PayTM Number = 9167100326

Write a java code to get the output as shown below if the user input the String 'D'.
```
A
B A
C B A
D C B A
class Alphabets{
      Alphabets(char c){
                  for(int i = 0; i < (c-'A')+1; ++i) {
                              for(int j = 0, k=i; j <= i; ++j, --k)
                                    System.out.print((char)('A' + k));
                              System.out.println();
                  }
      }
      public static void main(String args[]){
                  Alphabets ab = new Alphabets('D');
      }
}
```

Design a class to represent a bank account. Include the following members:
Data Members:
1) Name of the depositor 2)Account number 3) Type of
    account(Savings/Current) 2) Balance amount in the account(Minimum
    balance is Rs.500.00)
Methods:
1) To read account number, Depositor name, Type of account
2) To deposit an amount (Deposited amount should de added with it)
3) To withdraw an amount after checking balance(Minimum balance must be
    Rs.500.00)
4) To display the balance
```
class Bank{
      String name, type;
      long acc;
      double bal;
      Bank(String n, String t, long a, double b){
                  this.name = n;
                  this.type = t;
                  this.acc = a;
                  this.bal = b;
      }
      String getAcc(){
                  return(acc + "-" + name + "-" + type);
      }
      void deposit(double amt){
                  this.bal += amt;
                  System.out.println(amt + " deposited successfully.");
      }
      void withdraw(double amt){
                  if(this.bal-amt < 500){
                              System.out.println("Insufficient Balance,
Cannot withdraw " + amt);
                              return;
```

```java
                    }
                    else{
                            this.bal -= amt;
                            System.out.println(amt + " withdrawed
successfully.");
                    }
        }
        void display(){
                    System.out.println("Balance is " + this.bal);
        }
        public static void main(String args[]){
                    Bank b = new Bank("John","Savings",12151021,500);
                    System.out.println("Account Details = " + b.getAcc());
                    b.deposit(1000);
                    b.display();
                    b.withdraw(500);
                    b.display();
        }
}
```

Write a java program to calculate area of rectangle by passing and
returning object as a parameter.

```java
class Rectangle{
        float length, breadth, area;
        Rectangle(){
                    length = breadth = area = 0;
        }
        Rectangle(float l, float b){
                    this.length = l;
                    this.breadth = b;
        }
        Rectangle(float a){
                    this.area = a;
        }
        Rectangle area(Rectangle r){
                    return(new Rectangle((r.length*r.breadth)));
        }
        public static void main(String args[]){
                    Rectangle obj = new Rectangle(2,3);
                    Rectangle A = obj.area(obj);
                    System.out.println("Area is " + A.area);
        }
}
```

Design an AWT application to calculate the factorial of a number.

```java
import java.awt.*;
import java.awt.event.*;
class FactorialAwt extends Frame{
        Label l1,l2;
        Button b1,b2;
        TextField t1;
        FactorialAwt(){
                    super("Factorial of a number");
```

```java
                setLayout(null);
                setSize(500,300);
                l1 = new Label("Enter a number: ");
                l1.setBounds(100,100,100,25);
                add(l1);
                t1 = new TextField();
                t1.setBounds(200,100,200,25);
                add(t1);
                l2 = new Label("The factorial is:");
                l2.setBounds(100,150,200,25);
                add(l2);
                b1 = new Button("Find");
                b1.setBounds(100,200,150,20);
                b1.addActionListener(new ActionListener(){
                        public void actionPerformed(ActionEvent ae){
                                try{
                                        long factorial =
fact(Long.parseLong(t1.getText())));
                                        l2.setText("The factorial
is: " + factorial);
                                }
                                catch(NumberFormatException nfe){
                                        l2.setText("The factorial
is: Error! Input not a number");
                                }
                        }
                });
                add(b1);
                b2 = new Button("Clear");
                b2.setBounds(250,200,150,20);
                b2.addActionListener(new ActionListener(){
                        public void actionPerformed(ActionEvent ae){
                                l2.setText("The factorial is:");
                        }
                });
                add(b2);
                setVisible(true);
                addWindowListener(new WindowAdapter(){
                        public void windowClosing(WindowEvent e){

                                dispose();
                        }
                });
        }
        long fact(long n){
                long f=1;
                for(long i=1;i<=n;i++)
                        f=f*i;
                return f;
        }
        public static void main(String args[]){
                new FactorialAwt();
        }
}
```

Write a Java program to create a class Employee with a name & salary. Create a class Manager inherited from Employee. Add an instance variable department. Create a class Executive inherit from Manager and add an instance variable location. Write the class definitions, the constructors and methods that read and display the information

```java
class Employee{
      String name;
      float salary;
      Employee(String n, float s){
                  name = n;
                  salary = s;
      }
      String display(){
                  return(name + " - " + salary);
      }
}
class Manager extends Employee{
      String department;
      Manager(String n, float s,String d){
                  super(n,s);
                  department = d;
      }
      String display(){
                  return(name + " - " + salary + " - " + department);
      }
}
class Executive extends Manager{
      String location;
      Executive(String n, float s,String d, String l){
                  super(n, s, d);
                  location = l;
      }
      String display(){
                  return(name + " - " + salary + " - " + department + " - "
+ location);
      }
}
class EmployeeData{
      public static void main(String args[]){
                  Employee a = new Employee("Abdullah",25000);
                  Manager b = new Manager("Ronak",75000,"HR");
                  Executive c = new
Executive("Karan",80000,"Management","Mumbai");
                  System.out.println(a.display());
                  System.out.println(b.display());
                  System.out.println(c.display());
      }
}
```

Design an AWT application to check whether the number entered in textbox is prime or not.

```java
import java.awt.*;
import java.awt.event.*;
```

```java
class Prime extends Frame implements ActionListener{
      Label l1,l2,l3;
      Button b1;
      TextField t1;
      Prime(){
                super("Prime of a number");
                setLayout(null);
                setSize(500,500);
                l1 = new Label("Enter a number: ");
                l1.setBounds(100,100,100,20);
                add(l1);
                t1 = new TextField();
                t1.setBounds(200,100,200,20);
                add(t1);
                b1 = new Button("Check if Prime");
                b1.setBounds(150,200,200,20);
                b1.addActionListener(this);
                add(b1);
                l2 = new Label(null);
                l2.setBounds(200,250,125,50);
                add(l2);
                setVisible(true);
                addWindowListener(new WindowAdapter(){
                        public void windowClosing(WindowEvent e){

                                dispose();
                        }
                });
      }
      public void actionPerformed(ActionEvent ae){
                try{
                        if(prime(Integer.parseInt(t1.getText())))
                                l2.setText("Number is Prime");
                        else
                                l2.setText("Number is not Prime");
                }
                catch(NumberFormatException nfe){
                        l2.setText("Input not a number");
                }
      }
      boolean prime(int num){
                int temp;
                boolean isPrime = true;
                for(int i=2;i<=num/2;i++){
                        temp = num%i;
                        if(temp == 0){
                                isPrime = false;
                                break;
                        }
                }
                return isPrime;
      }
      public static void main(String args[]){
                new Prime();
```

```
        }
}

Write a Java program that copies content of one file to another. While
copying the destination file should be an encrypted file. For example A is
represented as C, B as D, C as E, and D as F and so on.
import java.io.*;
class FileCopyEncrypted{
      public static void main(String args[]){
                  FileInputStream fin;
                  FileOutputStream fout;
                  int i;
                  try{
                              fin = new FileInputStream(args[0]);
                              fout = new FileOutputStream(args[1]);
                              do{
                                    i = fin.read();
                                    if(i != -1)
                                              fout.write(i + 2);
                              }while(i != -1);
                              fin.close();
                              fout.close();
                  }
                  catch(FileNotFoundException fe){
                              System.out.println("File not Found.");
                  }
                  catch(IOException ie){
                              System.out.println("I/O Error.");
                  }
                  catch(ArrayIndexOutOfBoundsException ar){
                              System.out.println("Invalid Arguments.");

                  }
      }
}

Design an AWT application to accept a number from user through textbox and
print its reverse.
import java.awt.*;
import java.awt.event.*;
class Reverse extends Frame implements ActionListener{
      Label l1,l2;
      Button b1;
      TextField t1;
      Reverse(){
                  super("Reverse of a number");
                  setLayout(null);
                  setSize(500,500);
                  l1 = new Label("Enter a number: ");
                  l1.setBounds(100,100,100,20);
                  add(l1);
                  t1 = new TextField();
                  t1.setBounds(200,100,200,20);
                  add(t1);
```

```java
                b1 = new Button("Calculate Reverse");
                b1.setBounds(150,200,200,20);
                b1.addActionListener(this);
                add(b1);
                l2 = new Label(null);
                l2.setBounds(200,250,125,50);
                add(l2);
                setVisible(true);
                addWindowListener(new WindowAdapter(){
                            public void windowClosing(WindowEvent e){

                                    dispose();
                            }
                });
        }
        public void actionPerformed(ActionEvent ae){
                try{
                            l2.setText("Reverse is " +
    reverse(Integer.parseInt(t1.getText())));
                }
                catch(NumberFormatException nfe){
                            l2.setText("Input not a number");
                }
        }
        int reverse(int n){
                int x, a = 0;
                while(n > 0){
            x = n % 10;
            a = a * 10 + x;
            n = n / 10;
        }
                return a;
        }
        public static void main(String args[]){
                new Reverse();
        }
}
```

Write a Java code to input height (in inches) and convert it into feet and inches. Display the final result in feet and inches. For e.g. if height is 77 inches then after conversion it will be 6 feet 5 inches. [1 feet=12 inches]

```java
class Conversion{
        int inches;
        Conversion(){
                inches = 0;
        }
        Conversion(int i){
                inches = i;
        }
        String convert(){
                return(inches/12 + "\'" + inches%12 + "\"");
        }
        public static void main(String args[]){
```

```
                        Conversion c = new Conversion(77);
                        System.out.println("Height is " + c.convert());
            }
}

Write a Java code to implement MouseListener and MouseMotionListener.
import java.awt.*;
import java.awt.event.*;
public class Mouse extends Frame implements MouseListener,
MouseMotionListener{
    Label l1,l2,l3;
      int mouseDraggedCount, mouseMovedCount;
    Mouse(){
        l1 = new Label();
        l1.setBounds(50,50,150,20);
                l1.addMouseListener(this);
        add(l1);
                l2 = new Label();
        l2.setBounds(50,100,150,20);
                l2.addMouseMotionListener(this);
        add(l2);
                l3 = new Label();
        l3.setBounds(250,100,150,20);
                l3.addMouseMotionListener(this);
        add(l3);
        setSize(300,300);
        setLayout(null);
        setVisible(true);
                addWindowListener(new WindowAdapter(){
                        public void windowClosing(WindowEvent e){

                                dispose();
                        }
                });
    }
    public void mouseClicked(MouseEvent e) {
        l1.setText("Mouse Clicked");
    }
    public void mouseEntered(MouseEvent e) {
        l1.setText("Mouse Entered");
    }
    public void mouseExited(MouseEvent e) {
        l1.setText("Mouse Exited");
    }
    public void mousePressed(MouseEvent e) {
        l1.setText("Mouse Pressed");
    }
    public void mouseReleased(MouseEvent e) {
        l1.setText("Mouse Released");
    }
      public void mouseDragged(MouseEvent e) {
                mouseDraggedCount++;
                l2.setText(Integer.toString(mouseDraggedCount));
      }
```

```java
        public void mouseMoved(MouseEvent e) {
                mouseMovedCount++;
                l3.setText(Integer.toString(mouseMovedCount));
        }
        public static void main(String[] args) {
                new Mouse();
        }
}
```

Write a Java program to input Basic salary of a person and calculate Net
salary in Rs. after increasing his salary as per the following criteria
and Display the Net Salary.

Basic(Rs.)	%increase
< 3000	2
>=3000 <5000	5
>=5000 <10000	10
Above 10000	20

```java
class Salary{
      double salary;
      Salary(double s){
                salary = s;
      }
      double calculate(){
                if(salary < 3000)
                        salary += 0.02*salary;
                if(salary >= 3000 && salary < 5000)
                        salary += 0.05*salary;
                if(salary >= 5000 && salary < 10000)
                        salary += 0.1*salary;
                if(salary >= 10000)
                        salary += 0.2*salary;
                return salary;
      }
      public static void main(String args[]){
                Salary s = new Salary(23250);
                System.out.println("Net Salary = " + s.calculate());
      }
}
```

Write a Java program for multiplying two matrices and print the product
for the same

```java
class Matrix{
    int[][] element;
    int rows, cols;
    Matrix(int rows, int cols) {
        this.rows = rows;
        this.cols = cols;
        element = new int[rows][cols];
    }
    public int getValue(int row, int col) {
        return element[row][col];
    }
    public void setValue(int row, int col, int value) {
        element[row][col] = value;
```

```java
    }
      public int getNoRows(){
          return rows;
      }
    public int getNoCols(){
          return cols;
      }
      Matrix multiply(Matrix m2) {
          if (this.getNoCols() != m2.getNoRows()) {
              throw new IllegalArgumentException("These Matrices can't be
multiplied");
          }
                    int row = this.getNoRows();
                    int col = m2.getNoCols();
                    Matrix m3 = new Matrix(row,col);
                            for(int i=0;i<row;i++){
                                for(int j=0;j<col;j++){

    m3.element[i][j]=0;
                                                        for(int
k=0;k<col;k++){

    m3.element[i][j] += element[i][k] * m2.element[k][j];
                                                        }
                                }
                            }
                    return m3;
      }
      public void display(){
                    for(int i=0;i<this.rows;i++){
                            for(int j=0;j<this.cols;j++)
                                    System.out.print(this.getValue(i,j) + "
");
                            System.out.println();
                    }
      }
      public static void main(String[] args){
                    Matrix m1 = new Matrix(2,2);
                    m1.setValue(0,0,3);
                    m1.setValue(0,1,5);
                    m1.setValue(1,0,1);
                    m1.setValue(1,1,7);
                    System.out.println("Matrix 1 is:");
                    m1.display();
                    Matrix m2 = new Matrix(2,2);
                    m2.setValue(0,0,4);
                    m2.setValue(0,1,9);
                    m2.setValue(1,0,12);
                    m2.setValue(1,1,6);
                    System.out.println("Matrix 2 is:");
                    m2.display();
                    Matrix m3 = m1.multiply(m2);
                    System.out.println("Matrix 1 * Matrix 2 is:");
                    m3.display();
```

```
        }
}

Write a Java program that translates a letter grade into a number grade.
Letter grades are A, B, C, D, and F possibly followed by + or -. Their
numeric values are 4,3,2,1 and 0. There is no F+ and F-. + increases the
value by 0.3 and - decreases the value by 0.3. However A+ has the value as
4.0 only. For example
Enter the grade : B-
The numeric value is : 2.7
class Grade{
        String letterGrade;
        float numberGrade;
        Grade(){
                numberGrade = 0;
        }
        Grade(String lg){
                letterGrade = lg.toUpperCase();
        }
        float convert(){
                char grade = letterGrade.charAt(0);
                char sign = ' ';
                if(letterGrade.length() == 2){
                        sign =
letterGrade.charAt(letterGrade.length()-1);
                }
                if((sign == '+' || sign == '-') && grade == 'F'){
                        System.out.println("Enter A Valid Grade");
                        System.exit(0);
                }
                if(sign == '+' && grade != 'F' && grade != 'A')
                        numberGrade += 0.3;
                else if(sign == '-' && grade != 'F')
                        numberGrade -= 0.3;
                switch(grade){
                        case 'A':
                                numberGrade += 4;
                                break;
                        case 'B':
                                numberGrade += 3;
                                break;
                        case 'C':
                                numberGrade += 2;
                                break;
                        case 'D':
                                numberGrade += 1;
                                break;
                        case 'F':
                                break;
                        default:
                                System.out.println("Enter A Valid
Grade");
                                System.exit(0);
                }
```

```java
                return numberGrade;
        }
        public static void main(String args[]){
                    Grade g = new Grade("f-");
                    System.out.println(g.convert());
        }
}
```

Write a Java program to merge the contents of two file into a single file
```java
import java.io.*;
class FileMerge{
        public static void main(String args[]){
                    FileInputStream fin;
                    FileOutputStream fout;
                    int i;
                    try{
                                fin = new FileInputStream(args[0]);
                                fout = new FileOutputStream(args[1],true);
                                do{
                                        i = fin.read();
                                        if(i != -1)
                                                fout.write(i);
                                }while(i != -1);
                                fin.close();
                                fout.close();
                    }
                    catch(FileNotFoundException fe){
                                System.out.println("File not Found.");
                    }
                    catch(IOException ie){
                                System.out.println("I/O Error.");
                    }
                    catch(ArrayIndexOutOfBoundsException ar){
                                System.out.println("Invalid Arguments.");

                    }
        }
}
```

Write a Java program to implement KeyListener.
```java
import java.awt.*;
import java.awt.event.*;
public class Key extends Frame implements KeyListener{
    Label l1,l2,l3;
      TextField t;
    Key(){
                    super("Key Listener");
                    t = new TextField();
                    t.setBounds(50,50,700,50);
                    t.addKeyListener(this);
                    add(t);
        l1 = new Label();
        l1.setBounds(50,100,700,40);
        add(l1);
```

```java
                l2 = new Label();
        l2.setBounds(50,150,700,40);
        add(l2);
                l3 = new Label();
        l3.setBounds(50,200,700,40);
        add(l3);
        setSize(800,300);
        setLayout(null);
        setVisible(true);
                addWindowListener(new WindowAdapter(){
                        public void windowClosing(WindowEvent e){

                                dispose();
                        }
                });
    }
    public void keyTyped(KeyEvent e) {
        l1.setText(t.getText() + " key Clicked");
    }
    public void keyPressed(KeyEvent e) {
        l2.setText(t.getText() + " key Pressed");
    }
    public void keyReleased(KeyEvent e) {
        l3.setText(t.getText() + " key Released");
    }

     public static void main(String[] args) {
                new Key();
     }
}
```

Write a Java program to accept the credit card type and shopping amount
from the user and then display the Net Price as Net Price= Shopping Amount
– Discount.
The discount is calculated based on credit card and total shopping amount
as follows:

Credit Card Type	Shopping Amount	Discount (%)
VISA	<5000	10
	>=5000	20
XYZ	<10000	15
	>=10000	25
ABC	<8000	12
	>=8000	15

```java
class Credit{
    String card;
    double amount;
    Credit(String c,double a){
                card = c.toLowerCase();
                amount = a;
    }
    double calculate(){
```

```java
                double net = 0;
                switch(card){
                        case "visa":
                                if(amount < 5000)
                                        net = amount - (0.1*amount);
                                else
                                        net = amount - (0.2*amount);
                                break;
                        case "xyz":
                                if(amount < 10000)
                                        net = amount -
(0.15*amount);
                                else
                                        net = amount -
(0.25*amount);
                                break;
                        case "abc":
                                if(amount < 8000)
                                        net = amount -
(0.12*amount);
                                else
                                        net = amount -
(0.15*amount);
                                break;
                        default:
                                System.out.println("Invalid Card");
                                System.exit(0);
                }
                return net;
        }
        public static void main(String args[]){
                Credit c = new Credit("Visa",5000);
                System.out.println("Net Price = " + c.calculate());
        }
}
```

Write a Java program to convert a decimal number to binary number.

```java
class BinaryConversion{
        public String decimalToBinary(int decimal){
                String binary = "";
                int a = 0,count = 0;
                while(decimal > 0){
            a = decimal % 2;
            if(a == 1)
                count++;
            binary = binary + "" + a;
            decimal = decimal / 2;
        }
                return binary;
        }
        public int binaryToDecimal(int binary){
                int decimal = 0;
                int n = 0;
                while(true){
```

```java
                        if(binary == 0)
                                break;
                        else{
                                int temp = binary%10;
                                decimal += temp*Math.pow(2, n);
                                binary = binary/10;
                                n++;
                        }
                }
                return decimal;
        }
        public static void main(String args[]){
                BinaryConversion convert = new BinaryConversion();
                System.out.println("15 in binary is " +
convert.decimalToBinary(15));
                System.out.println("1111 in decimal is " +
convert.binaryToDecimal(1111));
        }
}
```

Write a java program to input two numbers x and y and count total number of prime numbers between x and y. For example if x=1 and y=10 then o/p is 4.

```java
class Primes{
        int x,y;
        Primes(int n, int m){
                x = n;
                y = m;
        }
        int primeCount(){
                int count = 0,i,j;
                boolean isPrime = false;
                for(i=x;i<=y;i++){
                        if(i==2)
                                count++;
                        for(j=2;j<i;j++){
                                if(i%j==0){
                                        isPrime = false;
                                        break;
                                }
                                else
                                        isPrime = true;
                        }
                        if(isPrime)
                                count++;
                }
                return count;
        }
        public static void main(String args[]){
                Primes p = new Primes(5,25);
                System.out.println("Prime Numbers between 5 and 25 = " +
p.primeCount());
        }
}
```

Write a Java Program to find the largest and smallest element from an array.

```java
class SmallestAndBiggest{
      int findSmallest(int arr[]){
                  int smallest = arr[0];
                  for(int i=0;i < arr.length;i++)
                              if(smallest > arr[i])
                                    smallest=arr[i];

                  return (smallest);
      }
      int findBiggest(int arr[]){
                  int biggest = arr[0];
                  for(int i=0;i < arr.length;i++)
                              if(biggest<arr[i])
                                    biggest=arr[i];

                  return (biggest);
      }
      public static void main(String args[]    ){
                  SmallestAndBiggest sb = new SmallestAndBiggest();
                  int arr[] = {23,34,56,76,89,22,44};
                  System.out.println("The smallest number in array is:
"+sb.findSmallest(arr));
                  System.out.println("The biggest number in array is:
"+sb.findBiggest(arr));
      }
}
```

Write a Java program to create a class account with attributes acc_no, name and balance. Initialize the values through parameterized constructor. If balance between 1000 and 5000 generate a user defined exception "Balance within the range".

```java
class BalanceWithinLimitsException extends Exception{
      public BalanceWithinLimitsException(String s){
                  super(s);
      }
}
class Account{
      int acc_no;
      String name;
      double balance;
      Account(int a, String n, double b){
                  acc_no = a;
                  name = n;
                  balance = b;
      }
      void checkBalance() throws BalanceWithinLimitsException{
                  if(balance > 1000 && balance <5000)
                              throw new
BalanceWithinLimitsException("Balance Within the Range");
      }
      public static void main(String args[]){
```

```
                    Account a = new Account(1813355,"Abdullah",2500);
                    try{
                            a.checkBalance();
                    }
                    catch(BalanceWithinLimitsException b){
                            System.out.println(b.getMessage());
                    }
        }
}
```

Write a Java AWT program to accept a number from user (TextBox) and
display the cube of the number.

```
import java.awt.*;
import java.awt.event.*;
class Cube extends Frame implements ActionListener{
      Label l1,l2,l3;
      Button b1;
      TextField t1;
      Cube(){
                    super("Cube of a number");
                    setLayout(null);
                    setSize(500,500);
                    l1 = new Label("Enter a number: ");
                    l1.setBounds(100,100,100,20);
                    add(l1);
                    t1 = new TextField();
                    t1.setBounds(200,100,200,20);
                    add(t1);
                    b1 = new Button("Calculate Cube");
                    b1.setBounds(150,200,200,20);
                    b1.addActionListener(this);
                    add(b1);
                    l2 = new Label(null);
                    add(l2);
                    setVisible(true);
                    addWindowListener(new WindowAdapter(){
                            public void windowClosing(WindowEvent e){

                                    dispose();
                            }
                    });
      }
      public void actionPerformed(ActionEvent ae){
                    try{
                            int Cube =
cube(Integer.parseInt(t1.getText()));
                            l2.setText("Cube is " + Cube);
                            l2.setBounds(200,250,100,50);
                            add(l2);
                    }
                    catch(NumberFormatException nfe){
                            l2.setText("Input not a num.");
                    }
      }
```

```
        int cube(int n){
                return n*n*n;
        }
        public static void main(String args[]){
                new Cube();
        }
}
```

Define a class Electbill that contains consumer details as follows:-
Data members/Instance variable :
cno (long) //consumer number
cname (String) // consumer name
cadd (String) // consumer address
NOU(long) // to store number of units consumed
Member functions / Methods :
(i) Electbill() : Parameterised constructor to assign values to consumer
number, consumer name and address
(ii) void display() : Display consumers details
(iii) void calculate() : Calculate the monthly bill of consumer according
to following slabs and it should also display the total amount to be paid

Number of units consumed	Rate
1-100	Rs 500 rental charge only
101-200	Rs 1.00 per unit + Rs 500 rental charge
201-300	Rs 1.20 per unit + Rs 500 rental charge
Above 300	Rs 1.50 per unit + Rs 500 rental charge

```
class ElectricityBill{
        long customerNumber, numberOfUnits;
        String customerName, customerAddress;
        ElectricityBill(long cno, String cname, String cadd){
                customerNumber = cno;
                customerName = cname;
                customerAddress = cadd;
        }
        String display(){
                return("Customer Number: " + customerNumber + "\nCustomer
Name: " + customerName + "\nCustomer Address: " + customerAddress);
        }
        long calculate(int nou){
                numberOfUnits = nou;
                long amount = 0;
                if(numberOfUnits <= 100)
                        amount = 500;
                if(numberOfUnits > 100 && numberOfUnits <= 200)
                        amount += numberOfUnits*1 + 500;
                if(numberOfUnits > 200 && numberOfUnits <= 300)
                        amount += numberOfUnits*1.2 + 500;
                if(numberOfUnits > 300)
                        amount += numberOfUnits*1.5 + 500;
                return amount;
        }
        public static void main(String args[]){
```

```
                    ElectricityBill e = new
ElectricityBill(254120,"Abdullah","Andheri");
                    System.out.println(e.display());
                    System.out.println("Bill for 450 units = " +
e.calculate(450));
        }
}
```

Write a Java program that prompts the user(using Buffered Reader) for a
radius and then prints
a.   Area and Circumference of the circle with that radius
b.   Volume ((4/3)*Pi*R3))and Surface Area(4*Pi*R2) of the sphere with
     that radius

```
import java.io.*;
class Circle{
        double radius;
        Circle(){
                    radius = 0;
        }
        public void accept() throws IOException{
                    System.out.print("Enter radius of a Circle: ");
                    BufferedReader br=new BufferedReader(new
InputStreamReader(System.in));
                    radius = Float.parseFloat(br.readLine());
        }
        String calculate(){
                    final double PI = 3.1415;
                    return("Area = " + (PI*radius*radius) + "\nCircumeference
= " + (2*PI*radius) + "\nVolume = " + ((4/3)*PI*radius*radius*radius) +
"\nSurface Area = " + (4*PI*radius*radius));
        }
        public static void main(String args[]) throws IOException{
                    Circle c = new Circle();
                    c.accept();
                    System.out.println(c.calculate());
        }
}
```

Write a Java program that prompts the users for 2 integers using command
line argument and then prints (i) sum (ii) difference (iii) product (iv)
average (v) maximum (vi) minimum. Write methods to calculate the same.

```
class Arithmetic{
        int x,y;
        Arithmetic(int a,int b){
                    x = a;
                    y = b;
        }
        int sum(){
                    return x+y;
        }
        int difference(){
                    return x-y;
        }
        int product(){
```

```
                        return x*y;
        }
        int average(){
                        return sum()/2;
        }
        int maximum(){
                        int max;
                        if(x>y)
                                        max = x;
                        else
                                        max = y;
                        return max;
        }
        int minimum(){
                        int min;
                        if(x<y)
                                        min = x;
                        else
                                        min = y;
                        return min;
        }
        public static void main(String args[]){
                        Arithmetic a = new
Arithmetic(Integer.parseInt(args[0]),Integer.parseInt(args[1]));
                        System.out.println("Sum = " + a.sum());
                        System.out.println("Difference = " + a.difference());
                        System.out.println("Product = " + a.product());
                        System.out.println("Average = " + a.average());
                        System.out.println("Maximum = " + a.maximum());
                        System.out.println("Minimum = " + a.minimum());
        }
}
```

Write an AWT Program to design the Following GUI
The Grade should be calculated based on the following table

Marks Percentage	Grade
>=60	A++
>=45 <60	B
>=33<45	C
<33	F

```
import java.awt.*;
import java.awt.event.*;
class Grades extends Frame implements ActionListener{
        Label l1,l2;
        TextField t1;
        Button b1;
        Grades(){
                        setLayout(null);
                        setSize(500,300);
                        l1 = new Label("Enter your marks %:");
                        l1.setBounds(100,100,150,25);
                        add(l1);
                        t1 = new TextField();
                        t1.setBounds(250,100,200,25);
```

```java
                add(t1);
                b1 = new Button("Calculate Grade");
                b1.setBounds(150,180,200,25);
                b1.addActionListener(this);
                add(b1);
                l2 = new Label(null);
                l2.setBounds(215,225,200,25);
                add(l2);
                setVisible(true);
                addWindowListener(new WindowAdapter(){
                        public void windowClosing(WindowEvent e){
                                dispose();
                        }
                });
        }
        public void actionPerformed(ActionEvent ae){
                try{
                        l2.setText("Grade is " +
grades(Integer.parseInt(t1.getText())));
                }
                catch(NumberFormatException nfe){
                        l2.setText("Input not a number");
                }
        }
        String grades(int n){
                if(n>=60)
                        return "A++";
                if(n>=45 && n<60)
                        return "B";
                if(n>=33 && n<45)
                        return "C";
                if(n<33)
                        return "F";
                return "";
        }
        public static void main(String args[]){
                new Grades();
        }
}
```

Write a java program to input a number from user and print the sum of its odd factors only. Example: - If number is 36 then its factors are 1,2,3,4,6,9,12,18 and sum of its odd factors is 1+3+9=13.

```java
class OddFactors{
        int num;
        OddFactors(int n){
                num = n;
        }
        int sumOfFactors(){
                int sum = 0;
                for(int i=1;i<=(num)/2;i++){
                        if(num%i == 0 && i%2 != 0)
                                sum += i;
                }
```

```java
                        return sum;
        }
        public static void main(String args[]){
                        OddFactors o = new OddFactors(36);
                        System.out.println("Sum of Odd Factors of 36 = " +
o.sumOfFactors());
        }
}
```

Write a java Program to input any digit number and print the sum of only its even digits. Example: 2354=2+4=6.

```java
class EvenDigits{
        long num;
        EvenDigits(long n){
                        num = n;
        }
        long sumOfEvenDigits(){
                        long sum = 0;
                        int digit = 0;
                        String snum = Long.toString(num);
                        for(int i=0;i<=snum.length()-1;i++){
                                        digit =
Character.getNumericValue(snum.charAt(i));
                                        if(digit%2==0)
                                                        sum += digit;
                        }
                        return sum;
        }
        public static void main(String args[]){
                        EvenDigits e = new EvenDigits(2354);
                        System.out.println("Sum of Even Digits = " +
e.sumOfEvenDigits());
        }
}
```

Design an abstract class called Shape which has three subclasses say Triangle, Rectangle, and Circle. Define one method area () in the abstract class and override this area () in these three subclasses to calculate for specific object i.e. area () of Triangle subclass should calculate area of triangle etc. Same for Rectangle and Circle

```java
abstract class Shape{
        double dim1, dim2;
        Shape(){
                        dim1 = dim2 = 0;
        }
        Shape(double a){
                        dim1 = a;
        }
        Shape(double a, double b){
                        dim1 = a;
                        dim2 = b;
        }
        abstract double area();
}
```

```java
class Circle extends Shape{
      Circle(double radius){
                super(radius);
      }
      double area(){
                return 3.14 * dim1 * dim1;
      }
}
class Triangle extends Shape{
      Triangle(double base,double height){
                super(base,height);
      }
      double area(){
                return 0.5 * dim1 * dim2;
      }
}
class Rectangle extends Shape{
      Rectangle(double length, double breadth){
                super(length,breadth);
      }
      double area(){
                return dim1 * dim2;
      }
}
class AbstractAreas{
      public static void main(String args[]){
                Circle c = new Circle(5);
                Triangle t = new Triangle(9,5);
                Rectangle r = new Rectangle(5,6);
                Shape shapeRef;
                shapeRef = c;
                System.out.println("Area of Circle is: " +
shapeRef.area());
                shapeRef = t;
                System.out.println("Area of Triangle is: " +
shapeRef.area());
                shapeRef = r;
                System.out.println("Area of Rectangle is: " +
shapeRef.area());
      }
}
```

Write a java program for multiplying two matrices and print the product for the same.
#Repeat

Create a class "Employee" as follows:-
Instance variables:- empno(long), empname(String), job(String);
Methods:-
i) void showinfo() - to display details of employee.
Create another class "Salary" that inherits from class "Employee" as follows:-
Instance variables:- basic(double), newsal(double)
Methods:-

i) void calculate(double perc) – that takes percentage amount "perc" as argument and calculates newsalary by incrementing the basic salary by that percentage amount.
ii) void dispdata() – to display basic salary.
Write a Java program to create an object of class Salary to input details of employee and also invoke showinfo(), calculate() and dispdata() methods.

```java
class Employee{
    long empNo;
    String empName, job;
    Employee(long eno,String ename, String j){
        empNo = eno;
        empName = ename;
        job = j;
    }
    void showInfo(){
        System.out.println(
            "Employee Number: " + empNo + "\n" +
            "Employee Name: " + empName + "\n" +
            "Job: " + job
        );
    }
}
class Salary extends Employee{
    double basic, newSal;
    Salary(long eno,String ename, String j,double salary){
        super(eno,ename,j);
        basic = salary;
        newSal = 0;
    }
    void calculate(double perc){
        newSal = basic + (basic*(perc/100));
    }
    void dispdata(){
        System.out.println(
            "Basic Salary: " + basic + "\n" +
            "New Salary: " + newSal
        );
    }
}
class EmpSal{
    public static void main(String args[]){
        Salary s = new Salary(101,"Abdullah","Mining",50000);
        s.showInfo();
        s.calculate(50);
        s.dispdata();
    }
}
```

Write a Java program for generating 4 threads to do the following operations.
(a)getting n numbers (b)printing even numbers
(c)printing odd numbers (d)printing square of a numbers
import java.util.Scanner;

```java
public class MultipleThreads implements Runnable{
    Thread t1, t2, t3, t4;
    int [] numbers;
    Scanner sc = new Scanner(System.in);
    MultipleThreads(){
        t1 = new Thread(this);
        t2 = new Thread(this);
        t3 = new Thread(this);
        t4 = new Thread(this);
        t1.setName("First");
        t2.setName("Second");
        t3.setName("Third");
        t4.setName("Fourth");
        t1.start();
    }
    public void run(){
        if(Thread.currentThread().getName().equalsIgnoreCase("First"))
            getNumbers();
        else
if(Thread.currentThread().getName().equalsIgnoreCase("Second"))
            printEven();
        else
if(Thread.currentThread().getName().equalsIgnoreCase("Third"))
            printOdd();
        else
if(Thread.currentThread().getName().equalsIgnoreCase("Fourth"))
            printSquares();
    }
    void getNumbers(){
        System.out.print("How many numbers you want to enter? : ");
        numbers = new int[sc.nextInt()];
        for(int i=0; i<numbers.length; i++)
            numbers[i] = sc.nextInt();
        t2.start();
    }
    void printEven(){
        System.out.println("Even : ");
        for(int i=0; i<numbers.length; i++)
            if(numbers[i]%2==0)
                System.out.print(numbers[i]+" ");
        System.out.println("");
        t3.start();
    }
    void printOdd(){
        System.out.println("Odd : ");
        for(int i=0; i<numbers.length; i++)
            if(numbers[i]%2==1)
                System.out.print(numbers[i]+" ");
        System.out.println("");
        t4.start();
    }
    void printSquares(){
        System.out.println("Squares : ");
        for(int i=0; i<numbers.length; i++)
```

```
            System.out.print(numbers[i]*numbers[i]+" ");
        System.out.println("");
    }

    public static void main(String[] args) {
        MultipleThreads t = new MultipleThreads();
    }
}
```

Write a Java program to multiply two matrices. Before multiplication the
matrices should be checked whether they can be multiplied or not.
#Repeated

Write a method in Java that takes two integer arguments and returns power
of it. Suppose x and y passing as an argument(using call by reference)
then it returns x to power y after calculation

```
class Power{
    int power(int x, int y){
            int pow = 1;
            while(y != 0){
                    pow *= x;
                    y--;
            }
            return pow;
    }
    public static void main(String args[]){
            Power p = new Power();
            System.out.println(p.power(5,3));
    }
}
```

Define 2 packages (i) Prime (ii) Factorial. Write a Java program to create
a class
PrimeFact to import these packages
- C:\prime\Prime.java :
```
package prime;
public class Prime{
    public boolean isItPrime(int num){
            boolean isPrime = false;
            for(int i=2;i<=num/2;i++){
                    if(num%i == 0){
                            break;
                    }
                    else
                            isPrime = true;
            }
            return isPrime;
    }
}
```
- C:\factorial\Factorial.java :
```
package factorial;
public class Factorial{
    public long factorial(int num){
            long f=1;
```

```java
                for(int i=1;i<=num;i++)
                        f=f*i;
                return f;
        }
}
-   C:\PrimeFact.java
import prime.*;
import factorial.*;
class PrimeFact{
      public static void main(String args[]){
                Prime p = new Prime();
                Factorial f = new Factorial();
                System.out.println("Is 2 prime? " + p.isItPrime(2));
                System.out.println("Is 4 prime? " + p.isItPrime(4));
                System.out.println("Factorial of 5 is " +
f.factorial(5));
        }
}
```

Write a java program to copy the contents from one file to other file.
```java
import java.io.*;
class FileCopy{
      public static void main(String args[]){
                FileInputStream fin;
                FileOutputStream fout;
                int i;
                try{
                        fin = new FileInputStream(args[0]);
                        fout = new FileOutputStream(args[1]);
                        do{
                            i = fin.read();
                            if(i != -1)
                                     fout.write(i);
                        }while(i != -1);
                        fin.close();
                        fout.close();
                }
                catch(FileNotFoundException fe){
                        System.out.println("File not Found.");
                }
                catch(IOException ie){
                        System.out.println("I/O Error.");
                }
                catch(ArrayIndexOutOfBoundsException ar){
                        System.out.println("Invalid Arguments.");

                }
        }
}
```

Define a class Travel with the following descriptions :
Data members/Instance variable :
TravelCode(long),Place(string),No_of_travellers(int),No_of_buses(integer)
Member functions / Methods :

i) A constructor to assign initial values of TravelCode as 201, Place as "Nainital", No_of_travellers as 10, No_of_buses as 1
ii)A method NewTravel() which allows user to enter TravelCode, Place and No_of_travellers through arguments.
Also, assign the value of No_of_buses as per the following conditions :
Noof Travellers NoofBuses
Less than 20 01
Equal to or More Than 20 and less than 40 02
Equal to 40 or more than 40 03
iii) A method ShowTravel( ) to display the content of all the data members on
screen. WAP to create an object of class Travel and invoke all its methods

```java
class Travel{
      long travelCode;
      String place;
      int noOfTravellers, noOfBuses;
      Travel(){
                travelCode = 201;
                place = "Nainital";
                noOfTravellers = 10;
                noOfBuses = 1;
      }
      void newTravel(long tc, String p, int not){
                travelCode = tc;
                place = p;
                noOfTravellers = not;
                if(noOfTravellers < 20)
                        noOfBuses = 1;
                else if(noOfTravellers >= 20 && noOfTravellers < 40)
                        noOfBuses = 2;
                else if(noOfTravellers >= 40)
                        noOfBuses = 3;
      }
      String showTravel(){
                return(
                        "Travel Code: " + travelCode + "\n" +
                        "Place: " + place + "\n" +
                        "Number of Travellers: " + noOfTravellers +
"\n" +
                        "Number of Buses: " + noOfBuses
                );
      }
      public static void main(String args[]){
                Travel t = new Travel();
                System.out.println(t.showTravel());
                t.newTravel(202,"Lavasa",50);
                System.out.println(t.showTravel());
      }
}
```

Write a Java program to accept a sentence from user using command line argument and store it in a file data.txt.
```java
import java.io.*;
class FileCommand{
```

```java
        public static void main(String args[]){
                FileOutputStream fout;
                int i;
                try{
                        String sentence = "";
                        for(i=0;i<args.length-1;i++)
                                sentence += args[i] + " ";
                        fout = new FileOutputStream(args[i]);
                        fout.write(sentence.getBytes());
                        fout.close();
                }
                catch(FileNotFoundException fe){
                        System.out.println("File not Found.");
                }
                catch(IOException ie){
                        System.out.println("I/O Error.");
                }
                catch(ArrayIndexOutOfBoundsException ar){
                        System.out.println("Invalid Arguments.");

                }
        }
}
```

Write a Java program that translates a number between 0 to 4 into the letter
grades as F, D, C, B and A. For example if the number entered is 2.8 then grade
is B and if number entered is 2.3 then grade would be C.

```java
class NumberGrade{
        String letterGrade;
        double numberGrade;
        NumberGrade(){
                letterGrade = "";
        }
        NumberGrade(double ng){
                numberGrade = ng;
        }
        String convert(){
                if(numberGrade == 0)
                        letterGrade = "F";
                else if(numberGrade > 0 && numberGrade <= 1.4)
                        letterGrade = "D";
                else if(numberGrade > 1.4 && numberGrade <= 2.4)
                        letterGrade = "C";
                else if(numberGrade > 2.4 && numberGrade <= 3.4)
                        letterGrade = "B";
                else if(numberGrade > 3.4 && numberGrade <= 4)
                        letterGrade = "A";
                return letterGrade;
        }
        public static void main(String args[]){
                NumberGrade n = new NumberGrade(2.3);
                System.out.println(n.convert());
```

```
            }
}

Write a Java AWT program to calculate area of Rectangle.
import java.awt.*;
import java.awt.event.*;
class RectangleAwt extends Frame implements ActionListener{
      Label l1,l2,l3;
      Button b1;
      TextField t1,t2;
      RectangleAwt(){
                  super("Area of a Rectangle");
                  setLayout(null);
                  setSize(500,500);
                  l1 = new Label("Enter Length: ");
                  l1.setBounds(100,100,100,20);
                  add(l1);
                  t1 = new TextField();
                  t1.setBounds(200,100,200,20);
                  add(t1);
                  l2 = new Label("Enter Breadth: ");
                  l2.setBounds(100,150,100,20);
                  add(l2);
                  t2 = new TextField();
                  t2.setBounds(200,150,200,20);
                  add(t2);
                  b1 = new Button("Calculate Area");
                  b1.setBounds(150,200,200,20);
                  b1.addActionListener(this);
                  add(b1);
                  l3 = new Label(null);
                  add(l3);
                  setVisible(true);
                  addWindowListener(new WindowAdapter(){
                            public void windowClosing(WindowEvent e){

                                    dispose();
                            }
                  });
      }
      public void actionPerformed(ActionEvent ae){
                  try{
                            l3.setText("Area of Rectangle is " +
(Integer.parseInt(t1.getText())*Integer.parseInt(t2.getText())));
                            l3.setBounds(190,250,200,50);
                            add(l3);
                  }
                  catch(NumberFormatException nfe){
                            l3.setText("Input not a num.");
                  }
      }
      public static void main(String args[]){
                  new RectangleAwt();
      }
```

```
}

Write a Java program to create a class student with attributes roll no,
name, age
and course. Initialize values through parameterized constructor. If age is
not
between 15 and 21 then generate a user defined exception "Age not within
the
range".
class AgeException extends Exception{
      public AgeException(String s){
                  super(s);
      }
}
class Student{
      int rollNo, age;
      String name, course;
      Student(int r, int a, String n, String c){
                  rollNo = r;
                  age = a;
                  name = n;
                  course = c;
      }
      void checkAge() throws AgeException{
                  if(age < 15 || age > 21)
                              throw new AgeException("Age not within the
range");
      }
      public static void main(String args[]){
                  Student s1 = new Student(101,22,"Abdullah","BscIT");
                  try{
                              s1.checkAge();
                  }
                  catch(AgeException a){
                              System.out.println(a.getMessage());
                  }
      }
}

Write a Java program to sort the array in ascending and descending order
class SortArray{
      int[] arr;
      int index;
      SortArray(int size){
                  arr = new int[size];
                  index = -1;
      }
      void setData(int item){
                  try{
                              arr[++index] = item;
                  }
                  catch(ArrayIndexOutOfBoundsException ae){
                              System.out.println("Array Index Error.");
                  }
```

```java
        }
        void ascending(){
                int temp = 0;
                for(int i=0;i < arr.length;i++)
                        for(int j=i+1;j < arr.length;j++)
                                if(arr[i] > arr[j]){
                                        temp = arr[i];
                                        arr[i] = arr[j];
                                        arr[j] = temp;
                                }
        }
        void descending(){
                int temp = 0;
                for(int i=0;i < arr.length;i++)
                        for(int j=i+1;j < arr.length;j++)
                                if(arr[i] < arr[j]){
                                        temp = arr[i];
                                        arr[i] = arr[j];
                                        arr[j] = temp;
                                }
        }
        void display(){
                for(int i=0;i < arr.length;i++)
                        System.out.println(arr[i]);
        }
        public static void main(String args[]    ){
                SortArray a = new SortArray(5);
                a.setData(76);
                a.setData(45);
                a.setData(65);
                a.setData(12);
                a.setData(22);
                System.out.println("Array is: ");
                a.display();
                a.ascending();
                System.out.println("Ascending Array is: ");
                a.display();
                a.descending();
                System.out.println("Descending Array is: ");
                a.display();
        }
}

-  C:\rectangle\Rectangle.java :
package rectangle;
public class Rectangle{
        double length, breadth;
        public Rectangle(double l, double b){
                length = l;
                breadth = b;
        }
        public double area(){
                return length*breadth;
        }
```

```java
}
-  C:\square\Square.java :
package square;
public class Square{
      double side;
      public Square(double s){
                side = s;
      }
      public double area(){
                return side*side;
      }
}
-  C:\triangle\Triangle.java :
package triangle;
public class Triangle{
      double base, height;
      public Triangle(double b, double h){
                base = b;
                height = h;
      }
      public double area(){
                return 0.5*base*height;
      }
}
-  C:\ShapeDemo.java
import rectangle.*;
import square.*;
import triangle.*;
class ShapeDemo{
      public static void main(String args[]){
                Rectangle r = new Rectangle(3,4);
                System.out.println("Area of Rectangle = " + r.area());
                Square s = new Square(5);
                System.out.println("Area of Square = " + s.area());
                Triangle t = new Triangle(3,4);
                System.out.println("Area of Triangle = " + t.area());
      }
}
```

Write a Java program to convert digit into words.(E.g.: 12 One Two)

```java
class DigitConversion{
      int num;
      DigitConversion(int n){
                num = n;
      }
      String convert(){
                String snum = Integer.toString(num);
                String words = "";
                char digits[] = new char[snum.length()];
                for(int i=0;i<digits.length;i++){
                          digits[i] = snum.charAt(i);
                          switch(digits[i]){
                                case '1':
                                          words += "One ";
```

```
                                                            break;
                                    case '2':
                                                words += "Two ";
                                                break;
                                    case '3':
                                                words += "Three ";
                                                break;
                                    case '4':
                                                words += "Four ";
                                                break;
                                    case '5':
                                                words += "Five ";
                                                break;
                                    case '6':
                                                words += "Six ";
                                                break;
                                    case '7':
                                                words += "Seven ";
                                                break;
                                    case '8':
                                                words += "Eight ";
                                                break;
                                    case '9':
                                                words += "Nine ";
                                                break;
                                    case '0':
                                                words += "Zero ";
                                                break;
                        }
                }
                return words;
        }
        public static void main(String args[]){
                        DigitConversion dc = new DigitConversion(12);
                        System.out.println(dc.convert());
        }
}
```

Define a class TOUR as follows:-
Private Members:-
Tcode(string),Noofadults(int),Noofkids(int),kilometres(int),totFare(float)
Public:
i) A constructor to assign initial values as follows:-
Tcode with the word "NULL", Nofadults,Noofkids,kilometres & totfare with zero.
ii) A function AssignFare() which calculates and assigns the value of data members TotFare as follows:-
For Each Adult:

Fare(Rs.)	For Kilometres
500	>=1000
300	<1000 & >=500
200	<500

For each kid the above fare will be 50% of the Fare mentioned above.
Example if distance is 850 km and Noofadults are 2, Noofkids are 3 then TotFare=1050Rs.

iii) EnterTour() to input values for Tcode, Nofoadults,Noofkids and kilometres through arguments.
ShowTour() to display the details of all the data members along with total fare.

```java
class Tour{
        private String tCode;
        private int noOfAdults, noOfKids, kilometres;
        private float totFare;
        public Tour(){
                    tCode = "NULL";
                    noOfAdults = noOfKids = kilometres = 0;
                    totFare = 0;
        }
        public void assignFare(){
                    if(kilometres < 500)
                                totFare += noOfAdults*200 + noOfKids*100;
                    if(kilometres < 1000 && kilometres >= 500)
                                totFare += noOfAdults*300 + noOfKids*150;
                    if(kilometres >= 1000)
                                totFare += noOfAdults*500 + noOfKids*250;
        }
        public void enterTour(String t, int noa, int nok, int k){
                    tCode = t;
                    noOfAdults = noa;
                    noOfKids = nok;
                    kilometres = k;
        }
        public String showTour(){
                    return(
                                "Travel Code: " + tCode + "\n" +
                                "Number of Adutls: " + noOfAdults + "\n" +
                                "Number of Kids: " + noOfKids + "\n" +
                                "Total Fare: " + totFare
                    );
        }
        public static void main(String args[]){
                    Tour mumbai = new Tour();
                    mumbai.enterTour("BOM",2,3,850);
                    mumbai.assignFare();
                    System.out.println(mumbai.showTour());
        }
}
```

Write a Java program that accepts two strings as command line arguments. It checks for the number of command line arguments. If they are less or more it throws a user defined exception else it will display the strings.

```java
class InvalidNumberOfArgumentsException extends Exception{
        public InvalidNumberOfArgumentsException(String s){
                    super(s);
        }
}
class CommandLineArguments{
        public static void main(String args[]) throws
InvalidNumberOfArgumentsException{
```

```
                        int i;
                        try{
                                if(args.length != 2)
                                        throw new
InvalidNumberOfArgumentsException("Invalid Number of Arguments");
                                else
                                        for(i = 0; i <= args.length-1; i++)
                                                System.out.print(args[i] + "
");
                        }
                        catch(InvalidNumberOfArgumentsException e){
                                System.out.println(e.getMessage());
                        }
        }
}
```

Write a Java program called CozaLozaWoza which prints the number 1 to 110,
11 numbers per line. The program shall print "Coza" in place of the
numbers which are multiples of 3, "Loza" for multiples of 5, "Woza" for
multiples of 7, "CozaLoza" for multiples of 3 and 5, and so on. The output
shall look like:
1. 2 Coza 4 Loza Coza Woza 8 Coza Loza 11
Coza 13 Woza CozaLoza 16 17 Coza 19 Loza CozaWoza 22
23 Coza Loza 26 Coza Woza 29 CozaLoza 31 32 Coza

```
class CozaLozaWoza{
        public static void main(String args[]){
                        for(int i=1;i<=110;i++){
                                boolean regular = true;
                                if(i%3 == 0){
                                        System.out.print("Coza");
                                        regular = false;
                                }
                                if(i%5 == 0){
                                        System.out.print("Loza");
                                        regular = false;
                                }
                                if(i%7 == 0){
                                        System.out.print("Woza");
                                        regular = false;
                                }
                                if(regular)
                                        System.out.print(i);
                                if(i%11 == 0)
                                        System.out.println();
                                else
                                        System.out.print(" ");
                        }
        }
}
```

Write a Java AWT program to calculate area of Circle.
```
import java.awt.*;
import java.awt.event.*;
class CircleAwt extends Frame implements ActionListener{
```

```java
        Label l1,l2;
        Button b1;
        TextField t1;
        CircleAwt(){
                super("Area of A circle");
                setLayout(null);
                setSize(500,500);
                l1 = new Label("Enter radius: ");
                l1.setBounds(100,100,100,20);
                add(l1);
                t1 = new TextField();
                t1.setBounds(200,100,200,20);
                add(t1);
                b1 = new Button("Calculate Area");
                b1.setBounds(150,200,200,20);
                b1.addActionListener(this);
                add(b1);
                l2 = new Label(null);
                add(l2);
                setVisible(true);
                addWindowListener(new WindowAdapter(){
                        public void windowClosing(WindowEvent e){

                                dispose();
                        }
                });
        }
        public void actionPerformed(ActionEvent ae){
                try{
                        l2.setText("Area of Circle is " +
(Double.parseDouble(t1.getText())*Integer.parseInt(t1.getText())*3.1415));
                        l2.setBounds(175,250,200,50);
                        add(l2);
                }
                catch(NumberFormatException nfe){
                        l2.setText("Input not a num.");
                }
        }
        public static void main(String args[]){
                new CircleAwt();
        }
}
```

Design a student class. A student has a name, stipend, and enrolment
number. Write a default constructor and a constructor with two parameters
(name and enrolment number) and two methods. (a) To return the name and
enrolment number. (b) A method that increases the student's stipend. Write
a small program that tests your class.

```java
class StudentTest{
        String name;
        float stipend;
        long enrolmentNumber;
        StudentTest(){
                name = "";
```

```java
                stipend = 0;
                enrolmentNumber = 0;
        }
        StudentTest(String n, long en){
                name = n;
                enrolmentNumber = en;
                stipend = 500;
        }
        String getData(){
                return(
                        "Name: " + name + "\n" +
                        "Enrolment Number: " + enrolmentNumber + "\n"
+
                        "Stipend: " + stipend
                );
        }
        float increaseStipend(float percentage){
                stipend += stipend*(percentage/100);
                return(stipend);
        }
        public static void main(String args[]){
                StudentTest st = new StudentTest("Abdullah",101);
                System.out.println(st.getData());
                System.out.println("Stipend after increase: " +
st.increaseStipend(5));
        }
}
```

Write a Java code to design the following GUI and perform the arithmetic operation.

```java
import java.awt.*;
import java.awt.event.*;
class SimpleCalculator extends Frame{
        Label l1,l2,l3,l4;
        TextField t1,t2,t3;
        Choice c1;
        SimpleCalculator(){
                setLayout(null);
                setSize(400,200);
                setVisible(true);
                l1 = new Label("Enter 1st no.");
                l1.setBounds(50,50,100,25);
                add(l1);
                t1 = new TextField();
                t1.setBounds(150,50,200,25);
                add(t1);
                l2 = new Label("Enter 2nd no.");
                l2.setBounds(50,80,100,25);
                add(l2);
                t2 = new TextField();
                t2.setBounds(150,80,200,25);
                add(t2);
                l3 = new Label("Result");
                l3.setBounds(50,115,50,25);
```

```java
                add(l3);
                t3 = new TextField("Click here for result");
                t3.setEditable(false);
                t3.setBounds(110,115,210,25);
                t3.addMouseListener(new MouseAdapter(){
                        public void mouseClicked(MouseEvent e) {
                                String operator =
c1.getItem(c1.getSelectedIndex());
                                try{
                                        switch(operator){
                                                case "+":
                                                        l4.setText(

        Float.toString(

                Float.parseFloat(t1.getText()) +
Float.parseFloat(t2.getText())

        )

                                                        );
                                                        break;
                                                case "-":
                                                        l4.setText(

        Float.toString(

                Float.parseFloat(t1.getText()) -
Float.parseFloat(t2.getText())

        )

                                                        );
                                                        break;
                                                case "*":
                                                        l4.setText(

        Float.toString(

                Float.parseFloat(t1.getText()) *
Float.parseFloat(t2.getText())

        )

                                                        );
                                                        break;
                                                case "/":
                                                        l4.setText(

        Float.toString(

                Float.parseFloat(t1.getText()) /
Float.parseFloat(t2.getText())

        )

                                                        );
                                                        break;
```

```java
                                               }
                                }
                                catch(NumberFormatException nfe){
                                            l4.setText("Input not a
number.");
                                }

                        }
                });
                add(t3);
                c1 = new Choice();
                c1.setBounds(330,115,50,50);
                c1.add("+");
                c1.add("-");
                c1.add("*");
                c1.add("/");
                add(c1);
                l4 = new Label("0");
                l4.setBounds(200,135,200,50);
                add(l4);
                addWindowListener(new WindowAdapter(){
                            public void windowClosing(WindowEvent we){
                                dispose();
                            }
                });

        }
    public static void main(String args[]){
                new SimpleCalculator();
        }
}
```

Write a Java Program to create 5 threads using Runnable Interface
```java
import java.util.Scanner;
public class MultipleThreads implements Runnable{
    Thread t1, t2, t3, t4, t5;
    int [] numbers;
    Scanner sc = new Scanner(System.in);
    MultipleThreads(){
        t1 = new Thread(this);
        t2 = new Thread(this);
        t3 = new Thread(this);
        t4 = new Thread(this);
                t5 = new Thread(this);
        t1.setName("First");
        t2.setName("Second");
        t3.setName("Third");
        t4.setName("Fourth");
                t5.setName("Fifth");
        t1.start();
    }
    public void run(){
        if(Thread.currentThread().getName().equalsIgnoreCase("First"))
            getNumbers();
```

```java
            else
if(Thread.currentThread().getName().equalsIgnoreCase("Second"))
            printEven();
        else
if(Thread.currentThread().getName().equalsIgnoreCase("Third"))
            printOdd();
        else
if(Thread.currentThread().getName().equalsIgnoreCase("Fourth"))
            printSquares();
                else
if(Thread.currentThread().getName().equalsIgnoreCase("Fifth"))
            printFactorial();
    }
    void getNumbers(){
        System.out.print("How many numbers you want to enter? : ");
        numbers = new int[sc.nextInt()];
        for(int i=0; i<numbers.length; i++)
            numbers[i] = sc.nextInt();
        t2.start();
    }
    void printEven(){
        System.out.println("Even : ");
        for(int i=0; i<numbers.length; i++)
            if(numbers[i]%2==0)
                System.out.print(numbers[i]+" ");
        System.out.println("");
        t3.start();
    }
    void printOdd(){
        System.out.println("Odd : ");
        for(int i=0; i<numbers.length; i++)
            if(numbers[i]%2==1)
                System.out.print(numbers[i]+" ");
        System.out.println("");
        t4.start();
    }
    void printSquares(){
        System.out.println("Squares : ");
        for(int i=0; i<numbers.length; i++)
            System.out.print(numbers[i]*numbers[i]+" ");
        System.out.println("");
                t5.start();
    }
      void printFactorial(){
                System.out.println("Factorials : ");
                for(int i=0; i<numbers.length; i++)
            System.out.print(fact(numbers[i]) + " ");
        System.out.println("");
      }
    int fact(int n){
                int f=1;
                for(int i=1;i<=n;i++)
                        f=f*i;
                return f;
```

```java
        }
    public static void main(String[] args) {
        MultipleThreads t = new MultipleThreads();
    }
}
```

Write a Java program to read the student data from user and store it in the file.

```java
import java.io.*;
class Student{
    int id,age;
    String name;
    Student(int i, String n, int a, File file){
            id = i;
            name = n;
            age = a;
            try{
                    FileOutputStream fout = new
FileOutputStream(file,true);
                    String studentData = id + " " + name + " " +
age + "\n";
                    fout.write(studentData.getBytes());
                    fout.close();
            }
            catch(FileNotFoundException fe){
                    System.out.println("File not Found.");
            }
            catch(ArrayIndexOutOfBoundsException ar){
                    System.out.println("Invalid Arguments.");

            }
            catch(IOException ie){
                    System.out.println("I/O Error.");
            }
    }
    public static void main(String args[]){
            File file = new File(args[0]);
            Student s1 = new Student(101,"Abdullah",20,file);
            Student s2 = new Student(102,"Ronak",18,file);
    }
}
```

Write a Java program to create an interface Area with one method AreaCompute() with 2 float parameters. Design 2 classes Rectangle and Circle implementing the Area Interface. Input should be taken from the user using Buffered Reader class.

```java
import java.io.*;
interface Area{
    void AreaCompute(double a, double b);
}
class Rectangle{
    double length, breadth;
    Rectangle(){
            length = 0;
```

```java
                breadth = 0;
        }
        void setData() throws IOException{
                System.out.print("Enter Length of Rectangle: ");
                BufferedReader l = new BufferedReader(new
InputStreamReader(System.in));
                length = Double.parseDouble(l.readLine());
                System.out.print("Enter Breadth of Rectangle: ");
                BufferedReader b = new BufferedReader(new
InputStreamReader(System.in));
                breadth = Double.parseDouble(b.readLine());
                AreaCompute(length, breadth);
        }
        void AreaCompute(double l, double b){
                System.out.println("Area of Rectangle is " + l*b);
        }
}
class Circle{
        double radius, pi;
        Circle(){
                radius = 0;
                pi = 3.1415;
        }
        void setData() throws IOException{
                System.out.print("Enter Radius of Circle: ");
                BufferedReader r = new BufferedReader(new
InputStreamReader(System.in));
                radius = Double.parseDouble(r.readLine());
                AreaCompute(radius, pi);
        }
        void AreaCompute(double r, double p){
                System.out.println("Area of Rectangle is " + p*r*r);
        }
}
class RectangleCircle{
        public static void main(String args[]){
                Rectangle r = new Rectangle();
                Circle c = new Circle();
                try{
                        r.setData();
                        c.setData();
                }
                catch(IOException ioe){
                        System.err.println("IOException Occured");
                }
        }
}
```

Develop a GUI application using Java AWT to present a set of stationary
items (combo box) to the user. When the user clicks on a particular
stationary item, display the price of the item.

Stationary Item	Price
Ruler	10
Pencil	12

```
Pen                              20
Eraser                            5
Note Book            32
import java.awt.*;
import java.awt.event.*;
class Stationary extends Frame{
      Choice c1;
      Label l1;
      Stationary(){
                  super("Stationary");
                  setSize(200,200);
                  setLayout(null);
                  setVisible(true);
                  c1 = new Choice();
                  c1.add("Ruler");
                  c1.add("Pencil");
                  c1.add("Pen");
                  c1.add("Eraser");
                  c1.add("Note Book");
                  c1.setBounds(50,50,100,25);
                  c1.addItemListener(new ItemListener(){
                              public void itemStateChanged(ItemEvent ie){
                                    if(c1.getSelectedItem() == "Ruler")
                                          l1.setText("Price = 10");
                                    if(c1.getSelectedItem() == "Pencil")
                                          l1.setText("Price = 12");
                                    if(c1.getSelectedItem() == "Pen")
                                          l1.setText("Price = 20");
                                    if(c1.getSelectedItem() == "Eraser")
                                          l1.setText("Price = 5");
                                    if(c1.getSelectedItem() == "Note Book")
                                          l1.setText("Price = 32");
                              }
                  });
                  add(c1);
                  l1 = new Label("Price = 10");
                  l1.setBounds(70,100,100,25);
                  add(l1);
                  addWindowListener(new WindowAdapter(){
                              public void windowClosing(WindowEvent we){
                                    dispose();
                              }
                  });

      }
      public static void main(String args[]){
                  new Stationary();
      }
}

Write a java program for swapping of two n dimensional arrays. Accept the
array element from user.
class MultiArray{
      int[][] element;
```

```java
    int rows, cols;
    MultiArray(int rows, int cols) {
       this.rows = rows;
       this.cols = cols;
       element = new int[rows][cols];
    }
     public int getValue(int row, int col) {
       return element[row][col];
    }
   public void setValue(int row, int col, int value) {
       element[row][col] = value;
    }
     public int getNoRows(){
       return rows;
    }
   public int getNoCols(){
       return cols;
    }
     void swap(MultiArray a2) {
       if ((this.getNoCols() != a2.getNoCols()) || (this.getNoRows() !=
a2.getNoRows())) {
           throw new IllegalArgumentException("These Arrays can't be
swapped.");
       }
                int row = this.getNoRows();
                int col = this.getNoCols();
                int temp;
                        for(int i=0;i<row;i++){
                            for(int j=0;j<col;j++){
                                    temp = element[i][j];
                                    element[i][j] =
a2.element[i][j];
                                    a2.element[i][j] = temp;
                                }
                            }
    }
     public void display(){
                for(int i=0;i<this.rows;i++){
                        for(int j=0;j<this.cols;j++)
                            System.out.print(this.getValue(i,j) + "
");
                        System.out.println();
                }
    }
     public static void main(String[] args){
                MultiArray a1 = new MultiArray(2,2);
                a1.setValue(0,0,3);
                a1.setValue(0,1,5);
                a1.setValue(1,0,1);
                a1.setValue(1,1,7);
                System.out.println("MultiArray 1 is:");
                a1.display();
                MultiArray a2 = new MultiArray(2,2);
                a2.setValue(0,0,4);
```

```
                a2.setValue(0,1,9);
                a2.setValue(1,0,12);
                a2.setValue(1,1,6);
                System.out.println("MultiArray 2 is:");
                a2.display();
                a1.swap(a2);
                System.out.println("After Swapping:");
                System.out.println("MultiArray 1 is:");
                a1.display();
                System.out.println("MultiArray 2 is:");
                a2.display();
        }
}
```

Write a Java AWT code to calculate the factorial of a number for the following Gui

```java
import java.awt.*;
import java.awt.event.*;
class FactorialAwt extends Frame{
        Label l1,l2;
        Button b1,b2;
        TextField t1;
        FactorialAwt(){
                super("Factorial of a number");
                setLayout(null);
                setSize(500,300);
                l1 = new Label("Enter a number: ");
                l1.setBounds(100,100,100,25);
                add(l1);
                t1 = new TextField();
                t1.setBounds(200,100,200,25);
                add(t1);
                l2 = new Label("The factorial is:");
                l2.setBounds(100,150,200,25);
                add(l2);
                b1 = new Button("Find");
                b1.setBounds(100,200,150,20);
                b1.addActionListener(new ActionListener(){
                        public void actionPerformed(ActionEvent ae){
                                try{
                                        long factorial =
fact(Long.parseLong(t1.getText()));
                                        l2.setText("The factorial
is: " + factorial);
                                }
                                catch(NumberFormatException nfe){
                                        l2.setText("The factorial
is: Error! Input not a number");
                                }
                        }
                });
                add(b1);
                b2 = new Button("Clear");
                b2.setBounds(250,200,150,20);
```

```java
                b2.addActionListener(new ActionListener(){
                        public void actionPerformed(ActionEvent ae){
                                l2.setText("The factorial is:");
                        }
                });
                add(b2);
                setVisible(true);
                addWindowListener(new WindowAdapter(){
                        public void windowClosing(WindowEvent e){

                                dispose();
                        }
                });
        }
        long fact(long n){
                long f=1;
                for(long i=1;i<=n;i++)
                        f=f*i;
                return f;
        }
        public static void main(String args[]){
                new FactorialAwt();
        }
}
```

Write a Java Program using AWT Program to design the calculator.

```java
import java.awt.*;
import java.awt.event.*;
class Calculator extends Frame implements ActionListener{
        TextField t1;
        Button b0, b1, b2, b3, b4, b5, b6, b7, b8, b9, bPlus, bMinus,
bMultiply, bDivide, bPercentage, bEquals, bClear;
        String number1, number2, operator;
        boolean operationFlag = false;
        Calculator(){
                super("My calculator");
                setSize(300,300);
                setLayout(null);
                setResizable(false);
                setVisible(true);
                t1 = new TextField();
                t1.setBounds(25,50,235,35);
                t1.setEditable(false);
                add(t1);
                b0 = new Button("0");
                b0.setBounds(25,100,35,35);
                b0.addActionListener(this);
                add(b0);
                b1 = new Button("1");
                b1.setBounds(75,100,35,35);
                b1.addActionListener(this);
                add(b1);
                b2 = new Button("2");
                b2.setBounds(125,100,35,35);
```

```java
b2.addActionListener(this);
add(b2);
b3 = new Button("3");
b3.setBounds(175,100,35,35);
b3.addActionListener(this);
add(b3);
b4 = new Button("4");
b4.setBounds(225,100,35,35);
b4.addActionListener(this);
add(b4);
b5 = new Button("5");
b5.setBounds(25,150,35,35);
b5.addActionListener(this);
add(b5);
b6 = new Button("6");
b6.setBounds(75,150,35,35);
b6.addActionListener(this);
add(b6);
b7 = new Button("7");
b7.setBounds(125,150,35,35);
b7.addActionListener(this);
add(b7);
b8 = new Button("8");
b8.setBounds(175,150,35,35);
b8.addActionListener(this);
add(b8);
b9 = new Button("9");
b9.setBounds(225,150,35,35);
b9.addActionListener(this);
add(b9);
bPlus = new Button("+");
bPlus.setBounds(25,200,35,35);
bPlus.addActionListener(this);
add(bPlus);
bMinus = new Button("-");
bMinus.setBounds(75,200,35,35);
bMinus.addActionListener(this);
add(bMinus);
bMultiply = new Button("*");
bMultiply.setBounds(125,200,35,35);
bMultiply.addActionListener(this);
add(bMultiply);
bDivide = new Button("/");
bDivide.setBounds(175,200,35,35);
bDivide.addActionListener(this);
add(bDivide);
bPercentage = new Button("%");
bPercentage.setBounds(225,200,35,35);
bPercentage.addActionListener(this);
add(bPercentage);
bEquals = new Button("=");
bEquals.setBounds(25,250,35,35);
bEquals.addActionListener(this);
add(bEquals);
```

```java
                bClear = new Button("C");
                bClear.setBounds(75,250,35,35);
                add(bClear);
                bClear.addActionListener(this);
                addWindowListener(new WindowAdapter(){
                        public void windowClosing(WindowEvent e){

                                dispose();
                        }
                });
        }
        public void actionPerformed(ActionEvent ae){
                if(ae.getSource() == b0){
                        if(operationFlag){
                                t1.setText("0");
                                operationFlag = false;
                        }
                        else
                                t1.setText(t1.getText()+"0");
                }
                if(ae.getSource() == b1){
                        if(operationFlag){
                                t1.setText("1");
                                operationFlag = false;
                        }
                        else
                                t1.setText(t1.getText()+"1");
                }
                if(ae.getSource() == b2){
                        if(operationFlag){
                                t1.setText("2");
                                operationFlag = false;
                        }
                        else
                                t1.setText(t1.getText()+"2");
                }
                if(ae.getSource() == b3){
                        if(operationFlag){
                                t1.setText("3");
                                operationFlag = false;
                        }
                        else
                                t1.setText(t1.getText()+"3");
                }
                if(ae.getSource() == b4){
                        if(operationFlag){
                                t1.setText("4");
                                operationFlag = false;
                        }
                        else
                                t1.setText(t1.getText()+"4");
                }
                if(ae.getSource() == b5){
                        if(operationFlag){
```

```java
                    t1.setText("5");
                    operationFlag = false;
            }
            else
                    t1.setText(t1.getText()+"5");
    }
    if(ae.getSource() == b6){
            if(operationFlag){
                    t1.setText("6");
                    operationFlag = false;
            }
            else
                    t1.setText(t1.getText()+"6");
    }
    if(ae.getSource() == b7){
            if(operationFlag){
                    t1.setText("7");
                    operationFlag = false;
            }
            else
                    t1.setText(t1.getText()+"7");
    }
    if(ae.getSource() == b8){
            if(operationFlag){
                    t1.setText("8");
                    operationFlag = false;
            }
            else
                    t1.setText(t1.getText()+"8");
    }
    if(ae.getSource() == b9){
            if(operationFlag){
                    t1.setText("9");
                    operationFlag = false;
            }
            else
                    t1.setText(t1.getText()+"9");
    }
    if(ae.getSource() == bPlus){
            number1 = t1.getText();
            t1.setText(null);
            operator = "plus";
    }
    if(ae.getSource() == bMinus){
            number1 = t1.getText();
            t1.setText(null);
            operator = "minus";
    }
    if(ae.getSource() == bMultiply){
            number1 = t1.getText();
            t1.setText(null);
            operator = "multiply";
    }
    if(ae.getSource() == bDivide){
```

```java
                        number1 = t1.getText();
                        t1.setText(null);
                        operator = "divide";
            }
        if(ae.getSource() == bPercentage){
                        number2 = t1.getText();
                        if(number1 == null)

    t1.setText(Float.toString(Float.parseFloat(number2)/100));
                        else{
                                if(operator == "plus")

    t1.setText(Float.toString(Float.parseFloat(number1) +
(Float.parseFloat(number1)*Float.parseFloat(number2))/100));
                                if(operator == "minus")

    t1.setText(Float.toString(Float.parseFloat(number1) -
(Float.parseFloat(number1)*Float.parseFloat(number2))/100));
                                if(operator == "multiply")

    t1.setText(Float.toString(Float.parseFloat(number1) *
(Float.parseFloat(number1)*Float.parseFloat(number2))/100));
                                if(operator == "divide"){
                                        try{

    t1.setText(Float.toString(Float.parseFloat(number1) /
(Float.parseFloat(number1)*Float.parseFloat(number2))/100));
                                        }
                                        catch(ArithmeticException
a){

    t1.setText("Cannot Divide by Zero");
                                        }
                                }
                        }
                        operationFlag = true;
            }
        if(ae.getSource() == bEquals){
                        number2 = t1.getText();
                        if(operator == "plus")

    t1.setText(Integer.toString(Integer.parseInt(number1) +
Integer.parseInt(number2)));
                        if(operator == "minus")

    t1.setText(Integer.toString(Integer.parseInt(number1) -
Integer.parseInt(number2)));
                        if(operator == "multiply")

    t1.setText(Integer.toString(Integer.parseInt(number1) *
Integer.parseInt(number2)));
                        if(operator == "divide"){
                                try{
```

```java
        t1.setText(Float.toString(Float.parseFloat(number1) /
Float.parseFloat(number2)));
                                }
                                catch(ArithmeticException a){
                                        t1.setText("Cannot Divide by
Zero");
                                }
                        }
                        operationFlag = true;
                }
                if(ae.getSource() == bClear)
                        t1.setText(null);
        }
        public static void main(String args[]){
                new Calculator();
        }
}
```

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