

Lab Program 1:

Develop a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant b^2-4ac is negative, display a message stating that there are no real solutions.

Code:

```
import java.util.Scanner;

import java.lang.Math;

class qe
{
    public static void main(String xx[])
    {
        Scanner s=new Scanner (System.in);

        double a,b,c,d,r1,r2;

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

        a=s.nextDouble();

        b=s.nextDouble();

        c=s.nextDouble();

        if(a==0)

        { System.out.println("a shouldn't be 0");}

        else

        {

            d=(b*b)-(4*a*c);

            if(d>0)

            {

                System.out.println("Roots are real and distinct");

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

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

```
    System.out.print("R1:"+r1+" R2:"+r2);
}
else if(d==0)
{
    System.out.println("Roots are real and equal");
    r1=(-b)/(2*a);
    System.out.println("Roots are "+r1);
}
else
{
    System.out.println("Roots are imaginary");
    r1=(-b)/(2*a);
    r2=Math.sqrt(Math.abs(d))/(2*a);
    System.out.println("R1:"+r1+"+i"+r2+" R2:"+r1+"-i"+r2);
}
}
}
}
```

```
Lab1.java - Notepad
File Edit View

import java.util.Scanner;
import java.lang.Math;
class qe
{
    public static void main(String xx[])
    {
        Scanner s=new Scanner (System.in);
        double a,b,c,d,r1,r2;
        System.out.println("Enter values of a,b and c");
        a=s.nextDouble();
        b=s.nextDouble();
        c=s.nextDouble();
        if(a==0)
        { System.out.println("a shouldn't be 0");}
        else
        {
            d=(b*b)-(4*a*c);
            if(d>0)
            {
                System.out.println("Roots are real and distinct");
                r1= (-b+Math.sqrt(d))/(2*a);
                r2= (-b-Math.sqrt(d))/(2*a);
                System.out.print("R1:"+r1+" R2:"+r2);
            }
            else if(d==0)
            {
                System.out.println("Roots are real and equal");
                r1=(-b)/(2*a);
                System.out.println("Roots are "+r1);
            }
            else
            {
                System.out.println("Roots are imaginary");
                r1=(-b)/(2*a);
                r2=Math.sqrt(Math.abs(d))/(2*a);
                System.out.println("R1:"+r1+"+i"+r2+" R2:"+r1+"-i"+r2);
            }
        }
    }
}

Ln 1, Col 1 100% Windows (CRLF) UTF-8
```

Outputs:

```
Command Prompt
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bmsce>cd C:\Users\bmsce\Desktop\1BM21CS047\week-1

C:\Users\bmsce\Desktop\1BM21CS047\week-1>javac qe.java

C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
0 20 30
a shouldn't be 0

C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
1 2 1
Roots are real and equal
Roots are -1.0

C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
1 2 3
Roots are imaginary

C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
1 5 3
Roots are real and distinct
R1:-0.6972243622680054 R2:-4.302775637731995
C:\Users\bmsce\Desktop\1BM21CS047\week-1>
```

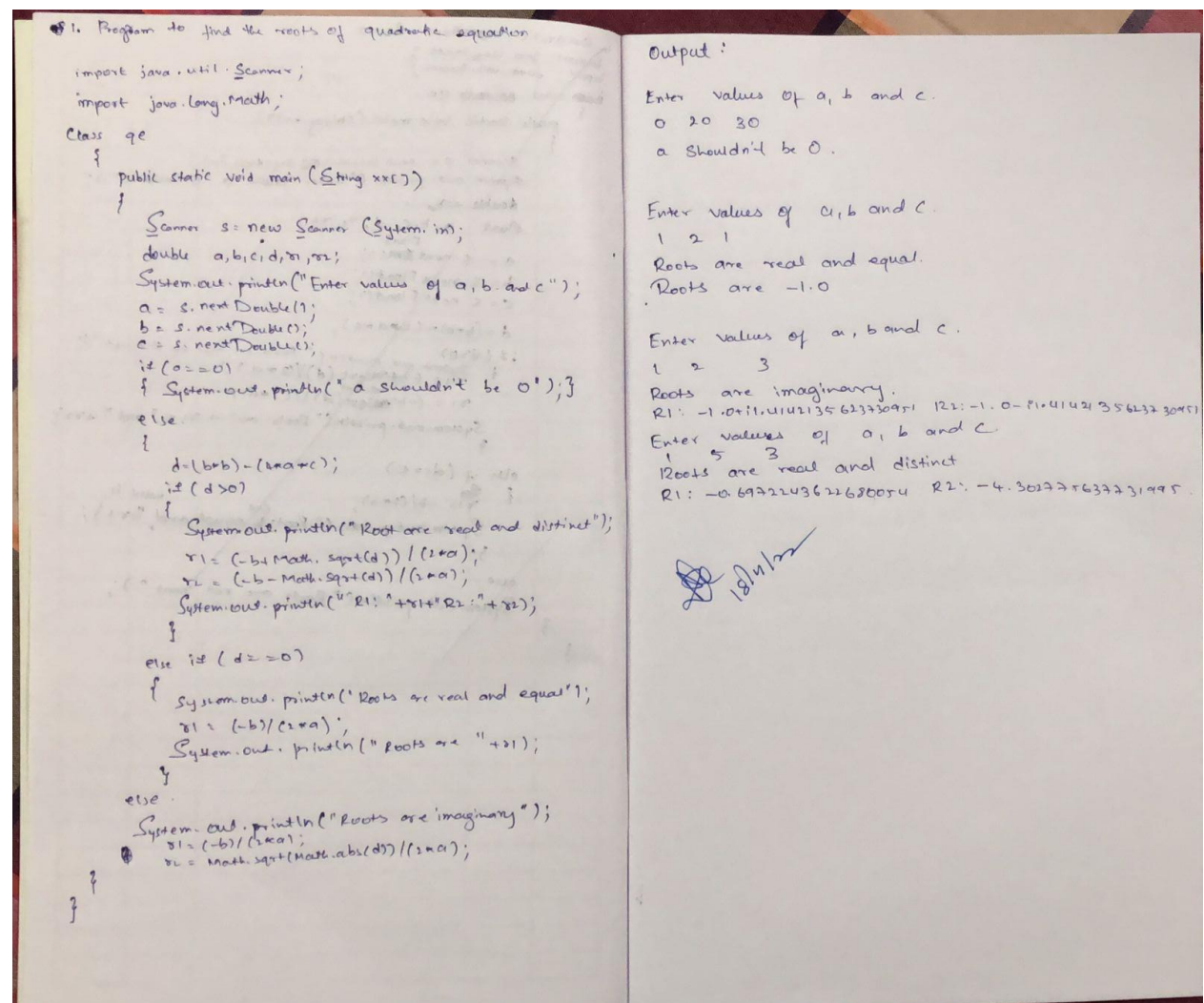
```
Select Command Prompt
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bmsce>cd C:\Users\bmsce\Desktop\1BM21CS047\week-1

C:\Users\bmsce\Desktop\1BM21CS047\week-1>javac qe.java

C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
1 2 3
Roots are imaginary
R1:-1.0+11.4142135623730951i R2:-1.0-11.4142135623730951i

C:\Users\bmsce\Desktop\1BM21CS047\week-1>
```



Lab 2: 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.

Code:

```
import java.util.Scanner;

class student
{
    student(){}

    String name;
    String usn;
    double result=0;
    int credits[]=new int[3];
    int marks[]=new int[3];
    int total=0;

    void accept()
    {
        Scanner s=new Scanner(System.in);

        System.out.println("Enter your Name ");
        name=s.nextLine();
        System.out.println("Enter USN ");
        usn=s.nextLine();
        System.out.println("Enter credits and marks of each subject respectively ");
        for(int i=0;i<3;i++)
        {
            this.credits[i]=s.nextInt();
```

```
this.marks[i]=s.nextInt();  
}  
}  
void calculate()  
{  
for(int i=0;i<3;i++)  
{  
if(marks[i]>=90 && marks[i]<=100)  
result+=10*credits[i];  
if(marks[i]>=80 && marks[i]<90)  
result+=9*credits[i];  
if(marks[i]>=70 && marks[i]<80)  
result+=8*credits[i];  
if(marks[i]>=60 && marks[i]<70)  
result+=7*credits[i];  
if(marks[i]>=50 && marks[i]<60)  
result+=6*credits[i];  
if(marks[i]>=40 && marks[i]<50)  
result+=5*credits[i];  
else result+=0*credits[i];  
}  
for(int i=0;i<3;i++)  
total+=credits[i];  
result=result/total;  
}  
void display()  
{  
System.out.println("Name:"+name+" USN:"+usn);  
System.out.println("credits Marks");
```

```

for(int i=0;i<3;i++)

System.out.println(credits[i]+"      "+marks[i]);

System.out.println("Total credits="+total);

System.out.println("SGPA="+result);

}

}

```

```

class lab2

{

public static void main(String[] args)

{

student s1=new student();

s1.accept();

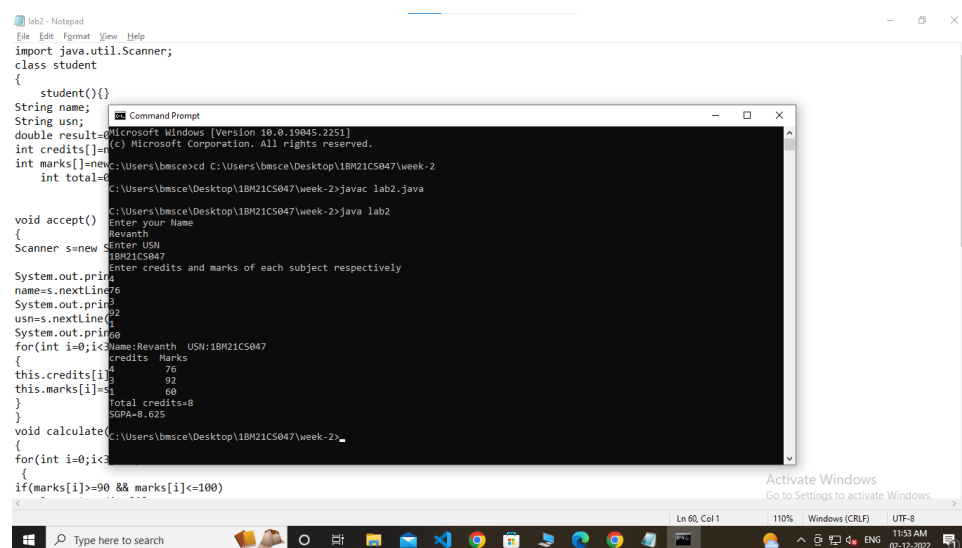
s1.calculate();

s1.display();

}

}

```



The screenshot shows a Windows desktop environment. In the background, a Notepad++ window is open, displaying the Java code for a class named 'lab2'. The code includes imports for 'java.util.Scanner', a 'student' class definition with methods 'accept()', 'calculate()', and 'display()', and a 'main' method that creates a 'student' object 's1' and calls these methods. In the foreground, a 'Command Prompt' window is open, showing the execution of the code. The prompt shows the user navigating to the directory 'C:\Users\bmsce\Desktop\1BM21CS047\week-2' and running 'javac lab2.java' followed by 'java lab2'. The output of the program is displayed in the Command Prompt, showing the user's name 'Revanth', USN '1BM21CS047', and a table of credits and marks for three subjects, resulting in a total of 8 credits and an SGPA of 8.625.

```

lab2 - Notepad
File Edit Format View Help
import java.util.Scanner;
class student
{
    student(){}
    String name;
    String usn;
    double result;
    int credits[]=new int[3];
    int marks[]=new int[3];
    int total=0;
    double result=0;

    void accept()
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter your Name");
        name=s.nextLine();
        System.out.println("Enter USN");
        usn=s.nextLine();
        System.out.println("Enter credits and marks of each subject respectively");
        for(int i=0;i<3;i++)
        {
            System.out.print("Credits: ");
            credits[i]=s.nextInt();
            System.out.print("Marks: ");
            marks[i]=s.nextInt();
        }
        calculate();
        display();
    }

    void calculate()
    {
        for(int i=0;i<3;i++)
        {
            if(marks[i]>=90 && marks[i]<=100)
            {
                result+=credits[i]*4;
            }
            else if(marks[i]>=80 && marks[i]<=90)
            {
                result+=credits[i]*3;
            }
            else if(marks[i]>=70 && marks[i]<=80)
            {
                result+=credits[i]*2;
            }
            else if(marks[i]>=60 && marks[i]<=70)
            {
                result+=credits[i]*1;
            }
            else
            {
                result+=credits[i]*0;
            }
        }
        total=total+result;
        result=result/total;
    }

    void display()
    {
        System.out.println("Name: "+name);
        System.out.println("USN: "+usn);
        System.out.println("Credits: ");
        for(int i=0;i<3;i++)
        {
            System.out.print(credits[i]);
            System.out.print(" ");
            System.out.print(marks[i]);
            System.out.print(" ");
            System.out.println();
        }
        System.out.println("Total credits: "+total);
        System.out.println("SGPA: "+result);
    }
}

class lab2
{
    public static void main(String[] args)
    {
        student s1=new student();
        s1.accept();
        s1.calculate();
        s1.display();
    }
}

```

```

Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\bmsce\Desktop\1BM21CS047\week-2>cd C:\Users\bmsce\Desktop\1BM21CS047\week-2
C:\Users\bmsce\Desktop\1BM21CS047\week-2>javac lab2.java
C:\Users\bmsce\Desktop\1BM21CS047\week-2>java lab2
Enter your Name
Revanth
Enter USN
1BM21CS047
Enter credits and marks of each subject respectively
Credits: 76
Marks: 92
Credits: 92
Marks: 60
Credits: 60
Marks: 80
Total credits=8
SGPA=8.625

```

Activate Windows
Go to Settings to activate Windows.

Ln 60, Col 1 110% Windows (CRLF) UTF-8 11:53 AM 02-12-2022

2/11/16
 @ Having a java program to check a given number with number
 (one, two, or many of 1's, 2's and 3's) and return of number
 (number) to check and return of number
 (number) to check and return of number

```

import java.util.Scanner;

class Solution {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int count = 0;
        while (n > 0) {
            if (n % 10 == 1 || n % 10 == 2 || n % 10 == 3) {
                count++;
            }
            n = n / 10;
        }
        System.out.println(count);
    }
}

```

2/11/16
 @ Having a java program to check a given number with number
 (one, two, or many of 1's, 2's and 3's) and return of number
 (number) to check and return of number
 (number) to check and return of number

```

import java.util.Scanner;

class Solution {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int count = 0;
        while (n > 0) {
            if (n % 10 == 1 || n % 10 == 2 || n % 10 == 3) {
                count++;
            }
            n = n / 10;
        }
        System.out.println(count);
    }
}

```


Lab 3: .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.

Code:

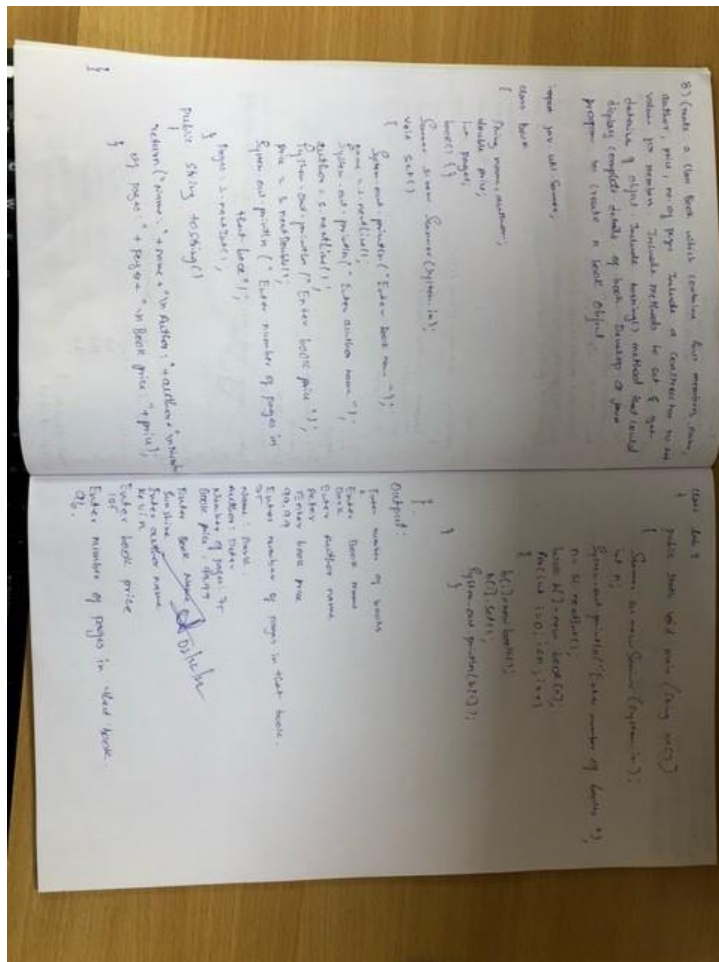
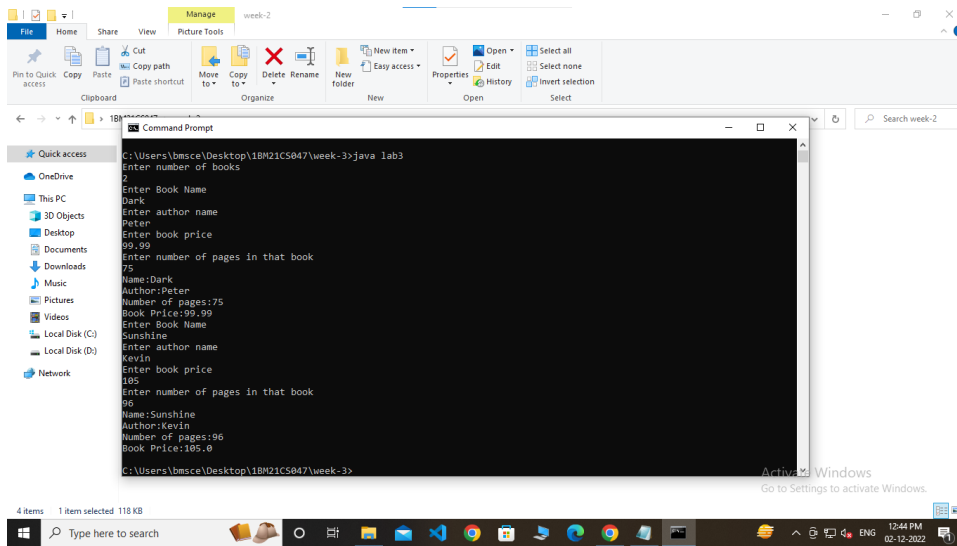
```
import java.util.Scanner;

class book
{
    String name,author;
    double price;
    int pages;
    book()
    {}
    Scanner s=new Scanner(System.in);
    void set()
    {
        System.out.println("Enter Book Name ");
        name=s.nextLine();
        System.out.println("Enter author name ");
        author=s.nextLine();
        System.out.println("Enter book price ");
        price=s.nextDouble();
        System.out.println("Enter number of pages in that book");
        pages=s.nextInt();
    }
}
```

```
public String toString()
{
return("Name:"+name+"\nAuthor:"+author+"\nNumber of pages:"+pages+"\nBook Price:"+price);
}

}
```

```
class lab3
{
public static void main(String xx[])
{
Scanner ss=new Scanner(System.in);
int n;
System.out.println("Enter number of books ");
n=ss.nextInt();
book b[]=new book[n];
for(int i=0;i<n;i++)
{
b[i]=new book();
b[i].set();
System.out.println(b[i]);
}
}
}
```



Name: Sunil
Author: Kishan
Number of pages: 96
Book price: 105.0

[Signature]

Lab4. 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.

Code:

```
import java.util.Scanner;

abstract class shape
{
    shape(){}

    int h,b;

    abstract void printArea();

}

class rectangle extends shape
{
    Scanner s=new Scanner(System.in);

    void printArea()
    {
        System.out.println("Enter height and width of rectangle");

        h=s.nextInt();

        b=s.nextInt();

        System.out.println("Area of Rectangle is "+b*h);

    }

    rectangle(){}

}

class triangle extends shape
{
    Scanner s=new Scanner(System.in);
```

```

void printArea()
{
    System.out.println("Enter height and base of Triangle");
    h=s.nextInt();
    b=s.nextInt();
    System.out.println("Area of Triangle is "+0.5*b*h);
}
triangle(){}
}

```

```

class circle extends shape
{
    Scanner s=new Scanner(System.in);
    void printArea()
    {
        System.out.println("Enter radius of Circle");
        h=s.nextInt();
        System.out.println("Area of Circle is "+3.14*h*h);
    }
    circle(){}
}

```

```

class Lab4
{
    public static void main(String xx[])
    {
        rectangle r=new rectangle();
        r.printArea();
    }
}

```

```

        triangle t=new triangle();

        t.printArea();

        circle c=new circle();

        c.printArea();

    }

}

```

The screenshot shows a Windows desktop environment. In the background, a Notepad window titled 'Lab4 - Notepad' contains the following Java code:

```

Scanner s=new Scanner(System.in);
void printArea()
{
    // ... (code for rectangle and triangle area calculation) ...
}

class circle
{
    // ... (code for circle area calculation) ...
}

class Lab4
{
    public static
    {
        // ... (code for creating and printing areas of rectangle, triangle, and circle) ...
    }
}

```

In the foreground, a Command Prompt window is open, displaying the execution of the Java code. The prompt shows the user navigating to the directory 'C:\Users\bmsce\Desktop\1BM21CS047\week-4' and running the commands 'javac Lab4.java' and 'java Lab4'. The output of the program is as follows:

```

C:\Users\bmsce\Desktop\1BM21CS047\week-4>javac Lab4.java
C:\Users\bmsce\Desktop\1BM21CS047\week-4>java Lab4
Enter height and width of rectangle
10 20
Area of Rectangle is 200
Enter height and base of Triangle
10 20
Area of Triangle is 100.0
Enter radius of Circle
5
Area of Circle is 78.5
C:\Users\bmsce\Desktop\1BM21CS047\week-4>

```

The Windows taskbar at the bottom shows the system clock as 06:13 AM on 09-12-2022, and the taskbar includes icons for various applications and the Windows search bar.

9/11/22

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

```
import java.util.Scanner;
abstract class Shape
{
    Shape() {}
    int h, b;
    abstract void printArea();
}
```

Class Rectangle extends Shape

```
{
    Scanner s = new Scanner(System.in);
    void printArea()
    {
        System.out.println("Enter height & width of rectangle");
        h = s.nextInt();
        b = s.nextInt();
        System.out.println("Area of rectangle is " + b * h);
    }
    Rectangle() {}
}
```

Class Triangle extends Shape

```
{
    Scanner s = new Scanner(System.in);
    void printArea()
    {
        System.out.println("Enter height & base of triangle");
        h = s.nextInt();
        b = s.nextInt();
        System.out.println("Area of triangle is " + 0.5 * b * h);
    }
    Triangle() {}
}
```

Class Circle extends Shape

```
{
    Scanner s = new Scanner(System.in);
    void printArea()
    {
        System.out.println("Enter radius of circle");
        r = s.nextInt();
        System.out.println("Area of circle is " + 3.14 * r * r);
    }
    Circle() {}
}
```


class Lab4

```
A {  
    public static void main(String x[])  
    {  
        rectangle r = new rectangle();  
        r.printArea();  
        triangle t = new triangle();  
        t.printArea();  
        circle c = new circle();  
        c.printArea();  
    }  
}
```

Output

Enter height and width of rectangle

10 20

Area of Rectangle is 200

Enter height and base of triangle

Area of triangle is 100.0

Enter radius of circle

5

Area of circle is 78.5

Optimization

So Develop
kinds of
provides
compound
facility
interest.

minimum
Service cl

Create a
number
save
order.

(a) Accept
(b) Display
(c) Comput
(d) Permit

Check on

import ja
import ja

class acc

String
int
double
Scanner

void
f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

f

Lab 5. 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.

Complete the observation and execution of both the above programs tomorrow.

Code:

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

```
import java.lang.Math;
```

```
class account
```

```
{
```

```
    String name=new String();
```

```
    int accno;
```

```
    double bal;
```

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

```

        void set()
        {
            System.out.println("Enter customer name");
            name=s.nextLine();
            System.out.println("Enter "+name+"'s account number");
            accno=s.nextInt();
            System.out.println("Enter balance amount ");
            bal=s.nextDouble();
        }
        void display()
        {
            System.out.println("Customer Name:"+name);
            System.out.println("Your account number:"+accno);
            System.out.println("Your Account Balance:"+bal);
        }
    account(){}
}

```

```

class savacct extends account

```

```

{
    Scanner s=new Scanner(System.in);
    savacct()
    {
        System.out.println("Cheque Facility not available ");
    }
    void deposit()
    {
        int ch;
        double amt;
    }
}

```

```

        System.out.println("Press 1 to deposit ");
        ch=s.nextInt();
        if(ch==1)
        {
            System.out.println("Enter amount to be deposited ");
            amt=s.nextDouble();
            bal=bal+amt;
        }
        else
            System.out.println("Invalid Input");
    }
    void in()
    {
        System.out.println("Enter rate of interest ");
        double r=s.nextDouble();
        r=r/100;
        System.out.println("Enter number of times interest applied per time period");
        int n=s.nextInt();
        System.out.println("Enter number of time periods");
        int t=s.nextInt();
        double x=(1+(r/n));
        double ci=bal*Math.pow(x,(n*t));
        System.out.println("Interest amount="+ (ci-bal)+" \nBalance amount without interest
is"+bal);
        bal=ci;
        System.out.println("Available balance after updating is"+bal);
    }
    void wd()
    {

```

```

        System.out.println("Press 1 to withdraw amount");
        int ch=s.nextInt();
        if(ch==1)
        {
            System.out.println("Enter the amount to be withdrawn ");
            double wdraw=s.nextDouble();
            if(wdraw<=bal)
            {
                bal=bal-wdraw;
                System.out.println("Available Balance:"+bal);
            }
        }
        else System.out.println("Invalid input");
    }
}

```

```

class curacct extends account
{
    Scanner s=new Scanner(System.in);
    curacct()
    {
        System.out.println("Cheque Facility available ");
    }
    void deposit()
    {
        int ch;
        double amt;
        System.out.println("Press 1 to deposit ");
        ch=s.nextInt();
    }
}

```

```

        if(ch==1)
        {
            System.out.println("Enter amount to be deposited ");
            amt=s.nextDouble();
            bal=bal+amt;
        }
        else
            System.out.println("Invalid Input");
    }

void wd()
{
    double wdraw;
    System.out.println("Press 1 to withdraw ammount");
    int ch=s.nextInt();
    if(ch==1)
    {
        System.out.println("Enter the amount to be withdrawn ");
        wdraw=s.nextDouble();
        bal=bal-wdraw;
        if(bal<1000)
        {
            System.out.println("You are running out of minimum balance \nAmount of rs 50
will be deducted as service charge for having low balance ");

            System.out.println("Do you want to continue with your transaction with
fine?\nPress 1 if yes ");

            int op=s.nextInt();
            if(op==1)
            {
                bal=bal-50;
            }
        }
    }
}

```

```

        System.out.println("Your Available Balance:"+bal);
    }
    else
    {
        System.out.println("your transaction is cancelled ");
        bal=bal+wdraw;
    }
}
}
else System.out.println("Invalid input");
}

}

class Lab5
{
    public static void main(String xx[])
    {
        Scanner s=new Scanner(System.in);
        int ch;
        System.out.println("\n\nPress\n1. if your account is savings account \n2. if your account is
current account");
        ch=s.nextInt();
        switch(ch)
        {
            case 1:
                savacct s1=new savacct();
                s1.set();
                s1.display();

```

```

        s1.deposit();

        s1.in();

        s1.wd();

        break;

    case 2:

        curacct c1=new curacct();

        c1.set();

        c1.display();

        c1.deposit();

        c1.wd();

        break;

    default :   System.exit(0);

}

}

}

```

```

Command Prompt

Press
1. if your account is savings account
2. if your account is current account
1
Cheque Facility not available
Enter customer name
Revanth
Enter Revanth's account number
1711
Enter balance amount
5000
Customer Name:Revanth
Your account number:1711
Your Account Balance:5000.0
Press 1 to deposit
1
Enter amount to be deposited
5000
Enter rate of interest
5
Enter number of times interest applied per time period
3
Enter number of time periods
2
Interest amount=1042.6042440414913
Balance amount without interest is10000.0
Available balance after updating is11042.604244041491
Press 1 to withdraw amount
1
Enter the amount to be withdrawn
3000
Available Balance:8042.604244041491

C:\Users\bmsce\Desktop\1BM21CS047\week-5>

```

Activate Windows
Go to Settings to activate Windows.

Type here to search

12:57 PM
09-12-2022


```
Command Prompt
Enter amount to be deposited
5000
Enter rate of interest
5
Enter number of times interest applied per time period
3
Enter number of time periods
2
Interest amount:1042.6042440414913
Balance amount without interest is:10000.0
Available balance after updating is:11042.604244041491
Press 1 to withdraw amount
1
Enter the amount to be withdrawn
3000
Available Balance:8042.604244041491

C:\Users\bmsce\Desktop\18M21CS047\week-5>java Lab5

Press
1. if your account is savings account
2. if your account is current account
2
Cheque Facility available
Enter customer name
Revanth
Enter Revanth's account number
1711
Enter balance amount
20000
Customer Name:Revanth
Your account number:1711
Your Account Balance:20000.0
Press 1 to deposit
1
Enter amount to be deposited
3000
Press 1 to withdraw ammount
1
Enter the amount to be withdrawn
20000

C:\Users\bmsce\Desktop\18M21CS047\week-5>
```

Activate Windows
Go to Settings to activate Windows.



5. Develop java program to create a class bank that maintains two kinds of account for its customers, one called Savings account provides and other current account. The savings account provide compound interest & 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 balance falls below this level, a service charge is imposed.

Create class Account that stores customer name, account number and type of account. From this derive current & sav-acc to their requirements, Include necessary methods in order.

(a) accept deposit from customer & update balance

(b) Display balance.

(c) Compute & deposit interest.

(d) Permit withdrawal & update balance.

Check minimum balance, impose penalty if necessary.

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

class Account

```
{
    String name = new String();
    int accno;
    double bal;
    Scanner s = new Scanner(System.in);
    void set()
    {
        System.out.println("Enter Customer name");
        name = s.next();
        System.out.println("Enter "+name+"'s account number");
        accno = s.nextInt();
        System.out.println("Enter balance amount");
        bal = s.nextDouble();
    }
    void display()
    {
        System.out.println("Customer Name: "+name);
        System.out.println("Your account number: "+accno);
        System.out.println("Your Account Balance: "+bal);
    }
}
```

```

class Saver extends account
{
    Scanner s = new Scanner(System.in);
    Saver() {
        System.out.println("Cheque Facility not available");
    }
    void deposit()
    {
        int ch;
        double amt;
        System.out.println("Press 1 to deposit");
        ch = s.nextInt();
        if (ch == 1)
        {
            System.out.println("Enter amount to be deposited");
            amt = s.nextDouble();
            bal = bal + amt;
        }
        else System.out.println("Invalid input");
    }
    void int()
    {
        System.out.println("Enter rate of interest");
        double r = s.nextDouble();
        System.out.println("Enter no. of times int applied per year");
        int n = s.nextInt();
        System.out.println("Enter number of time periods");
        int t = s.nextInt();
        double x = bal (1 + (r/n));
        double ci = Math.pow(x, n * t) * bal;
        System.out.println("Interest amount = " + ci + " & Balance without interest is " + bal);
        bal = bal + ci;
        System.out.println("Available balance is " + bal);
    }
}

void wd()
{
    System.out.println("Press 1 to withdraw amount");
    int ch = s.nextInt();
    if (ch == 1)
    {
        System.out.println("Enter amount to be withdrawn");
        double withdraw = s.nextDouble();
        bal = bal - withdraw;
        System.out.println("Available balance: " + bal);
    }
}

```

```

else System.out.println("Invalid input");
}

class Curacc extends account
{
    Scanner s = new Scanner(System.in);
    Curacc() {
        System.out.println("Cheque Facility is available");
    }
    void deposit()
    {
        int ch;
        double amt;
        System.out.println("Press 1 to deposit");
        ch = s.nextInt();
        if (ch == 1)
        {
            System.out.println("Enter amount to be deposited");
            amt = s.nextDouble();
            bal = bal + amt;
        }
        else System.out.println("Invalid input");
    }
    void wd()
    {
        double withdraw;
        System.out.println("Press 1 to withdraw amount");
        int ch = s.nextInt();
        if (ch == 1)
        {
            System.out.println("Enter the amount to be withdrawn");
            withdraw = s.nextDouble();
            bal = bal - withdraw;
            if (bal < 1000)
            {
                System.out.println("You are running out of minimum balance. An amount of rs 50 will be deducted as service charges for having low balance");
                System.out.println("Do you want to continue with your transaction with fine? (Press 1 if yes)");
                int op = s.nextInt();
                if (op == 1)
                {
                    bal = bal - 50;
                    System.out.println("Your Available Balance: " + bal);
                }
                else {
                    System.out.println("Your transaction is cancelled");
                    bal = bal + withdraw;
                }
            }
        }
    }
}

```

```

    }
    else System.out.println("Invalid input");
}
}

public static void main(String x[])
{
    Scanner s = new Scanner(System.in);
    int ch;
    System.out.println("In In Press 1, if your account is Savings account and 2 if your account is current account");
    ch = s.nextInt();
    switch(ch)
    {
        case 1: Savings s1 = new Savings();
                s1.set();
                s1.display();
                s1.deposit();
                s1.in();
                s1.withd();
                break;

        case 2: Current c1 = new Current();
                c1.set();
                c1.display();
                c1.deposit();
                c1.withd();
                break;

        default: System.exit(0);
    }
}
}

```

Output:

```

Press
1. if your account is Savings account
2. if your account is Current account
1.
Cheque Facility not available
Enter customer name
Renuka
Enter Renuka's account number
1211
Enter balance amount
5000
Customer Name: Renuka
Your Account number: 1211
Your Account Balance: 5000.0
Press 1 to deposit
Enter amount to be deposited
5000
Enter rate of interest
5
Enter no. of times interest applied per time period
2
Enter no. of time periods
2
Interest amount: 1042.6000000000003
Balance amount without interest is 10000.0
Available balance after updating is 11042.600000000003
Press 1 to withdraw amount
1
Enter amount to withdraw
3000
Available Balance: 8042.600000000003

```

Press

```

1. if your account is Savings account
2. if your account is Current account
2.
Cheque Facility available
Enter customer name
Renuka
Enter Renuka's account number
1211
Enter balance amount
8000
Customer Name: Renuka
Your account number: 1211
Your Account Balance: 8000.0
Press 1 to deposit
1
Enter amount to be deposited

```

3000

press 1 to withdraw amount

1

Enter amount to be withdrawn
20000.

~~Signature~~

Lab 6:

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.

Program:

```
import java.util.Scanner;
class WrongAgeException extends Exception{
    public String toString(){
        return ("WrongAge!!! Age cannot be negetive");
    }
}

class AgeException extends Exception{
    public String toString(){
        return("NotPossible!! Son's Age cannot be greater than Father's Age");
    }
}

class Father{
    int father_age;
    Father(int x) throws WrongAgeException{
        father_age=x;
        if(father_age<0){
            throw new WrongAgeException();
        }
    }
}

class Son extends Father{
    int son_age;
    Son(int x,int y) throws AgeException, WrongAgeException{
        super(x);
        son_age=y;
        if(son_age<0){
            throw new WrongAgeException();
        }
        if(son_age>=father_age){
            throw new AgeException();
        }
    }
}
```

```
}
```

```
class Lab6{  
    public static void main(String xx[]) {  
        try {  
            Scanner s=new Scanner(System.in);  
            System.out.println("Enter Son's age and Fathers age ");  
            int y=s.nextInt();  
            int x=s.nextInt();  
            Son so=new Son(x,y);  
            System.out.println("Father is " + so.father_age + " years old and son is  
"+so.son_age + " years old");  
        }  
        catch (WrongAgeException wa) {  
            System.out.println(wa);  
        }  
        catch (AgeException a){  
            System.out.println(a);  
        }  
        catch (Exception e){  
            System.out.println("Age is Interger value");  
        }  
    }  
}
```

Lab6 - Notepad

File Edit Format View Help

```
class Son extends Father{
    int son_age;
    Son(int x,int y) throws AgeException, WrongAgeException{
        super(x);
        son_age=y;
    }
}

class Lab6{
    public static void main(String[] args) {
        try {
            Son s = new Son(43, 10);
            System.out.println("Father is 43 years old and son is 10 years old");
        } catch (AgeException e) {
            System.out.println(e.getMessage());
        } catch (WrongAgeException e) {
            System.out.println(e.getMessage());
        }
    }
}
```

Command Prompt

Microsoft Windows [Version 10.0.19045.2364]
(c) Microsoft Corporation. All rights reserved.
C:\Users\bmsce>cd C:\Users\bmsce\Desktop\IBM21CS047\Week-6
C:\Users\bmsce\Desktop\IBM21CS047\Week-6>javac Lab6.java
C:\Users\bmsce\Desktop\IBM21CS047\Week-6>java Lab6
Enter Son's age and Fathers age
10
43
Father is 43 years old and son is 10 years old
C:\Users\bmsce\Desktop\IBM21CS047\Week-6>java Lab6
Enter Son's age and Fathers age
43
10
NotPossible!! Son's Age cannot be greater than Father's Age
C:\Users\bmsce\Desktop\IBM21CS047\Week-6>

Activate Windows
Go to Settings to activate Windows.

Ln 43, Col 54 100% Windows (CRLF) UTF-8

Type here to search

12:24 PM
30-12-2022

6. Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class "Father" and derived class "Son" which extends base class. Implement constructor which takes age in father class, throws exception WrongAge() when input age < 0. In son class, constructor which takes both ages & throws exception if son's age is >= father's age.

```
import java.util.Scanner;

class WrongAge extends Exception {
    public String toString() {
        return ("WrongAge!!! Age cannot be negative");
    }
}

class AgeException extends Exception {
    public String toString() {
        return ("Not Possible!! Son's Age cannot be greater than Father's Age");
    }
}

class Father {
    int father_age;
    Father(int x) throws WrongAge {
        father_age = x;
        if (father_age < 0) {
            throw new WrongAge();
        }
    }
}

class Son extends Father {
    int son_age;
    Son(int x, int y) throws AgeException, WrongAge {
        super(x);
        son_age = y;
        if (son_age < 0) {
            throw new WrongAge();
        }
        if (son_age >= father_age) {
            throw new AgeException();
        }
    }
}
```



```

class Lab61
{
    public static void main (String args[])
    {
        try {
            Scanner s = new Scanner (System.in);
            System.out.println("Enter Son's age & Father's age");
            int x = s.nextInt();
            int y = s.nextInt();
            Son so = new Son(x, y);
            System.out.println("Father is " + so.father_age +
                               " years old and Son is " + so.son_age + " years old");
        }
        catch (WrongAge wa)
        {
            System.out.println(wa);
        }
        catch (AgeException a)
        {
            System.out.println(a);
        }
        catch (Exception e)
        {
            System.out.println("Age is Integer value");
        }
    }
}

```

Output:

Enter Son's age and Father's age

43 10

Father is 43 years old and son is 10 years old.

Enter Son's age and Father's age

43 10

Not possible !! Son's Age cannot be greater than Father's Age

Correct
30-12-2022

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.

Program:

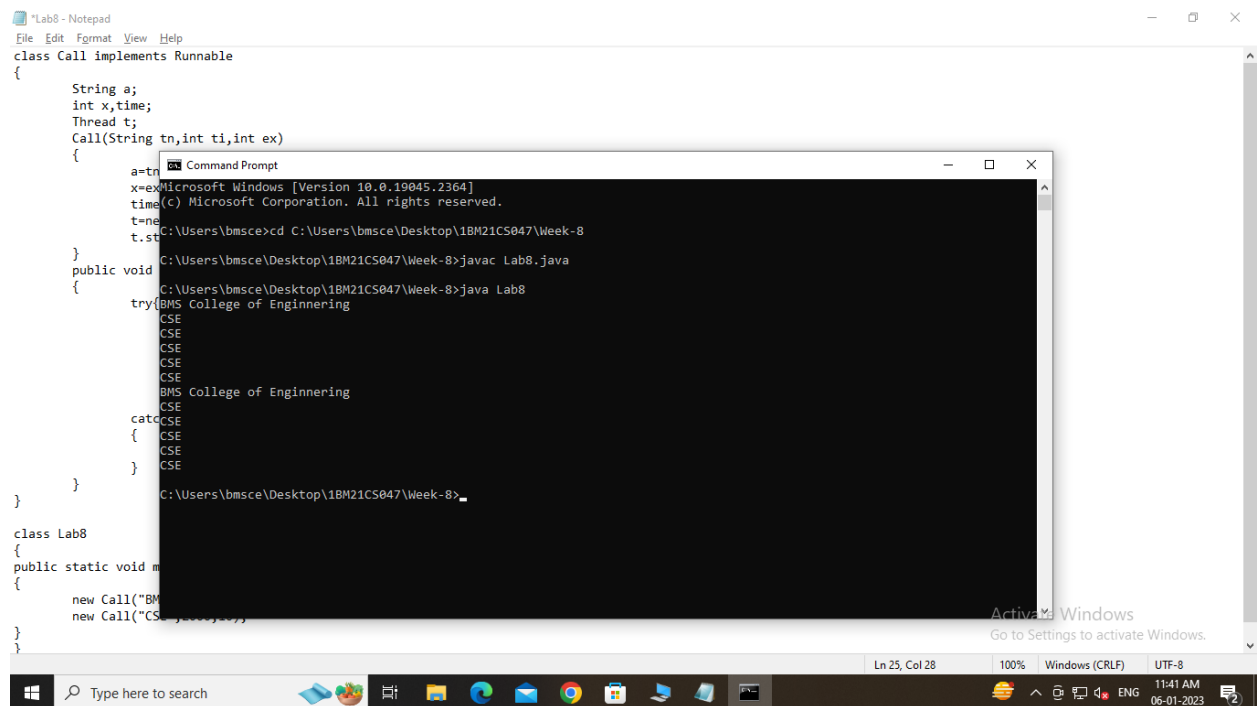
```
class Call implements Runnable
{
    String a;
    int x,time;
    Thread t;
    Call(String tn,int ti,int ex)
    {
        a=tn;
        x=ex;
        time=ti;
        t=new Thread(this,a);
        t.start();
    }
    public void run()
    {
        try{
            for(int i=0;i<x    ;i++)
            {
                System.out.println(a);
                Thread.sleep(time);
            }
        }
        catch(InterruptedException ie)
        {
            ;
        }
    }
}
```

```

        System.out.println("Interrupted ");
    }
}

class Lab8
{
    public static void main(String xx[])
    {
        new Call("BMS College of Engineering",10000,2);
        new Call("CSE",2000,10);
    }
}

```



The screenshot shows a Windows desktop environment. In the background, a Notepad window titled "Lab8 - Notepad" contains the following Java code:

```

class Call implements Runnable
{
    String a;
    int x,time;
    Thread t;
    Call(String tn,int ti,int ex)
    {
        a=tn;
        x=ex;
        time(ti);
        t=new Thread(this);
        t.start();
    }
    public void run()
    {
        try{
            a=a.concat("BMS College of Engineering");
            CSE
            CSE
            CSE
            CSE
            CSE
            BMS College of Engineering
            CSE
            CSE
            CSE
            CSE
            CSE
        }catch{
        }
    }
}

class Lab8
{
    public static void main(String xx[])
    {
        new Call("BMS College of Engineering",10000,2);
        new Call("CSE",2000,10);
    }
}

```

In the foreground, a Command Prompt window is open, showing the execution of the code. The prompt is at the directory C:\Users\bmsce\Desktop\1BM21CS047\Week-8. The user has entered the following commands:

```

C:\Users\bmsce\Desktop\1BM21CS047\Week-8>javac Lab8.java
C:\Users\bmsce\Desktop\1BM21CS047\Week-8>java Lab8

```

The output of the program is displayed in the Command Prompt, showing the string "BMS College of Engineering" being printed multiple times, followed by "CSE" being printed multiple times. The status bar at the bottom of the Command Prompt shows "Ln 25, Col 28", "100%", "Windows (CRLF)", and "UTF-8".

6-1-22

Lab 8.

class WAS to print BMS college of Engineering for
every 10s and CSE for every 2 sec.

class Call implements Runnable.

```

{
    String a;
    int n, time;
    Thread t;
    Call(String tn, int ti, int en)
    {
        a = tn;
        n = en;
        time = ti;
        t = new Thread(this, a);
        t.start();
    }

    public void run()
    {
        try {
            for (int i = 0; i < n; i++)
            {
                System.out.println(a);
                Thread.sleep(time);
            }
        }
        catch (InterruptedException ie)
        {
            System.out.println("Interrupted");
        }
    }
}

```

class Lab 8

```

{
    public static void main(String xx[])
    {
        System.out.println("BMS college of Engineering", 10000, 2);
        new Call("BMS college of Engineering", 10000, 2);
        new Call("CSE", 2000, 10);
    }
}

```

Output:

BMS College of Engineering

CSE

CSE

CSE

CSE

BMS College of Engineering

CSE

CSE

CSE

CSE

CSE

06/10/23

Lab 9:

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.

Code:

```
package cie;
import java.util.Scanner;
```

```
public class student
{
    Scanner s= new Scanner(System.in);
    public String usn=new String();
    public String name=new String();
    public int sem;
    public student()
    {
        System.out.println("Enter USN, Name and Semester ");
        usn=s.nextLine();
        name=s.nextLine();
        sem=s.nextInt();
    }
}
```

```
package cie;
import java.util.Scanner;
```

```
public class internals extends cie.student
{
    Scanner s= new Scanner(System.in);
    public int marks[]=new int[5];
    public internals()
    {
        System.out.println("Enter marks of all 5 courses ");
        for(int i=0;i<5;i++)
            marks[i]=s.nextInt();
    }
}
```

```

package see;

import java.util.Scanner;
import cie.*;

public class externals extends cie.internals
{
    Scanner s= new Scanner(System.in);
    public int emarks[]=new int[5];
    public externals()
    {
        System.out.println("Enter marks of all 5 courses ");
        for(int i=0;i<5;i++)
            emarks[i]=s.nextInt();
    }
    public void display()
    {
        for(int i=0;i<5;i++)
            System.out.println("Course "+i+": "+(marks[i]+(0.5*emarks[i])));
    }
}

```

```

import java.util.Scanner;
import cie.*;
import see.*;

class main
{
    public static void main(String xx[])
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter number of students");
        int n;
        n=s.nextInt();
        externals es[]=new externals[n];
        for(int i=0;i<n;i++)
            es[i]=new externals();
        for(int j=0;j<n;j++)
        {
            System.out.println("Student "+(j+1));
            for(int i=0;i<n;i++)
                es[i].display();
        }
    }
}

```


Output:

```
cmd Command Prompt
Enter number of students
2
Enter USN, Name and Semester
CS047
Revanth
2
Enter marks of all 5 courses
46
45
42
48
37
Enter marks of all 5 courses
76
78
98
88
86
Enter USN, Name and Semester
CS0155
XYZ
3
Enter marks of all 5 courses
46
45
44
43
48
Enter marks of all 5 courses
88
86
74
66
87
Student 0
Course 0: 78.0
Course 1: 85.0
Course 2: 91.0
Course 3: 92.0
Course 4: 80.0
Course 0: 90.0
Course 1: 88.0
Course 2: 81.0
Course 3: 76.0
Course 4: 91.5
Student 1
Course 0: 78.0
Course 1: 85.0
Course 2: 91.0
```

```
cmd Command Prompt
37
Enter marks of all 5 courses
76
78
98
88
86
Enter USN, Name and Semester
CS0155
XYZ
3
Enter marks of all 5 courses
46
45
44
43
48
Enter marks of all 5 courses
88
86
74
66
87
Student 0
Course 0: 78.0
Course 1: 85.0
Course 2: 91.0
Course 3: 92.0
Course 4: 80.0
Course 0: 90.0
Course 1: 88.0
Course 2: 81.0
Course 3: 76.0
Course 4: 91.5
Student 1
Course 0: 78.0
Course 1: 85.0
Course 2: 91.0
Course 3: 92.0
Course 4: 80.0
Course 0: 90.0
Course 1: 88.0
Course 2: 81.0
Course 3: 76.0
Course 4: 91.5
```

Observation:

18-1-23

create a package c1c which has two classes. student and internal (subclass of student). The class student has usn, name, sem as members, internal has array of marks for 5 courses. create another package s1c which has class derived from internal, stores array of 5 course marks. Import two packages in file that declares final marks of n students.

① package c1c;

import java.util.Scanner;

public class student

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

public String usn = new String();

public String name = new String();

public int sem;

public student()

{
System.out.println("Enter usn, name and sem");

usn = s.nextLine();

name = s.nextLine();

sem = s.nextInt();

}

}

② package c1c;

public class internal extends student

{
Scanner s = new Scanner();

int marks[] = new int[5];

public internal()

{
System.out.println("Enter marks of 5 courses");

for(int i=0; i<5; i++)

marks[i] = s.nextInt();

}

}

```

⑤ package sec;
import cie.*;
import java.util.Scanner;

public class external extends cie.External {
    int emarks[] = new int[5];
    {
        public external()
        {
            Scanner s = new Scanner(System.in);
            System.out.println("Enter marks of 5 course");
            for (int i=0; i<5; i++)
                emarks[i] = s.nextInt();
        }
    }

    public void display()
    {
        for (int i=0; i<5; i++)
        for (int i=0; i<5; i++)
            System.out.println("Course " + (i+1) + " : " + (marks[i] + (i+1) * emarks[i]));
    }
}

```

```

⑥ import cie.*;
import sec.*;
import java.util.Scanner;

public class Lab4 {
    public static void main(String xx[])
    {
        Scanner s = new Scanner(System.in);
        System.out.println("Enter no. of students");
        int n = s.nextInt();
        External RS[] = new External[n];
        for (int j=0; j<n; j++)
        {
            System.out.println("in Student " + (j+1));
            for (int i=0; i<5; i++)
                RS[j].display();
        }
    }
}

```