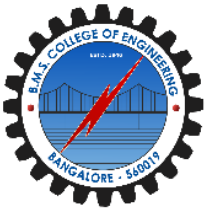
B.M.S. COLLEGE OF ENGINEERING
Basavanagudi, Bengaluru- 560019
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING



LAB REPORT

On

Object Oriented Java Programming

(23CS3PCOOJ)

Submitted By :

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1BM22CS010

In partial fulfilment of

BACHELOR OF ENGINEERING

In

COMPUTER SCIENCE AND ENGINEERING

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Faculty-In-Charge

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Department of Computer Science and Engineering

LAB-1

Sample Programs

1) Print an Integer (Entered by user)

```
import java.util.Scanner;

public class HelloWorld {

    public static void main (String[] args) {

        Scanner reader = new Scanner(System.in);
        System.out.print ("Enter a number : ");
        int number = reader.nextInt();
        System.out.println("You entered : "+number);
    }
}
```

Output:

```
Enter a number :
2
You entered : 2
```

2) Check whether a no. is even or odd

```
import java.util.Scanner;
public class JavaExample {
    public static void main (String[] args) {
        int num;
        System.out.print ("Enter integer : ");
        Scanner input = new Scanner(System.in);
        num = input.nextInt();
        if (num % 2 == 0)
            System.out.println(num + " is even");
        else
            System.out.println(num + " is odd");
    }
}
```

O/p:

Enter integer:

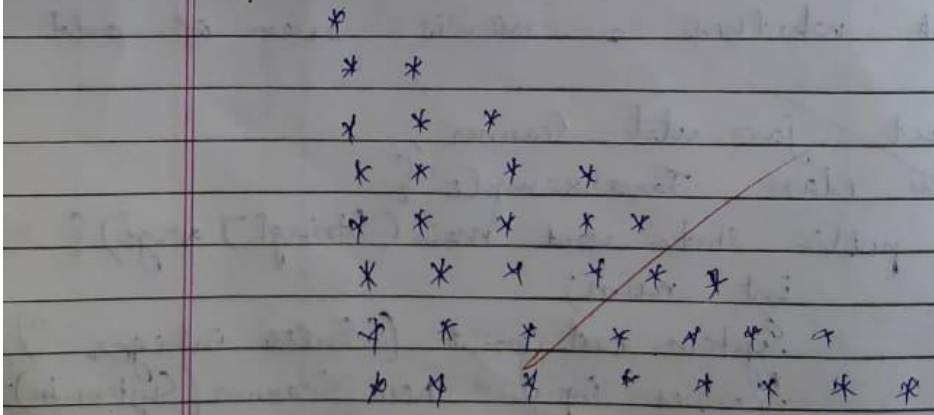
6

6 is even

3) Paint right star pattern

```
public class star {
    public static void main (String[] args){
        int r, c, n=8;
        for (r=0; r<n; r++) {
            for( c=0; c<=r; c++) {
                System.out.print("* ");
            }
            System.out.println();
        }
    }
}
```

O/p:



4) find Quotient & Remainder :

```
public class examplee {
    public static void main (String[] args) {
        int n1 = 15, n2 = 2;
        int q = n1/n2;
        int r = n1 % n2;
        System.out.println ("Quotient is : "+q);
        System.out.println ("Remainder is : "+r);
    }
}
```

O/p:
Quotient is : 7
Remainder is : 1

5) Multiply 2 no.s.

```
import java.util.Scanner;
public class multi {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print ("Enter 1st no. :");
        int n1 = sc.nextInt();
        System.out.print ("Enter 2nd no. : ");
        int n2 = sc.nextInt();
        sc.close();
        int p = n1 * n2;
        System.out.println ("Output: " +p);
    }
}
```

O/p: Enter 1st no. : 2
Enter 2nd no : 10
Output : 20

6) Swap using temporary variable :

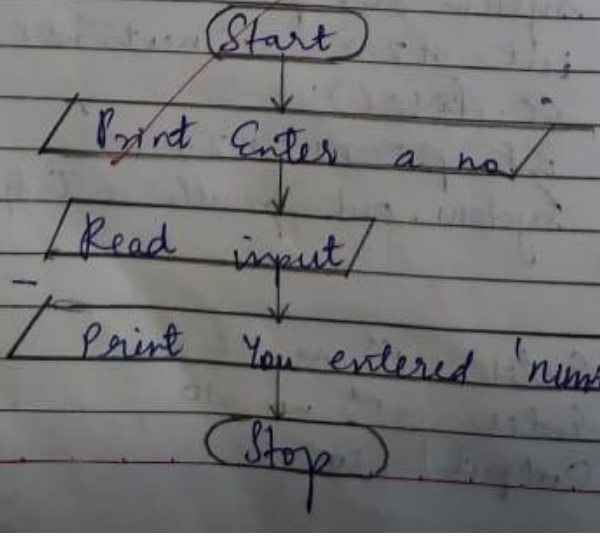
```
public class swap {
    public static void main (String[] args){
        float first = 1.20f , second = 2.95f;
        System.out.println ("-- Before swap --");
        System.out.println ("First no. =" + first);
        System.out.println ("Second no. =" + second);
        float temporary = first;
        first = second;
        second = temporary;
        System.out.println ("-- After swap --");
        System.out.println ("First no. =" + first);
        System.out.println ("Second no. =" + second);
```

Op: --Before Swap--
First no. = 1.20 Second no = 2.45 --After Swap-- First no. = 2.45 Second no. = 1.20

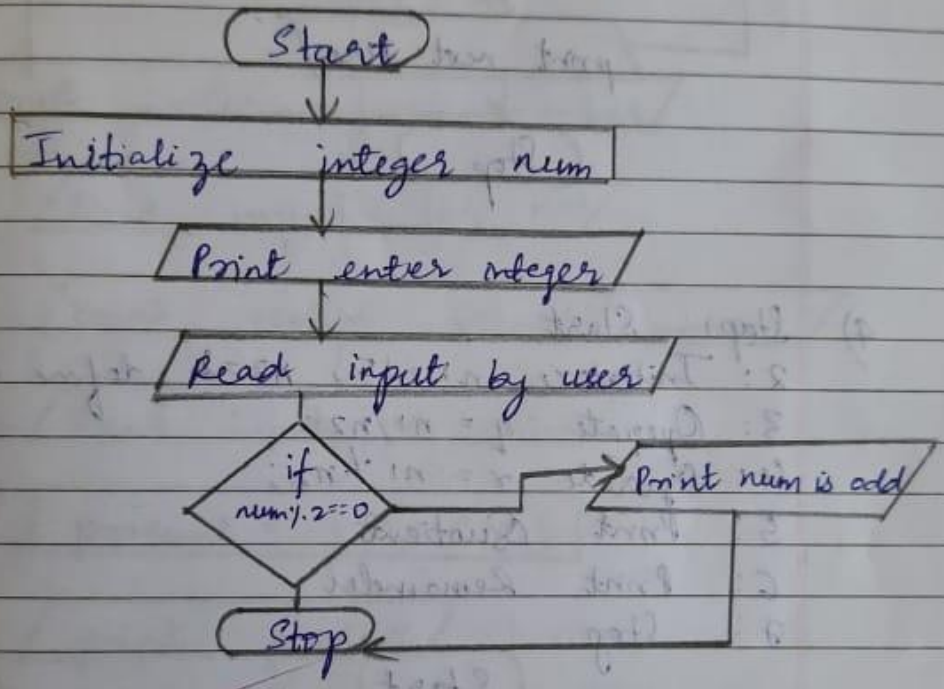
① Algorithm:

Step1: Start
Step2: Create a reader instance to take input
Step3: Print Enter no.
Step4: Read no. obtained by user
Step5: Print you entered (number)
Step6: Stop

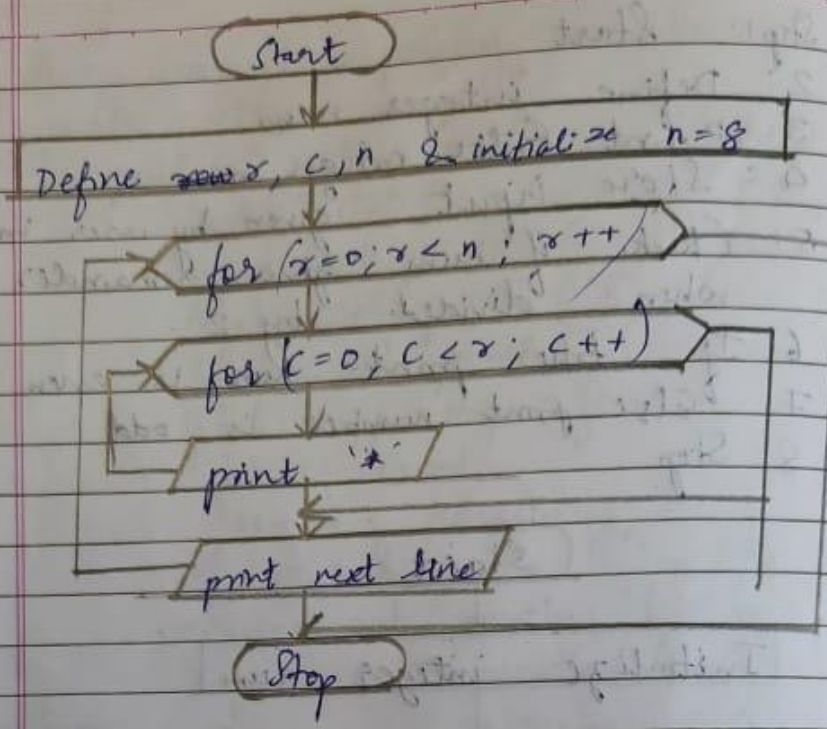
Flowchart:



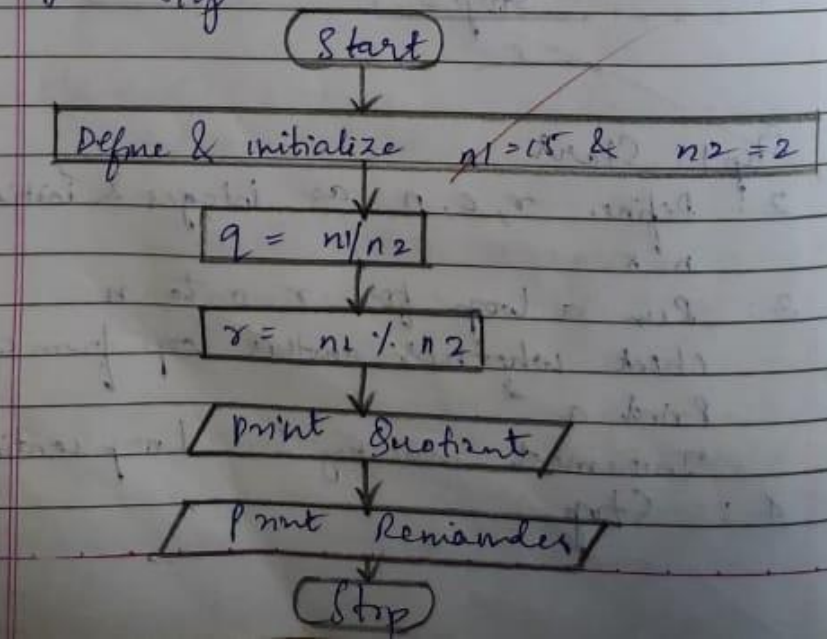
② Step 1: Start
2: Define integer num
3: Print Enter integer no.
4: Store input given by user in num
5: Check if num gives Remainder 0 when divided by 2.
6: If true print Num is even
7: Else print number is odd
8: Stop



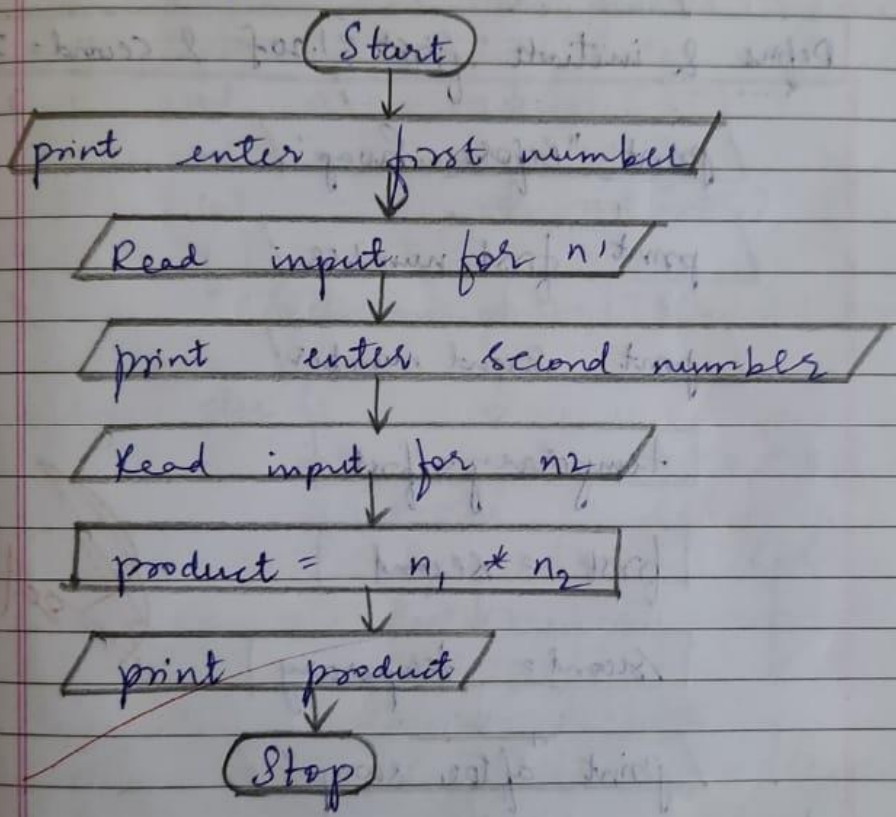
② Step 1: Start
2: Define r, c, n as integer & initialize n=8.
3: Run a loop for r 0 to n
Check whether another loop from c 0 to r
Print a *
Increment row by 1. Loop continues.
4: Stop



4) Step 1: Start
2: Initialize n1 = 15, n2 = 2 define as integer
3: Operate q = n1/n2;
4: Operate r = n1 % n2;
5: Print Quotient
6: Print Remainder
7: Stop

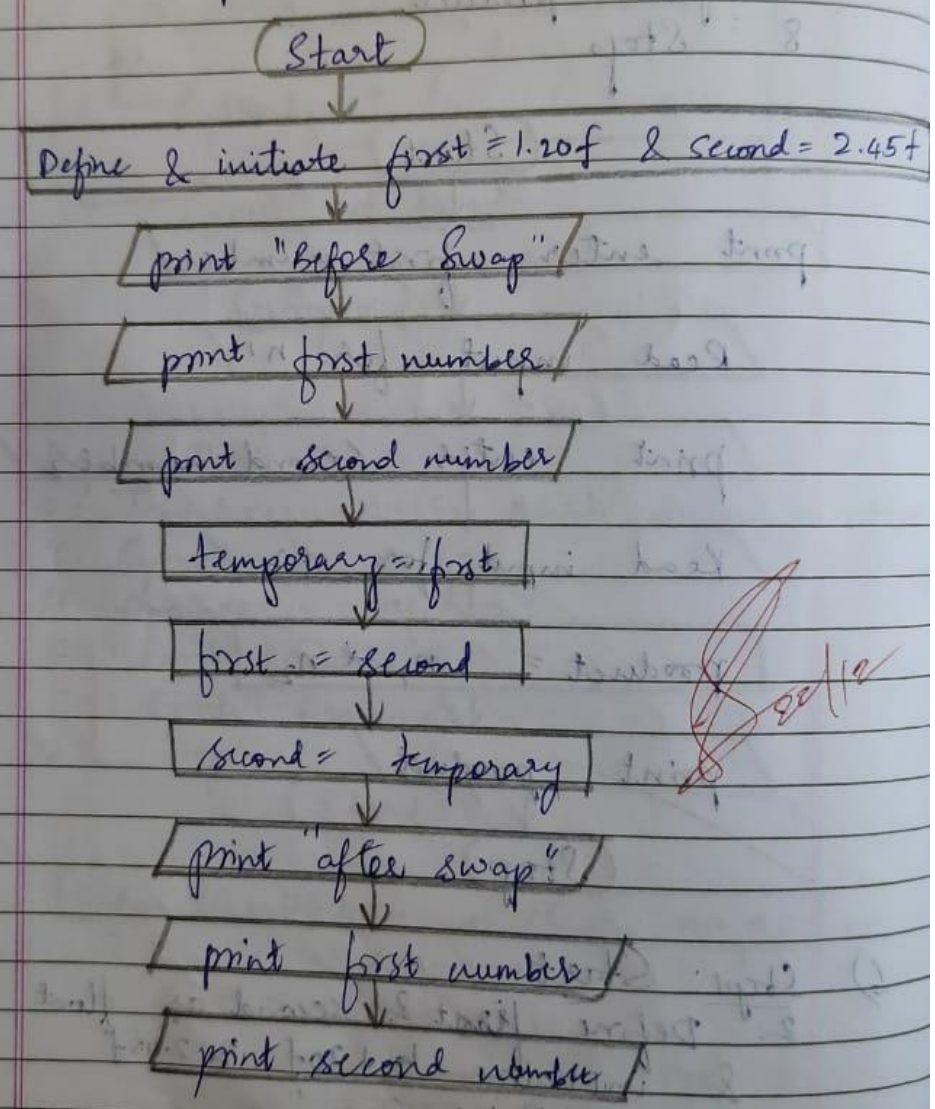


5) Step1 : Start
2: print enter first number
3: Read input integer n1 from user
4: Print enter second number
5: Read input for int n2
6: Calculate product = n1 * n2
7: print product
8 : Stop



6) Step1: Start
2: Define first & second as float datatype & initialize to 1.20f & 2.45f
3: Print "Befor Swap"
4: Print 1st no.
5: Print 2nd no.
6: Create a temporary variable of float
7: Store first in temporary

8: Store second in first
9: Store temporary in second
10: Print "After Swap"
11: Print 1st no.
12: Print 2nd no.
13: Stop



```
C:\Users\bmsce\Desktop\1BM22CS010>javac HelloWorld.java

C:\Users\bmsce\Desktop\1BM22CS010>java HelloWorld
Abubakar M Matte 1BM22CS010
Enter a number:
3
You entered: 3
```

```
C:\Users\bmsce\Desktop\1BM22CS010>javac EvenOdd.java

C:\Users\bmsce\Desktop\1BM22CS010>java EvenOdd
Abubakar M Matte 1BM22CS010
Enter an integer number:
6
6 is an even number
```


```
C:\Users\bmsce\Desktop\1BM22CS010>javac EvenOdd.java

C:\Users\bmsce\Desktop\1BM22CS010>java EvenOdd
Abubakar M Matte 1BM22CS010
Enter an integer number:
6
6 is an even number
```


```
C:\Users\bmsce\Desktop\1BM22CS010>javac quotientRemainder.java

C:\Users\bmsce\Desktop\1BM22CS010>java quotientRemainder
Abubakar M Matte 1BM22CS010
Quotient is: 7
Remainder is: 1
```


```
C:\Users\bmsce\Desktop\1BM22CS010>javac quotientRemainder.java

C:\Users\bmsce\Desktop\1BM22CS010>java quotientRemainder
Abubakar M Matte 1BM22CS010
Quotient is: 7
Remainder is: 1
```



```
C:\Users\bmsce\Desktop\1BM22CS010>javac quotientRemainder.java

C:\Users\bmsce\Desktop\1BM22CS010>java quotientRemainder
Abubakar M Matte 1BM22CS010
Quotient is: 7
Remainder is: 1
```

LAB-2

/*Develop a Java program that prints all real solutions to the quadratic equation ax2+bx+c = 0. Read in a, b, c and use the quadratic formula. If the discriminate b2-4ac is negative, display a message stating that there are no real solutions.*/

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Quadratic Equation Program

```
import java.util.Scanner;
import static java.lang.Math.sqrt;
import static java.lang.Math.abs;

public class quad {
    public static void main (String[] args){
        Scanner in = new Scanner (System.in);
        System.out.println ("Enter coefficients: ");
        int a = in.nextInt();
        int b = in.nextInt();
        int c = in.nextInt();
        if (a==0) {
            System.out.println ("Invalid input");
        }
        else {
            int d = b*b - 4*a*c;
            if (d>0) {
                System.out.println ("Roots are real");
                float r1 = (float)(-b + sqrt(d))/(2*a);
                float r2 = (float)(-b - sqrt(d))/(2*a);
                System.out.println (r1);
                System.out.println (r2);
            }
            elseif (d<0){
                System.out.println ("Roots are imaginary
                There are no real solutions");
                float r1 = (float) -b/(2*a);
                float r2 = (float) sqrt (abs(d))/(2*a);
                System.out.println (r1 + "+i" + r2);
                System.out.println (r1 + "-i" + r2);
            }
```

```
        else {
            System.out.println("Roots are equal");
            float r = (float) -b/(2*a);
            System.out.println(r);
        }
    }
}
```

O/p (i) Enter coefficients: 0 1 1
Invalid Input

(ii) Enter coefficients: 1 2 1
Roots are equal: -1

(iii) Enter coefficients: 1 -6 5
Roots are real: 5 1

(iv) Enter coefficients: 5 1 5
Roots are imaginary. There are no real solutions.
-0.1 + i0.9949873 -0.1 - i0.9949873

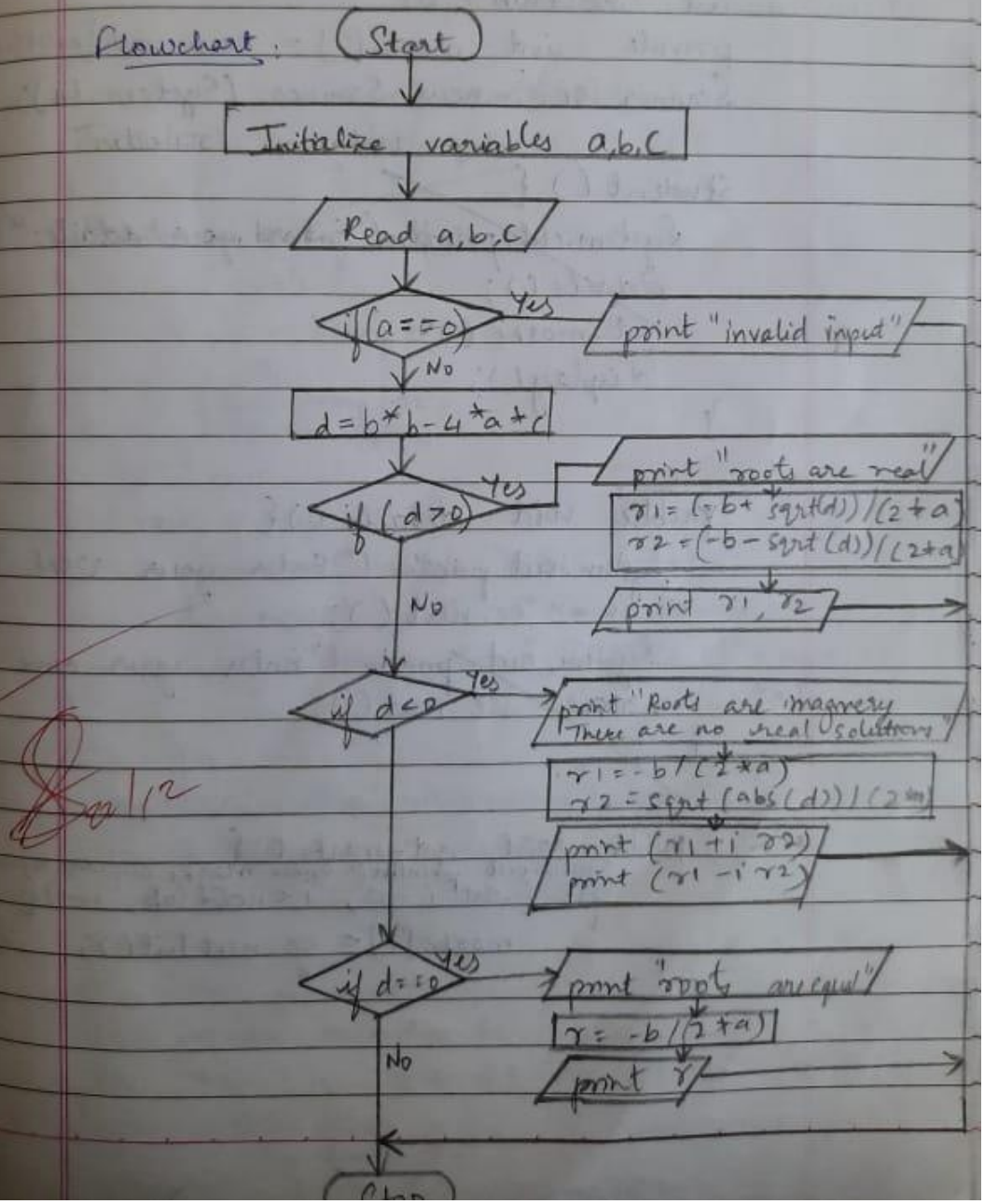
Algorithm:
Step 1: Start
Step 2: initialise variable a,b,c,d & read a,b,c
Step 3: if (a=0) print "invalid input" goto Step 1
Step 4: d = b*b - 4*a*c
Step 5: if d>0
print "roots are real"
r1 = (-b + sqrt(d))/(2*a)
r2 = (-b - sqrt(d))/(2*a)
print (r1, r2) goto step 6
Step 6: if d<0
print ("Roots are imaginary
There are no real solutions")
r1 = -b/(2*a);

r2 = sqrt(abs(d))/(2*a)
print (r1 + i r2)
print (r1 - i r2) goto step8.

Step 7: if d=0
print "Roots are equal"
r = -b/(2*a)
print r

Step 8: Stop.

Flowchart:



```
C:\Users\bmsce\Desktop\1BM22CS010>java quad
Name: Abubakar Mohammedshafee Matte
USN: 1BM22CS010
Enter coefficients:
0 1 1
Invalid Input.

C:\Users\bmsce\Desktop\1BM22CS010>javac quad.java

C:\Users\bmsce\Desktop\1BM22CS010>java quad
Name: Abubakar Mohammedshafee Matte
USN: 1BM22CS010
Enter coefficients:
1 2 1
Roots are equal:
-1.0

C:\Users\bmsce\Desktop\1BM22CS010>javac quad.java

C:\Users\bmsce\Desktop\1BM22CS010>java quad
Name: Abubakar Mohammedshafee Matte
USN: 1BM22CS010
Enter coefficients:
1 -6 5
Roots are real:
5.0
1.0

C:\Users\bmsce\Desktop\1BM22CS010>javac quad.java

C:\Users\bmsce\Desktop\1BM22CS010>java quad
Name: Abubakar Mohammedshafee Matte
USN: 1BM22CS010
Enter coefficients:
5 1 5
Roots are imaginary. There are no real solutions. Complex solutions:
-0.1+i0.99498737
-0.1-i0.99498737
```

LAB-3

/*Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student. */

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SGPA Calculation.

```
import java.util.Scanner;

public class Student {
    String usn;
    String name;
    private static int credits[] = {4,4,4,3,3,2,1,1};
    int noOfSub = 8;
    private int marks[] = new int[noOfSub];
    Scanner sc = new Scanner(System.in);

    Student() {
        System.out.println("Enter your details:");
        details();
        get_marks();
        display();
    }

    public void details(){
        System.out.println("Enter your USN:");
        usn = sc.next();
        System.out.println("Enter your name:");
        name = sc.next();
    }

    public void get_marks(){
        System.out.println("Enter marks according to credits:");
        for(int i=0; i<noOfSub; i++){
            marks[i] = sc.nextInt();
        }
    }
}
```

```
double sgpa(){
    double sgpa=0, temp=0;
    for(int i=0; i<noofSub; i++){
        if(marks[i]>=40){
            if(marks[i]==100){
                temp += credits[i]*((int)(marks[i]/10));
            }
            else if(marks[i]<100){
                temp += credits[i]*((int)(marks[i]/10)+1);
            }
            else{
                temp+=0;
            }
        }
        else{
            temp+=0;
        }
    }
    sgpa=temp/22;
    return sgpa;
}

void display(){
    System.out.println("USN:"+usn);
    System.out.println("Name:"+name);
    System.out.println("SGPA is:"+sgpa());
}

public static void main(String[] args){
    Student s1 = new Student();
}
}
```

o/p: Enter your details:
Enter marks accordiy to credits:
99 94 92 97 83 96 83 90
USN: 1BM22CS010
Name: Abubakar
SGPA is: 9.681818181818182

Algorithm: Step1: Start

Step2: Create class Student and initialize usn and name as string

Step3: Initialise credits array as {4,4,4,3,3,2,1,1}
Initialise noOfSub = 8
Initialise marks array with size noOfSub

Step3: Create constructor Student
Print (Enter your details:)
Call functions details(), get_marks(), display()

Step4: Create method details()
print (Enter USN) print (Enter name)
Take user input for USN and name

Step5: Create method get_details()
print (Enter your marks)
Take user input for marks.

Step6: Create method double sgpa()
initialize sgpa=0, temp=0 as double
Run loop for (i=0, i< noOfSub, i++)
if marks >= 40,
if marks = 100, temp+= credits * (marks/10)
else if marks <100, temp+= credits * (marks++/10)
else temp+=0
else temp = temp + 0. sgpa = temp/22. return sgpa

Step7: create method display()
print USN, name and call sgpa()

Step8: Create main function
and make object S1 of Student.

Step9: Stop

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```
C:\Users\bmsce\Desktop\1BM22CS010>javac Student.java

C:\Users\bmsce\Desktop\1BM22CS010>java Student
Enter your details:
Abubakar Mohammedshafee Matte 1BM22CS010
Enter your USN:
1BM22CS010
Enter your name:
Abubakar
Enter your marks accoring to credits-4,4,4,3,3,2,1,1:
99
94
92
87
83
96
83
90
USN: 1BM22CS010
Name: Abubakar
SGPA is: 9.681818181818182
```

LAB-4

/*Create a class Book which contains four members: name, author, price, 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.*/

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3) Create class book which consists of name, author, price, num-pages. Include constructor, set values. Include set, get details, toString() method.

Soln

```
import java.util.Scanner;
abstract class Shape {
class book {
    String name;
    String author;
    float price;
    int num_pages;

    book() { }
    book(String name, String author, int num_pages, float price) {
        this.name = name;
        this.author = author;
        this.num_pages = num_pages;
        this.price = price;
    }

    void set_details() {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter bookname, author, price, num_pages");
        name = sc.next();
        author = sc.next();
        price = sc.nextFloat();
        num_pages = sc.nextInt();
    }

    void get_details() {book b[], String search_name) {
        // int n = b.length;
        // boolean found = false;
        //for(int i=0; i<n; i++) {
            //if (b[i].name.equals(search_name)) {
                // found = true;
                System.out.println("details of the book is :");
                System.out.println(b[i].toString());
            }
        }
    }
    // if (found == false) {
```

```
// System.out.print("no book exists with
//                  such name");
//
// }
}
public String toString() {
    return "The book "+name+" was
    written by "+author+" it consists of "
    +num_pages+" pages and costs around "+price;
}
public static void main(String[] args){
    Scanner sc = new Scanner(System.in);
    // System.out.println("enter no. of books");
    // int n = sc.nextInt();
    // book b[] = new book[n];
    // for(int i=0; i<n; i++) {
    //     b[i] = new book();
    //     b[i].set_details();
    //     b[i].get_details();
    // }
    // System.out.println("enter name of book
    //                     to search");
    // String search_name = sc.next();
    // b[0].get_details(b, search_name);
    }
}
Output:
book b[] = new book[3];
book b[0] = new book("Java", "S", 99, 200);
b[1] = new book();
b[2] = new book();
b[1].set_details();
b[2].set_details();
b[0].get_details();
b[1].get_details();
b[2].get_details();
}
```

Algorithm: Step 1

Step1: Create class book and initialize name, author, price, num_pages.

Step2: Create method set_details() in that print bookname, author, price, num_pages. Get users input for these.

Step3: Create method to get_details(), ~~pass parameters book b[], String~~ print the details of the book call function toString().

Step4: Create method toString()
return "To book" + name + "was written by" + author + "it consists of" + num_pages + "pages and costs" + price;

Step5: Create main function.
Get user input for no. of books.
Create book b[] array. ~~and~~
Run a loop, call object book().
call function set_details():
Run a loop, and call get_details().

Step 6: Stop.

Output: enter bookname, author, price, num_pges
ABC XYZ 100 100
enter bookname, author, price, numpages
PQR LMN 200 200
the book JAVA was written by S it consists of 90 pages and costs 200.0 rupees
the book ABC was written by XYZ it consists of 100 pages and costs 100.0 rupees
the book PQR was written by LMN it consists of 200 pages and costs 200.0 rupees.

```
C:\Users\bmsce\Desktop\1BM22CS010>javac book.java

C:\Users\bmsce\Desktop\1BM22CS010>java book
Abubakar Mohammedshafee Matte 1BM22CS010
enter bookname,author,price,num_pages
ABC
XYZ
100
100
enter bookname,author,price,num_pages
PQR
LMN
200
200
the book Java was written by Strange it consists of 9857 pages and costs 243.0rupees.
the book ABC was written by XYZ it consists of 100 pages and costs 100.0rupees.
the book PQR was written by LMN it consists of 200 pages and costs 200.0rupees.
```

LAB-5

/*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 only the method printArea( ) that prints the area of the given shape*/

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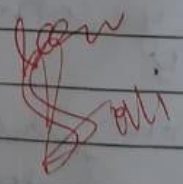
④
```
import java.util.Scanner;
abstract class Shape {
    int x, y;
    abstract void area();
}
class Circle extends Shape {
    Circle() {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter radius:");
        x = sc.nextInt();
        y = x;
    }
    void area() {
        System.out.println("area of circle =" + 3.14*x*y);
    }
}
class Rectangle extends Shape {
    Rectangle() {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter length, breadth");
        x = sc.nextInt();
        y = sc.nextInt();
    }
    void area() {
        System.out.println("area of rectangle =" + x*y);
    }
}
class Triangle extends Shape {
    Triangle() {
        Scanner sc = new Scanner(System.in);
        System.out.println("enter base, height");
        x = sc.nextInt();
        y = sc.nextInt();
    }
```

```
    void area(){
        System.out.println("Area of triangle = "+0.5*x*
    }
}
class Area(){
    public static void main(String[] Args){
        //System.out.println("Abubakar 18M22CS0
        Circle obj1 = new Circle;
        obj1.area();
        Rectangle obj2 = new Rectangle;
        obj2.area();
        Triangle obj3 = new Triangle;
        obj3.area();
    }
}
```

Output: Enter radius : 1
Area of circle = 3.14
Enter length, breadth : 2 2
Area of rectangle = 4
Enter base, height : 2 2
Area of triangle = 2.0



Algorithm: Step 1: Start
Step 2: Create abstract class Shape()
Initialize x, y
Call get-area() function.
Step 3: Create main function and then
Create 3 objects Circle, Rectangle,
Triangle under Shape parent class.
Step 4: Create Circle class extending Shape
Create constructor Circle().
Get user input for radius value.
Create function void-area() and
print area of circle 3.14 * x * y
Step 5: Create Rectangle Class extending Shape
Create constructor Rectangle().
Get user input for length, breadth
Create function void-area() and
print area of rectangle x * y
Step 6: Create Triangle Class extending Shape
Create constructor Triangle().
Get user input for base, height
Create function void-area() and
print area of Triangle 0.5 * x * y
Step 7: Stop.

```
C:\Users\bmsce\Desktop\1BM22CS010>java Area
Abubakar 1BM22CS010
enter the radius of the circle
1
area of circle is 3.14
enter the length and breadth of the rectangle
2
2
area of rectangle is 4
enter the base and hieght of the triangle
2
2
area of triangle is 2.0
```

LAB-6

/*Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed.

Create a class Account that stores customer name, account number and type of account. From this derive the classes Cur-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:

a) Accept deposit from customer and update the balance.

b) Display the balance.

c) Compute and deposit interest

d) Permit withdrawal and update the balance

Check for the minimum balance, impose penalty if necessary and update the balance. */

19/12/22

5 8) Develop program to create class Bank that maintains 2 account for current, savings.
savings → compound interest
current → "min" bal.

Sol^n

```
import java.util.Scanner;
class Account {
    String customerName
    long accno,
    String accountType;
    double balance;
    public Account (String customerName, long accno,
                    String accountType) {
        this.customerName = customerName;
        this.accno = accno;
        this.accountType = accountType;
        this.balance = 0.0;
    }
    public void displayBalance() {
        System.out.println("Account No.:" + accno);
        System.out.println("Account type: " + accountType);
        System.out.println("Balance: Rs." + balance);
    }
}
class CurAcct extends Account {
    double minBalance;
    double serviceCharge;
    public CurAcct (String customerName, long accno){
    super (CustomerName, accno, "Current");
    this.minBalance = 500.0;
    this.serviceChrg = 50.0;
    }
    public void withdraw (double amount) {
        if (balance - amount >= minBalance)
            balance = amount;
```

Cheque issued.");
System.out.println("Withdrawal successful.
Current balance : Rs." + balance);
} else {
System.out.println("With Insufficient funds.");
}
}
public void imposeServiceCharge() {
if (balance < minBalance) {
balance -= serviceCharge;
System.out.println("Service charge imposed.
Current Balance : Rs" + balance);
}
}
class SavAcct extends Account {
double interestRate;
public SavAccount (String customerName, long accno) {
super(customerName, accno, "Savings");
this.interestRate = 0.05;
}
public void compoundInterest() { double initialAmount, int term
double interest = balance *
double compoundInterest = initialAmount *
Math.pow((1 + interestRate), term) -
initialAmount;
balance += compoundInterest;
}
}
public class Bank {
public static void main (String[] args) {
Scanner scanner = new Scanner (System.in);
System.out.println("Choose acc type:");
System.out.println("1. Current 2. Savings
Enter 1 or 2");

```
scanner.nextInt();
System.out.println("Enter customer name:");
String s = scanner.next();
System.out.println("Enter accno:");
Scanner.nextLong();
if (choice == 1) {
    CurAcct curAccount = new CurAcct(customerName, accno);
    System.out.println("Enter initial balance:Rs");
    double initialBalance = scanner.nextDouble();
    curAccount.balance = initialBalance;
    System.out.println("Enter withdrawal amount:Rs");
    double withrawalAmount = Scanner.next().Double();

    curAccount.withdraw(withdrawAmount);
    curAccount.displayBalance();
    curAccount.ServiceCharge();
}
else if (choice == 2) {
    SavAcct savAccount = new SavAcct
        (customerName, accno);
    System.out.println("Enter initial Balance:Rs");
    double initialBalance = sc.nextDouble();
    System.out.println("Enter withdrawal amount:Rs");
    double withdrawalAmount = Scanner.nextDouble();
    SavAcct.balance = withdrawalAmount;
    System.out.println("Withdrawal Successful,
    Current Balance = Rs" + SavAccount.Balance);
    System.out.println("Enter interest rate:");
    double interestRate = scanner.nextDouble();
    savAccount.interestRate = interestRate;
    SavAccount.displayBalance();
    System.out.println("Enter Term (in years)
    for CI calculation:");
```

```
int term = scanner.nextInt();
SavAcct compound Intrest (initialBalance, term);
SavAccount.displayBalance();
}
else {
System.out.println("Invalid choice");
}
}
}
```

Algorithm

Step 1: Start

Step 2: Create class Account.
Initialize customerName, accno, accountType, balance.

Step 3: Create constructor with all these parameters

Step 4: Create ~~for~~ method displayBalance to display all these values.

Step 5: Create class curAcct extending Account
Initialize minBalance, serviceCharge.

Step 6: Create ~~post~~ constructor.
Take initialization from super class and give values to minBalance & Service charge.

Step 7: Create method withdraw.
If balance - amount > 0, then do it
or else print insufficient funds.
Create method

Step 8: Create method imposeServiceCharge().
If balance < minBalance, balance -= Service charge.

Step 9: Create class SavAcct extending Account.
Initialize interestRate.

Step 10: Create constructor SavAccount and initialize from supes class.

Give value to interestRate.

Step 11: Create method compoundInterest to calculate mathematical compound Interest and add to balance.

Step 12: Create class Bank.
Create main function.
Print Choose acc type: 1. Current 2. Savings.
Take user input for choice, name, accno.

Step 13: If choice = 1, create object of CurAcct. Initialize initialBalance, withdrawal amount.
Call methods withdraw(), displayBalance(), ServiceCharge();
Or else choice = 2, create obj of SavAcct. Initialize initialBalance, withdrawal amount, interest rate.
Call methods withdraw(), compoundInterest(), displayBalance();
Else print invalid choice.

Step 14: Stop.

Front page

Output1: Choose account type : 1. Current 2. Savings
Enter choice : 1
Enter customer name : Abubakar
Enter account number : 1248991
Enter initial balance : $400
Enter withdrawal amount : $100
Insufficient funds. Withdrawal not allowed.
Service charge imposed. Current Balance : $350
Account Number : 321457.
Account Type : Current

Output 2: Choose Account Type:
1. Current 2. Savings:
Enter choice: 2
Enter customer name: Abubakar
Enter account number: 12345678
Enter initial balance: $8000
Enter withdrawal amount: $1500.
Withdrawal successful. Current Balance: $6500.
Enter interest rate: 0.08.
Account Number: 12345678
Customer Name: Abubakar
Account type: Savings
Balance: $6500
Enter term (in year) for CI calculation: 3
Compound Interest deposited. Current Balance: $. 8577.696
Account Number: 12345678
Customer Name: Abubakar
Account type: Savings
Balance: $ 8577.696

19/1

```
C:\Users\bmsce\Desktop\1BM22CS010>javac Bank.java

C:\Users\bmsce\Desktop\1BM22CS010>java Bank
Abubakar Matte 1BM22CS010
Choose account type:
1. Current
2. Savings
Enter choice (1 or 2): 1
Enter customer name: Abubakar
Enter account number: 3625245
Enter initial balance: $400
Enter withdrawal amount: $100
Insufficient funds. Withdrawal not allowed.
Service charge imposed. Current Balance: Rs.350.0
Account Number: 3625245
Customer Name: Abubakar
Account Type: Current
Balance: $350.0

C:\Users\bmsce\Desktop\1BM22CS010>javac Bank.java

C:\Users\bmsce\Desktop\1BM22CS010>java Bank
Abubakar Matte 1BM22CS010
Choose account type:
1. Current
2. Savings
Enter choice (1 or 2): 1
Enter customer name: Abubakar
Enter account number: 9857932
Enter initial balance: $10000
Enter withdrawal amount: $1000
Withdrawal successful. Current Balance: $9000.0
Account Number: 9857932
Customer Name: Abubakar
Account Type: Current
Balance: $9000.0

C:\Users\bmsce\Desktop\1BM22CS010>javac Bank.java

C:\Users\bmsce\Desktop\1BM22CS010>java Bank
Abubakar Matte 1BM22CS010
Choose account type:
1. Current
2. Savings
Enter choice (1 or 2): 2
Enter customer name: Abubakar
Enter account number: 12345678
Enter initial balance: $8000
Enter withdrawal amount: $1500
Withdrawal successful. Current Balance: $6500.0
Enter interest rate: 0.08
Account Number: 12345678
Customer Name: Abubakar
Account Type: Savings
Balance: $6500.0
Enter term (in years) for compound interest calculation: 3
Compound Interest deposited. Current Balance: Rs.8577.696000000002
Account Number: 12345678
Customer Name: Abubakar
Account Type: Savings
Balance: $8577.696000000002
```

LAB-7

/*Create a package CIE which has two classes- Student and Internals. The class Personal has members like usn, name, sem. The class internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Student. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses.*/

2/2/24

6 → Packages: Create packages CIE, SEE and import & display

```
package CIE;
import java.util.*;
public class Student {
    public int sem;
    public String usn;
    public String name;

    public void accept(){
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter usn, name, sem:");
        usn = sc.nextLine();
        name = sc.nextLine();
        sem = sc.nextLine();
    }
}

package 6
public class Internals {
    public int in_marks[] = new int[5];
}

package SEE;
import CIE.Student;
public class External extends Student {
    public int ex_marks[] = new int[5];
}

im
package
import java.util.*;
import SEE.*;
import CIE.*;
public class FinalMarks {
    public static void main(String[] args){
```

```
int f_marks[] = new int[5];
Scanner sc = new Scanner(System.in);
System.out.println("Enter no. of students");
int n = sc.nextInt();
SEE_External st[] = new SEE_External[n];
CIE_Internals s[] = new CIE_Internals[n];
for(int i=0; i<n; i++){
    st[i] = new SEE_External();
    s[i] = new CIE_Internals();
    System.out.println("Enter details" + (i+1));
    s[i].accept();
    for(int j=0; j<5; j++){
        System.out.println("Enter internal
and external marks of subject" + (i+1));
        s[i].in_marks[j] = sc.nextInt();
        st[i].ex_marks[j] = sc.nextInt();
        f_marks[j] = s[i].in_marks[j] +
                     st[i].ex_marks[j];
    }
    System.out.println("Final marks of"
                     + st[i].name);
    for(int k=0; k<5; k++){
        System.out.println("Course" + (k+1) +
                     "=" + f_marks[k]);
    }
}
}
```

O/p: Enter no. of students: 1
Enter USN, Name, Semester:
1BM22CS010
Abubakar
3

Enter internal and external marks of subject 1: 49 48
Enter internal and external marks of subject 2: 47 49
Enter internal and external marks of subject 3: 50 49
Enter internal and external marks of subject 4: 48 46
Enter internal and external marks of subject 5: 45 50
final marks of Abubakar:
Course 1 = 97
Course 2 = 96
Course 3 = 99
Course 4 = 94
Course 5 = 95

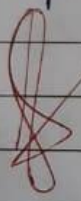
Algorithm:
Step1: Start
Step2: Create a package named CIE,
Create a public class named Student
Initialize public variables usn, name, sem.
Step3: Create a public method named accept()
Print "Enter usn, name, sem:"
Take user input
Step4: Create a public ~~method~~ class named Internals.
Initialize public array in-marks.
Step5: Create a package named SEE and import
CIE.Student from package CIE
Create public class named External which is extending Student
Initialize public array ex-marks.
Step6: Import SEE.* and CIE.*.
Create a public Class named finalMarks.
Create main method.
Initialize array f-marks.
Take user input for no of students.

Step7: Create a st[] obj for SEE External and a s[] obj for CIE Internals and new doubles.

Step8: Run loop from 0 to n
Accept s[] details.
Run loop from 0 to 5
Take in_marks & ex_marks from user and take their sum in fi_marks. Print it.

Step9: Run loop from 0 to 5
Print all the details.

Step10: Stop



```
C:\Users\bmsce\Desktop\1BM22CS010\CIE_SEE>javac -d . FinalMarks.java

C:\Users\bmsce\Desktop\1BM22CS010\CIE_SEE>java FinalMarks
Enter n:
2
Enter details 1
Enter USN, Name, Semester:

1BM22CS010
Abubakar
3
Enter internal  and external marks of subject 1
49
48
Enter internal  and external marks of subject 2
47
49
Enter internal  and external marks of subject 3
50
49
Enter internal  and external marks of subject 4
48
46
Enter internal  and external marks of subject 5
45
49
Final marks of Abubakar
Course 1 = 97
Course 2 = 96
Course 3 = 99
Course 4 = 94
Course 5 = 94
Enter details 2
Enter USN, Name, Semester:

1BM22CS010
Abubakar
4
Enter internal  and external marks of subject 1
50
50
Enter internal  and external marks of subject 2
49
48
Enter internal  and external marks of subject 3
47
49
Enter internal  and external marks of subject 4
48
48
Enter internal  and external marks of subject 5
49
50
Final marks of Abubakar
Course 1 = 100
Course 2 = 97
Course 3 = 96
Course 4 = 96
Course 5 = 99
```

LAB-8

/*Write a program that demonstrates handling of exceptions in inheritance tree.

Create a base class called “Father” and derived class called “Son” which extends the

base class. In Father class, implement a constructor which takes the age and throws

the exception WrongAge( ) when the input age<0. In Son class, implement a

constructor that cases both father and son’s age and throws an exception if son’s age is >=father,s age */

16/2/24

5) (18) Exception Handling

```
import java.util.Scanner;
class WrongeAge extends Exception {
    public WrongAge (String message) {
        super (message);
    }
}
class Father {
    int fathersAge;
    public Father (int fathersAge) throwes
    WrongAge {
        if (fathersAge < 0) {
            throw new WrongAge ("Age cannot
            be negative");
        }
        this.fathersAge = fathersAge;
    }
}
class Son extends Father {
    int sonAge;
    public Son (int fathersAge, int sonAge)
    throwes WrongAge {
        super (fathersAge);
        if (sonAge >= fathersAge) {
            throw new WrongeAge ("Son's
            age must be less than father's age");
        }
        this.sonAge = sonAge;
    }
}
```

```
public class fatherson{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter father's &
        Son's age:");
        int fa = sc.nextInt();
        int sa = sc.nextInt();
        try{
            Son s= new Son(fa,sa);
            System.out.println("father's age:"+
                                s.fatherAge);
            System.out.println("Son's age:"+
                                s.sonAge);
        }
        catch(WrongAge e){
            System.out.println("Error:"+e.getMessage());
        }
    }
}
```

o/p: Enter father's age & Son's age:
30
31
Error: Son's age must be less than father's age.

Step 1 : Start

Algorithm : Step 2 : create a class named WrongAge which is extending Exception. Create constructor and call super(message)

Step 3 : Create a class named father. Initialize fatherAge. Create constructor that throws WrongAge if fatherage' < 0.

Step 4 : Create a class named Son which is extending father. Initialize sonAge. Create constructor that throws WrongAge exception if sonAge <= fatherAge

Step 5 : create a main class fatherson. In main function, print "Enter father's & son's details:" Take user input for the two, fa & sa. Inside try block, create object of Son s, put fa, sa as parameters print father's & son's age. Inside catch block print error & e.getmessage().

Step 6 : Stop.

```
C:\Users\bmsce>cd C:\Users\bmsce\Desktop\1BM22CS010

C:\Users\bmsce\Desktop\1BM22CS010>javac fatherson.java

C:\Users\bmsce\Desktop\1BM22CS010>java fatherson
Name: Abubakar Mohammedshafee Matte
USN: 1BM22CS010
Enter father's age and son's age:
45
15
Father's age: 45
Son's age: 15

C:\Users\bmsce\Desktop\1BM22CS010>javac fatherson.java

C:\Users\bmsce\Desktop\1BM22CS010>java fatherson
Name: Abubakar Mohammedshafee Matte
USN: 1BM22CS010
Enter father's age and son's age:
30
31
Error: Son's age must be less than Father's age

C:\Users\bmsce\Desktop\1BM22CS010>java fatherson
Name: Abubakar Mohammedshafee Matte
USN: 1BM22CS010
Enter father's age and son's age:
-1
-46735
Error: Age cannot be negative
```

LAB-8

/*Write a program which creates two threads, one thread displaying “BMS College of

Engineering” once every ten seconds and another displaying “CSE” once every two seconds
*/

16/2/24

7) (i) Q) Multi Threading

```
class A extends Thread {
    int t1, time;
    A() {
        t1 = 0;
        time = 25000;
    }
    public void run() {
        while (t1 <= time) {
            System.out.println("BMS College
                of Engineering");

            try {
                sleep (10000);
            }
            catch (Exception e) {
                System.out.println ("Error");
            } t1 += 10000;
        }
    }
}
class B extends Thread {
    int t2, time;
    B() {
        t2 = 0;
        time = 25000;
    }
    public void run() {
        while (t2 <= time) {
            System.out.println ("CSE");
            try {
                sleep (2000);
```

```
        }
        catch (Exception e) {
            System.out.println("Error");
        } t2 t = 2000;
    }
}
}
class MThread {
    public static void main () {
        A a = new A();
        B b = new B();
        a.start();
        b.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

Algorithm: Step1: Start
Step2: create a class A which extends Thread.
Initialize t1, time inside its constructor.
Override run method.
while t1 ≤ time,
print BMS College of Engineering
Inside try block, block the thread for 10 seconds using sleep(10000)
Catch Exception e and display error
Increment t1 by 10000 every iteration

Step3: Create a class B which extends Thread.
Initialize t2, time inside its constructor.
Override the run method.
while t2 ≤ time,
print CSE
Inside try block, block the thread for 2 seconds using sleep(2000);
Catch Exception e & display error.
Increment t2 by 2000 every iteration

Step4: Create public class MThread.
Inside main function, create objects a & b for class A & B respectively.
Call their respective run methods using a.start() & b.start()

Step5: Stop.

16.02.24

```
C:\Users\bmsce\Desktop\1BM22CS010>javac MThread.java

C:\Users\bmsce\Desktop\1BM22CS010>java MThread
Name: Abubakar Mohammedshafee Matte
USN: 1BM22CS010
BMS COLLEGE OF ENGINEERING
CSE
CSE
CSE
CSE
CSE
BMS COLLEGE OF ENGINEERING
CSE
CSE
CSE
CSE
CSE
BMS COLLEGE OF ENGINEERING
CSE
```

LAB-9

/*Java awt class*/

23/2/24

AWT

- javax.swing : Provides interfaces that enable development of i/p methods that can be used to with any Java runtime environment.
- JFrame : class, has decorations like border, title, supports button components
- FlowLayout() : Arranges components in a left-to-right flow, much like para.
- setDefaultCloseOperation() : hides JFrame when user closes window.
- EXIT_ON_CLOSE : Exits application using System exit method.
- JLabel : class, lets you display information on a JFrame.
- JTextField : lightweight component that allows editing of single line of text.
- JButton : class used to generate push-button control that triggers an ActionEvent when pressed.
- add() - adds frame
- ActionListener - define what should be done when user performs certain operation.

- ActionEvent : Handles actionPerformed event by invoking methods.
- parseInt() : static method that takes a string as argument & returns Integer.
- setText() : substitutes characters sText for text in text field. (WORKS for first line only)
- setVisible() : If true, it is visible on screen.
- SwingUtilities.invokeLater(new Runnable(){ :

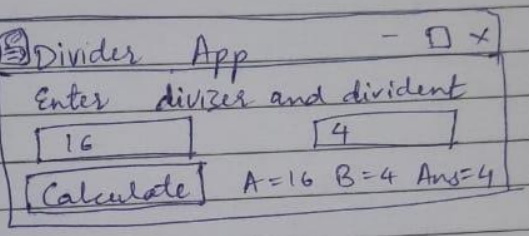
  Creates an instance of anonymous implementation of Runnable interface & passes it to invokeLater, which puts it to queue.
  invokeLater performs asynchronously in AWT Event dispatches thread.
- getText() : returns text from single-line text field.

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

class SwingDemo {
    SwingDemo() {
        JFrame jfrm = new JFrame("Divider App");
        jfrm.setSize(275, 150);
        jfrm.setLayout(new FlowLayout());
        jfrm.setDefaultCloseOperation(JFrame.
            EXIT_ON_CLOSE);
        JLabel jlab = new JLabel("Enter
        divider and divident:");
        JTextField ajtf = new JTextField(8);
        JTextField bjtf = new JTextField(8);
        JButton button = new JButton("Calculate");
        JLabel err = new JLabel();
        JLabel alab = new JLabel();
        JLabel blab = new JLabel();
        JLabel anslab = new JLabel();
        jfrm.add(err);
        jfrm.add(jlab);
        jfrm.add(ajtf);
        jfrm.add(bjtf);
        jfrm.add(button);
        jfrm.add(alab);
        jfrm.add(blab);
        jfrm.add(anslab);

        ActionListener l = new ActionListener() {
            public void actionPerformed(ActionEvent
            evt) {
                System.out.println("Action event
```

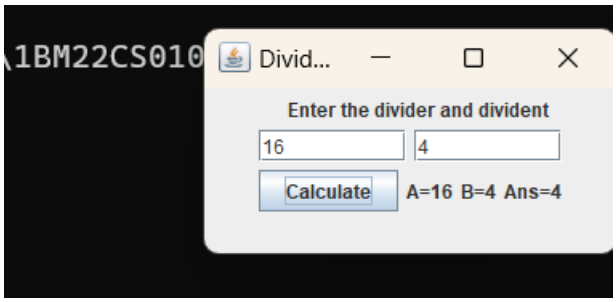
```
        from a text field");
    }
};
ajtf.addActionListener(l);
bjtf.addActionListener(l);

button.addActionListener(new ActionListener(){
    public void actionPerformed(ActionEvent e){
    try{
        int a = Integer.parseInt(ajtf.getText());
        int b = Integer.parseInt(bjtf.getText());
        int ans = a/b;

        alab.setText("In A = "+a);
        blab.setText("In B = "+b);
        anslab.setText("In Ans = "+ans);
    }
    catch(NumberFormatException e){
        alab.setText("");
        blab.setText("");
        anslab.setText("");
        err.setText("Enter only integers!");
    }
    catch(ArithmeticException e){
        alab.setText("");
        blab.setText("");
        anslab.setText("");
        err.setText("B should be NON zero");
    }
}
});
jfm.setVisible(true);
}
```

```
public static void main (String args[]) {
    SwingUtilities.invokeLater(new Runnable() {
        public void run() {
            new SwingDemo();
        }
    });
}
}
```

o/p :



93/2


1BM22CS010
Divid...
Enter the divider and divident
16
4
Calculate
A=16 B=4 Ans=4