

# INDEX

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# Lab-1

1) 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 ~~over~~ toString() method that could display the complete details of the book.

Ans)

```
import java.util.Scanner;  
class Books {  
    String name;  
    String author;  
    int price;  
    int numPages;  
    Books() {}  
    Books (String name, String author, int price, int numPages)  
    {  
        this.name = name;  
        this.author = author;  
        this.price = price;  
        this.numPages = numPages;  
    }  
    public String toString()  
    {  
        String name, author, price, numPages;  
        name = "Book name: " + this.name + "\n";  
        author = "Author name: " + this.author + "\n";  
        price = "Price: " + this.price + "\n";  
        numPages = "No of Pages: " + this.numPages + "\n";  
        return name + author + price + numPages;  
    }  
}
```

```
{  
class maintain  
{  
    public static void main (String args [ ] )  
{  
        Scanner s = new Scanner (System.in);  
        int n;  
        String name;  
        String author;  
        int price;  
        int npages;  
        System.out.println ("Enter the no of books: ");  
        n = s.nextInt();  
        Books b [ ] ;  
        b = new Books [n];  
        for (int i=0; i < n; i++)  
        {  
            System.out.println ("Book" + (i+1) + ":");  
            System.out.println ("Enter name of the book: ");  
            name = s.next();  
            System.out.println ("Enter Author name: ");  
            author = s.next();  
            System.out.println ("Enter Price: ");  
            price = s.nextInt();  
            System.out.println ("Enter no of pages: ");  
            npages = s.nextInt();  
            b [i] = new Books (name, author, price,  
                npages);  
        }  
    }  
}
```

```
for (int i = 0; i < n; i++)  
    System.out.println("Book" + (i + 1) + ":" + b[i])  
}
```

{

}

### Output:

Enter the no of book:

1

BOOK 1:

Enter name of the book:

~~Object in Java~~ OOP's

Enter author name:

Hanacher

Enter price:

234

Enter no of pages:

501

BOOK 1:

Book name: OOP's ~~Object~~

Author name: Hanacher

Price: 234

No of Pages: 500

2) Write a Java program to create a class student with USN, name, marks (6 subjects) include a method to accept student details and marks, Also include a method to calculate the percentage and display appropriate details.

Ans)

```
import java.util.Scanner;  
class Student {  
    String USN;  
    String name;  
    int[] marks = new int[6];  
    void acceptDetails() {  
        Scanner s = new Scanner (System.in);  
        System.out.println ("Enter USN: ");  
        USN = s.next();  
        System.out.println ("Enter marks for 6 subjects.");  
        for (int i=0; i<6; i++) {  
            System.out.print ("Subject" + (i+1) + ": ");  
            marks[i] = s.nextInt();  
        }  
        double calculatePercentage() {  
            int totalMarks = 0;  
            for (int mark: marks)  
                totalMarks += mark;  
            return (double) totalMarks / 6;  
        }  
}
```

```
void displayDetails () {  
    System.out.println ("Student details : ");  
    System.out.println ("USN : " + USN);  
    System.out.println ("Name : " + name);  
    System.out.println ("Percentage : " + calculatePercentage () + "%");  
}
```

```
public class Shubham
```

```
{  
    public static void main (String args []) {  
        Scanner s = new Scanner (System.in);  
        System.out.print ("Enter the number of students : ");  
        int numStudents = s.nextInt ();  
        Student [] students = new Student [args.length];  
        for (int i = 0; i < numStudents; i++)  
            students [i] = new Student ();  
        System.out.println ("Enter details for  
        student " + (i + 1) + ": ");  
        students [i].acceptDetails ();  
    }  
}
```

```
System.out.println ("Details of all Students : ");  
for (Student student : students) {  
    student.displayDetails ();  
    System.out.println ();  
}
```

Output :

Enter the number of students: 1

Enter details for student 1:

Enter USN: IBM 22 Icos8.

Enter name: Shubham

Enter marks for 6 subjects.

Subject 1: 90

Subject 2: 100

Subject 3: 90

Subject 4: 100

Subject 5: 90

Subject 6: 100

Details of all student,

Student details:

USN: IBM 22 Icos8

Name: Shubham

Percentage: 95 %

DMD  
8/1/24

### 3.) Program in Quadratic.

Ans)

```
import.java.util.Scanner;  
import.java.lang.Math;
```

```
Class Quadratic {
```

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

```
        int a, b, c;
```

```
        System.out.println ("Enter the values of a, b, c");
```

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

```
        a = s.nextInt ();
```

```
        b = s.nextInt ();
```

```
        c = s.nextInt ();
```

```
        double d = b * b - 4 * a * c;
```

```
        System.out.println ("a = " + a + "b = " + b +  
                            "c = " + c);
```

```
        if (a == 0) {
```

```
            System.out.println ("The equation is not  
                                quadratic");
```

```
        } else if (d > 0) {
```

```
            System.out.println ("The equation has two  
                                real and different solutions");
```

```
            double r1 = (-b + Math.sqrt (d)) / (2 * a);
```

```
            double r2 = (-b - Math.sqrt (d)) / (2 * a);
```

```
            System.out.println ("r1 = " + r1);
```

```
            System.out.println ("r2 = " + r2);
```

else if ( $d == 0$ ) {

System.out.println("The equation has real  
and equal solution");

double  $r_1 = -b/(2*a)$ ;

double  $r_2 = -b/(2*a)$ ;

System.out.println("r<sub>1</sub> = r<sub>2</sub> = " +  $r_1$ );

}

else if ( $d < 0$ ) {

System.out.println("The equation has  
unreal solutions");

}

}

}

Output:

Enter the values of a, b, c :

2, 4, 5

The equation has unreal solutions.

Enter the values of a, b, c : ~~10~~

1 -7 10

The equation has two real and different solutions

$r_1 = 50$

$r_2 = 20$

22/01/2023

Lab - 2

1) Develop a Java program to create a abstract class named Shape that contain two integers and an empty method named printArea().

(Ans)

```
import java.util.*;  
abstract class Shape  
{  
    int x, y;  
    abstract void area(double x, double y);  
}  
  
class Rectangle extends Shape  
{  
    void area(double x, double y)  
    {  
        System.out.println("Area of rectangle is "+(x*y));  
    }  
}  
  
class Circle extends Shape  
{  
    void area(double x, double y)  
    {  
        System.out.println("Area of circle is: "+(3.14*x*x));  
    }  
}  
  
class Triangle extends Shape  
{  
    void area(double x, double y)  
    {  
        System.out.println("Area of triangle is: "+(0.5*x*y));  
    }  
}
```

```
public class AbstractDDemo
{
    public static void main (String [ ] args)
    {
        Rectangle r = new Rectangle ();
        r.area (2, 5);

        Circle c = new Circle ();
        c.area (3, 5);

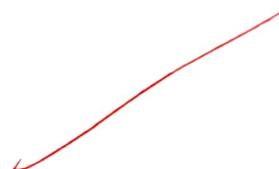
        Triangle t = new Triangle ();
        t.area (2, 5);
    }
}
```

### Output:

Area of rectangle is : 10.0

Area of circle is : 78.5

Area of triangle is : 5.0



2) Develop a Java program to create a class

Bank that maintains two kind of account  
One is saving and other is current account.

The task performed is:

Accept, Display, deposit interest and Withdrawl.

Now

abstract class BankAccount {

    private String accountNumber;

    private double balance;

    public BankAccount (String accountNumber, double balance)

        this.accountNumber = accountNumber;

        this.balance = balance;

}

    public String getAccountNumber()

        return AccountNumber;

}

    public double getBalance()

{

        return balance;

}

    protected void setBalance (double balance)

{

        this.balance = balance;

}

    public abstract void deposit(double amount);

    public abstract void withdrawl (double amount);

}

class SavingsAccount extends BankAccount

```
{  
    public Saving Account (String accountNumber, double balance)  
    {  
        super (account Number, balance);  
    }  
}
```

public void deposit (double amount)

```
{  
    set Balance (get Balance () + amount);  
}
```

```
System.out.println ("Deposit of Rs" + amount +  
    amount +  
    "Successful. Current Balance: Rs" +  
    get Balance () );  
}  
}
```

public void withdraw (double amount)

```
{  
    if (get Balance () >= amount)  
    {  
        set Balance (get Balance () - amount);  
        System.out.println ("Withdrawal of Rs" + amount  
            + "Successful. Current balance: Rs"  
            + get Balance () );  
    }  
}
```

else

```
{  
    System.out.println ("Insufficient funds.  
        Withdrawal failed.");  
}
```

3 3 3

class CurrentAccount extends BankAccount

8

```
public CurrentAccount( String accountNumber, double balance )  
    {  
        super( accountNumber, balance );  
    }  
}
```

public void deposit (double amount)

{

setBalance(getBalance() + amount);

System.out.println ("Deposit of Rs " + amount +

"Successful. Current balance: Rs"

+ getBalance( )) ;

三

```
public void withdraw(double amount)
```

5

if (`getBalance()` >= amount)

{

Set Balance:  $(\text{getBalance}() - \text{amount})$ .

System.out.println ("Withdrawal of Rs "+ amount);

+ "Successful current

balance :  $B'' + \text{getBalance}()$ .

3

else

1

System.out.println("Insufficient funds.");

Withdrawal failed.";

3

3

public class Main

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

3

double ibal, dant, want;

四

ibal = 1000.00;

Savings Account Savings Account = new Saving Account

( "SA001", :bal ).

```
System.out.println("Savings A/c: Initial Balance: Rs")
```

$$d_{\text{ant}} = 500.0$$

## Savings Account deposit (damt),

$$\text{want} = 250.00;$$

Savings Account. withdraw (want);

$$w_{\text{amt}} = 160 \text{ O.O.}$$

```
System.out.println("In try to withdraw: Rs "+  
want);  
SavingAccount.withdraw(want);
```

System.out.println();

$$ibal = 5000 \cdot 0;$$

CurrentAccount currentAccount = new CurrentAccount

System.out.println (" Current A/c : " + Initial Balance - R");

+ ibal);

*dated*

Current Account ~~deposit~~ (₹ 1000.0),

~~deposit = 1000.0~~

Current Account. withdraw (3000.0);

want = 6000.00;

System.out.println ("In try to withdraw: Rs " +

SavingsAccount. withdraw (want),  
want);

}

}

Output:

Savings A/c : Initial Balance : Rs 1000.0

Deposit of Rs 500.0 successful. Current balance: Rs 1500.0

Withdrawal of Rs 250.0 successful. Current balance: Rs 1250.0

Try to withdraw : Rs 1800.0

Insufficient funds. Withdrawal failed.

~~deposit~~

Current A/c : Initial Balance: Rs 5000.0

Deposit of Rs 1000.0 successful. Current balance : Rs 6000

withdrawl of Rs 3000.0 successful. Current balance :  
Rs 3000.0

Try to withdrawal : Rs 6000.0

Insufficient funds withdrawal failed!

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22/04

29/01/2024

Lab - 3

## 1) Package Problem .

Package CIE;

public class ~~Internals~~ 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;

}

}

Package CIE;

public class Internals extends Student {

    public int [ ] internalMarks;

    public Internals (String USN, String name, int sem,

                  int [ ] internalMarks) {

        super (USN, name, sem);

        this.internalMarks = internalMarks;

}

```
Package SEE;  
import CIE.student;  
Public class External extends Student {  
    Public int[] externalMarks;  
    Public External (String usn, String name, int sem,  
                    int[] externalMarks) {  
        Super (usn, name, sem);  
        This. externalMarks = externalMarks;  
    }  
}
```

```
import java.util.Scanner;  
import CIE.Internal;  
import SEE.External;  
Public class Main {  
    Public static void main (String[] args) {  
        Scanner scanner = new Scanner (System.in);  
        System.out.print ("Enter the number of students: ");  
        int n = scanner.nextInt();  
        scanner.nextLine();  
        Internal[] internalData = new Internal[n];  
        External[] externalData = new External[n];
```

```

for (int i=0; i<n; i++) {
    System.out.print (" Enter USN: ");
    String USN = scanner.nextLine ();
    System.out.print (" Enter name: ");
    String name = scanner.nextLine ();
    System.out.print (" Enter Semester: ");
    int sem = scanner.nextInt ();
    scanner.nextLine ();

    System.out.println (" Enter Internal Marks for
                        5 subjects: ");
    int [] internalMarks = new int [5];
    for (int j=0; j < 5; j++) {
        System.out.print (" Subject " + (j+1) + ": ");
        internalMarks [j] = scanner.nextInt ();
    }

    System.out.println (" Enter External Marks for 5
                        subjects: ");
    int [] externalMarks = new int [5];
    for (int j=0; j < 5; j++) {
        System.out.print (" Subject " + (j+1) + ": ");
        externalMarks [j] = scanner.nextInt ();
    }

    InternalData [i] = new Internal (USN, name, sem, internalMarks);
    ExternalData [i] = new External (USN, name, sem, externalMarks);
}

```

```
for (int i=0; i<n; i++) {  
    System.out.println(" \n Student " + (i+1) + ": ");  
    System.out.println(" Internal Marks: " +  
        internal.  
        arrayToString(internalData[i],  
            internalMarks));  
    System.out.println(" External Marks: " +  
        arrayToString(externalData[i],  
            externalMarks));  
    System.out.println(" Total Marks (CIE + SEE): "  
        + calculateTotalMarks(internalData[i],  
            internalMarks,  
            externalData[i].externalMarks));  
}
```

```
Scanner.close();
```

```
}
```

```
private static int calculateTotalMarks (int [ ] internalMarks,  
                                      int [ ] externalMarks) {  
    int total = 0;  
    for (int i=0; i<internalMarks.length; i++) {  
        total += internalMarks[i] +  
            externalMarks[i];  
    }  
    return total;  
}
```

```

private static String arrayToString (int [] array) {
    String Builder sb = new StringBuilder();
    sb.append ("[ ");
    for (int i=0; i<array.length; i++) {
        sb.append (array[i]);
        if (i != array.length-1) {
            sb.append (", ");
        }
    }
    sb.append ("] ");
    return sb.toString();
}

```

### Output:

Enter the number of students: 1

Enter details for Student # 1:

Enter USN: IBM22ICOS9

Enter Name: Shubham Maloo

Enter Semester: 3

Enter Internal Marks for 5 subjects:

Subject 1: 50

Subject 2: 50

Subject 3: 50

Subject 4: 50

Subject 5: 50

Enter External Marks for 5 subjects:

Subject 1: 50

Subject 2: 50

Subject 3: 50

Subject 4: 50

Subject 5: 50

Student I :

Internal Marks: [ 50, 50, 50, 50, 50 ]

External Marks: [ 50, 50, 50, 50, 50 ]

Total Marks (CIE + SEE) = 500

Done  
29/1/29

19/02/2024

## Lab - 4

1) Father Son problem using exception handling

Ans

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

```
class WrongAgeException extends Exception {
```

```
    public WrongAgeException WrongAgeException (String message) {  
        super (message);  
    }
```

}

```
class Father {
```

```
    int age;
```

```
    public Father (int age) throws WrongAgeException {
```

```
        if (age <= 0) {
```

```
            throw new WrongAgeException ("Age cannot  
be negative");
```

```
}
```

```
    this.age = age;
```

```
}
```

```
}
```

```
class Son {
```

```
    int sonAge;
```

```
    public Son (int fatherAge, int sonAge) throws  
    WrongAgeException {
```

```
        super (fatherAge);
```

```
        if (sonAge >= fatherAge) {
```

```
            throw new WrongAgeException ("Son's age  
cannot be greater than  
or equal to Father's age");
```

```
}
```

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

```
}
```

```
}
```

```
public class Main {  
    public static void main (String [ ] args) {  
        Scanner scanner = new Scanner (System.in);  
        try {  
            System.out.print ("Enter father's age: ");  
            int fatherAge = scanner.nextInt ();  
            System.out.print ("Enter son's age: ");  
            int sonAge = scanner.nextInt ();  
            Son son = new Son (fatherAge, sonAge);  
            System.out.println ("Father's age: " + fatherAge);  
            System.out.println ("Son's age: " + sonAge);  
        } catch (WrongAgeException e) {  
            System.out.println ("Error: " + e.getMessage());  
        } catch (Exception e) {  
            System.out.println ("Error: " + e.getMessage());  
        } finally {  
            scanner.close ();  
        }  
    }  
}
```

## Output:

Enter father's age: 30

Enter son's age: 30

Error: Son's age cannot be greater than or equal to father's age.

Enter father's age: -1

Enter son's age : 2

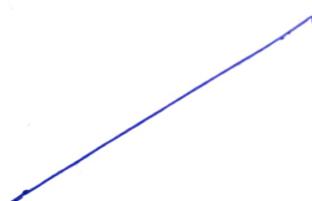
Error: Age cannot be negative.

Enter father's age : 50

Enter son's age : 20

Father's age: 50

Son's age: 20



## 2.7 Thread problem.

Ans

```
class MessageThread extends Thread {  
    private String message;  
    private int interval;  
    public MessageThread (String message, int interval) {  
        this.message = message;  
        this.interval = interval;  
    }  
    @Override  
    public void run() {  
        while (true) {  
            try {  
                System.out.println(message);  
                Thread.sleep (interval);  
            } catch (InterruptedException e) {  
                e.printStackTrace();  
            }  
        }  
    }  
}
```

public class ~~see~~ Main {

public static void main (String [] args) {

Thread thread1 = new MessageThread ("BMS College  
of Engineering", 10000);

Thread thread2 = new MessageThread ("(SE", 2000);

thread1.start();

} thread2.start();

Output:

BMS College of Engineering

CSE

CSE

CSE

CSE

BMS College of Engineering

CSE

Dom  
19/2/24

## AWT

1) Creating Label, button and Text field.

~~Ans~~  
import java.awt.\*;  
import java.awt.event.\*;  
public class awtEx extends WindowAdapter {

Frame f;

awtEx () {

f = new Frame();

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(f);~~

~~f.setSize (400, 300);~~

f.setTitle ("Emp-Info")

f.setLayout (null);

f.setVisible (true);

}

```
public void windowClosing(WindowEvent e){  
    System.exit(0);  
}  
public static void main(String[] args){  
    awtex aw = new awtex();  
}  
}
```

Output:

Employee Info

Employee ID:

Submit

2.) Create a button and add a action listener for mouse click.

Ans

```
import java.awt.*;
import java.awt.event.*;
public class Event Handling extends WindowAdapter
    implements ActionListener {
    Frame f;
    TextField tf;
    Event Handling() {
        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) {  
    tf.setText("Welcome!");  
}
```

```
public void windowClosing(WindowEvent e) {  
    System.exit(0);  
}  
}  
public static void main(String args[]) {  
    NewEventHandling; //
```

3  
3  
3  
Output:  
20/21

