

Develop a Java program to create a class Student with member 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.

→ import java.util.Scanner;

class Student {

void display (String name, String USN)

{
System.out.println ("USN of Student " + USN);
System.out.println ("Name of Student " + name);
void calculateSGPA (double [] marks, double [] credits, int
number)

{

double gradepoints [] = new double [number];

double SGPA, sum = 0, tnum = 0;

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

{ if (marks[i] >= 90)

grade points [i] = 10;

else if (marks [i] >= 80)

grade points [i] = 9;

else if (marks [i] >= 70)

grade points [i] = 8;

else if (marks [i] >= 60)

grade points [i] = 7;

else if (marks [i] >= 50)

grade points [i] = 6;

else if (marks [i] >= 40)

grade points [i] = 4;

else

grade points [i] = 0;

} for (int i = 0; i < number; i++)

{

sum += credits [i] * gradepoints [i];

{

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

```
tnum += credits[i];
```

```
Sgpa = sum / tnum;
```

System.out.println ("Sgpa is " + Sgpa);

3
class Sgpa {

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

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

```
System.out.println ("Enter name and usn of student");
```

```
String name = S.next();
```

```
String USN = S.next();
```

```
Student SI = new Student();
```

```
System.out.print ("Enter the number of courses");
```

```
int numbers = S.nextInt();
```

```
double credits [] = new double [numbers];
```

```
double marks [] = new double [numbers];
```

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

```
{  
System.out.print ("Credit of subject " + (i + 1) + ": ");
```

```
credits [i] = S.nextDouble();
```

```
System.out.print ("Marks of Subject " + (i + 1) + ": ");
```

```
marks [i] = S.nextDouble();
```

```
SI.display (name, USN);
```

```
SI.calculatesgpa (marks, credits, numbers);
```

3.

Output :- Enter your name: Sheege M

Enter USN : 1BM21CS056

Enter the marks of each subject: 98, 88, 78, 67, 98

Enter no of credits :- 4, 3, 2, 1, 4

Name:- Sheege M USN : 1BM21CS056

Marks of Subject 1 : 98

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ers\hp>cd C:\Users\hp\OneDrive\Desktop\1bm21cs056

ers\hp\OneDrive\Desktop\1bm21cs056>javac sgpa.java

ers\hp\OneDrive\Desktop\1bm21cs056>java sgpa

r name and usn of student

vya ■

r the number of courses

it of subject 1 : 4

s of subject 1 : 40

it of subject 2 : 3

s of subject 2 : 90

it of subject 3 : 2

s of subject 3 : 85

it of subject 4 : 1

s of subject 4 : 70

it of subject 5 : 4

s of subject 5 : 100

of the student ■

e of the student: dhravya

A is 8.0

Users\hp\OneDrive\Desktop\1bm21cs056>

System.out.println ("The roots are imaginary");

}
else
{

System.out.println ("Invalid Inputs");

}

}

OUTPUT

Enter the value of a 0 Invalid input. Two methods

Enter the value of b 1 I detect that a = 0 which

Enter the value of c 2 two roots along "I detect two methods"

Invalid output

Enter the value of a 0 Invalid input. Two methods

Enter the coefficient a,b,c 1,2,1 Two methods

Roots are real and equal Roots are $r_1 = r_2 = -1, 0$

Enter the coefficient a,b,c 1,5,1

The roots are real and distinct

Enter the coefficient a,b,c 1,2,3

The roots are imaginary

Program 1

Q) Develop a Java program that prints all real solutions to the Quadratic equation $ax^2 + bx + c = 0$. Read a, b, c and use the Quadratic formula -

```
import java.util.*;
```

```
import java.math.*;
```

```
public class Quadratic
```

```
{
```

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

```
{
```

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

```
    System . out . println ("Enter the value of a'");
```

```
    double a = in . nextDouble ();
```

```
    System . out . println ("Enter the value of b'");
```

```
    double b = in . nextDouble ();
```

```
    System . out . println ("Enter the value of c'");
```

```
    double c = in . nextDouble ();
```

```
    if (a != 0.0) {
```

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

```
        if (d > 0.0)
```

```
            double s1 = (-b + Math . pow (d, 0.5) / (2.0 * a));
```

```
            double s2 = (-b - Math . pow (d, 0.5) / (2.0 * a));
```

```
            System . out . println ("The roots are real and distinct");
```

```
            System . out . println ("The roots are " + s1 + " and " + s2);
```

```
}
```

```
        else if (d == 0.0)
```

```
{
```

```
            double s1 = -b / (2.0 * a);
```

```
            System . out . println ("The roots are real and equal");
```

```
            System . out . println ("The root is " + s1);
```

3.

Create a class Book which contains four members : name, author, price, numPages. Include a constructor to set the values for the members. Include methods to set and get the details of the object. Include a toString() method that could display the complete details of the book.

Develop a Java program to create n books objects.

```
→ import java.util.*;
import java.lang.*;
class Book
{
    String name, author; int price, numPages;
    void getval()
    {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter book name");
        name = sc.next();
        System.out.println("Enter the author name");
        author = sc.next();
        System.out.println("Enter price");
        price = sc.nextInt();
        System.out.println("Enter No. of Pages");
        numPages = sc.nextInt();
    }
    public String toString()
    {
        return name + " " + author + " " + price + " " + numPages;
    }
    void display(Books o)
    {
        System.out.println(o);
    }
}
class Books VCK
{
    public static void main(String args[])
    {
    }
}
```

System.out.println ("Ap-

int n = cn.nextcn();

Book ob = New Books

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

{ ob[i] = new Book(); }

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

{ ob[i].getval(); }

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

{ ob[i].display(); }

Output

Enter the no of book objects
1

Enter book Name

Macbeth

Enter author name

Shakespeare

Enter price

400

Enter No. of pages

600

Macbeth, Shakespeare, 400, 600

```
C:\Users\hp\OneDrive\Desktop\1bm21cs056>java Bookvck
```

```
Enter the no. of book objects
```

```
Enter book name
```

```
Enter Alice in the wonderland
```

```
Enter author name
```

```
Enter price
```

```
Exception in thread "main" java.util.InputMismatchException
```

```
    at java.base/java.util.Scanner.throwFor(Scanner.java:943)
```

```
    at java.base/java.util.Scanner.next(Scanner.java:1598)
```

```
    at java.base/java.util.Scanner.nextInt(Scanner.java:2263)
```

```
    at java.base/java.util.Scanner.nextInt(Scanner.java:2217)
```

```
    at Book.getval(Bookvck.java:19)
```

```
    at Bookvck.main(Bookvck.java:47)
```

```
C:\Users\hp\OneDrive\Desktop\1bm21cs056>java Bookvck
```

```
Enter the no. of book objects
```

```
Enter book name
```

```
Enter title
```

```
Enter author name
```

```
Enter shakespeare
```

```
Enter price
```

```
Enter No. of pages
```

```
Enter shakespeare 400 600
```

```
C:\Users\hp\OneDrive\Desktop\1bm21cs056>
```

1. Develop a Java Program to create abstract class called Shape that contains two integers and an empty method name print area(). Provide three class named rectangle, triangle such that each one of class extends class shape. Each one of class contains only the method print area() that prints the area of given shape.

import java.util.Scanner;
import java.lang.Math;
abstract class Shape

{
int length, breadth;
Scanner ss = new Scanner(System.in);
abstract void printArea();

2. Class rectangle extends shape

{
void printArea(){
System.out.println("Enter length and breadth");
length = ss.nextInt(); breadth = ss.nextInt();
int area = length * breadth;
System.out.println("The area of rectangle is: " + area);

3. Class triangle extends shape

{
void printArea(){
System.out.println("Enter base length and height");
length = ss.nextInt();
breadth = ss.nextInt();
int area = (length * breadth) / 2;
System.out.println("The area of triangle is: " + area);

4. Class circle extends shape

{
void printArea()

System.out.println ("Enter the radius of circle");

length = ss.nextInt();

double area = Math.PI * length * length;

System.out.println ("The area of circle is : " + area);

3

class B_main

public static void main (String args [])

{ int ch;

Scanner Scan = new Scanner (System.in);

System.out.println ("In MENU\n" "Select shape\n 1. Rectangle\n\n 2. Triangle\n 3. Circle\n");

ch = Scan.nextInt();

switch (ch)

Case 1: Rectangle f1 = new Rectangle (1);

f1.parentArea (1);

break;

Case 2: Triangle f1 = new Triangle (1);

f1.parentArea (1);

break;

Case 3: Circle c1 = new Circle (1);

c1.parentArea (1);

break;

default System.out.println ("Invalid Input Try Again");

4

5

6

Output:

(1) Menu

(2) Select Shape

1) Rectangle

2) Triangle

3) Circle



Enter length and breadth

10 20

The area of Rectangle is : 200

MENU

Select Shape

1) Rectangle

2) Triangle

3) Circle

2
Enter base length and height

10 20

The area of Triangle is : 100

~~DD~~

enter

B&O

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Users\hp>cd C:\Users\hp\OneDrive\Desktop\1bm21cs056

Users\hp\OneDrive\Desktop\1bm21cs056>javac main.java

Users\hp\OneDrive\Desktop\1bm21cs056>java main
Enter height and width of rectangle

Area of Rectangle is 200
Enter height and base of triangle

Area of Triangle is 600.0
Enter radius of Circle

Area of Circle is 7850.0

Users\hp\OneDrive\Desktop\1bm21cs056>

Lab Program 3

```
import java.util.Scanner;
import java.lang.Math;
class Account
{
    String name, acc-type;
    int acc-no;
    double bal-dep;
    Scanner ss = new Scanner(System.in);
    void Setd()
    {
        System.out.print("Enter Your name " name = ss.next());
        System.out.print("Enter Your account number ");
        acc-no = ss.nextInt();
        System.out.println("Name : " + name);
        System.out.println("Account Number : " + acc-no);
        System.out.println("Current Balance is : " + bal);
    }
    void deposit()
    {
        System.out.println("Name : " + name);
        System.out.println("Account Number : " + acc-no);
        System.out.println("Account type : " + acc-type);
        System.out.println("Current Balance is : " + bal);
    }
    void deposit()
    {
        System.out.print("Enter the amount to be deposited : ");
        dep = ss.nextDouble();
        bal += dep;
        System.out.println("Balance amount : " + bal);
    }
    {
        bal -= amt;
        System.out.println("Account balance after withdrawal is : " + bal);
    }
    else
        System.out.println("\nThe amount can't be withdrawn");
    }
    class Sav-acct extends Account
    {
        void calc-interest()
    }
```

```
System.out.println("Enter name and rate of interest");  
double t = ss.nextDouble();  
double a = ss.nextDouble();  
double CI = bal * Math.PI * (t + 100); t;  
System.out.println("The compound interest is " + CI);  
bal -= CI;  
System.out.println("Balance amount : " + bal);  
3  
void withdrawal()  
{ double amt  
System.out.print("Enter amount to be withdrawn : ");  
amt = ss.nextDouble();  
if (bal >= amt)  
{ bal -= amt;  
System.out.println("Account Balance after withdrawal is " + bal);  
}  
else  
System.out.println("The amount can't be withdrawn");  
}  
3  
class Bank  
{ public static void main(String args[]){  
Scanner ss = new Scanner(System.in);  
Account a1 = new Account();  
a1.setd();  
if (a1.acc_type) == true)  
{ Sav acct s1 = new Savacct();  
s1.name = a1.name; s1.acctno = a1.acctNo; s1.acc_type = a1.acc_type;  
s1.bal = a1.bal  
System.out.println("Enter your choice : 1. deposit 2. calculate interest 3. withdraw  
74. display 5. Exit"); int ch = ss.nextInt();  
switch(ch){  
case 1: s1.deposit(); break;  
case 2: s1.calc_interest(); break;  
case 3: s1.withdraw(); break;  
case 4: s1.disp(); break;  
case 5: exit(0); break;  
boolean acc (String acc_type)  
if (acc_type == "Savings")
```

```
    return true;
else if (acc_type == "current")
    return false;
else
    return true;
}

class acc_acc extends Account
{
    int penal()
    {
        double min_pen;
        System.out.println("Enter minimum balance & penalty amount if not followed");
        min = ss.nextDouble(); pen = ss.nextDouble();
    }
    else
        return 1;
}

void withdraw()
{
    double amt;
    System.out.println("Enter amount to be withdrawn : ");
    amt = ss.nextDouble(); int a = penal();
    if (a == 1)
        if (bal >= amt)
            default System.out.println("Invalid Input");
    }

    acc acc cl = new acc_acc();
    cl.name = a1.name; cl.acc_no = a1.acc_no;
    cl.acc_type = a1.acc_type; cl.bal = a1.bal;
    System.out.println("\nEnter your choices: /n 1. Deposit /n 2. penalty
    check /n 3. withdraw /n 4. Display /n 5. Exit ");
    int ch = ss.nextInt();
    switch(ch)
    {
        case 1: cl.deposit(); break;
        case 2: cl.penal(); break;
        case 3: cl.withdraw(); break;
        case 4: cl.dep(); break;
        case 5: exit(0); break;
        default: System.out.println("Invalid Input");
    }
}
```

Output :-

Enter your account type:

- 1) Savings account
- 2) Current account

1.

Cheque facility not available

Enter customer name

hhh

Enter hhh's account number

555

Enter balance amount

60000

Customer Name: hhh

Your account number : 555

Your account balance : 60000.0

Press 1 to deposit

1

Enter amount to be deposited

500

Enter interest

4

Enter no of times interest applied

8

Enter no of time period

4

Interest amt : 68054.272000001

Balance amt without interest is 60300

Available balance after updating is 68054.272

Press 1 to withdraw amount

er your account type:

Savings account

Current account

que Facility not available

er customer name

er hhhh's account number

er balance amount

00

ustomer Name: hhhh

r account number: 555

r Account Balance: 60000.0

ss 1 to deposit

er amount to be deposited

er rate of interest

er number of times interest applied per time period

er number of time periods

interest amount -68054.2720000001

alance amount without interest is 60500.0

llable balance after updating is 69054.2720000001

ss 1 to withdraw amount

6.

```
out :  
our ac import Java.util.Scanner;  
ings  
ut a Class WrongAgeException extends Exception  
Public String toString() {  
return ("Entered age is negative");  
}  
balas }  
mes  
acc  
acc  
al }  
o }  
as }  
n }  
- }  
na }  
z }  
  
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) {  
" " -> son_age = 10  
}
```

class Lab-7 {

public static void main (String [] args) {

try {

Scanner s = new Scanner (System.in);

System.out.println ("Enter father's and Son's ages");

int x = s.nextInt();

int y = s.nextInt();

Son so = new Son (x, y);

System.out.printf ("Father is %d years old and son is %d years old", so.
father-age, so.son-age);

} catch (WrongAgeException wa) {

System.out.println (wa);

}

catch (AgeException a) {

System.out.println (a);

}

catch (Exception e) {

System.out.println ("Enter Valid Value");

}

}

Output -

Enter father's and Son's ages

40

10

Father is 40 years old and Son is 10 years old

Enter father's and Son's ages

10

40

Age entered of the father is greater than that of son

Enter father's and son's ages

-50

15

Entered age is negative

~~3 (age [1 year]) doesn't make sense~~

~~(Wahil)~~

~~11 (no. of years) doesn't make sense~~

~~30-12=18~~

"Age and the number of years" actually mean
the difference between the two ages.

```
\Users\bmsce\Desktop\1BM21CS055>java Lab_7
```

```
Enter father's and son's ages
```

```
40
```

```
Entered age is negative
```

```
\Users\bmsce\Desktop\1BM21CS055>java Lab_74
```

```
Error: Could not find or load main class Lab_74
```

```
Caused by: java.lang.ClassNotFoundException: Lab_74
```

```
\Users\bmsce\Desktop\1BM21CS055>java Lab_7
```

```
Enter father's and son's ages
```

```
40
```

```
The entered age of the fathe is greater than that of the son
```

```
\Users\bmsce\Desktop\1BM21CS055>java Lab_720
```

```
Error: Could not find or load main class Lab_720
```

```
Caused by: java.lang.ClassNotFoundException: Lab_720
```

```
\Users\bmsce\Desktop\1BM21CS055>java Lab_7
```

```
Enter father's and son's ages
```

```
The entered age of the fathe is greater than that of the son
```

```
\Users\bmsce\Desktop\1BM21CS055>java Lab_7
```

```
Enter father's and son's ages
```

```
Father is 40 years old and son is 10 years old
```

```
\Users\bmsce\Desktop\1BM21CS055>java Lab_7
```

```
Enter father's and son's ages
```

```
The entered age of the fathe is greater than that of the son
```

```
\Users\bmsce\Desktop\1BM21CS055>java Lab_7
```

```
Enter father's and son's ages
```

```
40
```

```
Entered age is negative
```

```
\Users\bmsce\Desktop\1BM21CS055>
```

Activate Windows

Go to Settings to activate Windows.

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", 5000, 2);
    new call ("CSE", 2000, 10);
}

```

Output

BMS college of Engineering

CSE

CSE

CSE

CSE

CSE

BMS college of Engineering

CSE

CSE

CSE

CSE

R
i | 1 | 2 →

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C:\Users\bmsce>cd C:\Users\bmsce

C:\Users\bmsce>javac Lab8_.java

C:\Users\bmsce>java Lab8_
BMS College of Engineering

CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
CSE
CSE

C:\Users\bmsce>java Lab8_
BMS College of Engineering

CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
CSE

C:\Users\bmsce>_

Command Prompt

Microsoft Windows [Version 10.0.22000.1455]

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C:\Users\hp>cd C:\Users\hp\OneDrive\Desktop\1bm21cs056

C:\Users\hp\OneDrive\Desktop\1bm21cs056>javac generics.java

C:\Users\hp\OneDrive\Desktop\1bm21cs056>java generics

The value for x =1

The value for y =Nitin

value of T =java.lang.Integer

value of V =java.lang.String

C:\Users\hp\OneDrive\Desktop\1bm21cs056>