

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.

→ Import `java.math.*;`
Import `java.util.Scanner;`

```
class Quad {
    double a, b, c, firstroot, secondroot;
    Quad (double a, double b, double c) {
        this.a = a;
        this.b = b;
        this.c = c;
    }
    void Eval() {
        double det = b * b - 4 * a * c;
        if (det > 0) {
            firstroot = (-b + Math.sqrt(det)) / (2 * a);
            secondroot = (-b - Math.sqrt(det)) / (2 * a);
            System.out.format(
                "Firstroot = Secondroot = %.2f", firstroot);
        }
    }
}
```

```
if (det == 0) {
```

$$\text{firstroot} = \text{secondroot} = -b / (2 \times a);$$

```
System.out.format(
```

```
"First Root = Second Root = %.2f",  
firstroot);
```

```
}
```

```
else {
```

$$\text{double real} = -b / (2 \times a);$$

$$\text{double Rng} = \text{Math.sqrt}(-\text{det}) / (2 \times a);$$

```
System.out.printf("First Root = %.2f + %.2fi",  
real, Rng);
```

```
System.out.printf("Im Second Root = %.2f - %.2fi",  
real, Rng);
```

```
}
```

```
3
```

```
class GRUn {
```

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

```
double a, b, c;
```

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

```
System.out.print ("Enter a: ");
```

```
a = sc.nextDouble();
```

```
System.out.print ("Enter b: ");
```

```
b = sc.nextDouble();
```

```
System.out.print ("Enter c: ");
```

```
c = sc.nextDouble();
```

Program 3

Abstract Method class

```
→ abstract class shape {  
    public int side1, side2;  
    abstract void printArea();  
}
```

```
class Rectangle extends Shape {
```

```
    Rectangle (int length, int breadth)  
        this. side1 = length;  
        this. side2 = breadth;
```

```
    void printArea () {  
        System.out.println ("The area of rectangle : " + (side1 * side2));  
    }
```

```
class Triangle extends shape {  
    Triangle (int base, int height) {  
        this. side1 = base;  
        this. side2 = height;  
    }
```

```
    void printArea () {  
        System.out.println ("The Area of Triangle : " +  
            (0.5 * side1 * side2));  
    }
```

Quad q = new Quad(a, b, c);
q.Eval();
3

3

Output:-

Enter a: 2

B

Enter b: 1

Enter c: -300

First Root = 12.00

Second Root = -12.86

Output

Enter Student USN:

1BMA2CS104

Enter Student Name:

Mousha

Enter sub1: Mark (out of 100):

95

Enter sub2: Mark (out of 100):

95

Enter sub3: Mark (out of 100):

95

Enter sub4: Mark (out of 100):

95

Total percentage of Student with USN - PRM001919
NAME: Mousha % 95.00

```
double totalmarks_percent() {
    for (int i=0; i<6; i++) {
        sum = sum + marks[i];
    }
    return (sum/6);
}
```

```
class SRun {
    public static void main (String [] args) {
        Scanner sc = new Scanner (System.in);
        System.out.println ("Enter student USN:");
        String USN = sc.nextLine();
        System.out.println ("Enter Student Name:");
        String name = sc.nextLine();
    }
}
```

```
Student s1 = new Student (USN, name);
s1.getMarks();
double percentage = s1.totalmarks_percent();
```

```
System.out.println ("Total percentage of student
with USN:" + s1.USN + " NAME:"
+ s1.Name + " %:" + percentage);
```

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

→ Import `java.util.Scanner;`

class student {

String USN, Name;
double mark, sum;

Scanner sc = new Scanner(System.in);
double marks[] = new double[6];

Student (String USN, String Name) {

this.USN = USN;

this.Name = Name;

}

void

getMarks() {

for (int p=0; p<6; p++) {

System.out.println(" Enter Sub: " + (p+1) + " Mark (out of 100): ");

mark = sc.nextDouble();

marks[p] = mark;

}

3

```
class Circle extends Shape {  
    Circle (int rad) {  
        this.side1 = this.side2 = rad;  
    }  
}
```

```
void printArea() {  
    System.out.println ("The Area of " + (Circle)  
        + " is " + (3.14 * side1 * side2));  
}  
}
```

```
class SRun {  
    public static void main (String [] args) {  
        Rectangle b = new Rectangle (10, 10);  
        Triangle t = new Triangle (5, 10);  
        Circle c = new Circle (5);  
    }  
}
```

Circle c = new Circle (5);

```
b = printArea()  
t = printArea()  
c = printArea()  
}
```

OUTPUT :

The Area of Rectangle : 100

The Area of Triangle : 25.0

The Area of Circle : 78.5

Program 4:

Book Database

```
→ Import java.util.Scanner;
```

```
class Books {  
    String name, author;  
    int price, numPages;  
    Book() {};
```

```
Book (String name, String author, int price, int numPages)  
    this.name = name;  
    this.author = author;  
    this.price = price;  
    this.numPages = numPages;  
}
```

```
Public static toString () {
```

```
String name = "Book Name:" + this.name + "\n";  
String author = "Author Name:" + this.author + "\n";  
String price = "Price :" + this.price + "\n";  
String numPages = "Number of Pages" + this.numPages + "\n";
```

```
return name + author + price + numPages;
```

{

3

class Book {

 pvm {

 Scanner sc = new Scanner(System.in);

 String name, author;

 int price, numPages, n;

 System.out.println("Enter the no. of books:");

 n = sc.nextInt();

 Books b[];

 b = new Books[n];

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

 System.out.print("Books " + (i+1) + " (" + i + ")");

 System.out.println(" Enter name of the book:");

 name = sc.nextLine();

 System.out.print("Enter Author: ");

 author = sc.nextLine();

 System.out.print("Enter price: ");

 price = sc.nextInt();

 System.out.print("Enter no. of pages: ");

 numPages = sc.nextInt();

 b[i] = new Books(name, author, price, numPages);

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

 System.out.println("Book " + (i+1) + " | " + b[i]);

Output:

Enter no. of books: 2

Books 1:

Enter name of the book: Mahatma

Enter Author: Grandhi

Enter price: 100

Enter no. of pages: 190

Book 2:

Enter name of the book: Virat

Enter Author: Kohli

Enter price: 1000

Enter no. of pages: 786

Book 3:

Enter name of the book: Christian

Enter Author: Ronaldo

Enter price: 10000

Enter no. of pages: 1100

```
void deposit ( double amount ) {  
    balance += amount;  
    Sys0 (" Amount deposited :" + amount);  
}
```

```
void displayBalance () {  
    Sys0 (" Balance :" + balance);  
}
```

```
void computeInterest () {  
    double interestRate = 0.05;  
    double interest = balance * interestRate;  
    balance += interest;  
    Sys0 (" Interest Added :" + interest);  
}
```

```
void withdraw ( double amount ) {  
    if (balance < amount) {  
        Sys0 (" Insufficient Balance ");  
    }  
}
```

```
else {  
    balance -= amount;  
    Sys0 (" Amount withdrawn :" + amount);  
}
```

Program

Bank Class

```
-> import java.util.Scanner;
```

```
abstract class Account {
```

```
String customerName, accountType;
```

```
int accountNumber;
```

```
double balance;
```

```
Account (String customerName, int accountNumber,  
String accountType, double balance) {
```

```
this.customerName = customerName;
```

```
this.accountNumber = accountNumber;
```

```
this.accountType = accountType;
```

```
this.balance = balance;
```

```
3 abstract void deposit (double amount);
```

```
abstract void displayBalance();
```

```
abstract void computeInterest();
```

```
abstract void withdraw (double amount);
```

```
class SavingsAccount extends Account {
```

```
SavingsAccount (String customerName, int account  
Number, String accountType, double balance) {
```

```
super (customerName, accountNumber,  
accountType, balance);
```

class Current Account Extends Account {
 double serviceCharge = 50;
 Current Account (String customerName, int
 accountNumber, String accountType, double balance);
 Super (customerName, accountNumber, accountType,
 balance);
}

void deposit (double amount) {

balance += amount;

SysOut (" Amount deposited " + amount);

}

void displayBalance () {

SysOut (" Balance: " + balance);

}

void computeInterest () {

SysOut (" Current amount does not interest ");

3

void withdraw (double amount) {

if (balance - amount < 1000) {

SysOut (" Insufficient balance ");

balance = serviceCharge;

} SysOut (" Service charges: " + serviceCharge);

3

else {

balance -= amount;

SysOut (" Amount withdrawn: " + amount);

3

3

```
class BRun{
```

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

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

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

```
String customerName = sc.nextLine();
```

```
System.out.println ("Enter account no.:");
```

```
int accountNo = sc.nextInt();
```

```
System.out.println ("Enter account type (Savings/Current):");
```

```
String accountType = sc.next();
```

```
System.out.println ("Enter initial Balance:");
```

```
double balance = sc.nextDouble();
```

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

```
Account account;
```

```
If (accountType.equals ("Savings")) {
```

```
account = new SavingsAccount (customerName,  
accountNumber, accountType, balance);
```

```
}
```

```
else {
```

```
account = new CurrentAccount (customerName,  
accountNumber, accountType, balance);
```

```
}
```

```
while (true) {
```

```
System.out.println ("1. Deposit 2. Display Balance 3.
```

```
4. Compute Interest 5. Withdrawal 6. Exit (n/n)");
```

```
System.out.println ("Enter choice");
```

```
int choice = sc.nextInt();
```