

a) 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.util.*;
public class Main {
    public static void main (String [] args) {
        Scanner sc = new Scanner (System.in);
        System.out.print ("Enter co-efficients a,b,c : \n");
        a = sc.nextDouble();
        b = sc.nextDouble();
        c = sc.nextDouble();
        discriminant = (b*b) - (4*a*c);
        if (discriminant > 0)
            root1 = (-b + Math.sqrt(discriminant)) / (2*a);
            root2 = (-b - Math.sqrt(discriminant)) / (2*a);
            System.out.println ("Two distinct real roots are : ");
            System.out.printf ("root1 = %.4f and root2 = %.4f", root1,
                root2);
        else if (discriminant == 0)
            root1 = root2 = -b / (2*a);
            System.out.printf ("Two equal roots : %.4f", root1);
```

else if (discriminant < 0) {  
 // Roots are not real  
 System.out.println("Roots are not real");

} else {  
 // Roots are real  
 double root1 = (-b + Math.sqrt(discriminant)) / (2 \* a);  
 double root2 = (-b - Math.sqrt(discriminant)) / (2 \* a);  
 System.out.println("Root 1 = " + root1);  
 System.out.println("Root 2 = " + root2);

input

ENTER CO-EFFICIENTS a,b,c :

1  
4  
4

TWO EQUAL ROOTS: -2.0000

...Program finished with exit code 0

Press ENTER to exit console.□

```
import java.util.*;  
class Student {  
    private String usn;  
    private String name;  
    private int cred[];  
    private int marks[];  
    private int n;  
    void accept()  
{
```

```
Scanner s = new Scanner (System.in);  
System.out.println ("Enter Student details");  
System.out.println ("USN of Student:");  
usn = s.next();  
System.out.println ("Name of student");  
name = s.next();  
System.out.println ("Enter the number of subjects");  
n = s.nextInt();  
cred = new int[n];  
marks = new int[n];  
System.out.println ("Enter credits and marks attained  
by the student in each subject out of 100");  
for (int i=0; i<n; i++)  
{
```

```
    cred[i] = s.nextInt();  
    marks[i] = s.nextInt();  
}
```

```
void display()  
{
```

```
System.out.println ("Student details");  
System.out.println ("USN: " + usn);
```

```

System.out.println ("Name: " + name);
System.out.println ("Marks in each subject:");
for (int i = 0; i < n; i++)
    {
        System.out.println ("Subject" + (i + 1) + ":" + marks[i]);
    }
}

```

double calculate()

```

{
    int tp = 0, tc = 0;
    for (int i = 0; i < n; i++)
        {
            tc = tc + cred[i];
            if (marks[i] >= 50)
                tch = tch + ((marks[i] / 10) + 1) * cred[i];
            else if (marks[i] >= 40 && marks[i] < 50)
                tch = tch + (4 * cred[i]);
        }
}

```

```

else if (marks[i] >= 40 && marks[i] < 50)
{
    tch = tch + (4 * cred[i]);
}
return (double) tch / tc;
}

```

class Main

```

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

```

```

Student s1 = new Student();

```

```

s1.accept();
s1.display();
}

```

System.out.println("S6PA : " + s1.calculate());

and student

student living room

student living room

student calculate

student calculate

student calculate

and accept ()

Learned to use learn with student in

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name calculate ()

System.out.println("Sum of student")

and accept ()

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student calculate ()

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when student calculate formula will be

student calculate ()

and calculate ()

action calculate ()

input

```
KETAN
Enter the number of subjects:
5
Enter credits and marks attained by the student in each subject(out of 100)
5
90
4
80
4
78
3
40
4
86
Student details:
USN:1BM19CS076
Name:KETAN
Marks in each subject:
Subject 1:90
Subject 2:80
Subject 3:78
Subject 4:40
Subject 5:86
SGPA: 8.3
```

```
...Program finished with exit code 0
```

## Lab Program 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 4 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 a book objects.

```

import java.util.*;
import java.lang.*;
class Main
{
    String name;
    String author;
    double price;
    int num_pages;
    void getdetails()
    {
        Scanner x = new Scanner(System.in);
        System.out.println("Enter book Details");
        System.out.println("Enter book name:");
        name = x.next();
        System.out.println("Enter the Author");
        author = x.next();
        System.out.println("Enter the price of the book");
        num_pages price = x.nextDouble();
        System.out.println("Enter the number of pages in
                           the book");
    }
}
  
```

```
num_pages = x.nextInt();
```

{

```
public String toString()
```

```
{ return ("BOOK DETAILS" + "In The name of the  
book: " + name + " In The author of the book: " + author +  
" In The price of the book: " + price + " In Number of  
pages in book: " + num_pages);
```

{

```
class Main
```

{

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

{

```
int i, n;
```

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

```
System.out.println ("Enter the number of books");
```

```
n = x.nextInt();
```

```
Main b [] = new Main [n];
```

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

{

```
b[i] = new Main ();
```

```
b[i].getDetails ();
```

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

{

```
System.out.println (b[i]);
```

```
System.out.println ("Total pages: " + num_pages);
```

```
System.out.println ("Average pages per book: " + (double) num_pages / n);
```

```
System.out.println ("Maximum pages per book: " + max_pages);
```

```
System.out.println ("Minimum pages per book: " + min_pages);
```

```
51 < Enter the number of books  
1  
Enter Book Details  
Enter Book Name:  
java  
Enter the Author  
reemathareja  
Enter the Price of the book  
680  
Enter the number of pages in the book  
1058  
< BOOK DETAILS*  
The name of the book : java  
The author of the book :reemathareja  
The price of the book: 680.0  
Number of pages in book :1058  
  
...Program finished with exit code 0  
Press ENTER to exit console.
```

- (Q) 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 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.

import java.util.Scanner;  
abstract class Shape

{

    int d1;  
    int d2;  
    Shape (int a, int b)

{

    d1 = a;  
    d2 = b;

{

    abstract void printArea();

{

class Rectangle extends Shape

{

    Rectangle (int a, int b)

{

        super (a, b);

{

        void printArea()

{

            double area = d1 \* d2;

System.out.println ("Area of the rectangle : "+area);

3 class Triangle extends Shape

{  
Triangle (int a, int b)

of super (a, b);

3 void printarea()

{  
double area = d1 \* d2 / 2;

System.out.println ("Area of the triangle : "+area);

3 class Circle extends Shape

{  
Circle (int a, int b)

super (a, b);

3 void printarea()

{  
double area = 3.14 \* d1 \* d1;

System.out.println ("Area of the circle : "+area);

3 class Main

{  
public static void main (String args [])

```
System.out.println("Enter the dimensions of rectangle");
Scanner sc = new Scanner(System.in);
int x = sc.nextInt();
int y = sc.nextInt();
System.out.println("Enter dimensions of triangle");
int s = sc.nextInt();
int w = sc.nextInt();
System.out.println("Enter the radius of circle");
int f = sc.nextInt();
Rectangle r = new Rectangle(x,y);
Triangle t = new Triangle(s,w);
Circle c = new Circle(f,f);
r.printarea();
t.printarea();
c.printarea();
```

Enter the dimensions of rectangle

10

20

Enter the dimensions of triangle

9

8

Enter the radius of circle

5

Area of the rectangle : 200.0

Area of the triangle : 36.0

Area of the circle : 78.5

... Program finished with exit code 0

Press ENTER to exit console.

Lab-5

Develop a Java program to write 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 withdraw facilities but no cheque book facility.

import java.util.Scanner;  
abstract class Account

{  
String cust\_name;

long acc\_no;

String acc\_type;

double balance;

double min\_bal = 1000.0;

Account (String cust\_name, long acc\_no, String acc\_type, double balance)

{

this.cust\_name = cust\_name;

this.acc\_no = acc\_no;

this.acc\_type = acc\_type;

this.balance = balance;

}

abstract void deposit (double amount);

abstract void display();

abstract void withdraw (double amount);

{

class Curr\_acct extends Account

{

double penalty = 100.0;

curr\_act (String cust\_name, long acc\_no,  
String acc\_type, double balance)

{  
super(cust\_name, acc\_no, acc\_type, balance),  
System.out.println ("Name of the customer : "+ cust\_name);

System.out.println ("Account Number : " + acc\_no);

System.out.println ("Account type : " + acc\_type);

System.out.println ("Balance : " + balance);

? void deposit (double amount)

{  
this.balance = this.balance + amount;

? void withdraw (double amount)

this.balance = this.balance - amount;

impose penalty();

System.out.println ("The current balance is " + balance);

? void imposePenalty ()

{  
if (this.balance < min\_bal)

this.balance = this.balance - penalty;

System.out.println ("The balance amount is  
insufficient, The penalty imposed = 100Rs);

? void display()

```
System.out.println("Balance is :" + this.balance);
```

}

class Sav acct extends Account

{

```
Sav_acct (String cust_name, long acc_no,  
String acc_type, double balance)
```

{

```
super(cust_name, acc_no, acc_type, balance);
```

```
System.out.println ("Name of the customer :" + cust_name);
```

```
System.out.println ("Account Number :" + acc_no);
```

```
System.out.println ("Account type :" + acc_type);
```

```
System.out.println ("Balance :" + balance);
```

}

void deposit (double amount)

{

```
this.balance = this.balance + amount;
```

```
interest();
```

}

void interest()

{

```
int rate = 10, time = 1;
```

```
float ci = (float)
```

```
(this.balance * Math. pow (1 + rate / 100.0, time) -
```

this.balance);

```
System.out.println ("The interest amount added to  
balance is :" + ci);
```

this.balance = this.balance + ci;

}

void withdraw (double amount)

{

this.balance = this.balance - amount;

System.out.println ("The current balance is " + balance);

void display()

System.out.println ("Balance is " + this.balance);

class AccountMain

public static void main (String [] args)

Scanner xx = new Scanner (System.in);

Double amount;

int flag = 0;

while (flag == 0)

{

System.out.println ("Enter the type of Account : Int:  
Current account 1 n2: Savings account ");

int choice = xx.nextInt();

switch (choice)

{

case 1: System.out.println ("1 n Current account : ");

System.out.println ("Enter the name of account holder");

String f = xx.next();

System.out.println ("Enter the account number");

long g = xx.nextLong();

System.out.println ("Enter the balance amount");

double h = xx.nextDouble();

curr\_act = new Current\_act (fig, "current", h);  
int flag = 0;  
while (flag == 0)

{  
System.out.println ("Enter your choice\n1: Deposit  
amount\n2: Display Balance\n3: Withdraw");  
int choice = xx.nextInt();  
switch (choice) {

{  
case 1:  
System.out.println ("Enter amount to be deposited");  
amount = xx.nextDouble();  
c.deposit(amount);  
break;  
case 2:  
c.display();  
break;

case 3:  
System.out.println ("Enter amount you want to  
withdraw");

amount = xx.nextDouble();  
c.withdrawl(amount);

break;

default:

flag = 1;

{

break;

case 2 : System.out.println ("In Savings Account:\n")

System.out.println ("Enter name of account holder");

String h = xx.next();

```

long long q = xx. nextLong();
System.out.println ("Enter the balance amount");
double r = xx. nextDouble();
Date accTc = new Date - accT(p,q, "Swings", n);
int flag2 = 0;
while (flag2 == 0)
{
    fl. "What would you like? 1n-1: Deposit

```

```
System.out.println ("Enter your choice. 1n-1: Deposit  
amount \n2: Display Balance \n3: Withdraw");  
int choice2 = xx.nextInt();  
switch (choice2) {  
    case 1: System.out.println ("Enter amount to  
deposited: ");  
    amount = xx.nextDouble();
```

Conclusions

Greek;

~~CRW 2:~~

s. display();

brick,

Case 3: System.out.println ("Enter amount you want to withdraw:");

amount =  $\pi \times \text{nextDouble}()$

S. withdrawal amount);

break

default:

~~flag 2 = 1;~~

3

~~default = flag = 13~~

3

3

```
enter customer's account type 1.savings account 2.current account
1
-----enter account details-----
enter customer name
karthik
enter customer account number
34576897
enter customer's account type 1.savings account 2.current account
1
enter customer's balance amount in account
30000
-----customer's account details-----
customer name    karthik
customer account number 34576897
customer's account type 1
customer's balance amount in account    30000.0
enter 1.deposit 2.withdrawal
1
enter amount to be deposited
560
enter rate and time period
```

```
1
enter customer's balance amount in account
30000
-----customer's account details-----
customer name karthik
customer account number 34576897
customer's account type 1
customer's balance amount in account 30000.0
enter 1.deposit 2.withdrawal
1
enter amount to be deposited
560
enter rate and time period
2
2
compound interest = 1234.623999999998
customer's balance amount in account 31794.624

...Program finished with exit code 0
Press ENTER to exit console.
```