

22/12/23

OOS Lab

## Program - 1

- ① Write a program to overload the method print that prints sum of  $n$  natural numbers when one variable is passed and prints the prime numbers in a given range when 2 parameters are passed.

class Overload {

{

void print(int n)

{

int sum = 0;

for (int i = 1; i &lt;= n; i++)

{

sum = sum + i;

}

System.out.println("Sum of " + n + " natural numbers is " + sum);

}

void print(int m, int n)

{

System.out.println("Prime numbers in the range are ");

for (int i = m; i &lt;= n; i++)

{

int flag = 0;

for (int j = 2; j &lt;= i/2; j++)

{

if (i % j == 0)

{

flag = 1;

break;

}

}

if (flag == 0)

```

        System.out.println(i);
    }
}

class OverloadDemo
{
    public static void main(String[] args)
    {
        Overload o = new Overload();
        o.print(5);
        o.print(7, 13);
    }
}

```

O/p

Sum of 5 natural numbers is 15  
 prime numbers in the range are  
 7  
 11  
 13

=>

```

class Grocery {
    String c-name;
    String c-ph;
    double total;

    Grocery (String c-name, String c-ph) {
        this.c-name = c-name;
        this.c-ph = c-ph;
    }

    void calc { double q-dal, double q-pulses, double q-sugar;
        total = q-dal * 100 + q-pulses * 80 + q-sugar * 50;
    }
}

```



```
void display ()
```

```
{
```

```
system.out.println("Name " + " + phone number " + " + " + " Total");  
system.out.println(c-name + " " + c-ph + " " + total);  
system.out.println();
```

```
}
```

```
class GDemo1
```

```
public static void main (String [] args) {
```

```
    Grocery g1 = new Grocery ("Rama", "8060302010");
```

```
    Grocery g2 = new Grocery ("Shama", "9481520238");
```

```
    Grocery g3 = new Grocery ("Bhama", "9448822133");
```

```
    g1.calc(2,2,1);
```

```
    g1.display();
```

```
    g2.calc(3,5,2);
```

```
    g2.display();
```

```
    g3.calc(1,1,0.5);
```

```
    g3.display();
```

```
}
```

```
}
```

o/p

Name	phone number	Total
Rama	8060 302010	410

Name	phone number	Total
Shama	9481528238	800

Name	phone number	Total
Bhama	9448822133	205

```

→ import java.util.Scanner;
class Quad {
    int a, b, c;
    double root1, root2, d;
    Scanner s = new Scanner(System.in);
    void input()
    {
        System.out.println("Quadratic equation is in the form:  $ax^2+bx+c$ ");
        System.out.print("Enter a:");
        a = s.nextInt();
        System.out.print("Enter b:");
        b = s.nextInt();
        System.out.print("Enter c:");
        c = s.nextInt();
    }
    void discriminant() {
        d = (b*b) - (4*a*c);
    }
    void calculateRoots() {
        if (d > 0)
        {
            System.out.print("Roots are equal");
            root1 = (-b + Math.sqrt(d)) / (2*a);
            root2 = (-b - Math.sqrt(d)) / (2*a);
            System.out.println("First root is: " + root1);
            System.out.println("Second root is: " + root2);
        }
        else if (d == 0)
        {
            System.out.print("Roots are real and equal");
            root1 = (-b + Math.sqrt(d)) / (2*a);

```



```
System.out.println("Roots:" + roots);
```

```
}
```

```
else
```

```
{
```

```
System.out.println("no real solutions roots are imaginary");
```

```
double real = -b/(2*a);
```

```
double imaginary = Math.sqrt(-d)/(2*a);
```

```
System.out.println("The equation has two complex roots : " + real + "  
imaginary + "i and" + real + " - " + imaginary + "i");
```

```
}
```

```
}
```

```
class main {
```

```
public static void main (String [] args) {
```

```
Quad q = new Quad();
```

```
q.input();
```

```
q.discriminant();
```

```
q.calculateRoots();
```

```
}
```

```
}
```

o/p Quadratic equation is in the form :  $ax^2 + bx + c$

Enter a: 5

Enter b: 10

Enter c: 30

No real solution roots are imaginary.

The equation has two complex roots :  $-1.0 + 2.23606797$  and

$-1.0 - 2.2360$



12/01/24

- Write a program to create a class Student with members USN, name, marks (6 subjects). Include methods to accept student details and marks. Also include a method to calculate the percentage and display appropriate details. (Array of student object to be created).

Soln

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

```
class Student
```

```
{
```

```
    String usn;
```

```
    String name;
```

```
    int marks[] = new int[6];
```

```
    void displayDetails()
```

```
{
```

```
        Scanner s = new Scanner(System.in);
```

```
        System.out.println("Enter USN:");
```

```
        usn = s.next();
```

```
        System.out.println("Enter name:");
```

```
        name = s.next();
```

```
        System.out.println("Enter marks for 6 subjects:");
```

```
        for (int i = 0; i < 6; i++)
```

```
{
```

```
            System.out.println("Subject" + (i + 1) + ": ");
```

```
            marks[i] = s.nextInt();
```

```
}
```

```
} }
```

```
    double percentage()
```

```
{
```

```
        int total = 0;
```

```
        for (int i = 0; i < 6; i++)
```

```
{
```

```
            total += marks[i];
```

```
}
```

```
        double p = total / 6;
```



```
return p;
```

```
}
```

```
void display()
```

```
{
```

```
System.out.println("\n Student Details:");
```

```
System.out.println(" VSN: " + usn);
```

```
System.out.println(" Name: " + name);
```

```
System.out.println(" Marks: ");
```

```
for (int i = 0; i < 6; i++)
```

```
{
```

```
System.out.println(" Subject " + (i+1) + ": " +  
marks[i]);
```

```
}
```

```
System.out.println(" Percentage : " + percentage() + "%");
```

```
}
```

```
}
```

```
class Lab1 Student
```

```
{
```

```
public static void main(String args[])
```

```
{
```

```
Scanner s = new Scanner(System.in);
```

```
System.out.println(" Enter the numbers of students: ");
```

```
int n = s.nextInt();
```

```
Student[] students = new Student[n];
```

```
for (int i = 0; i < n; i++)
```

```
{
```

```
students[i] = new Student();
```

```
System.out.println(" \n Enter Details for Student " +  
(i+1) + ": ");
```

```
students[i].details();
```

```
}
```

```
for (Student student : students)
```

```
{
```

```
student.display();
```

```
}
```

```
}
```



Output:

Enter the number of students: 1

Enter USN

IBM22CS315

Enter name

Suvina

Enter marks for 6 subjects:

Subject 1: 99

Subject 2: 89

Subject 3: 90

Subject 4: 98

Subject 5: 89

Subject 6: 89

Student Details

USN: IBM22CS315

Name: Suvina

Subject 1: 99

Subject 4: 89

Subject 2: 89

Subject 5: 89

Subject 3: 90

Subject 6: 89

Percentage: 92.0%



→ Create a class Book that contains four members: name, author, price and num pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a toString() method that could display the complete details of the book. Develop a Java program to create n book objects.

```
Solu
import java.util.Scanner;
class Books
{
    String name;
    String Author;
    int price;
    int numPages;
    Books(String Name, String Author, int price, int numPages)
    {
        this.Name = Name;
        this.Author = Author;
        this.numPages = numPages;
        this.price = price;
    }
    public String toString()
    {
        String name, author, price, numPages;
        name = "Book name: " + this.Name + "\n";
        author = "Author name: " + this.Author + "\n";
        numPages = "Number of pages: " + this.numPages + "\n";
        price = "Price: " + this.price + "\n";
        return name + author + numPages + price;
    }
}
class Main
{
    public static void main(String[] args)
```



```

{
    Scanner s = new Scanner(System.in);
    int n;
    String name;
    String author;
    int price;
    int numPages;
    System.out.println("Enter the no. of books");
    n = s.nextInt();
    Books b[] = new Books[n];
    for(int i = 0; i < n; i++)
    {
        S.O.Pl("book");
        S.O.Pl("Enter name of book:");
        Name = s.next();
        S.O.Pl("Enter price:");
        price = s.nextInt();
        S.O.Pl("Enter numPages");
        numPages = s.nextInt();
        b[i] = new Books(Name, Author, price, numPages);
    }
    for(int i = 0; i < n; i++)
    {
        System.out.println("Books" + (i+1) + "\n");
        System.out.println(b[i].toString());
    }
}
}

```

22/1/24

O/P:

Enter the number of books: 1

Book 1:

Enter the name: Jungle Book

Enter the author: A Shetty

Enter the price: 1000

Enter the number of pages: 500



19/01/24

- Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain the method printArea() that prints the area of the given shape.

Soln

```
import java.util.*;  
class InputScanner  
{  
    int a, b;  
    Scanner sc = new Scanner(System.in);  
    InputScanner()  
    {  
        // from main  
        if (this.getClass() == circle.class)  
        {  
            S.O.PlN("Enter the radius");  
            a = sc.nextInt();  
        }  
        else  
        {  
            S.O.PlN("Enter height and weight");  
            a = sc.nextInt();  
            b = sc.nextInt();  
        }  
    }  
}  
  
abstract class Shape extends InputScanner  
{  
    abstract void printArea();  
}  
  
class rectangle extends Shape  
{
```



```
void printArea()
```

```
{
```

```
    S.O.println("Area of the rectangle is" + (double)(a*b));
```

```
}
```

```
class triangle extends Shape
```

```
{
```

```
    void printArea()
```

```
{
```

```
        S.O.println("Area of triangle is" + (double)(a*b)/2);
```

```
}
```

```
}
```

```
class circle extends Shape
```

```
{
```

```
    void printArea()
```

```
{
```

```
        S.O.println("Area of circle is" + (double)(3.14 * a*a));
```

```
}
```

```
}
```

```
class Area Main
```

```
{
```

```
    public static void main (String args[])
```

```
{
```

```
        S.O.println("For triangle");
```

```
        Triangle t = new triangle();
```

```
        S.O.println("For rectangle");
```

```
        rectangle r = new rectangle();
```

```
        S.O.println("For circle");
```

```
        circle c = new circle();
```

```
        t.printArea();
```

```
        r.printArea();
```

```
        c.printArea();
```

```
}
```

```
}
```



Output:-

For triangle

Enter height and weight

2

3

For rectangle

Enter height and weight

4

5

For circle

Enter radius

5

Area of triangle is: 3.0

Area of rectangle is: 20.0

Area of circle is: 78.5

~~18~~  
~~19/11/24~~



## → Bank Account

```
import java.util.Scanner;  
class Account  
{
```

```
    String customername;  
    int acc_no;  
    String acc_type;  
    double balance;
```

```
}
```

```
    Account (String customername, int acc_no, String  
             acc_type, double balance)
```

```
{
```

```
    this.customername = customername;  
    this.acc_no = acc_no;  
    this.acc_type = acc_type;  
    this.balance = balance;
```

```
}
```

```
    void deposit (double amount)
```

```
{
```

```
        balance += amount;
```

```
        System.out.println ("Updated balance : " + balance);
```

```
}
```

```
    void displayBalance()
```

```
{
```

```
        System.out.println ("Balance : " + balance);
```

```
}
```

```
}
```

```
class cur_acc extends Account
```

```
{
```

```
    double min_balance;
```

```
    double service_charge;
```

```
    cur_acc (String customername, int acc_no, double  
             balance, double min_balance, double service_charge)
```



```

{
    super(customer name, acc_no, "current", balance);
    this.min_balance = min_balance;
    this.service_charge = service_charge;
}
void checkMinBalance()
{
    if (balance < min_balance)
    {
        balance -= service_charge;
        System.out.println("Service Charge imposed"
            + "Updated balance:" + balance);
    }
    else
    {
        System.out.println("Min Balance maintained.");
    }
}
}
class sav_acct extends Account
{
    double interest_rate;
    savacct(String customname, int acc_no, double
        balance, double interest_rate)
    {
        super(customname, acc_no, "Savings", balance);
        this.interest_rate = interest_rate;
    }
    void DepositInterest()
    {
        double interest = balance * interest_rate / 100;
        balance += interest;
        System.out.println("Interest deposited:" +
            "Updated balance:" + balance);
    }
}

```



```

void withdraw (double amount)
{
    if (amount <= balance)
    {
        balance -= amount;
        S.O.Plnt("Remaining balance: "+balance);
    }
    else
    {
        S.O.Plnt("Insufficient balance");
    }
}

public class Bank Bank
{
    public static void main (String [] args)
    {
        current ca = new current ("abc", 12345,
                                   1000, 500, 10);
        ca.deposit (500.0);
        ca.checkMinBalance ();
        ca.display Balance ();
        savacct sa = new savacct ("xyz", 12367,
                                   2000, 5);
        sa.Deposit Interest ();
        sa.withdraw (300.0);
        sa.display Balance ();
    }
}

```

O/P:-

Updated Balance: 1500

Min Balance maintained

Balance: 1500

Interest deposited

Updated Balance: 2100.0

Remaining Balance: 1800.0

Balance: 1800.0



## Packages

```

package CIE
public class Student
{
    public String usn;
    public String name;
    public int sem;
    public Student (String usn, String name, int sem)
    {
        this.usn = usn;
        this.name = name;
        this.sem = sem;
    }
}

```

```

public class Internals
{
    public int[] marks;
    public Internals (int[] marks)
    {
        this.marks = marks;
    }
}

```

```

package SEE
import CIE.Student;
public class External extends Student
{
    public int[] marks;
    public External (String usn, String name, int sem,
        int[] marks)
    {
        super (usn, name, sem);
        this.marks = marks;
    }
}

```



```
import CIE. Student;  
import SEE. External;  
public class Main
```

```
{  
    public static void main (String[] args)
```

```
    {  
        Student s1 = new Student ("IBM22CS315",  
                                    "abc", 3);
```

```
        int[] SEE marks = { 87, 81, 95, 91, 89 };  
        External s2 = new External ("IBM22CS315",  
                                     "xyz", 3, SEEmarks);
```

```
        S.O.pln (" Student 1: ");
```

```
        S.O.pln (" USN: " + s1.usn);
```

```
        S.O.pln (" Name: " + s1.name);
```

```
        S.O.pln (" Sem: " + s1.sem);
```

```
        S.O.pln (" Student 2: ");
```

```
        S.O.pln (" USN: " + s2.usn);
```

```
        S.O.pln (" Name: " + s2.name);
```

```
        S.O.pln (" Sem: " + s2.sem);
```

```
    }
```

```
}
```

O/P:-

Student 1: IBM22CS315

abc

3

Student 2: IBM22CS299

xyz

3



→ class WrongAge extends Exception

```
{
    public WrongAge (String str)
    {
        super(str);
    }
}
```

class father

```
{
    int fAge;
    public father (int fAge) throws WrongAge
    {
        if (fAge < 0)
            SOPln ("Invalid age input");
        this.fAge = fAge;
    }
}
```

public class son extends father

```
{
    int sonAge;
    public son (int sonAge, int fAge) throws WrongAge
    {
```

```
        super (fAge);
        if (sonAge > fAge)
```

```
            SOPln ("Son's age can't be greater than
            father's age");
        }
```

```
        this.sonAge = sonAge;
    }
```

public class Main

```
{
    public static void main (String args[])
```



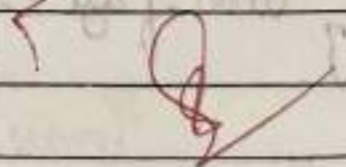
```

{
    try {
        Father f = new Father(30);
        Son s = new Son(70, 50);
    }
    catch (WrongAge e) {
        System.out.println(e);
    }
}

```

O/P:-

wrong age son's age can't be greater than father's age





11/02/24

→ Write a program which creates two threads, one thread displaying "BMS college of engineering" once every 10 seconds and another displaying "CSE" once every 2 seconds.

```
class BMS implements Runnable {
    public void run() {
        while (true) {
            try {
                System.out.println("BMS college of Engineering");
                Thread.sleep(10000);
            } catch (InterruptedException e) {
                e.printStackTrace();
            }
        }
    }
}
```

```
class CSE implements Runnable {
    public void run() {
        while (true) {
            try {
                System.out.print("CSE");
                Thread.sleep(2000);
            } catch (InterruptedException e) {
                e.printStackTrace();
            }
        }
    }
}
```

```
public class Main {
    public static void main (String[] args) {
        Thread t1 = new Thread (new BMS college of Engineering());
        Thread t2 = new Thread (new CSE());
        t1.start();
        t2.start();
    }
}
```



O/P:-

BMS college of Engineering

CSE

CSE

CSE

CSE

CSE

BMS college of Engineering

CSE

CSE

CSE

CSE

CSE

BMS College of Engineering

CSE

CSE

CSE

CSE

CSE

BMS college of Engineering



→ Creating label, button and TextField in a frame using AWT.

```
import java.awt.*;
import java.awt.event.*;
public class AWTExample extends WindowAdapter {
    JFrame f;
    AWTExample() {
        f = new JFrame();
        f.addWindowListener(this);
        Label l = new Label("Employee id:");
        Button b = new Button("Submit");
        TextField t = new TextField();
        l.setBounds(20, 80, 80, 30);
        t.setBounds(20, 100, 80, 30);
        b.setBounds(100, 100, 80, 30);
        f.add(b);
        f.add(l);
        f.add(t);
        f.setSize(400, 300);
        f.setTitle("Employee info");
        f.setLayout(null);
        f.setVisible(true);
    }
    public void windowClosing(WindowEvent e) {
        System.exit(0);
    }
    public static void main(String[] args) {
        AWTExample awt_obj = new AWTExample();
    }
}
```

o/p : Employee ID

Submit



→ Create a button and add a action listener for Mouse click.

```
import java.awt.*;  
import java.awt.event.*;  
public class EventHandlering extends WindowAdapter implements  
ActionListener {
```

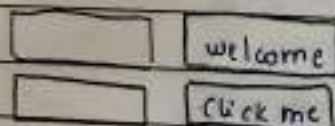
```
    Frame f;  
    TextField tf;  
    EventHandlering() {  
        f = new Frame();  
        f.addWindowListener(this);  
        tf = new TextField();  
        tf.setBounds(60, 50, 170, 20);  
        Button b = new Button("click me");  
        b.setBounds(100, 120, 80, 30);  
        b.addActionListener(this);  
        f.add(b);  
        f.add(tf);  
        f.setSize(300, 300);  
        f.setLayout(null);  
        f.setVisible(true);  
    }
```

```
    public void actionPerformed(ActionEvent e) {  
        System.exit(0);  
    }
```

*Handwritten note:* If button = welcome?  
`public void WindowClosing(WindowEvent e) {`

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

o/p





## → Example Programs on IO

### Example - 1

```
import java.io.*;
public class ByteArrayInput {
    public static void main (String[] args) throws IOException {
        byte[] buf = {35, 36, 37, 38};
        ByteArrayInputStream byt = new ByteArrayInputStream(buf);
        int k=0;
        while((k = byt.read()) != -1) {
            char ch = (char) k;
            System.out.println("ASCII value of character is: "
                + k + "; special character is: " + ch);
        }
    }
}
```

O/P:-

ASCII value 35

ASCII value 36

ASCII value 37

ASCII value 38

### → Example - 2

```
public class FileEx {
    public static void main (String a[]) throws IOException {
        File InputStream fin = new FileInputStream("example.txt");
        int content;
        SOP("Remaining bytes that can be read: " + fin.available());
        content = fin.read();
        SOP("(char) content + " " ");
        SOP(content + " ");
        SOP("Remaining bytes that can be read: " + fin.available());
        SOP("Remaining bytes that can be read: " + fin.available());
    }
}
```



O/P:-

Remaining bytes that can be read: 1 A  
Remaining bytes that can be read: 0 65

Example-3

```
import java.io.*;
import java.io.IOException;

public class FileEx2 {
    public static void main (String a[]) throws IOException {
        FileInputStream fin = new FileInputStream("example.txt");
        byte[] bytes = new byte[20];
        int i;
        char c;
        i = fin.read(bytes);
        System.out.println("Number of bytes read: "+i);
        System.out.print("Bytes read:");
        for (byte b: bytes) {
            c = (char) b;
            System.out.print(c);
        }
    }
}
```

O/P:-

No. of bytes read: 20

Bytes read: Hello it is good