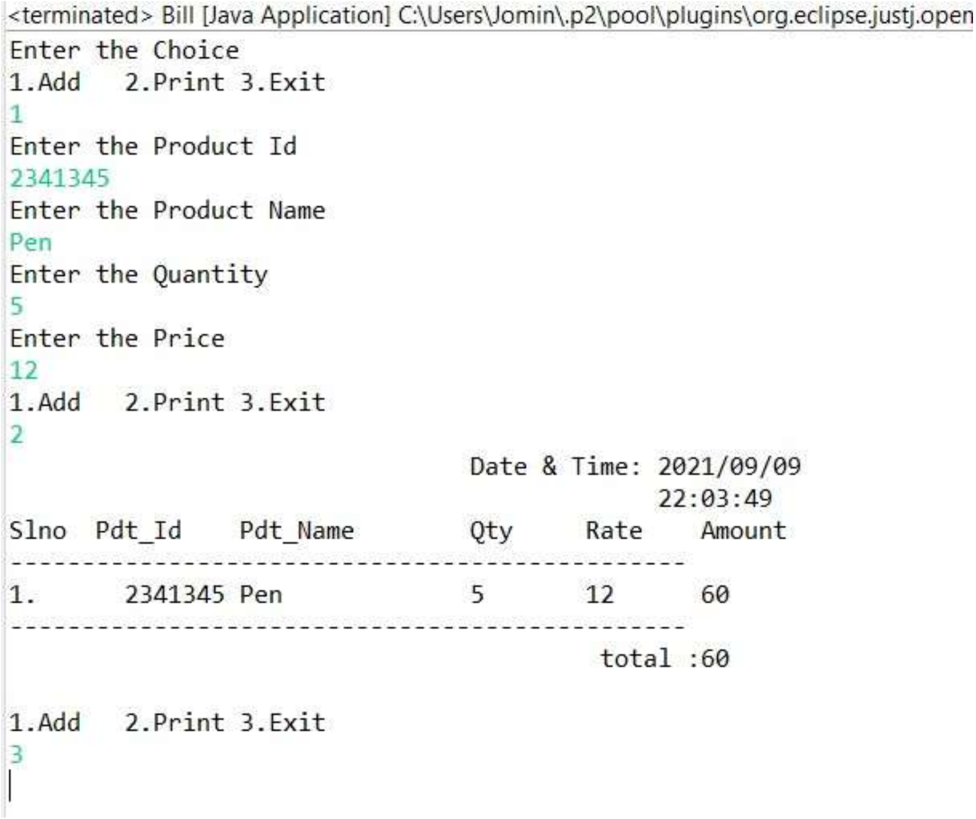
STEP 1: Create a class Bill
STEP 2: Create interface billing and create class section implements from billing.
STEP 3: Create a display function
STEP 4: Print the values as shown as the question
STEP 5: Stop

## Source Code:

```
package packoops;
import java.util.Scanner;
import java.time.format.DateTimeFormatter;
import java.time.LocalDateTime;
interface billing{
public void product();
public int calculation();
}
class section implements billing{
```

```
int prdtid,orderid,quanity,price,total;
String prdtname;
int pprice;
Scanner obj1=new Scanner(System.in);
public void product() {
System.out.println("Enter the Product Id");
prdtid=obj1.nextInt();
System.out.println("Enter the Product Name");
prdtname=obj1.next();
System.out.println("Enter the Quantity");
quanity=obj1.nextInt();
System.out.println("Enter the Price");
price=obj1.nextInt();
}
public int calculation() {
pprice =price*quanity;
return pprice;
}
public void display(int i) {
System.out.println(i+".
"+"\t"+prdtid+"\t"+prdtname+"\t\t"+quanity+"\t"+price+"
\t"+pprice);
}
}
public class Bill {
public static void main(String[] args) {
int p=0,ch=0,total=0,ttotal=0,count=0;
DateTimeFormatter dtf =
DateTimeFormatter.ofPattern("yyyy/MM/dd  \n\t\t\t\t\t
HH:mm:ss");
LocalDateTime now = LocalDateTime.now();
Scanner obj=new Scanner(System.in);
section[] obj1 = new section[5] ;
System.out.println("Enter the Choice");
while(ch<3) {
System.out.println("1.Add"+"\t"+"2.Print"+"\t"+"3.Exit");
ch=obj.nextInt();
switch(ch) {
case 1:
count=count+1;
obj1[count] = new section();
obj1[count].product();
ttotal=obj1[count].calculation();
total=total+ttotal;
break;
case 2:
System.out.println("\t\t\t\tDate & Time: "+dtf.format(now));
System.out.println("Slno "+"
Pdt_Id"+"\t"+"Pdt_Name"+"\t"+"Qty"+"\t"+"Rate" +
"\t"+"Amount");
System.out.println("------------------------------------------------");
for(int i=1;i<count+1;i++) {
obj1[i].display(i);
}
System.out.println("------------------------------------------------");
System.out.println("\t\t\t\t\t total :"+total+"\n");
break;
default:
System.out.println("");
break;
}
}
}
}
```

# Output:



```
<terminated> Bill [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.open
Enter the Choice
1.Add   2.Print 3.Exit
1
Enter the Product Id
2341345
Enter the Product Name
Pen
Enter the Quantity
5
Enter the Price
12
1.Add   2.Print 3.Exit
2
                                Date & Time: 2021/09/09
                                             22:03:49
Slno  Pdt_Id    Pdt_Name        Qty     Rate    Amount
-----------------------------------------------
1.      2341345 Pen             5       12      60
-----------------------------------------------
                                         total :60

1.Add   2.Print 3.Exit
3
```

# Program 8

07/06/2021

**Aim:** Create a Graphics package that has classes and interfaces for figures Rectangle, Triangle, Square and Circle. Test the package by finding the area of these figures.

## Algorithm:

Step 1: Start
Step 2: Define a package contain functions to assign calculate and display.
Step 3: Read inputs from user and assign values to objects.
Step 4: Perform desired operations.
Step 5: Print the Outputs.
Step 6: Stop

## Source Code:

***test.java***

```
package Main;
import java.util.Scanner;
import packoops.Dimension;
public class test {
public static void main(String[] args) {
Scanner obk=new Scanner(System.in);
Dimension obj=new Dimension();
int ch=0;
while(ch<5) {
```

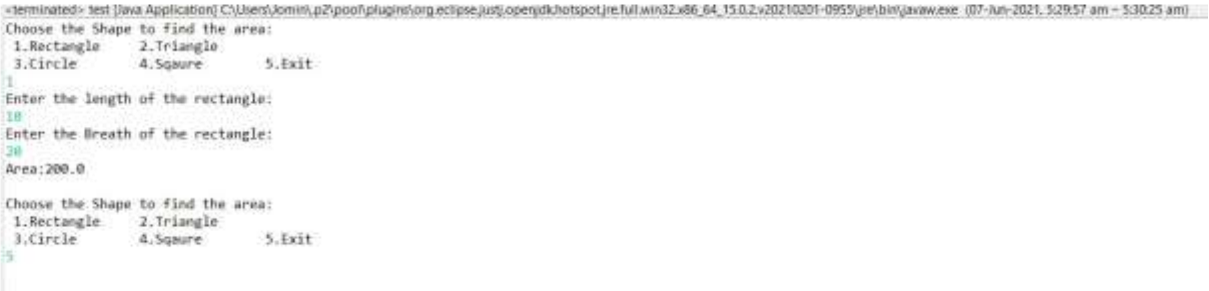
```
System.out.println("Choose the Shape to find the area:"+"\n
1.Rectangle \t 2.Triangle \n 3.Circle \t 4.Sqaure \t 5.Exit");
ch=obk.nextInt();
switch(ch) {
case 1:
obj.rectangle();
break;
case 2:
obj.triangle();
break;
case 3:
obj.circle();
break;
case 4:
obj.square();
break;
case 5: break;
default:
System.out.println("invalid choice");
break;
}
}
}
}
```

***Dimension.java***

```
package packoops;
import java.util.Scanner;
interface calculation{
public void rectangle();
public void triangle();
public void circle();
public void square();
```

```
}
public class Dimension implements calculation {
double area;
Scanner obj1=new Scanner(System.in);
public void rectangle() {
int l,b;
System.out.println("Enter the length of the rectangle:");
l=obj1.nextInt();
System.out.println("Enter the Breath of the rectangle:");
b=obj1.nextInt();
area=l*b;
System.out.println("Area:"+area+"\n");
}
public void triangle() {
int h,b;
System.out.println("Enter the base of the Triangle:");
b=obj1.nextInt();
System.out.println("Enter the height of the Triangle:");
h=obj1.nextInt();
area=(h*b)/2;
System.out.println("Area:"+area+"\n");
}
public void circle() {
float r;
System.out.println("Enter the Radius of the Circle:");
r=obj1.nextInt();
area=3.14*r*r;
System.out.println("Area:"+area+"\n");
}
public void square() {
int s;
System.out.println("Enter the Side of the Square:");
s=obj1.nextInt();
area=s*s;
System.out.println("Area:"+area+"\n");
}
}
```

**Output :**



```
<terminated> test [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_15.0.2.v20210201-0955\jre\bin\javaw.exe  (07-Jun-2021, 5:29:57 am – 5:30:25 am)
Choose the Shape to find the area:
 1.Rectangle     2.Triangle
 3.Circle        4.Sqaure        5.Exit
1
Enter the length of the rectangle:
10
Enter the Breath of the rectangle:
20
Area:200.0

Choose the Shape to find the area:
 1.Rectangle     2.Triangle
 3.Circle        4.Sqaure        5.Exit
5
```

# Program 9

10/06/2021

**Aim:** Create an Arithmetic package that has classes and interfaces for the 4 basic arithmetic operations. Test the package by implementing all operations on two given numbers.

## Algorithm:

Step 1: Start
Step 2: Define a package contain functions to assign calculate and display.
Step 3: Read inputs from user and assign values to objects.
Step 4: Perform desired operations.
Step 5: Print the Outputs.
Step 6: Stop

## Source Code:

### ***oper.java***

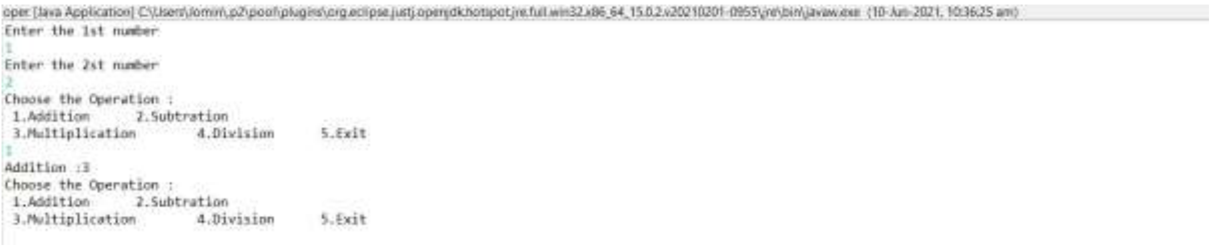
```
package Main;
import packoops.Operation;
import Graphics.Dimension;
import java.util.Scanner;
public class oper {
public static void main(String[] args) {
Operation obj=new Operation();
Scanner obk=new Scanner(System.in);
System.out.println("Enter the 1st number");
int a=obk.nextInt();
System.out.println("Enter the 2st number");
int b=obk.nextInt();
int ch=0;
obj.data(a, b);
while(ch<5) {
System.out.println("Choose the Operation :"+"\n 1.Addition \t
2.Subtration \n 3.Multiplication \t 4.Division \t 5.Exit");
ch=obk.nextInt();
switch(ch) {
case 1:
obj.add();
break;
case 2:
obj.sub();
break;
case 3:
obj.mult();
break;
case 4:
obj.div();
break;
case 5: break;
default:
System.out.println("invalid choice");
break;
}
}
}
}
```

***Operation.java***

```
package packoops;
```

```
interface arith {
public void add();
public void sub();
public void mult();
public void div();
}
public class Operation implements arith{
int x,y;
public void data(int a,int b) {
x=a;
y=b;
}
public void add() {
int s;
s=x+y;
System.out.println("Addition :"+s);
}
public void sub() {
int m;
m=x-y;
System.out.println("Subtration :"+m);
}
public void mult() {
int p;
p=x*y;
System.out.println("Multiplication :"+p);
}
public void div() {
float d;
d=x/y;
System.out.println("Division :"+d);
}
}
```

# Output:



```
oper [Java Application] C:\Users\lomim\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_15.0.2.v20210201-0955\jre\bin\javaw.exe  (10-Jun-2021, 10:36:25 am)
Enter the 1st number
1
Enter the 2st number
2
Choose the Operation :
 1.Addition      2.Subtration
 3.Multiplication        4.Division      5.Exit
1
Addition :3
Choose the Operation :
 1.Addition      2.Subtration
 3.Multiplication        4.Division      5.Exit
```

# Program 10

10/06/2021

**Aim:** Write a user defined exception class to authenticate the user name and password.

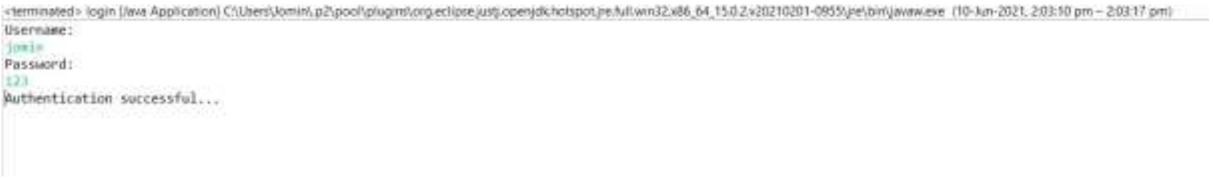
## Algorithm:

```
Step 1: Start
Step 2: Read inputs as username and password.
Step 3: Verify the username and password.
Step 4: If its true; Print Authentication successful.
Step 5: Else print invalid.
Step 6: Stop
```

## Source Code:

```
package packoops;
import java.util.Scanner;
class authException extends Exception
{
public authException(String s) {
super(s);
}
}
public class login
{
public static void main(String[] args) {
String username = "jomin";
String passcode = "123";
String user_name,password;
Scanner sc = new Scanner(System.in);
try
{
System.out.println("Username:");
user_name = sc.nextLine();
System.out.println("Password:");
password = sc.nextLine();
if(username.equals(user_name) &&
passcode.equals(password))
{
System.out.println("Authentication successful...");
}
else
throw new authException("Invalid user credentials");
}
catch(authException e)
{
System.out.println("Exception caught "+e);
}
}
}
```

**Output:**



```
<terminated> login [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_15.0.2.v20210201-0955\jre\bin\javaw.exe  (10-Jun-2021, 2:03:10 pm – 2:03:17 pm)
Username:
jomin
Password:
123
Authentication successful...
```

# Program 11

10/06/2021

**Aim:** Find the average of N positive integers, raising a user defined exception for each negative input.

## Algorithm:

```
Step 1: Start
Step 2: Enter a limit n.
Step 3: Read n elements.
Step 4: Iterate the loop .
Step 5: if(num[i]>0) then
Step 6: total += num[i] ,count++;
Step 7: Else Print error message
Step 8: Average=total/count
Step 9: Print Average
Step 10: Stop
```

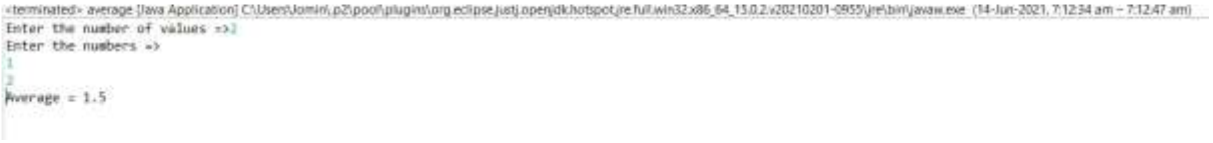
## Source Code:

```
package packoops;
import java.util.Scanner;
class NegativeIntegerException extends Exception
{
public NegativeIntegerException(String s)
{
super(s);
}
}
public class average {
public static void sample()
```

```
{
try {
int n,count=0;
float num[];
float total=0;
Scanner sc = new Scanner(System.in);
System.out.print("Enter the number of values =>");
n = sc.nextInt();
num = new float[n];
System.out.println("Enter the numbers =>");
for(int i=0;i<n;i++)
{
num[i] = sc.nextInt();
try{
if(num[i]<0)
{
throw new NegativeIntegerException("Negative integer");
}
else
{
total += num[i];
count++;
}
}catch(NegativeIntegerException e)
{
System.out.println("Exception caught "+e);
}
}
System.out.println("Average = "+(total/count));
} catch (Exception e) {
System.out.println("Exception caught "+e);
}
}
```

```
public static void main(String[] args) {
try {
sample();
} catch (Exception e) {
}
}
}
```

**Output:**



```
<terminated> average [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_15.0.2.v20210201-0955\jre\bin\javaw.exe  (14-Jun-2021, 7:12:34 am – 7:12:47 am)
Enter the number of values =>2
Enter the numbers =>
1
2
Average = 1.5
```

# Program 12

01/09/2021

**Aim:** Define 2 classes; one for generating multiplication table of 5 and other for displaying first N prime numbers. Implement using threads. (Thread class).

## Algorithm:

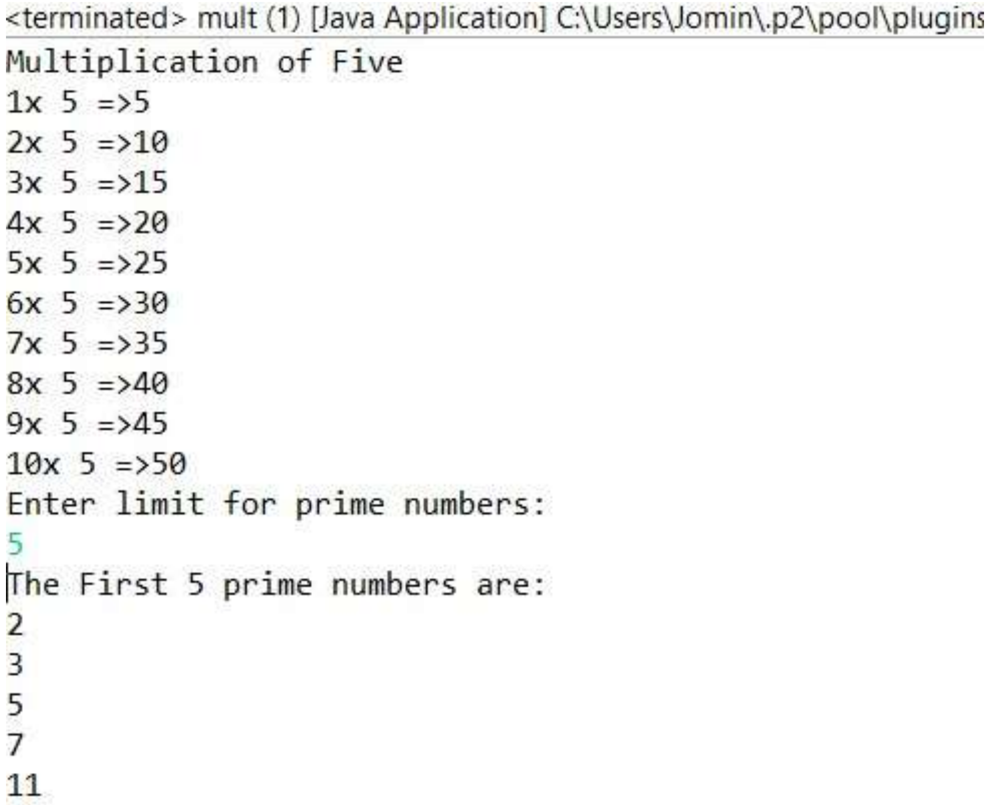
Step 1: Start
Step 2: Define a class for multiplication and another for prime numbers.
Step 3: Print the multiplication table of 5.
Step 4: Input the limit for prime numbers.
Step 5: Print prime numbers.
Step 6: Stop

## Source Code:

```
package packoops;
import java.util.Scanner;
public class mult {
public static void main(String[] args) throws
InterruptedException    {
multiplication_tbl a = new multiplication_tbl();
prime_num b = new prime_num();
a.start();
a.sleep(200);
b.start();
b.sleep(200);
}
```

```
}
class multiplication_tbl extends Thread{
public void run(){
int n=10;
Scanner sc= new Scanner(System.in);
System.out.println("Multiplication of Five");
for(int i=1;i<=10;i++)
{
System.out.println(+i+"x 5 =>"+(i*5));
}
}
}
class prime_num extends Thread{
public void run() {
int n,i=3,count,m;
Scanner sc= new Scanner(System.in);
System.out.println("Enter limit for prime numbers:");
n=sc.nextInt();
if(n >=1)
{
System.out.println("First prime"  +n+  "numbers are:");
System.out.println("2");
for(count = 2; count <= n; i++)
{
for(m= 2; m < i;m++)
{
if(i%m == 0)
break;
}
if(m== i)
{
System.out.println(i);
count++;
}
}
}
}}
```

## Output:



```
<terminated> mult (1) [Java Application] C:\Users\Jomin\.p2\pool\plugins
Multiplication of Five
1x 5 =>5
2x 5 =>10
3x 5 =>15
4x 5 =>20
5x 5 =>25
6x 5 =>30
7x 5 =>35
8x 5 =>40
9x 5 =>45
10x 5 =>50
Enter limit for prime numbers:
5
The First 5 prime numbers are:
2
3
5
7
11
```

# Program 13

17/06/2021

**Aim:** Define 2 classes; one for generating Fibonacci numbers and other for displaying even numbers in a given range.

Implement using threads. (Runnable Interface).

## Algorithm:

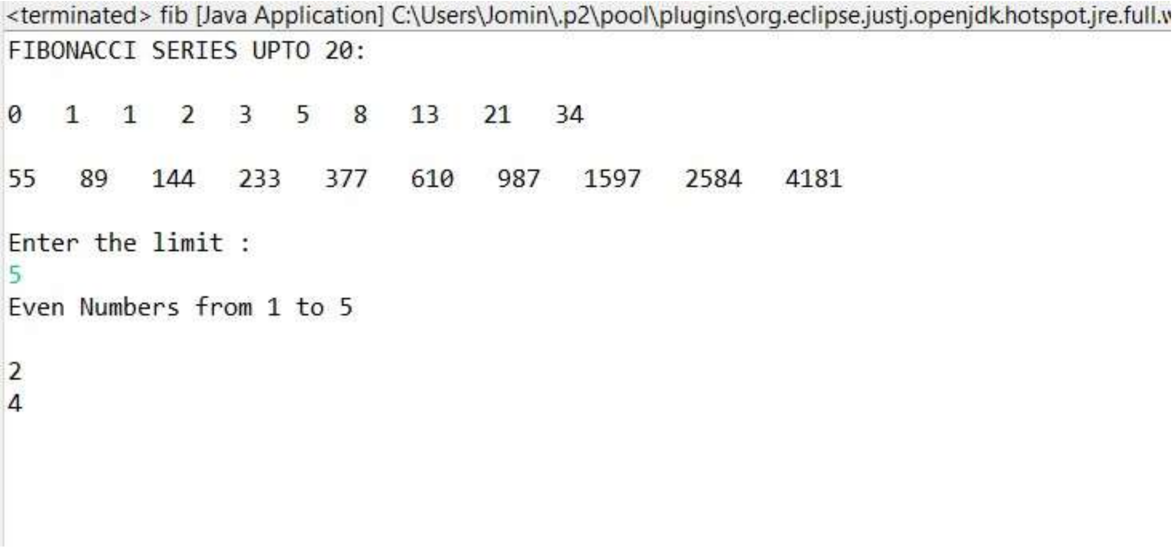
Step 1: Start<br>
Step 2: Define a class for Fibonacci and another for even numbers.<br>
Step 3: Print the Fibonnaci series of 20 number.<br>
Step 4: Input the limit for even numbers.<br>
Step 5: Print n even numbers.<br>
Step 6: Stop

## Source Code:

```
package packoops;
import java.util.Scanner;
class Fibonacci implements Runnable{
public void run(){
int a=0,b=1,c=0,l=20;
System.out.println("FIBONACCI SERIES UPTO "+l+": \n");
while (l>0)
{
System.out.print(c+"   ");
a=b;
b=c;
c=a+b;
l=l-1;
if(l%10==0)
{
System.out.println("\n");
}
}

}
}
class EvenNumber implements Runnable{
public void run(){
int n;
Scanner sc=new Scanner(System.in);
System.out.println("Enter the limit : ");
n=sc.nextInt();
System.out.println("Even Numbers from 1 to "+n+"\n");
for(int i=1;i<=n;i++) {
if(i%2==0) {
System.out.println(i);
}
}
}
}
public class fib {
public static void main(String[] args) {
Fibonacci obj1=new Fibonacci();
Thread t1=new Thread(obj1);
t1.start();
EvenNumber obj2=new EvenNumber();
Thread t2=new Thread(obj2);
t2.start();
}
}
```

# Output:



```
<terminated> fib [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.w
FIBONACCI SERIES UPTO 20:

0   1   1   2   3   5   8   13   21   34

55   89   144   233   377   610   987   1597   2584   4181

Enter the limit :
5
Even Numbers from 1 to 5

2
4
```

# Program 14

21/06/2021

**Aim:** Producer/Consumer using ITC.

**Algorithm:**

```
Step 1: Start
Step 2: Two processes, the producer and the consumer, which
          share a common, fixed-size buffer used as a queue
Step 3: The producer's job is to generate data, put it into the
          buffer, and start again
Step 4: At the same time, the consumer is consuming the data
         (i.e. removing it from   the buffer), one piece at a time
Step 5: The producer is to either go to sleep or discard data if
          the buffer is full
Step 6: The next time the consumer removes an item from the
          buffer, it notifies the producer
Step 7: The consumer can go to sleep if it finds the buffer to
          be empty, the next time the producer puts data into the
          buffer, it wakes up the sleeping consumer
Step 8: Stop
```

**Source Code:**

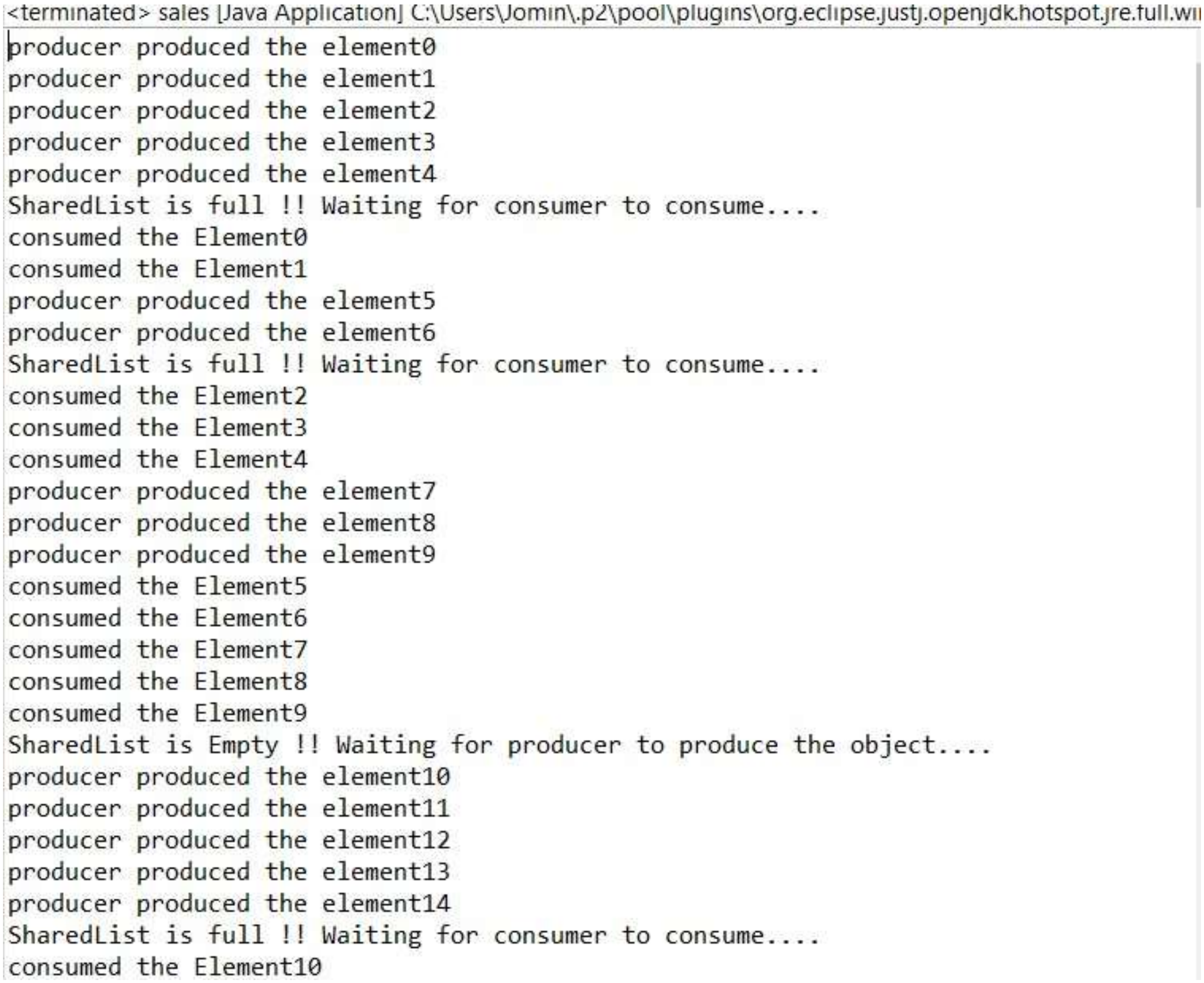
```
package packoops;
import java.util.ArrayList;
import java.util.List;
public class sales {
public static void main(String[] args) {
List<Integer> sharedList = new ArrayList<Integer>();
```

```
Thread t1 = new Thread(new Thread( new
Producer(sharedList)));
Thread t2 = new Thread(new Thread( new
Consumer(sharedList)));
t1.start();
t2.start();
}
}
class Producer implements Runnable
{
List<Integer> sharedList = null;
final int MAX_SIZE=5;
private int i = 0;
public Producer(List<Integer> sharedList) {
super();
this.sharedList = sharedList;
}
@Override
public void run() {
while(true) {
try
{
produce(i++);
}catch(InterruptedException exception) {
}
}
}
public void produce(int i) throws InterruptedException {
synchronized (sharedList) {
while(sharedList.size() == MAX_SIZE) {
System.out.println("SharedList is full !! Waiting for consumer
to consume....");
sharedList.wait();
```

```
}
}
synchronized (sharedList) {
System.out.println("producer produced the element"+i);
sharedList.add(i);
Thread.sleep(100);
sharedList.notify();
}
}
}
class Consumer implements Runnable
{
List<Integer> sharedList = null;
public Consumer(List<Integer> sharedList) {
super();
this.sharedList = sharedList;
}
@Override
public void run() {
while(true) {
try
{
consume();
}catch(InterruptedException exception) {
}
}
}
public void consume() throws InterruptedException {
synchronized (sharedList) {
while(sharedList.isEmpty()) {
System.out.println("SharedList is Empty !! Waiting for
producer to produce the object....");
sharedList.wait();
```

```
}
}
synchronized (sharedList) {
Thread.sleep(1000);
System.out.println("consumed the
Element"+sharedList.remove(0));
sharedList.notify();
}
}
}
```

**Output:**



```
<terminated> sales [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.wi
producer produced the element0
producer produced the element1
producer produced the element2
producer produced the element3
producer produced the element4
SharedList is full !! Waiting for consumer to consume....
consumed the Element0
consumed the Element1
producer produced the element5
producer produced the element6
SharedList is full !! Waiting for consumer to consume....
consumed the Element2
consumed the Element3
consumed the Element4
producer produced the element7
producer produced the element8
producer produced the element9
consumed the Element5
consumed the Element6
consumed the Element7
consumed the Element8
consumed the Element9
SharedList is Empty !! Waiting for producer to produce the object....
producer produced the element10
producer produced the element11
producer produced the element12
producer produced the element13
producer produced the element14
SharedList is full !! Waiting for consumer to consume....
consumed the Element10
```

# Program 15

24/06/2021

**Aim:** Program to create a generic stack and do the Push and Pop operations.

## Algorithm:

```
Step 1: Start
Step 2: Define a stack .
Step 3: Push();
        If top<n
        Top++
        Stack[top]=n.
Step 4: Pop()
         If top!=1
        .top--
Step 5: Print the stack.
Step 6: Stop
```

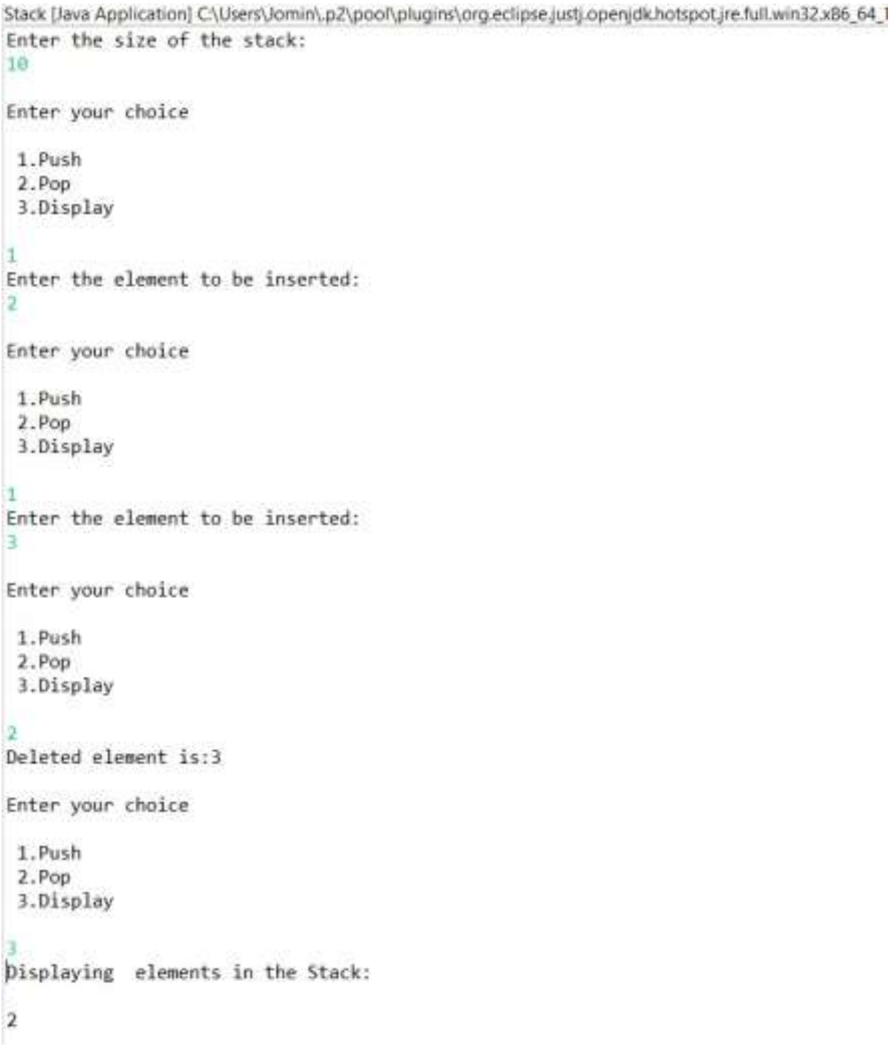
## Source Code:

```
package Graphics;
import java.util.*;
public class Stack {
int top=-1,ch,item,i;
int a[] = new int[10];
Scanner sc = new Scanner(System.in);
public static void main(String[] args) {
Stack st = new Stack ();
st.stack();
}
```

```
public void stack(){
System.out.println("Enter the size of the stack:");
int N=sc.nextInt();
do
{
System.out.println("\nEnter your choice ");
System.out.println("\n 1.Push \n 2.Pop \n 3.Display \n");
ch=sc.nextInt();
switch(ch){
case 1:
System.out.println("Enter the element to be inserted:");
item=sc.nextInt();
if(top==N-1) {
System.out.println("Stack overflow!");
}
else {
top++;
a[top]=item;
}
break;
case 2:
if(top==-1) {
System.out.println("Stack is empty!!");
}
else {
item=a[top];
top--;
System.out.println("Deleted element is:" +item);
}
break;
case 3:
if(top==-1)
{
```

```
System.out.println("Stack is empty!!");
}
else
{
System.out.println("Displaying  elements in the Stack:\n");
for(int i=top;i>=0;i--)
{
System.out.println(a[i]);
}
}
break;
case 4: System.out.println("Enter a valid choice");
}
}
while(ch!=5);
}
}
```

# Output:



```
Stack [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_1
Enter the size of the stack:
10

Enter your choice

 1.Push
 2.Pop
 3.Display

1
Enter the element to be inserted:
2

Enter your choice

 1.Push
 2.Pop
 3.Display

1
Enter the element to be inserted:
3

Enter your choice

 1.Push
 2.Pop
 3.Display

2
Deleted element is:3

Enter your choice

 1.Push
 2.Pop
 3.Display

3
Displaying  elements in the Stack:

2
```

# Program 16

24/06/2021

**Aim:** Using generic method perform Bubble sort.

## Algorithm:

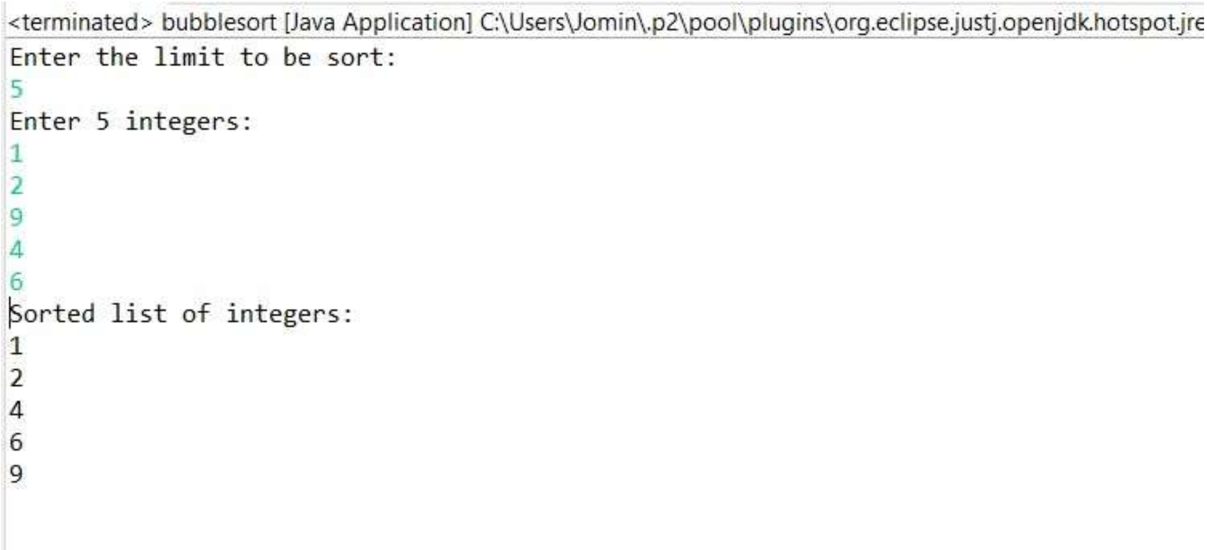
```
Step 1: Start
Step 2: Look at the first number in the list.
Step 3: Compare the current number with the next number.
Step 4: Is the next number smaller than the current number? If
so, swap the two numbers around. If not, do not swap.
Step 5: Move to the next number along in the list and make
this the current number.
Step 6: Repeat from step 2 until the last number in the list has
been reached.
Step 7: If any numbers were swapped, repeat again from step
1.
Step 8: If the end of the list is reached without any swaps
being made, then the list is ordered and the algorithm can
stop.
Step 9: Stop
```

## Source Code:

```
package packoops;
import java.util.*;
public class bubblesort {
public static void main(String[] args) {
int num, i, j, temp;
Scanner x = new Scanner(System.in);
System.out.println("Enter the limit to be sort:");
num = x.nextInt();
int array[] = new int[num];
System.out.println("Enter " + num + " integers: ");
for (i = 0; i < num; i++)
array[i] = x.nextInt();
for (i = 0; i < ( num - 1 ); i++) {
for (j = 0; j < num - i - 1; j++) {
if (array[j] > array[j+1])
{
temp = array[j];
array[j] = array[j+1];
array[j+1] = temp;
}
}
}

System.out.println("Sorted list of integers:");
for (i = 0; i < num; i++)
System.out.println(array[i]);
}
}
```

# Output:



```
<terminated> bubblesort [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre
Enter the limit to be sort:
5
Enter 5 integers:
1
2
9
4
6
Sorted list of integers:
1
2
4
6
9
```

# Program 17

24/06/2021

**Aim:** Maintain a list of Strings using Array List from collection framework, perform built-in operations.

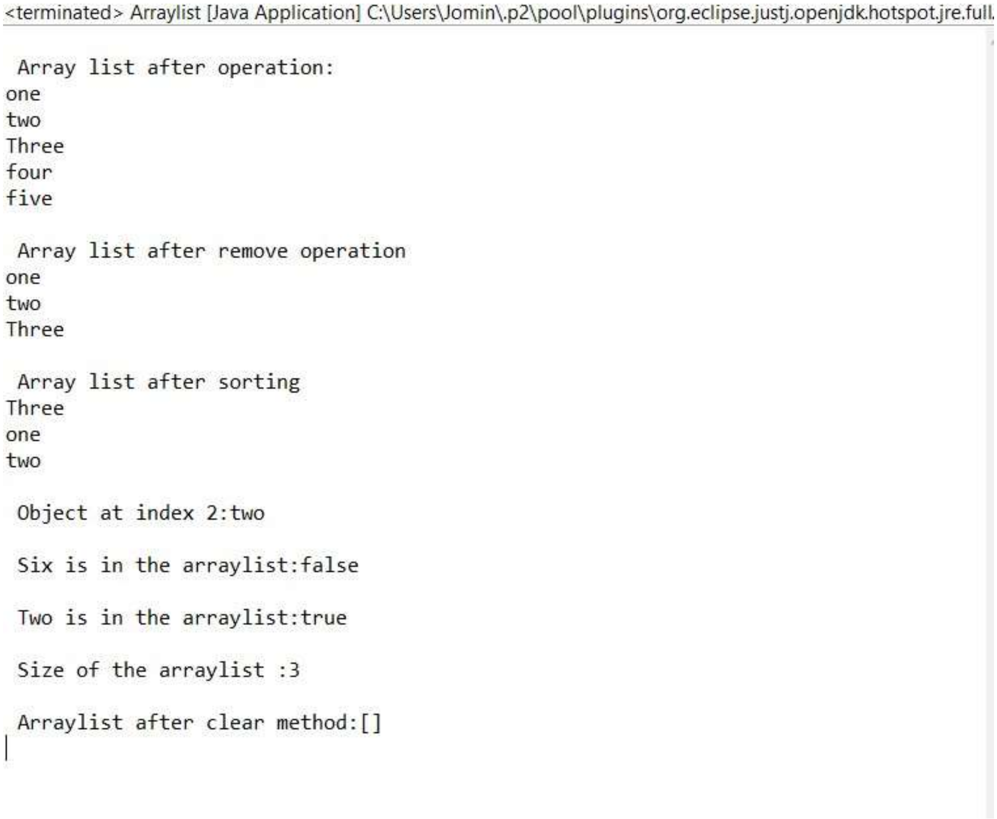
## Algorithm:

```
Step 1: Start
Step 2: Define an array.
Step 3: Define objects to array.
Step 4: Perform operation on array.
Step 5: Print the array after operations.
Step 6: Stop
```

## Source Code:

```
package packoops;
import java.util.*;
public class Arraylist
{
public static void main(String[] args)
{
ArrayList<String> obj=new ArrayList<String>();
obj.add("one");
obj.add("Three");
obj.add("four");
obj.add("five");
obj.add(1,"two");
System.out.println("\n Array list after operation:");
for(String str:obj)
System.out.println(str);
obj.remove("five");
obj.remove(3);
System.out.println("\n Array list after remove operation");
for(String str:obj)
System.out.println(str);
Collections.sort(obj);
System.out.println(" \n Array list after sorting");
for(String str : obj)
System.out.println(str);
System.out.println("\n Object at index 2:"+obj.get(2));
System.out.println("\n Six is in the
arraylist:"+obj.contains("six"));
System.out.println("\n Two is in the
arraylist:"+obj.contains("one"));
System.out.println("\n Size of the arraylist :"+obj.size());
obj.clear();
System.out.println("\n Arraylist after clear method:"+obj);
}
}
```

# Output:



```
<terminated> Arraylist [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.

 Array list after operation:
one
two
Three
four
five

 Array list after remove operation
one
two
Three

 Array list after sorting
Three
one
two

 Object at index 2:two

 Six is in the arraylist:false

 Two is in the arraylist:true

 Size of the arraylist :3

 Arraylist after clear method:[]
```

# Program 18

24/06/2021

**Aim:** Program to remove all the elements from a linked list.

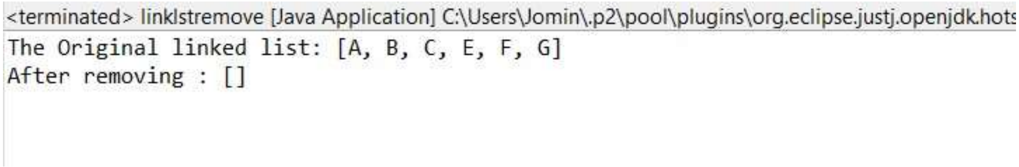
## Algorithm:

```
Step 1: Start
Step 2: Define a Linked list.
Step 3: Define objects to Linked list using add().
Step 4: Delete the elements in list using clear()
Step 5: Print the Outputs.
Step 6: Stop
```

## Source Code:

```
package packoops;
import java.util.*;
public class linklstremove {
public static void main(String[] args) {
LinkedList<String> list = new LinkedList<String>();
list.add("A");
list.add("B");
list.add("C");
list.add("E");
list.add("F");
list.add("G");
System.out.println("The Original linked list: " + list);
list.clear();
System.out.println("After removing : " + list);
}
}
```

# Output:



```
<terminated> linklstremove [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hots
The Original linked list: [A, B, C, E, F, G]
After removing : []
```

# Program 19

24/06/2021

**Aim:** Program to remove an object from the Stack when the position is passed as parameter.

## Algorithm:

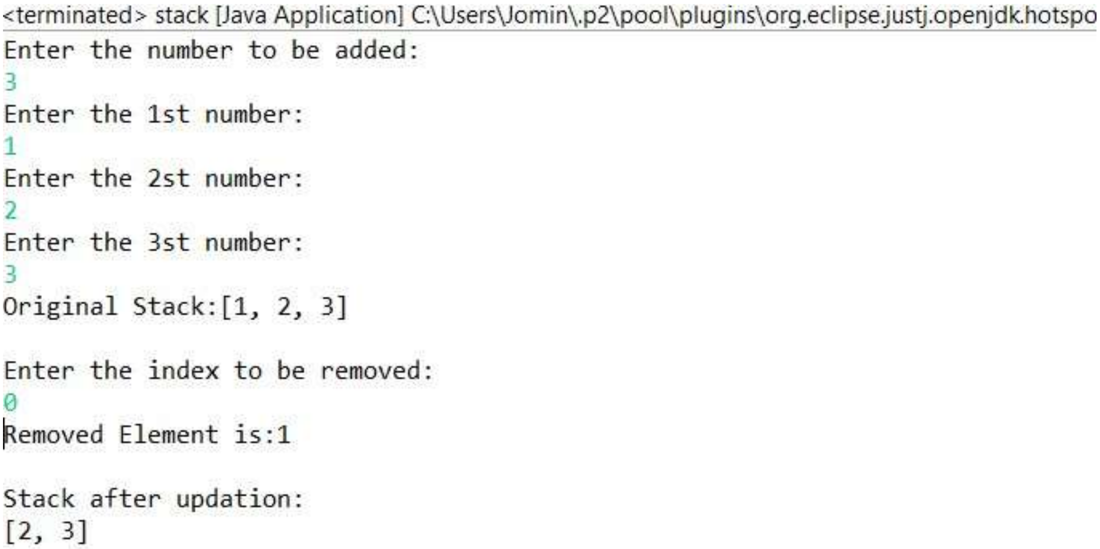
Step 1: Start
Step 2: Define a Stack.
Step 3: Define objects to Stack using add().
Step 4: Enter the element to remove the item.
Step 5: Remove the item using remove(key).
Step 6: Print outputs
Step 7: Stop

## Source Code:

```
package packoops;
import java.util.*;
public class stack {
public static void main(String[] args) {
Scanner s = new Scanner(System.in);
int i,n;
System.out.println("Enter the list of numbers to be added:");
int a=s.nextInt();
Stack <Integer> st = new Stack <Integer>();
for(i=1;i<=a;i++) {
System.out.println("Enter the "+(i)+"st number:");
n=s.nextInt();
st.add(n);
}
System.out.println("Original Stack:"+st);
System.out.println("\nEnter the index to be removed:");
int index = s.nextInt();
int rm_ele = st.remove(index);
System.out.println("Removed Element is:"+rm_ele);
System.out.println("\nStack after updation:\n"+st);

}
}
```

**Output:**



```
<terminated> stack [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspo
Enter the number to be added:
3
Enter the 1st number:
1
Enter the 2st number:
2
Enter the 3st number:
3
Original Stack:[1, 2, 3]

Enter the index to be removed:
0
Removed Element is:1

Stack after updation:
[2, 3]
```

# Program 20

24/06/2021

**Aim:** Program to demonstrate the creation of queue object using the PriorityQueue class.

## Algorithm:

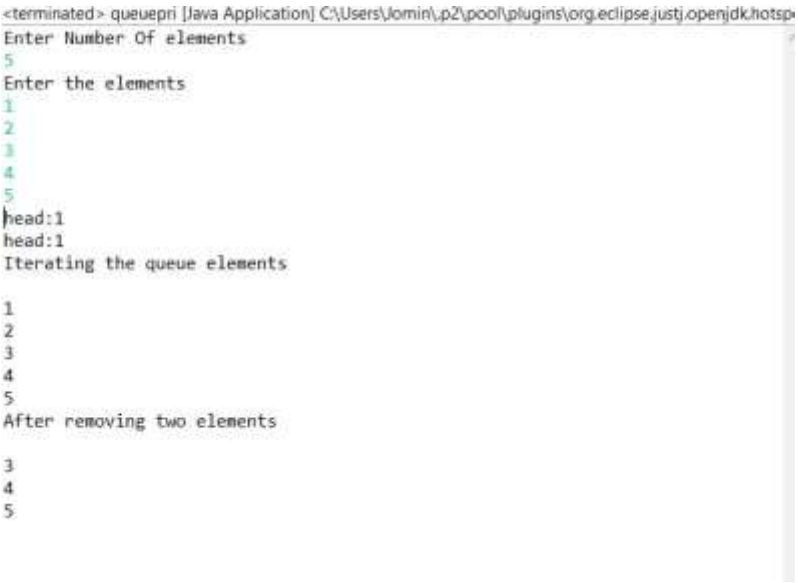
```
Step 1: Start
Step 2: Define a Priority Queue.
Step 3: Enter the limit.
Step 4: Add n elements to Queue.
Step 5: Perform operations like remove(), add() etc.
Step 6: Print output.
Step 7: Stop
```

## Source Code:

```
package packoops;
import java.util.Iterator;
import java.util.PriorityQueue;
import java.util.Scanner;
public class queuepri
{
public static void main(String args[])
{
PriorityQueue<String> queue=new PriorityQueue<String>();
Scanner sc=new Scanner(System.in);
System.out.println("Enter Number Of elements ");
int n=sc.nextInt();
System.out.println("Enter the elements ");
for(int i =0;i<n;i++)
{
String st=sc.next();
queue.add(st);

}
System.out.println("head:"+queue.element());
System.out.println("head:"+queue.peek());
System.out.println("Iterating the queue elements\n ");
Iterator itr=queue.iterator();
while(itr.hasNext()){
System.out.println(itr.next());
}
queue.remove();
queue.poll();
System.out.println("After removing two elements \n");
Iterator<String> itr2=queue.iterator();
while(itr2.hasNext()){
System.out.println(itr2.next());
}
}
}
```

# Output:



```
<terminated> queuepri [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotsp
Enter Number Of elements
5
Enter the elements
1
2
3
4
5
head:1
head:1
Iterating the queue elements

1
2
3
4
5
After removing two elements

3
4
5
```

# Program 21

24/06/2021

**Aim:** Program to demonstrate the addition and deletion of elements in deque.

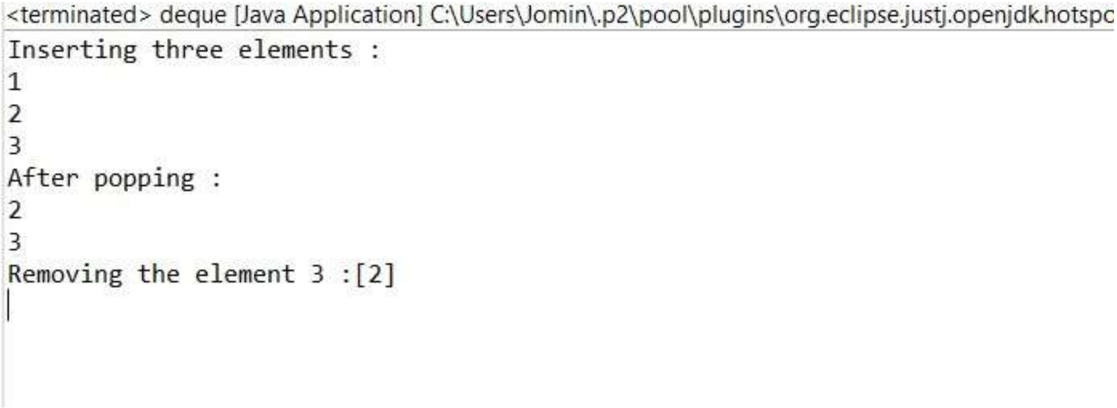
## Algorithm:

```
Step 1: Start
Step 2: Define an Array.
Step 3: Define objects to Array using add(),
Step 4: Perform desired operations.
Step 5: Remove the item using pop().
Step 6: Print outputs
Step 7: Stop
```

## Source Code:

```
package packoops;
import java.util.ArrayDeque;
import java.util.Deque;
public class deque {
public static void main(String[] args) {
Deque<Integer> deque = new ArrayDeque<Integer>();
deque.add(1);
deque.add(2);
deque.add(3);
System.out.println("Inserting three elements : ");
for (Integer integer : deque) {
System.out.println(integer);
}
deque.pop();
System.out.println("After popping : ");
for (Integer integer : deque) {
System.out.println(integer);
}
deque.remove(3);
System.out.println("Removing the element 3 :"+deque);
}
}
```

**Output:**



```
<terminated> deque [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspc
Inserting three elements :
1
2
3
After popping :
2
3
Removing the element 3 :[2]
```

# Program 22

24/06/2021

**Aim:** Program to demonstrate the creation of Set object using the Linked Hashset class.

**Algorithm:**

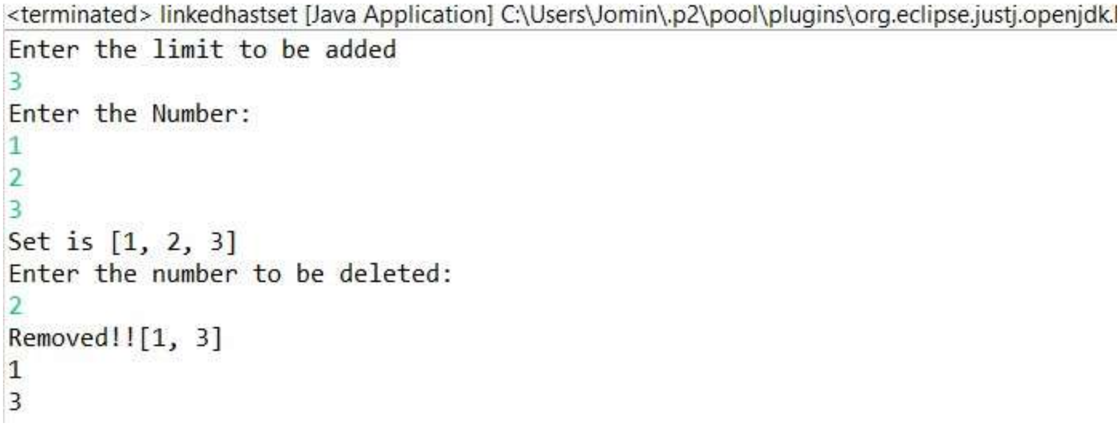
Step 1: Start
Step 2: Define a Linkedhash set.
Step 3: Define objects to Linked hash set using add().
Step 4: Perform desired operations like printing the elements and size of the hash set.
Step 5: Remove the item using remove(key).
Step 6: Print outputs
Step 7: Stop

**Source Code:**

```
package packoops;
import java.util.LinkedHashSet;
import java.util.Scanner;
import java.util.Set;
import java.util.Iterator;
public class linkedhastset {
public static void main(String[] args) {
Set<Integer> s = new LinkedHashSet<Integer>();
System.out.println("Enter the limit to be added");
Scanner inp=new Scanner(System.in);
int n=inp.nextInt();
System.out.println("Enter the Number:");
while(n!=0) {
int e = inp.nextInt();
s.add(e);
n--;
}
System.out.println("Set is "+s);


System.out.println("Enter the number to be deleted:");
int d= inp.nextInt();
if(s.remove(d)) {
System.out.println("Removed!!"+s);
}
else {
System.out.println("Element is not in the set");
}
Iterator<Integer> l = s.iterator();
while(l.hasNext())
System.out.println(l.next());
}
}
```

# Output:



```
<terminated> linkedhastset [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.
Enter the limit to be added
3
Enter the Number:
1
2
3
Set is [1, 2, 3]
Enter the number to be deleted:
2
Removed!![1, 3]
1
3
```

# Program 23

24/06/2021

**Aim:** Write a Java program to compare two hash set.

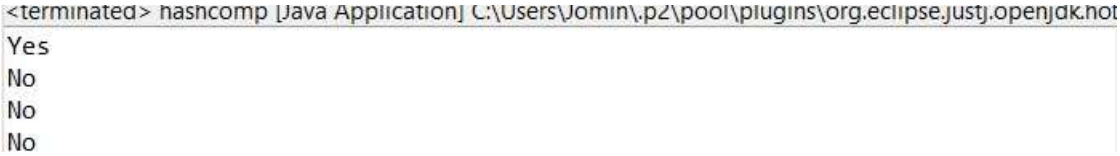
## Algorithm:

```
Step 1: Start
Step 2: Define 2 hash sets h_set and h_set2.
Step 3: Define objects to  hash h_set and h_set2 using add().
Step 4: Compare the hash sets; if its same.
Step 5: Print Yes
Step 6: Else Print No
Step 7: Stop
```

## Source Code:

```
package packoops;
import java.util.*;
public class hashcomp {
public static void main(String[] args) {
HashSet<String> h_set = new HashSet<String>();
h_set.add("Red");
h_set.add("Green");
h_set.add("Black");
h_set.add("White");
HashSet<String>h_set2 = new HashSet<String>();
h_set2.add("Red");
h_set2.add("Pink");
h_set2.add("Blue");
h_set2.add("Orange");
HashSet<String>result_set = new HashSet<String>();
for (String element : h_set){
System.out.println(h_set2.contains(element) ? "Yes" : "No");
}
}
}
```

**Output:**



```
<terminated> hashcomp [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.eclipse.justj.openjdk.hot
Yes
No
No
No
```

# Program 24

24/06/2021

**Aim:** Program to demonstrate the working of Map interface by adding, changing and removing elements.

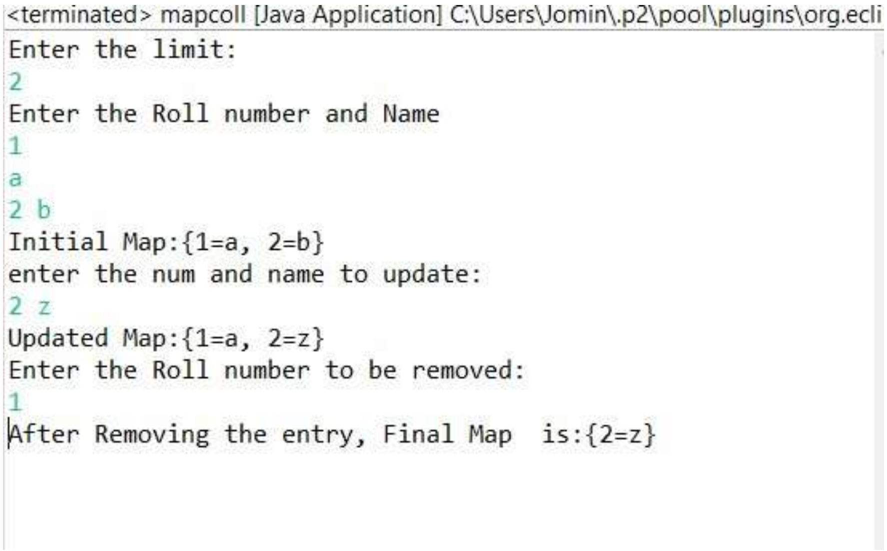
## Algorithm:

Step 1: Start
Step 2: Define a class mapcoll
Step 2: Define a Map set mp.
Step 3: Define objects to Map set mp using put().
Step 4: Remove the elements using remove().
Step 5: Print the Outputs.
Step 6: Stop

## Source Code:

```
package packoops;
import java.util.*;
public class mapcoll {
public static void main(String args[])
{
Map<Integer, String> mp = new HashMap<>();
//Inserting elements..
System.out.println("Enter the limit:");
Scanner inp = new Scanner(System.in);
int n= inp.nextInt();
System.out.println("Enter the Roll number and Name");
while(n!=0) {
int e= inp.nextInt();
String s= inp.next();
mp.put(e, s);
n--;
}
System.out.println("Initial Map:"+mp);
System.out.println("enter the num and name to update:");
Scanner in = new Scanner(System.in);
int e= in.nextInt();
String s= in.next();
mp.put(e, s);
System.out.println("Updated Map:"+mp);
//Removing..
System.out.println("Enter the Roll number to be removed:");
int r=inp.nextInt();
mp.remove(r);
// Final Map..
System.out.println("After Removing the entry, Final Map
is:"+mp);
}
}
```

# Output:



```
<terminated> mapcoll [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.ecli
Enter the limit:
2
Enter the Roll number and Name
1
a
2 b
Initial Map:{1=a, 2=b}
enter the num and name to update:
2 z
Updated Map:{1=a, 2=z}
Enter the Roll number to be removed:
1
After Removing the entry, Final Map  is:{2=z}
```

# Program 25

24/06/2021

**Aim:** Program to Convert Hash Map to Tree Map.

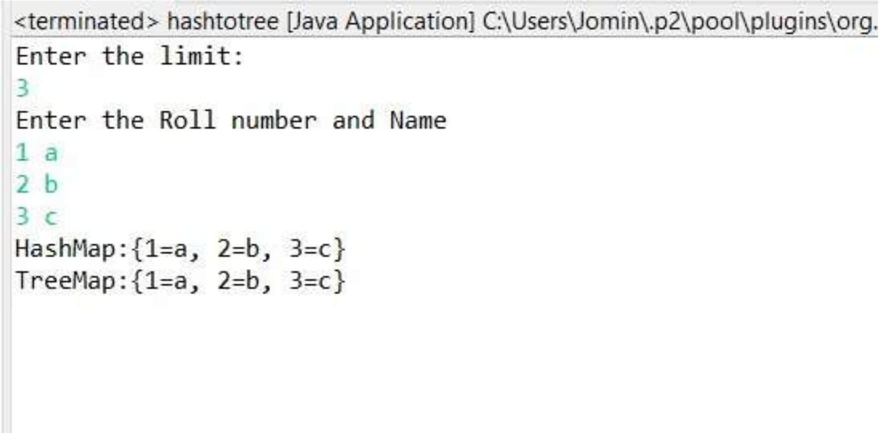
**Algorithm:**

```
Step 1: Start
Step 2: Create a class hashtotree
Step 3: Define a map.
Step 4: Define objects for map using put().
Step 5: Define a tree set treeMap
Step 6: Convert map set into tree using treeMap.putAll().
Step 7: Print the Outputs.
Step 8: Stop
```

**Source Code:**

```
package packoops;
import java.util.*;
public class hashtotree {
public static void main(String args[]) {
Map<String, String> map = new HashMap<>();
System.out.println("Enter the limit:");
Scanner inp = new Scanner(System.in);
int n= inp.nextInt();
System.out.println("Enter the Roll number and Name");
while(n!=0) {
String e= inp.next();
String s= inp.next();
map.put(e, s);
n--;
}
System.out.println("HashMap:"+map);
Map<String, String> treeMap = new TreeMap<>();
treeMap.putAll(map);
System.out.println("TreeMap:"+treeMap);
}
}
```

**Output:**



```
<terminated> hashtotree [Java Application] C:\Users\Jomin\.p2\pool\plugins\org.
Enter the limit:
3
Enter the Roll number and Name
1 a
2 b
3 c
HashMap:{1=a, 2=b, 3=c}
TreeMap:{1=a, 2=b, 3=c}
```