1. Lab Program:

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.

* LAB-1 :

Algorithm :

Step 1: Input the values of a, b and c

Step 2: Calculate using formula

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

Step 3: IF(d<0)

Print: No real solutions

else if(d = 0)

Print: Roots are equal

Print: r1=r2 =(-b/2*a)

else

Print: Roots are real

Print: r1= -b+ √d /(2*a);

Print: r2 = -b - √d /(2*a);

Step 4: End

* Program

```
import java.util.*
Public class Quad_roots
{
Public static void main(String args[])
{
double a,b,c,d,r1,r2;
System.out.println("Enter the values of a,b
and c");
Scanner sc = new Scanner(System.in);
a = sc.nextDouble();
b = sc.nextDouble();
c = sc.nextDouble();
d = (b*b)-(4*a*c);
```

Step4: End

* Program.

```
import java.util.*
Public class Quad_Roots
{
Public static void main(String args[])
{
double a,b,c,d,r1,r2;
System.out.println("Enter the values of a,b
and c");
Scanner sc = new Scanner(System.in);
a = sc.nextDouble();
b = sc.nextDouble();
c = sc.nextDouble();
d = (b*b)-(4*a*c);
If(d>0)
{
r1 = (-b+Math.sqrt(d))/(2*a);
r2 = (-b-Math.sqrt(d))/(2*a);
System.out.println("root1 = "+r1+"ROOT2 = "+r2);

}
else if(d==0)

{
r1=r2=-b/(2*a);
```



```
System.out.println("root1=root2 = "+r1);
}
else
{
System.out.println("There are no real
solutions for given equation");
}
}
}
```

```
Enter the values of a,b and c
1
-2
1
Root1=Root2=1.0


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

2. Lab Program 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.

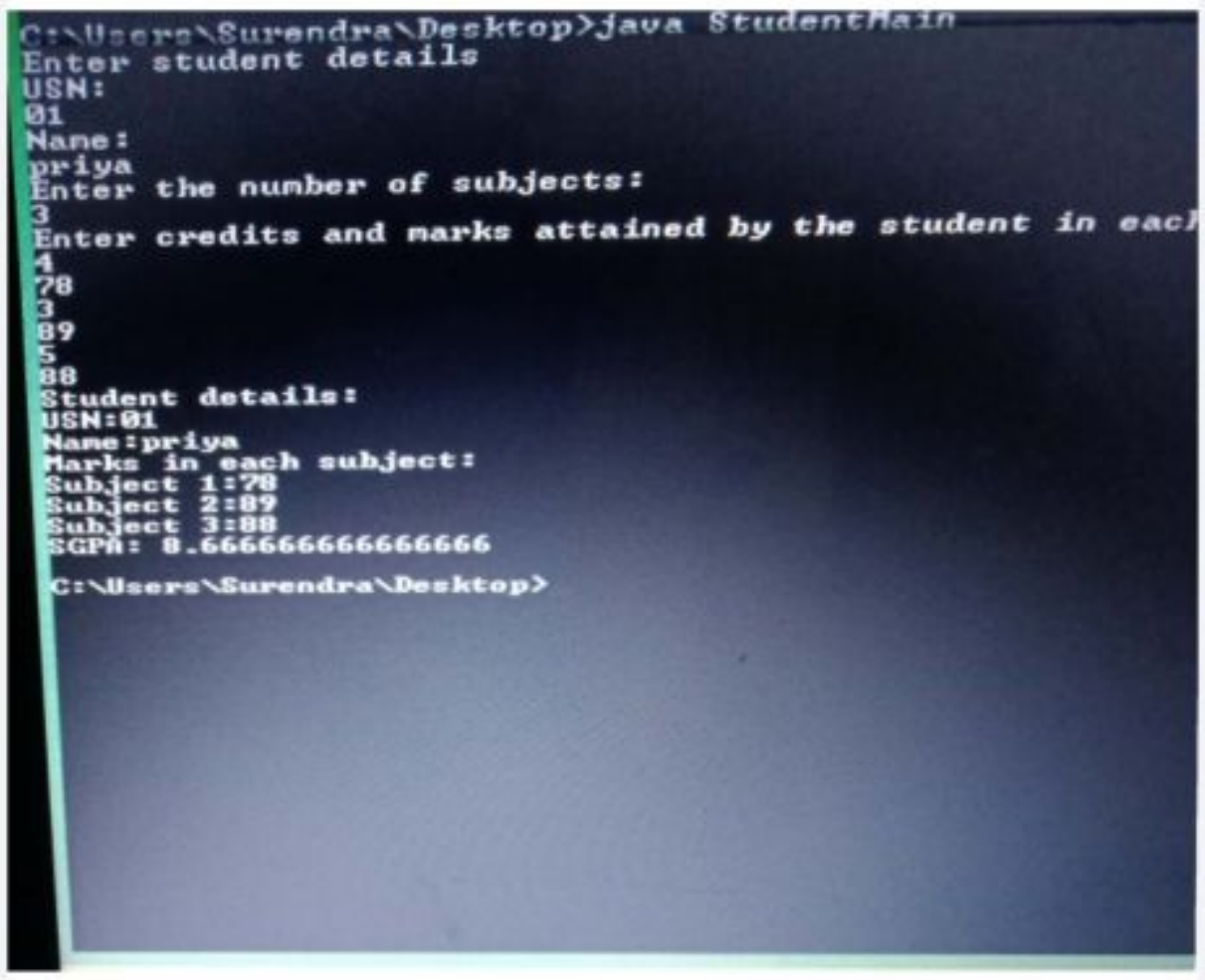
```
import java.util.*;
class student {
  Private string usn;
  Private string name;
  Private int credits[];
  Private int marks[];
  Private int n;
  void accept()
  {
   Scanner s=new Scanner(System.in);
   System.out.println("Enter student details");
   System.out.println("USN:");
   usn=s.next();
   System.out.println("Name:");
   name=s.next();
   System.out.println("Enter credits and marks
   attained by the student in each subject");
   for(int i=0;i<n;i++)
   {
   credits[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()
 {
```

```
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 tcp=0,tc=0;
 for(int i=0;i<n;i+1)
  {
 tc=tc+credits[i];
 if(marks[i]>=50)
 {
 tcp=tcp+((marks[i]/10+5)*credits[i]);
 }
else if(marks[i]>=40 && marks[i]<50)
  {
  tcp=tcp+(4*credits[i]);
  }
 }
```



```
return (double) tcp/tc;
 }
 }
 class Student Main
  {
 Public static void main(String SSD){
 Student S1= new student();
 S1.accept();
 S1.display();
 System.out.println("SGPA :"+S1.calcula
 }
 }
```



3. 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 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.

1. import java.util.*;
class Book {
String name;
String author;
int price;
int num_pages;
Book()
{
Book(string name, string author, int price, int num_pages)
{
this.name = name;
this.author = author;
this.price = price;
this.num_pages = num_pages;
}
void accept()
{
Scanner s = new Scanner(System.in);
System.out.println("Enter the name of book");
name = s.next();
System.out.println("Enter the author of book");
author = s.next();
System.out.println("Enter the price of the book");
Price = s.nextInt();
System.out.println("Enter the number of pages of book");
num_pages = s.nextInt();
}
Public string to string()
{
return ("Name:" + name + "\n" + "Author:" + author + "\n"
+ "Price:" + price + "\n" + "Number of Pages:" + num_pages);
}}

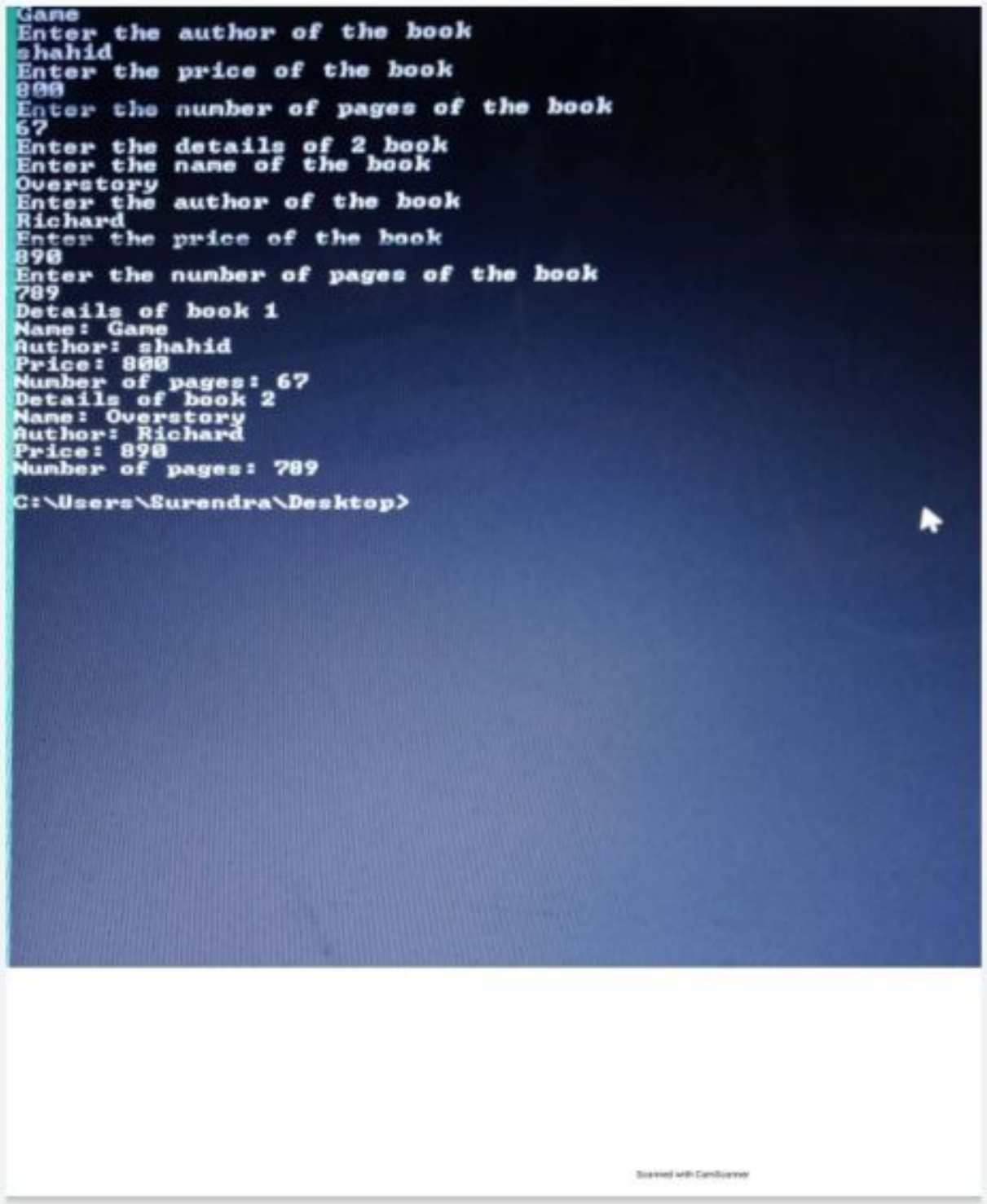
Class BookMain {
Public static void main (String s[])
{
Scanner a = new scanner(System.in);
Book b1 = new
Book("Wings of Fire", "APJ.AbdulKalam", 100, 200);
System.out.println("Sample input: \n" + b1);
System.out.println("Enter the number of books");
int n = a.nextInt();
Book b[] = new Book[n];
for(int i=0; i<n; i++)
{
i[i] = new Book();

```
System.out.println ("Enter the name of book");
name = s.next();
System.out.println ("Enter the author of book");
author = s.next();
System.out.println ("Enter the price of the book");
Price = s.nextInt();
System.out.println ("Enter the number of pages of book");
num_pages = s.nextInt();
}
Public String to String()
{
return ("Name:" +name+ "\n" + "Author:" +author + "\n"
+ "Price:" +price+ "\n" + "Number of Pages: " +num_pages);
} }
```

Scanned with CamScanner

```
Class BookMain {
  Public static void main (String s[])
  {
   Scanner a = new scanner(System.in);
   Book b1 = new
   Book ("Wings of Fire", "APJ Abdul Kalam", 100, 200);
   System.out.println ("Sample input: \n" + b1);
   System.out.println ("Enter the number of books");
   int n = a.nextInt();
   Book b[] = new Book [n];
   for(int i=0; i<n; i++)
   {
    b[i]=new Book();
    System.out.println ("Enter the details of " + (i+1) +"
     book");
      b[i].accept();
    }
    for(int i = 0; i<n; i++)
    {
    System.out.println("Details of book" + (i+1));
    System.out.println(b[i]);
    }
  }
```

Scanned with CamScanner



4. 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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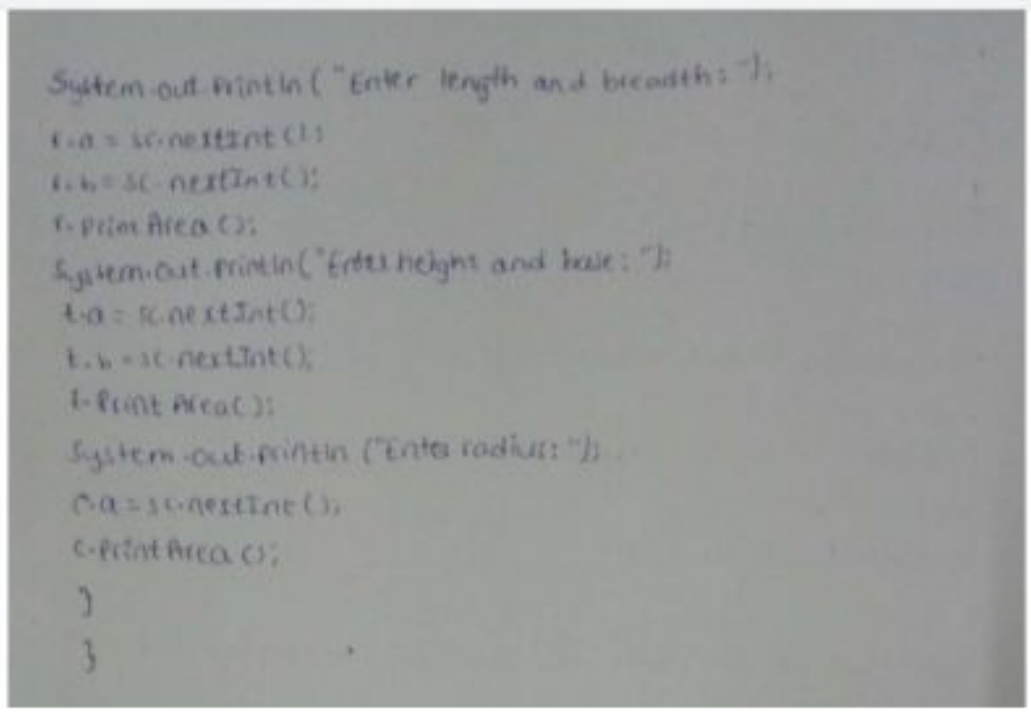
18MIS1CS032
Week 8

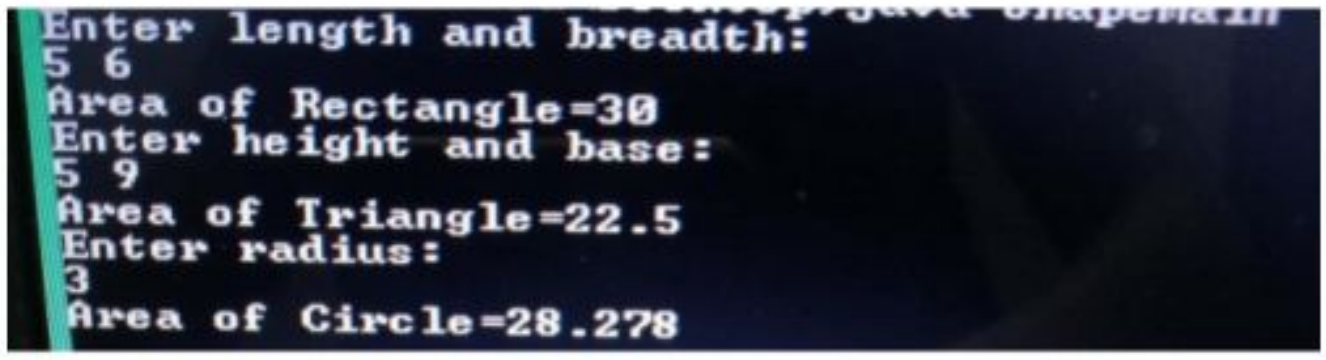
1. Import java.util.Scanner;
abstract class shape
{
int a,b;
abstract void printArea();
}
class Rectangle extends shape
{
void paintArea()
{
System.out.println("Area of Rectangle:"+(a*b));
}
}
class Triangle extends shape
{
void PrintArea()
{
System.out.println("Area of Triangle:"+(0.5*a*b));
}
}
class Circle extends shape
{
void paintArea()
{
System.out.println("Area of Circle:"+(3.14)*a*b);
}
}

class Shapemain


```
Class Shapemain
{
Public static void main (String args[])
{
Scanner sc=new Scanner(System.in);
Rectangle r= new Rectangle ();
Triangle t = new Triangle();
Circle c = new circle ();
```

```
System.out.println("Enter length and breadth:");
r.a = sc.nextInt();
r.b = sc.nextInt();
r.PrintArea();
System.out.println("Enter height and base:");
t.a = sc.nextInt();
t.b = sc.nextInt();
t.PrintArea();
System.out.println("Enter radius:");
c.a = sc.nextInt();
c.PrintArea();
}
}
```



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 Curr-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks: • Accept deposit from customer and update the balance. • Display the balance. • Compute and

deposit interest • Permit withdrawal and update the balance • Check for the minimum balance,

impose penalty if necessary and update the balance

2.

```
import java.util.Scanner;
class account
{
Private string name;
Private long account_number;
Private int account_type;
double balance;
void get_data()
{
Scanner ss = new Scanner(System.in)
System.out.Println("Enter the name");
name=ss.next();
System.out.Println("enter the account_number");
account_number=ss.nextLong();
System.out.Println("choose the account type");
System.out.Println("1.Savings account");
System.out.Println("2.Current account");
```



```
account_type=ss.nextInt();
}
int return_account_type()
{
return account_type;
}
}
class savings extends account
{
Scanner ss= new Scanner(System.in);
double amount;
Void get_sav_balance()
{
System.out.Println("Enter the amount to be placed in your
savings account");
amount = ss.nextDouble();
balance += amount;
}
void display_sav_bince()
{
System.out.println("balance:"+balance);
}
void compute_sav_interest()
{
System.out.Println("Interest of 5% shall be added to your
balance");
balance= balance+(0.5*balance);
}void withdraw_sav()
{
System.out.Println("Enter the amount to be withdrawn");
amount: ss.nextDouble();
```

```
balance = balance - amount;
}
}
class current extends account
{
Scanner ss = new Scanner(System.in);
double amount;
final double min_balance = 5000;
void get_cur_balance()
{
System.out.println("Enter the amount to be placed in your
account");
amount = ss.nextDouble();
balance4 = amount;
}
void display_cur_blance()
{
System.out.println("balance=" + balance);
}
void compute_cur_service_charges()
{
if(balance< min_balance)
{
System.out.println("service tax of 15.500 shall be levied");
balance= balance-500;
}
else
{
```



```
System.out.println("minimum balance is maintained");
}
}
void withdrawal_cur()
{
System.out.println("Enter the amount to be withdrawn");
amount=ss.nextDouble();
balance= balance - amount;
}
}
class bankmain
{
public static void main(String args[])
{
int type;
System.out.println("Enter the bank details");
account acc= new account();
acc.get_data();
type= acc.return_account_type();
```

```
System.out.println("minimum balance is maintained");
}
}
void withdrawal_cur()
{
System.out.println("Enter the amount tobe withdrawn");
amount=ss.nextDouble();
balance= balance- amount;
}
}
class bankmain
{
public static void main(String args[])
{
int type;
System.out.println("Enter the bank details");
account acc= new account();
acc.get_data();
type= acc.return_account_type();
if(type==1)
{
System.out.println("SAVINGS ACCOUNT");
Savings sav= new Savings();
sav.get_sav_balance();
sav.display_sav_bline();
sav.compute_sav_interest();
sav.display_sav_bline();
sav.withdrawal_sav();
sav.display_sav_bline();
}
```



```
if(type==2)
{
System.out.println("CURRENT ACCOUNT");
current cur= new current();
cur.get_cur_balance();
cur.display_cur_balance();
cur.compute_cur_service_charges();
cur.display_cur_bline();
cur.withdrawal_cur();
cur.display_cur_bline();
}
}
}
```

```
enter the bank details
enter your name
priya
enter the account_nunber
35259767
choose the account type
1.savings account
2.current account
1
SAVINGS ACCOUNT
enter the amount to be placed in your savings account
5688
balance=5688.0
interest of 5% shall be added to your balance
balance=5972.4
enter the amount to be withdrawn
678
balance=5294.4
```