ANAGHA ACHARYA

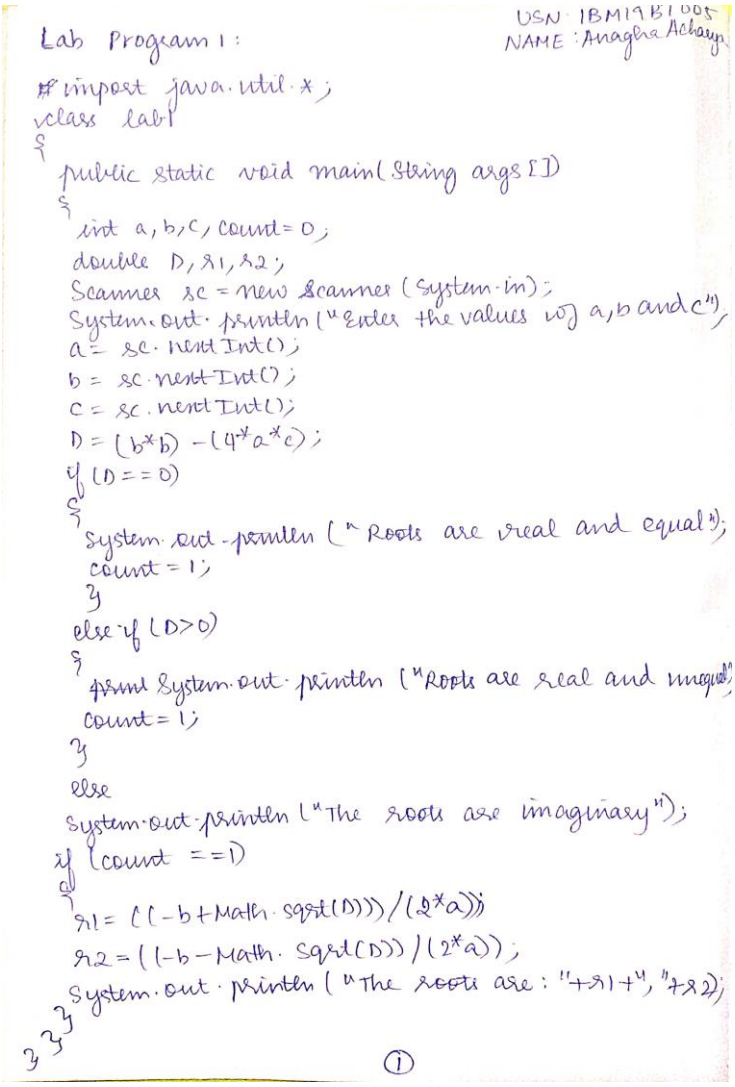
1BM19BT005

OOJ Lab Record

Lab Program - 1

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.

OBSERVATION:

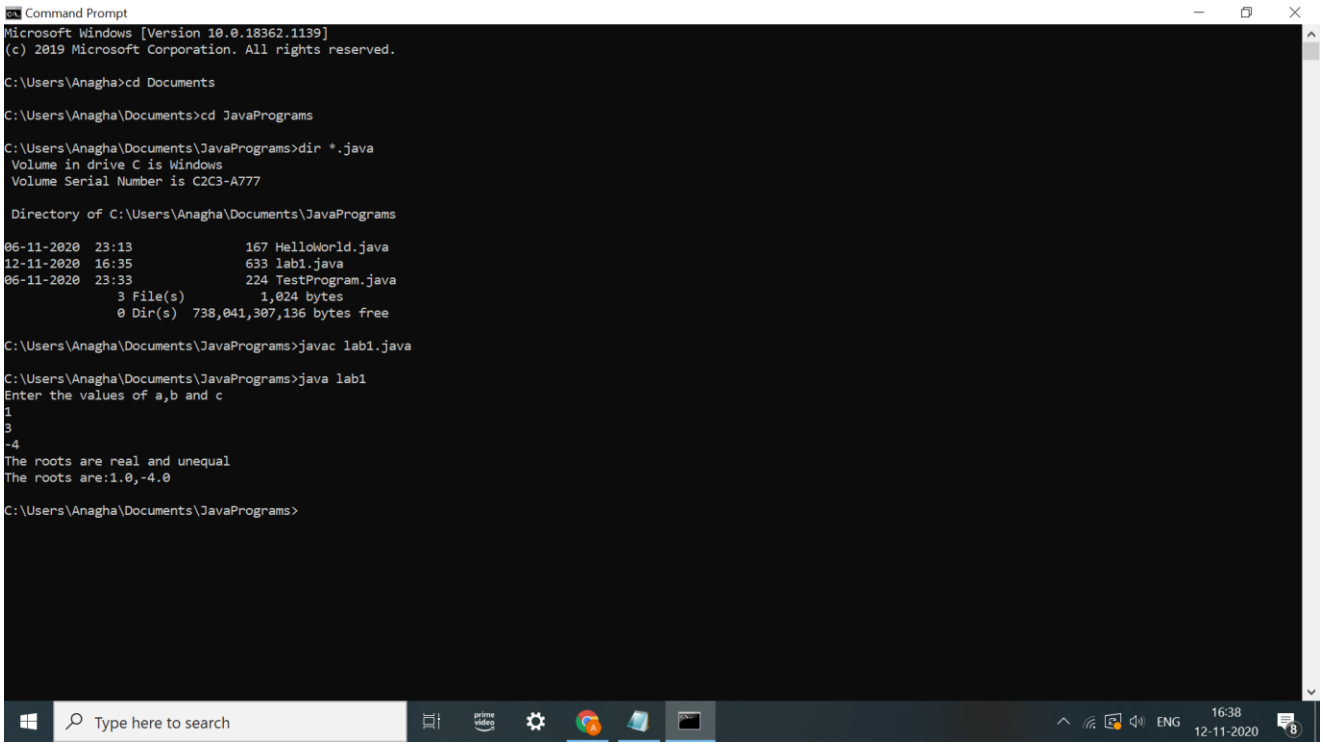


PROGRAM:

```
import java.util.*;

class lab1

{

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

```
{
int a,b,c,count=0;
double D,r1,r2;
Scanner sc=new Scanner(System.in);
System.out.println("Enter the values of a,b and c");
a=sc.nextInt();
b=sc.nextInt();
c=sc.nextInt();
D=(b*b)-(4*a*c);
if(D==0)
{
System.out.println("The roots are real and equal");
count=1;
}
else if(D>0)
{
System.out.println("The roots are real and unequal");
count =1;
}
else
System.out.println("The roots are imaginary");
if(count==1)
{
r1=((-b+Math.sqrt(D))/(2*a));
r2=((-b-Math.sqrt(D))/(2*a));
System.out.println("The roots are:"+r1+","+r2);
}
}
}
```

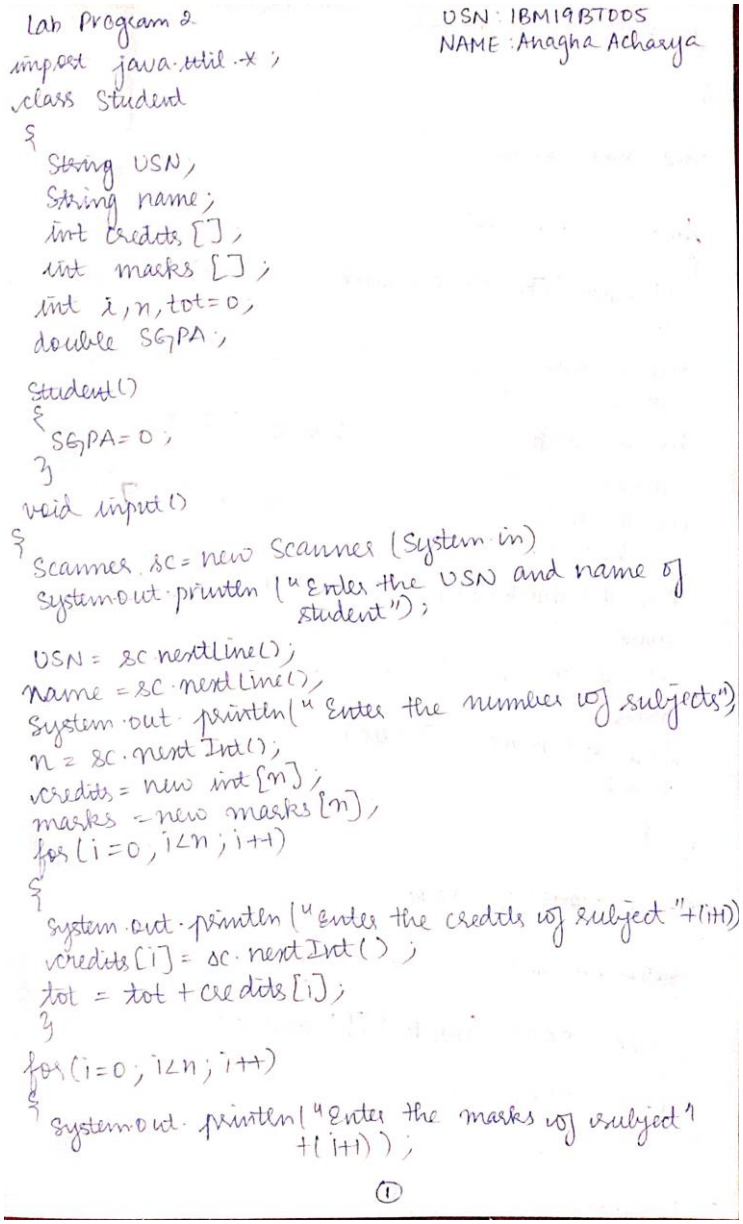
OUTPUT:


Command Prompt
Microsoft Windows [Version 10.0.18362.1139]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\Anagha>cd Documents
C:\Users\Anagha\Documents>cd JavaPrograms
C:\Users\Anagha\Documents\JavaPrograms>dir *.java
Volume in drive C is Windows
Volume Serial Number is C2C3-A777
Directory of C:\Users\Anagha\Documents\JavaPrograms
06-11-2020 23:13 167 HelloWorld.java
12-11-2020 16:35 633 lab1.java
06-11-2020 23:33 224 TestProgram.java
3 File(s) 1,024 bytes
0 Dir(s) 738,041,307,136 bytes free
C:\Users\Anagha\Documents\JavaPrograms>javac lab1.java
C:\Users\Anagha\Documents\JavaPrograms>java lab1
Enter the values of a,b and c
1
3
-4
The roots are real and unequal
The roots are:1.0,-4.0
C:\Users\Anagha\Documents\JavaPrograms>
Type here to search
ENG
16:38
12-11-2020

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.

OBSERVATION:



```
Lab Program 2                                   USN : 1BM19BTDDS
                                                NAME : Anagha Acharya
import java.util.*;
class Student
{
  String USN,
  String name;
  int credits[],
  int marks[];
  int i,n,tot=0,
  double SGPA;

  Student()
  {
   SGPA=0;
  }
 void input()
{
 Scanner sc=new Scanner(System.in)
 System.out.println("Enter the USN and name of
                     student");

 USN = sc.nextLine();
 name = sc.nextLine();
 System.out.println("Enter the number of subjects");
 n = sc.nextInt();
 credits = new int[n];
 marks = new marks[n],
 for(i=0,i<n;i++)
 {
  System.out.println("Enter the credits of subject "+(i+1))
  credits[i] = sc.nextInt();
  tot = tot + credits[i];
 }
for(i=0;i<n;i++)
{
 System.out.println("Enter the marks of subject"
                    +(i+1));
```

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

void grade_point()
{
    for(i=0; i<n; i++)
    {
        if(marks[i] >= 90 && marks[i] <= 100)
            marks[i] = 10;
        else if(marks[i] >= 80 && marks[i] < 90)
            marks[i] = 9;
        else if(marks[i] >= 70 && marks[i] < 80)
            marks[i] = 8;
        else if(marks[i] >= 60 && marks[i] < 70)
            marks[i] = 7;
        else if(marks[i] >= 50 && marks[i] < 60)
            marks[i] = 5;
        else if(marks[i] >= 40 && marks[i] < 50)
            marks[i] = 4;
        else if(marks[i] < 40)
            marks[i] = 0;
    }
}
void ~~display~~ cal_SGPA()
{
    ~~System.out~~ for(i=0; i<n; i++)
    {
        SGPA = SGPA + (marks[i] * credits[i]);
    }
    SGPA = SGPA / tot;
}
```



```
void display()
{
    System.out.println("----------");
    System.out.println("Student details are");
    System.out.println("USN : "+USN);
    System.out.println("Name : "+Sname);
    System.out.println("SGPA : "+SGPA);
    System.out.println("----------");
}
}
class lab2
{
    public static void main(String args[])
    {
        Student stu = new Student();
        stu.input();
        stu.grade_point();
        stu.cal_SGPA();
        stu.display();
    }
}
```

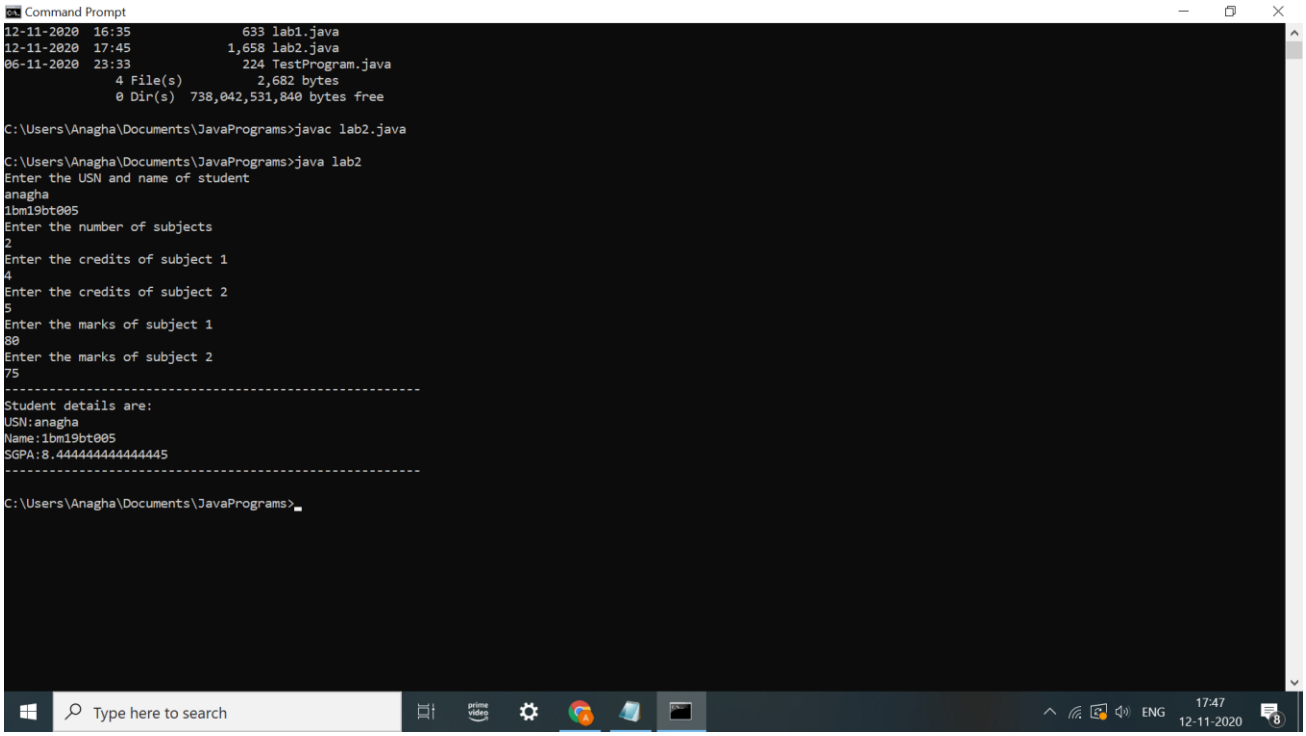
PROGRAM:

```
import java.util.*;
class Student
{
String USN;
String name;
int credits[];
int marks[];
int i,n,tot=0;
double SGPA;

Student()
{
SGPA=0;
}

void input()
{
Scanner sc=new Scanner(System.in);
System.out.println("Enter the USN and name of student");
USN=sc.nextLine();
name=sc.nextLine();
System.out.println("Enter the number of subjects");
n=sc.nextInt();
credits=new int[n];
marks=new int[n];
for(i=0;i<n;i++)
{
System.out.println("Enter the credits of subject "+(i+1));
credits[i]=sc.nextInt();
tot=tot+credits[i];
```

```
}
for(i=0;i<n;i++)
{
System.out.println("Enter the marks of subject "+(i+1));
marks[i]=sc.nextInt();
}
}
void grade_point()
{
for(i=0;i<n;i++)
{
if(marks[i]>=90 && marks[i]<=100)
marks[i]=10;
else if(marks[i]>=80 && marks[i]<90)
marks[i]=9;
else if(marks[i]>=70 && marks[i]<80)
marks[i]=8;
else if(marks[i]>=60 && marks[i]<70)
marks[i]=7;
else if(marks[i]>=50 && marks[i]<60)
marks[i]=5;
else if(marks[i]>=40 && marks[i]<50)
marks[i]=4;
else if(marks[i]<40)
marks[i]=0;
}
}

void cal_SGPA()
{
for(i=0;i<n;i++)
```

```
{
SGPA=SGPA+(credits[i]*marks[i]);
}
SGPA=SGPA/tot;
}
void display()
{
System.out.println("----------------------------------------------------");
System.out.println("Student details are:");
System.out.println("USN:"+USN);
System.out.println("Name:"+name);
System.out.println("SGPA:"+SGPA);
System.out.println("----------------------------------------------------");
}
}

class lab2
{
public static void main(String args[])
{
Student stu=new Student();
stu.input();
stu.grade_point();
stu.cal_SGPA();
stu.display();
}
}
```

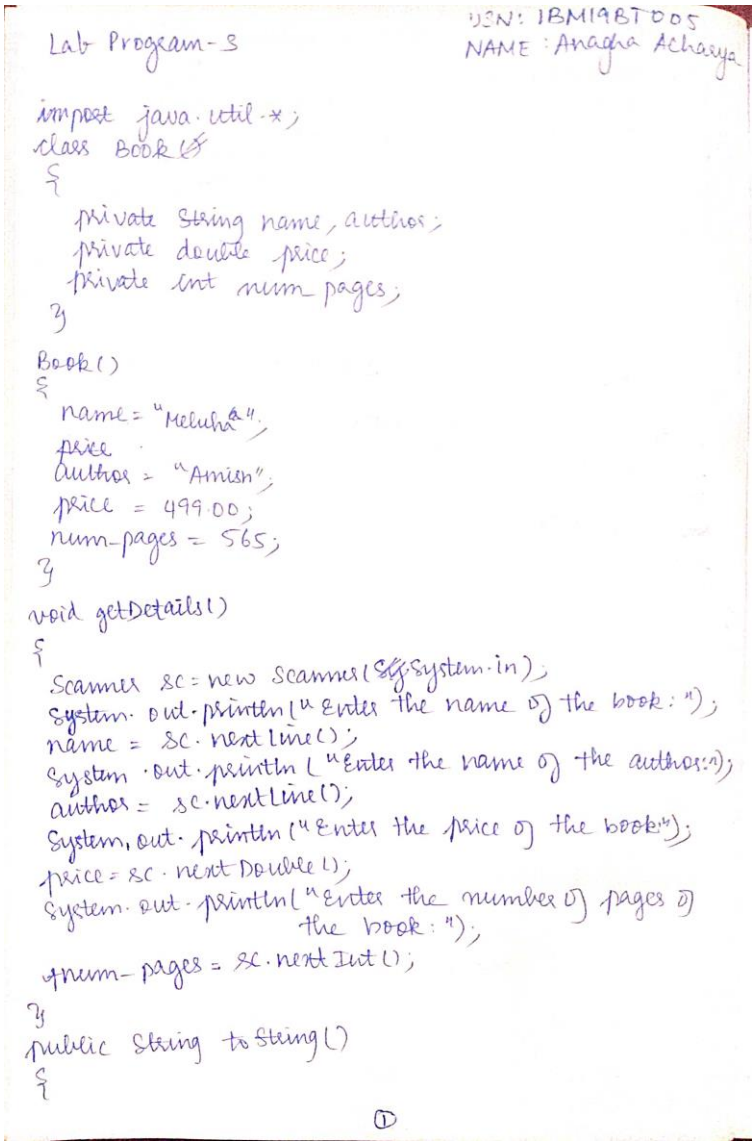
OUTPUT:


Command Prompt
12-11-2020 16:35 633 lab1.java
12-11-2020 17:45 1,658 lab2.java
06-11-2020 23:33 224 TestProgram.java
4 File(s) 2,682 bytes
0 Dir(s) 738,042,531,840 bytes free
C:\Users\Anagha\Documents\JavaPrograms>javac lab2.java
C:\Users\Anagha\Documents\JavaPrograms>java lab2
Enter the USN and name of student
anagha
1bm19bt005
Enter the number of subjects
2
Enter the credits of subject 1
4
Enter the credits of subject 2
5
Enter the marks of subject 1
80
Enter the marks of subject 2
75
Student details are:
USN:anagha
Name:1bm19bt005
SGPA:8.444444444444445
C:\Users\Anagha\Documents\JavaPrograms>
Type here to search
ENG
17:47
12-11-2020

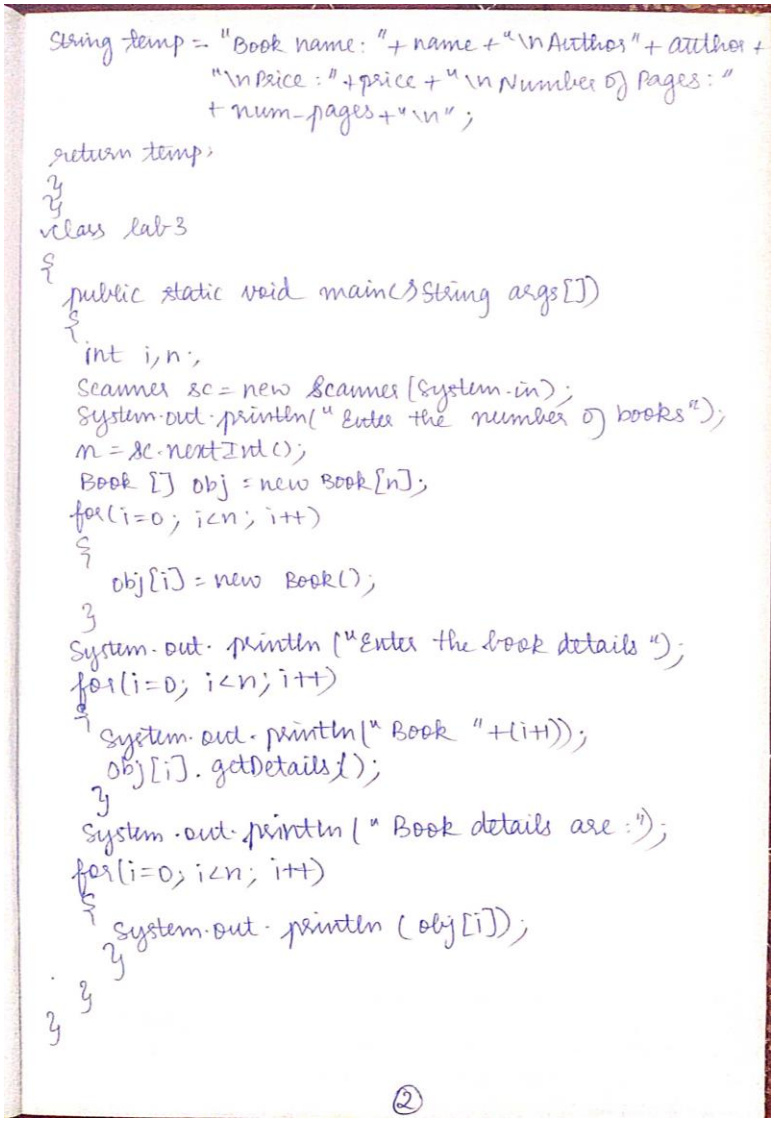
Lab program - 3

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.

OBSERVATION:



```
USN: 1BM19BT005
NAME : Anagha Acharya

Lab Program-3

import java.util.*;
class BOOK
{
  private String name, author;
  private double price;
  private int num_pages;
}
Book()
{
  name = "Mahabharata";
  price
  author = "Amish";
  price = 499.00;
  num_pages = 565;
}
void getDetails()
{
  Scanner sc = new Scanner(System.in);
  System.out.println("Enter the name of the book: ");
  name = sc.nextLine();
  System.out.println("Enter the name of the author:");
  author = sc.nextLine();
  System.out.println("Enter the price of the book:");
  price = sc.nextDouble();
  System.out.println("Enter the number of pages of
                      the book: ");
  num_pages = sc.nextInt();
}
public String toString()
{
```



```
String temp = "Book name: " + name + "\nAuthor" + author +
              "\nPrice : " + price + "\nNumber of Pages: "
              + num_pages + "\n";
return temp;
}
}
class lab3
{
 public static void main(String args[])
 {
  int i,n;
  Scanner sc = new Scanner(System.in);
  System.out.println("Enter the number of books");
  n = sc.nextInt();
  Book [] obj = new Book[n];
  for(i=0; i<n; i++)
  {
    obj[i] = new Book();
  }
  System.out.println("Enter the book details ");
  for(i=0; i<n; i++)
  {
    System.out.println("Book "+(i+1));
    obj[i].getDetails();
  }
  System.out.println("Book details are:");
  for(i=0; i<n; i++)
  {
    System.out.println(obj[i]);
  }
 }
}
```

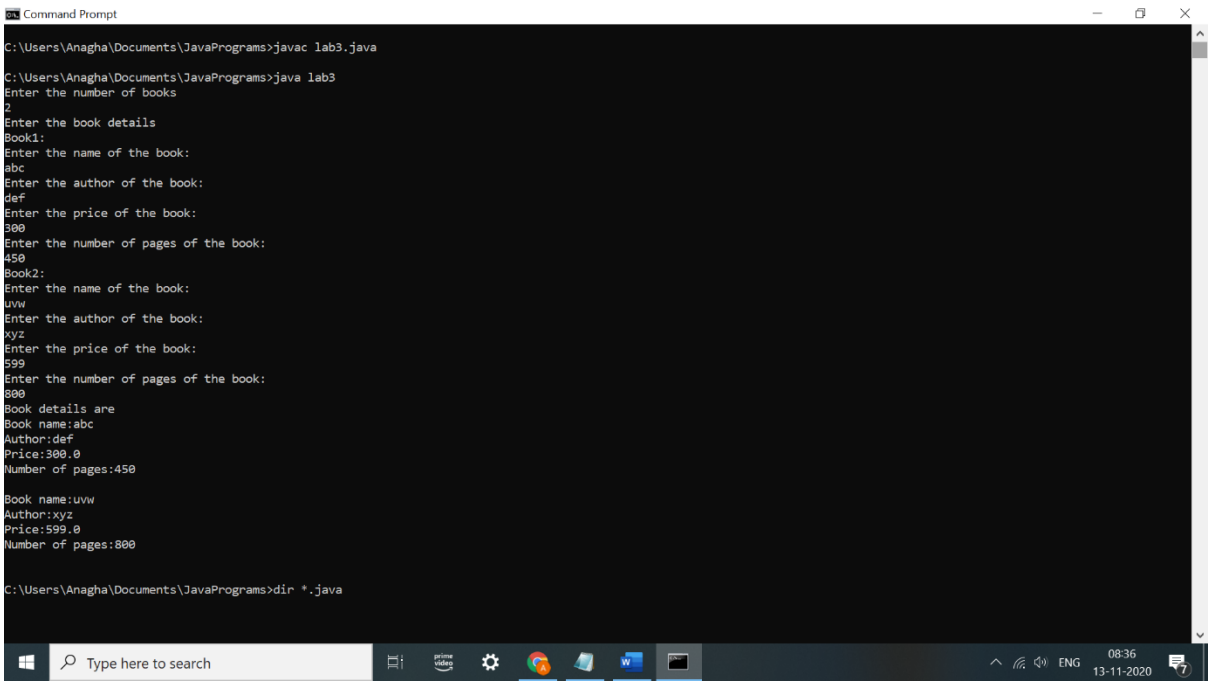

PROGRAM:

```
import java.util.*;
class Book
{
private String name,author;
private double price;
private int num_pages;

Book()
{
name="Meluha";
author="Amish";
```

```
price=499.00;
num_pages=565;
}

void getDetails()
{
Scanner sc=new Scanner(System.in);
System.out.println("Enter the name of the book:");
name=sc.nextLine();
System.out.println("Enter the author of the book:");
author=sc.nextLine();
System.out.println("Enter the price of the book:");
price=sc.nextDouble();
System.out.println("Enter the number of pages of the book:");
num_pages=sc.nextInt();
}
public String toString()
{
String temp="Book name:"+name+"\nAuthor:"+author+"\nPrice:"+price+"\nNumber of
pages:"+num_pages+"\n";
return (temp);
}
}
class lab3
{
public static void main(String args[])
{
int i,n;
Scanner sc=new Scanner(System.in);
System.out.println("Enter the number of books");
n=sc.nextInt();
Book[] obj=new Book[n];
for(i=0;i<n;i++)
{
```

```
obj[i]=new Book();
}
System.out.println("Enter the book details");
for(i=0;i<n;i++)
{
System.out.println("Book"+(i+1)+":");
obj[i].getDetails();
}
System.out.println("Book details are");
for(i=0;i<n;i++)
{
System.out.println(obj[i]);
}
}
}
```

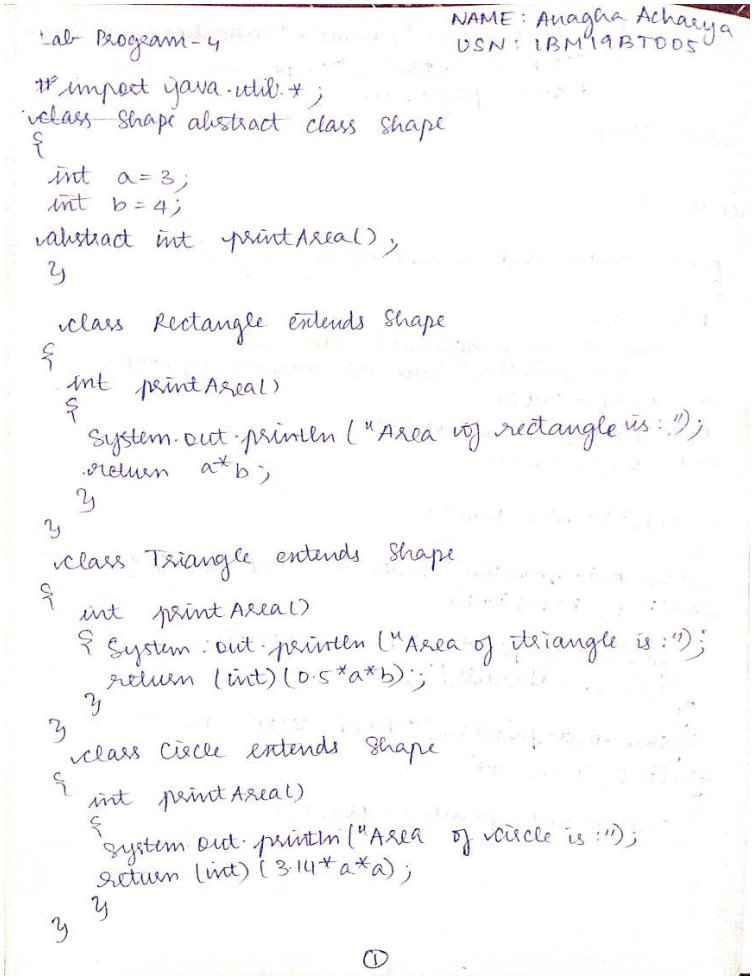
OUTPUT



Lab program - 4

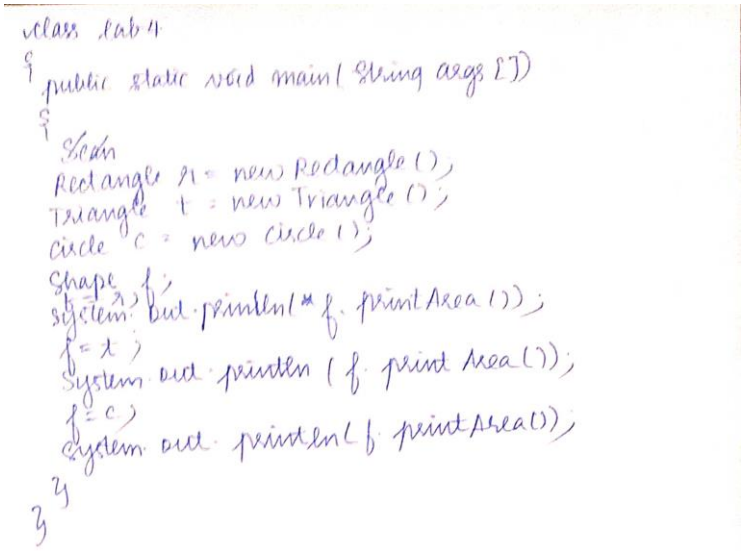
Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea( ). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea(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

OBSERVATION:



```
NAME : Anagha Acharya
USN : 1BM19BTD05
Lab Program - 4

import java.util.*;
abstract class Shape
{
 int a=3;
 int b=4;
abstract int printArea();
}

class Rectangle extends Shape
{
 int printArea()
 {
  System.out.println("Area of rectangle is :");
  return a*b;
 }
}
class Triangle extends Shape
{
 int printArea()
 { System.out.println("Area of triangle is :");
   return (int)(0.5*a*b);
 }
}
class Circle extends Shape
{
 int printArea()
 {
  System.out.println("Area of circle is :");
  return (int)(3.14*a*a);
 }
}
```

①

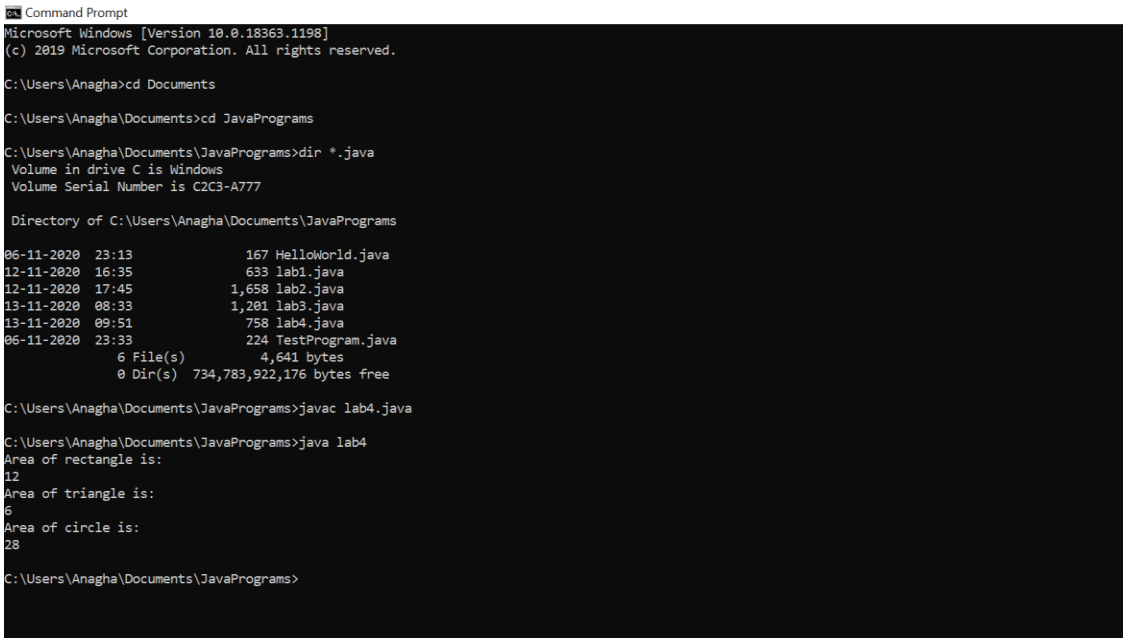


PROGRAM:

```
import java.util.*;
abstract class Shape
{
int a=3;
int b=4;
abstract int printArea();
}

class Rectangle extends Shape
{
int printArea()
{
System.out.println("Area of rectangle is:");
return a*b;
}
}
class Triangle extends Shape
{
int printArea()
{
```

```
System.out.println("Area of triangle is:");
return (int)(0.5*a*b);
}
}
class Circle extends Shape
{
int printArea()
{
System.out.println("Area of circle is:");
return (int)(3.14*a*a);
}
}
class lab4
{
public static void main(String args[])
{
Rectangle r=new Rectangle();
Triangle t=new Triangle();
Circle c=new Circle();
Shape f;
f=r;
System.out.println(f.printArea());
f=t;
System.out.println(f.printArea());
f=c;
System.out.println(f.printArea());
}
}
```

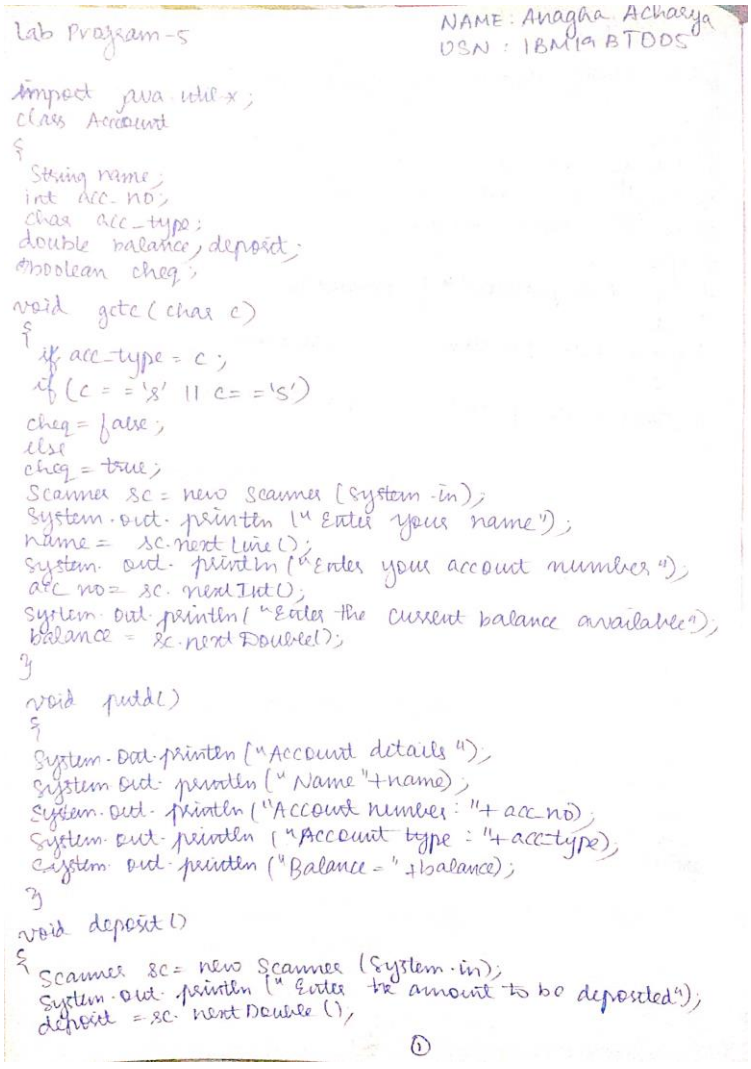
OUTPUT:


Command Prompt
Microsoft Windows [Version 10.0.18363.1198]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\Anagha>cd Documents
C:\Users\Anagha\Documents>cd JavaPrograms
C:\Users\Anagha\Documents\JavaPrograms>dir *.java
Volume in drive C is Windows
Volume Serial Number is C2C3-A777
Directory of C:\Users\Anagha\Documents\JavaPrograms
06-11-2020 23:13 167 HelloWorld.java
12-11-2020 16:35 633 lab1.java
12-11-2020 17:45 1,658 lab2.java
13-11-2020 08:33 1,201 lab3.java
13-11-2020 09:51 758 lab4.java
06-11-2020 23:33 224 TestProgram.java
6 File(s) 4,641 bytes
0 Dir(s) 734,783,922,176 bytes free
C:\Users\Anagha\Documents\JavaPrograms>javac lab4.java
C:\Users\Anagha\Documents\JavaPrograms>java lab4
Area of rectangle is:
12
Area of triangle is:
6
Area of circle is:
28
C:\Users\Anagha\Documents\JavaPrograms>

Lab program - 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: 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.

OBSERVATION:



Lab Program-5

NAME: Anagha Acharya
USN: 1BM19BTDDS

```
import java.util.*;
class Account
{
  String name;
  int acc_no;
  char acc_type;
  double balance, deposit;
  boolean cheq;
void getc(char c)
{
  if acc_type = c;
  if (c == 's' || c== 'S')
  cheq = false;
  else
  cheq = true;
  Scanner sc = new Scanner (System.in);
  System.out.println("Enter your name");
  name = sc.nextLine();
  System.out.println("Enter your account number");
  acc_no = sc.nextInt();
  System.out.println("Enter the current balance available");
  balance = sc.nextDouble();
}
void putd()
{
  System.out.println("Account details");
  System.out.println("Name"+name);
  System.out.println("Account number: "+acc_no);
  System.out.println("Account type : "+acc_type);
  System.out.println("Balance = "+balance);
}
void deposit()
{
  Scanner sc= new Scanner (System.in);
  System.out.println("Enter the amount to be deposited");
  deposit = sc.nextDouble();
```

①

```
balance = balance + deposit;
System.out.println("Amount has been deposited");
}
void display()
{
System.out.println("Balance amount = " + balance);
}
void check()
{
if (chq == false)
System.out.println("Cheque book facility unavailable");
else
System.out.println("Cheque book facility available");
}
}
class Savings extends Account
{
double rate, s_withdraw, amt, t, pr;
int n, ch;
void ci()
{
Scanner sc = new Scanner(System.in);
System.out.println("Enter the principal deposit amount");
pr = sc.nextDouble();
System.out.println("Enter rate");
rate = sc.nextDouble();
System.out.println("Enter term in years");
t = sc.nextDouble();
System.out.println("Enter number of times interest is
compounded");
n = sc.nextInt();
amt = pr * Math.pow((1 + (rate/100)), (n*t));
balance = balance + amt;
System.out.println("Interest is compounded and added
to the balance");
}
void with_s()
{
Scanner sc = new Scanner(System.in);
System.out.println("Enter the amount to be withdrawn");
s_withdrawn = sc.nextDouble;
```

(2)

```
if (S_withdraw>balance)
System.out.println ("Insufficient balance");
else
{
balance = balance- S_withdraw;
System.out.println("Amt has been withdrawn and
                    balance is updated");

 }
 }
}

class Current extends Account
{
double penalty, c_withdraw, min;
Current()
 {
   penalty =100;
   min =1000;
 }
void with_c()
{
Scanner sc= new Scanner (System.in);
System.out.println ("Enter amount to be withdrawn");
c_withdraw = sc.nextDouble();
if (c_withdraw>balance)
{System.out.println("Insufficient balance");
return;
}
 else
 {balance = balance - c_withdraw;
  System.out.println("Amt has been withdrawn and
                      balance is updated");
 }
if (balance < min)
{System.out.println("Balance below min value.
                     Service penalty charge of Rs.100
                     applicable");
```

```
if(balance < penalty)
System.out.println("Insufficient funds! Penalty will be
                    deducted after replenishing balance");
else
{
 balance = balance - penalty;
 System.out.println("Penalty charge deducted. Current
                     balance = "+balance);
  }
 }
}
class lab5
{
 public static void main(String args[])
 {
  int cch, chh;
  Scanner sc = new Scanner(System.in);
  System.out.println("------- WELCOME ------");
  System.out.println("Select an account: 1. Savings
                      2. Current");
  int ch = sc.nextInt();
  if(ch==1)
 {
  Savings s = new Savings();
  s.get('S');
  do {
    System.out.println("1. Deposit \n 2. Calculate
    compound interest \n 3. Withdrawn \n 4. Display \n 5. Cheque
    book \n 6. Exit");
    System.out.println("enter your choice");
    chh = sc.nextInt();
    switch(chh)
    {
     case 1 : s.deposit();
              break;
     case 2 : s.ci();
              break;
```

```
            case 3: s.with-s();
                    break;
            case 4: s.display();
                    s.putd();
                    break;
            case 5: ~~brea~~ s.check();
                    break
            case 6: break
            default: System.out.println("Wrong option");
                    break;
        }
    } while(ch! = 6);
}
else if (ch == 2)
{
    Current cr = new Current();
    cr.getc('c');
do {
    System.out.println("1. Deposit\n2. Cheque book\n
    3. Withdeawo\n 4. Display balance\n 5. Exit");
    cch = sc.nextInt();
    switch (cch);
    {
        case 1: cr.deposit();
                break;
        case 2: cr.check();
                break;
        case 3: cr.with-c();
                break;
        case 4: cr.display();
                cr.putd();
                break;
        case 5: break;
        default: system.out.println("Wrong option!");
                break;
    }
} while (cch ! = 5);
```

⑤

```
    }
else
System.out.println("Wrong!");
}
}
```

PROGRAM:

```
import java.util.*;
class Account
{
String name;
int acc_no;
char acc_type;
double balance;
double deposit;
boolean cheq;

void get(char c)
{
acc_type=c;
if(c=='s' || c=='S')
cheq=false;
else
cheq=true;
Scanner sc=new Scanner(System.in);
System.out.println("Enter your name");
name=sc.nextLine();
System.out.println("Enter your account number");
acc_no=sc.nextInt();
System.out.println("Enter the current balance available");
balance=sc.nextDouble();
}

void putd()
{
System.out.println("Account details");
System.out.println("Name:"+name);
```

```
System.out.println("Account number:"+acc_no);
System.out.println("Account type:"+acc_type);
System.out.println("Balance="+balance);
}

void deposit()
{
Scanner sc=new Scanner(System.in);
System.out.println("Enter the amount to be deposited");
deposit=sc.nextDouble();
balance=balance+deposit;
System.out.println("Amount has been deposited");
}

void display()
{
System.out.println("Balance amount="+balance);
}

void check()
{
if(cheq==false)
System.out.println("Cheque book facility is unavailable");
else
System.out.println("Cheque book facility available");
}
}

class Savings extends Account
{
double rate,s_withdraw,amt,t,pr;
```

```
int n,ch;

void ci()
{
Scanner sc=new Scanner(System.in);
System.out.println("Enter the principal deposit amount");
pr=sc.nextDouble();
System.out.println("Enter the rate");
rate=sc.nextDouble();
System.out.println("Enter the term in years");
t=sc.nextDouble();
System.out.println("Enter the number of times the intest is compounded");
n=sc.nextInt();
amt=pr*Math.pow((1+(rate/100)),(n*t));
balance=balance+amt;
System.out.println("Interest is compounded and added to the balance");
}

void with_s()
{
Scanner sc=new Scanner(System.in);
System.out.println("Enter the amount to be withdrawn");
s_withdraw=sc.nextDouble();
if(s_withdraw>balance)
System.out.println("Insufficient balance");
else
{
balance=balance-s_withdraw;
System.out.println("Amount has been withdrawn and balance is updated");
}
}
```

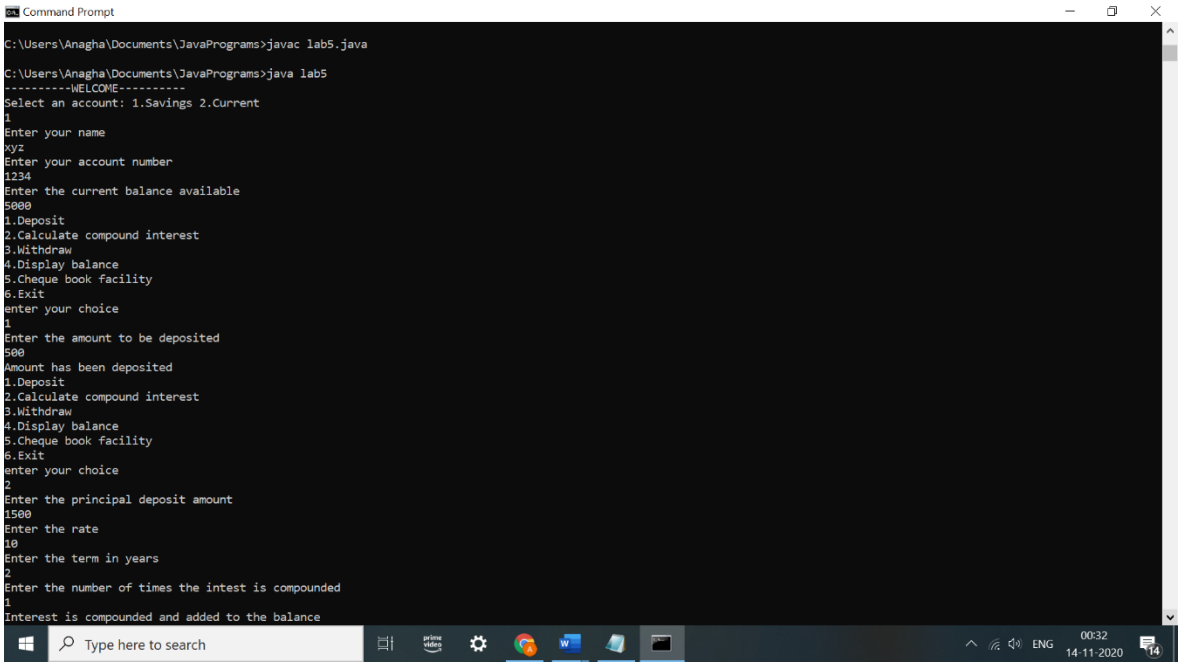
```
}

class Current extends Account
{
double penalty,c_withdraw,min;
Current()
{
penalty=100;
min=1000;
}

void with_c()
{
Scanner sc=new Scanner(System.in);
System.out.println("Enter the amount to be withdrawn");
c_withdraw=sc.nextDouble();
if(c_withdraw>balance)
{
System.out.println("Insufficient balance");
return;
}
else
{
balance=balance-c_withdraw;
System.out.println("Amount has been withdrawn and balance is updated");
}
if(balance<min)
{
System.out.println("Balance below the minimum value. Service penalty charge of Rs.100 applicable");
 if(balance<penalty)
 System.out.println("Insufficient funds!Penalty will be deducted after replenishing balance");
```

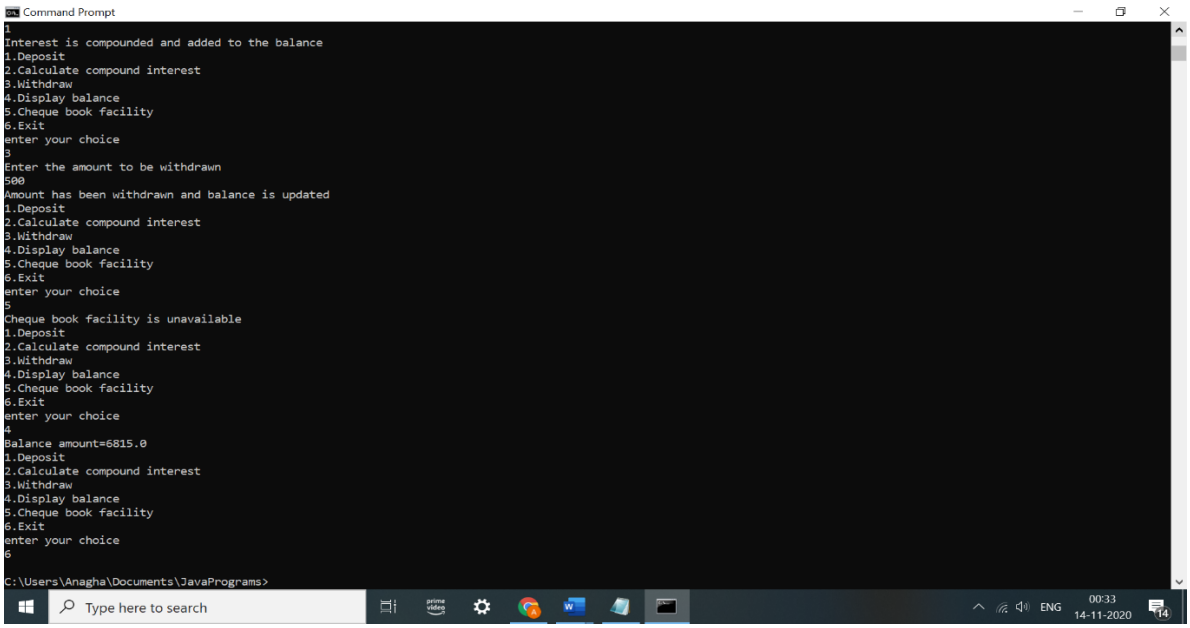
```
 else
 {
 balance=balance-penalty;
 System.out.println("Penalty charge has been deducted. Current balance="+balance);
 }
}
}
}

class lab5
{
public static void main(String args[])
{
int cch,chh;
Scanner sc=new Scanner(System.in);
System.out.println("----------WELCOME----------");
System.out.println("Select an account: 1.Savings 2.Current");
int ch=sc.nextInt();
if(ch==1)
{
 Savings s=new Savings();
s.get('S');
do{
System.out.println("1.Deposit\n2.Calculate compound interest\n3.Withdraw\n4.Display balance\n5.Cheque book facility\n6.Exit");
System.out.println("enter your choice");
chh=sc.nextInt();
switch(chh)
{
case 1:s.deposit();
      break;
```

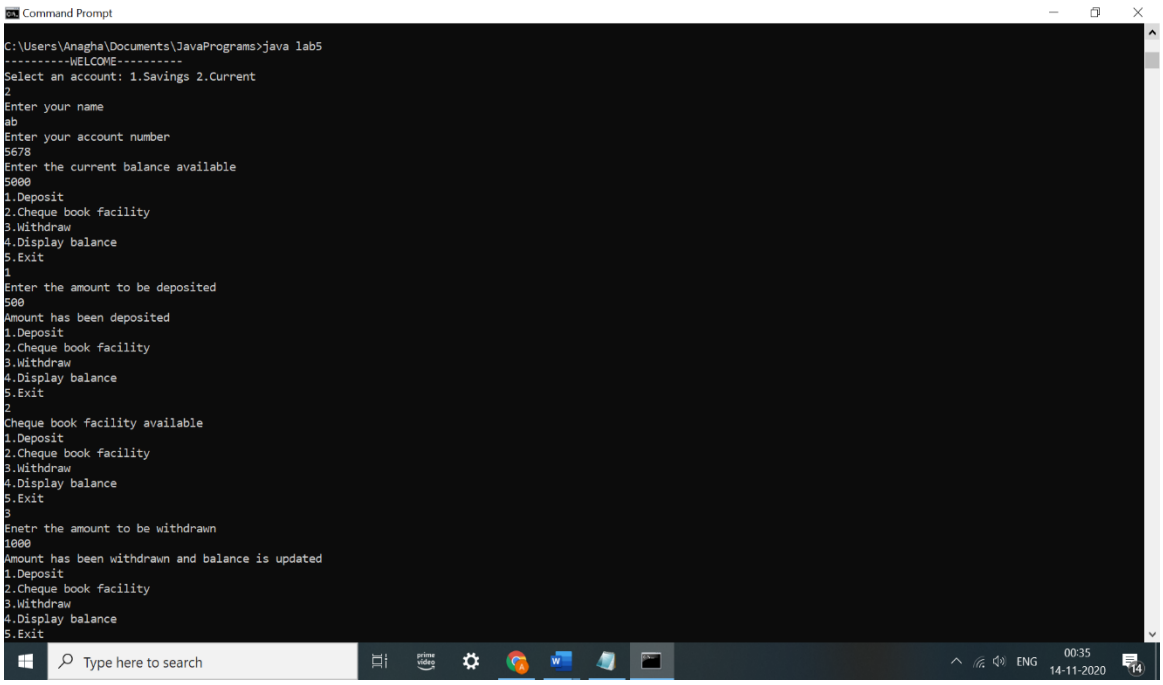
```
case 2:s.ci();
      break;
case 3:s.with_s();
      break;
case 4:s.display();
      s.putd();
      break;
case 5:s.check();
      break;
case 6:break;
default:System.out.println("Wrong option!");
       break;
}
}while(chh!=6);

}
else if(ch==2)
{
Current cr=new Current();
cr.get('C');
do{
System.out.println("1.Deposit\n2.Cheque book facility\n3.Withdraw\n4.Display balance\n5.Exit");
cch=sc.nextInt();
switch(cch)
{
 case 1:cr.deposit();
       break;
 case 2:cr.check();
       break;
 case 3:cr.with_c();
       break;
```

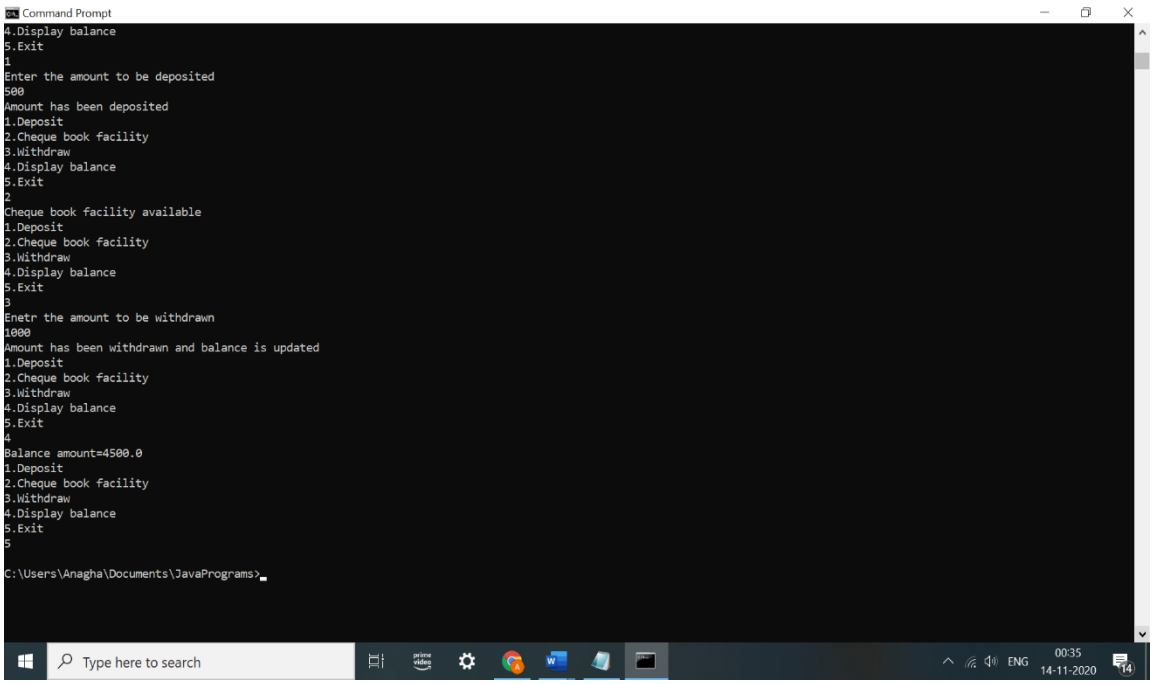
```
 case 4:cr.display();
        cr.putd();
        break;
 case 5:break;
 default:System.out.println("Wrong option!");
         break;
}
}while(cch!=5);
}
else
System.out.println("Wrong!");
}
}
```

OUTPUT:




Command Prompt
1
Interest is compounded and added to the balance
1.Deposit
2.Calculate compound interest
3.Withdraw
4.Display balance
5.Cheque book facility
6.Exit
enter your choice
3
Enter the amount to be withdrawn
500
Amount has been withdrawn and balance is updated
1.Deposit
2.Calculate compound interest
3.Withdraw
4.Display balance
5.Cheque book facility
6.Exit
enter your choice
5
Cheque book facility is unavailable
1.Deposit
2.Calculate compound interest
3.Withdraw
4.Display balance
5.Cheque book facility
6.Exit
enter your choice
4
Balance amount=6815.0
1.Deposit
2.Calculate compound interest
3.Withdraw
4.Display balance
5.Cheque book facility
6.Exit
enter your choice
6
C:\Users\Anagha\Documents\JavaPrograms>
Type here to search
ENG
00:33
14-11-2020

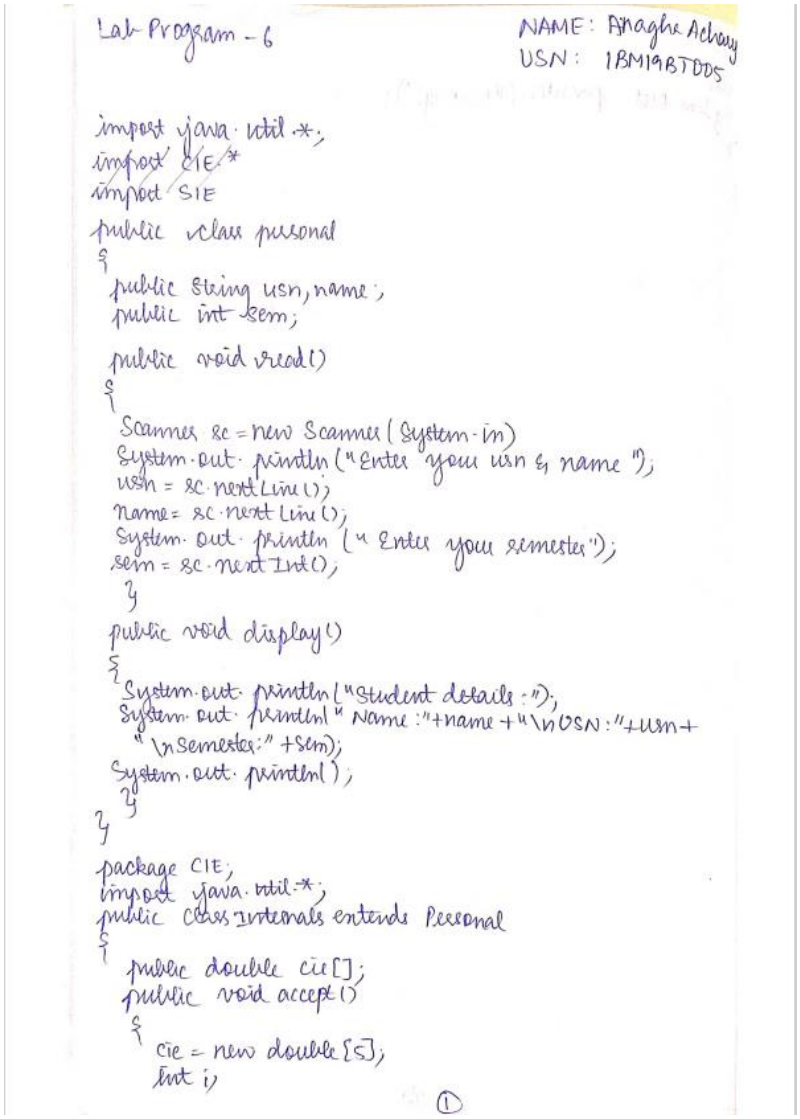

Command Prompt
C:\Users\Anagha\Documents\JavaPrograms>java lab5
----------WELCOME----------
Select an account: 1.Savings 2.Current
2
Enter your name
ab
Enter your account number
5678
Enter the current balance available
5000
1.Deposit
2.Cheque book facility
3.Withdraw
4.Display balance
5.Exit
1
Enter the amount to be deposited
500
Amount has been deposited
1.Deposit
2.Cheque book facility
3.Withdraw
4.Display balance
5.Exit
2
Cheque book facility available
1.Deposit
2.Cheque book facility
3.Withdraw
4.Display balance
5.Exit
3
Enetr the amount to be withdrawn
1000
Amount has been withdrawn and balance is updated
1.Deposit
2.Cheque book facility
3.Withdraw
4.Display balance
5.Exit
Type here to search
ENG
00:35
14-11-2020


Command Prompt
4.Display balance
5.Exit
1
Enter the amount to be deposited
500
Amount has been deposited
1.Deposit
2.Cheque book facility
3.Withdraw
4.Display balance
5.Exit
2
Cheque book facility available
1.Deposit
2.Cheque book facility
3.Withdraw
4.Display balance
5.Exit
3
Enetr the amount to be withdrawn
1000
Amount has been withdrawn and balance is updated
1.Deposit
2.Cheque book facility
3.Withdraw
4.Display balance
5.Exit
4
Balance amount=4500.0
1.Deposit
2.Cheque book facility
3.Withdraw
4.Display balance
5.Exit
5
C:\Users\Anagha\Documents\JavaPrograms>
Type here to search
ENG
00:35
14-11-2020

Lab Program-6

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.

OBSERVATION:



PROGRAM:

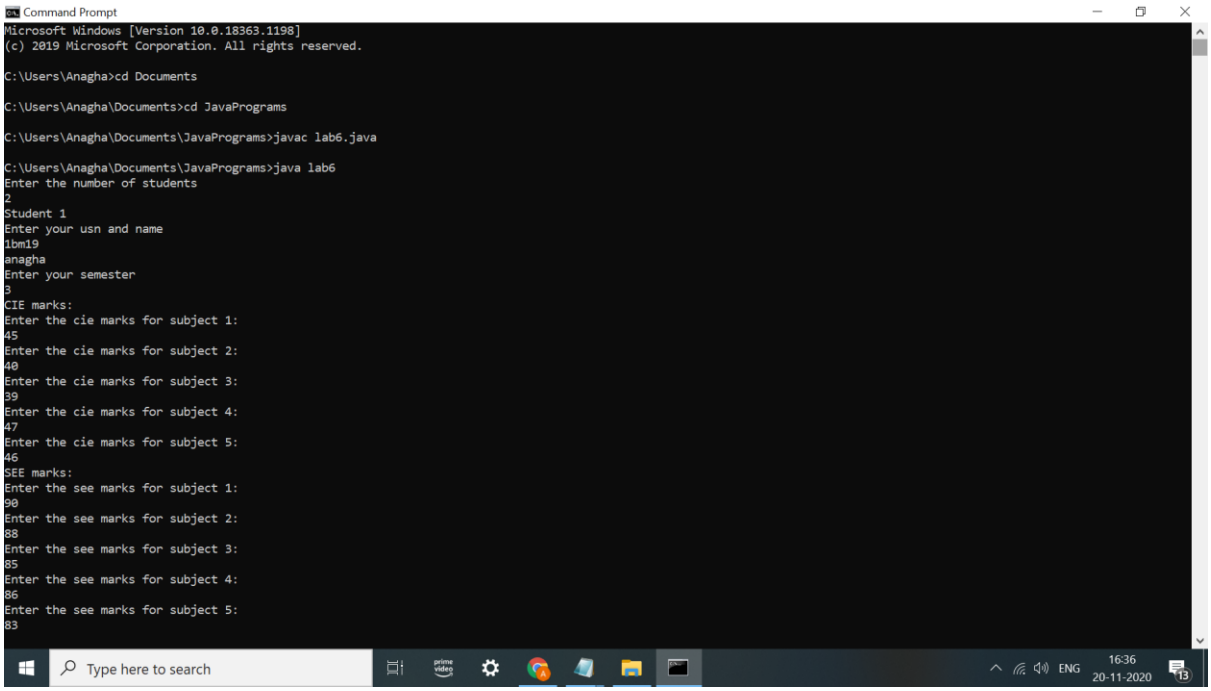
```
import java.util.*;

public class Personal

{

 public String usn,name;
```

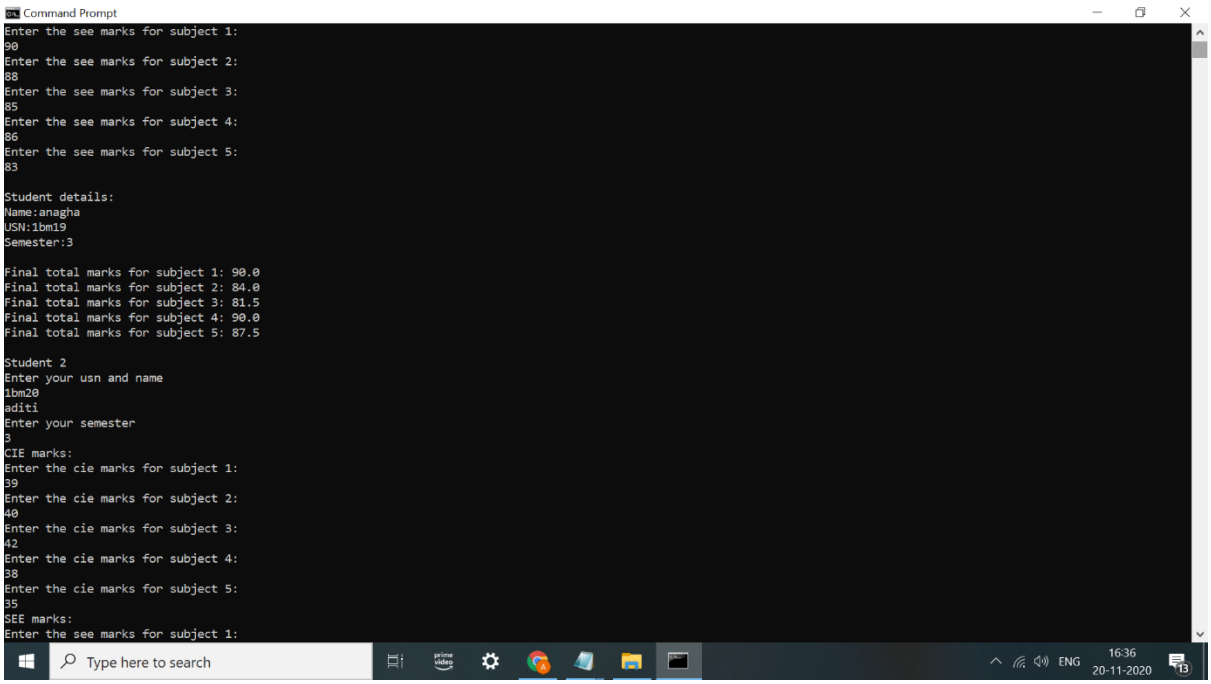
```
 public int sem;
 public void read()
 {
  Scanner sc=new Scanner(System.in);
  System.out.println("Enter your usn and name");
  usn=sc.nextLine();
  name=sc.nextLine();
  System.out.println("Enter your semester ");
  sem=sc.nextInt();
 }

 public void display()
 {
  System.out.println("Student details:");
  System.out.println("Name:"+name+"\nUSN:"+usn+"\nSemester:"+sem);
  System.out.println();
 }
}
package CIE;
import java.util.*;
public class Internals extends Personal
{
  public double cie[];
  public void accept()
   {
     cie=new double[5];
     int i;
     Scanner sc=new Scanner(System.in);
     for(i=0;i<5;i++)
     {
      System.out.println("Enter the cie marks for subject "+(i+1)+":");
```

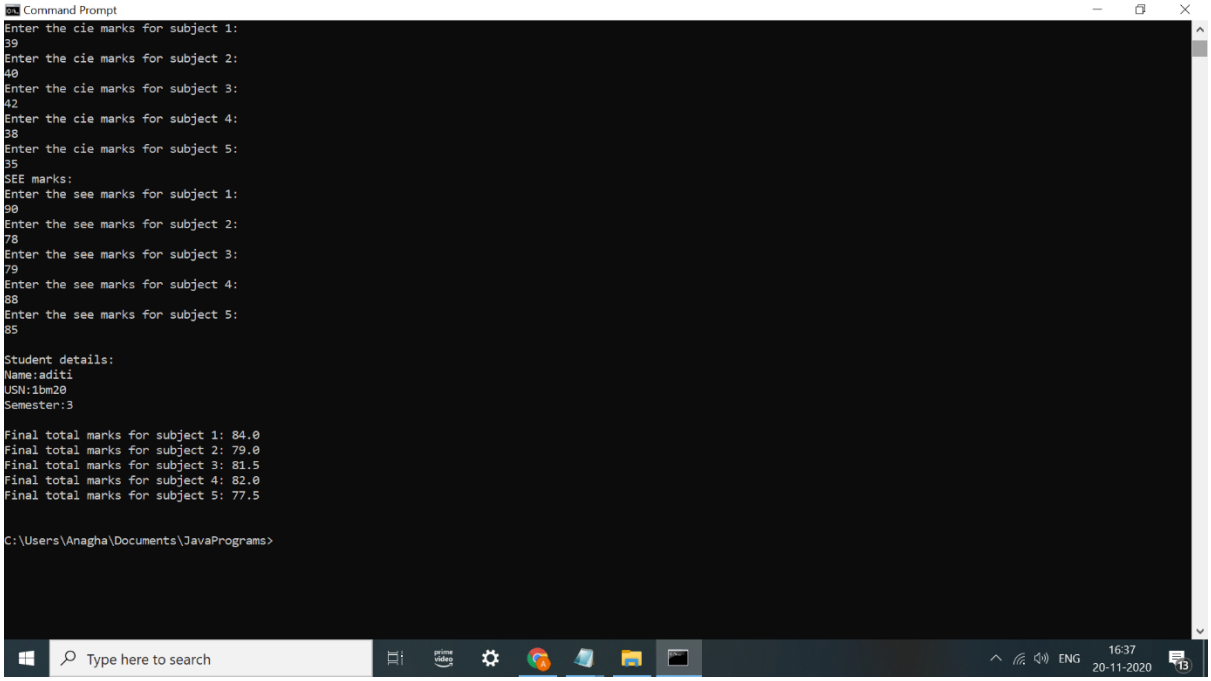
```
     cie[i]=sc.nextDouble();
    }
  }
}

package SEE;
import CIE.*;
import java.util.*;
public class External extends Personal
{
  public double see[];
  public void get()
  {
   see=new double[5];
   int i;
   Scanner sc=new Scanner(System.in);
   for(i=0;i<5;i++)
    {
     System.out.println("Enter the see marks for subject "+(i+1)+":");
     see[i]=sc.nextDouble();
    }
  }
}


import java.util.*;
import CIE.*;
import SEE.*;

class lab6
{
```

```
public static void main(String args[])
{
Scanner sc=new Scanner(System.in);
System.out.println("Enter the number of students");
int n=sc.nextInt();
CIE.Internals in[]=new CIE.Internals[n];
SEE.External en[]=new SEE.External[n];
int i,j;
for(i=0;i<n;i++)
 {
  System.out.println("Student "+(i+1));
  in[i]=new CIE.Internals();
  en[i]=new SEE.External();
  in[i].read();

 System.out.println("CIE marks:");
 in[i].accept();
 System.out.println("SEE marks:");
 en[i].get();
 System.out.println();
 in[i].display();
 for(j=0;j<5;j++)
   System.out.println("Final total marks for subject "+(j+1)+": "+(in[i].cie[j] + (en[i].see[j]/2)));
   System.out.println();
 }
}
}
```

OUTPUT:


Command Prompt
Microsoft Windows [Version 10.0.18363.1198]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\Anagha>cd Documents
C:\Users\Anagha\Documents>cd JavaPrograms
C:\Users\Anagha\Documents\JavaPrograms>javac lab6.java
C:\Users\Anagha\Documents\JavaPrograms>java lab6
Enter the number of students
2
Student 1
Enter your usn and name
1bm19
anagha
Enter your semester
3
CIE marks:
Enter the cie marks for subject 1:
45
Enter the cie marks for subject 2:
40
Enter the cie marks for subject 3:
39
Enter the cie marks for subject 4:
47
Enter the cie marks for subject 5:
46
SEE marks:
Enter the see marks for subject 1:
90
Enter the see marks for subject 2:
88
Enter the see marks for subject 3:
85
Enter the see marks for subject 4:
86
Enter the see marks for subject 5:
83
Type here to search
ENG
16:36
20-11-2020

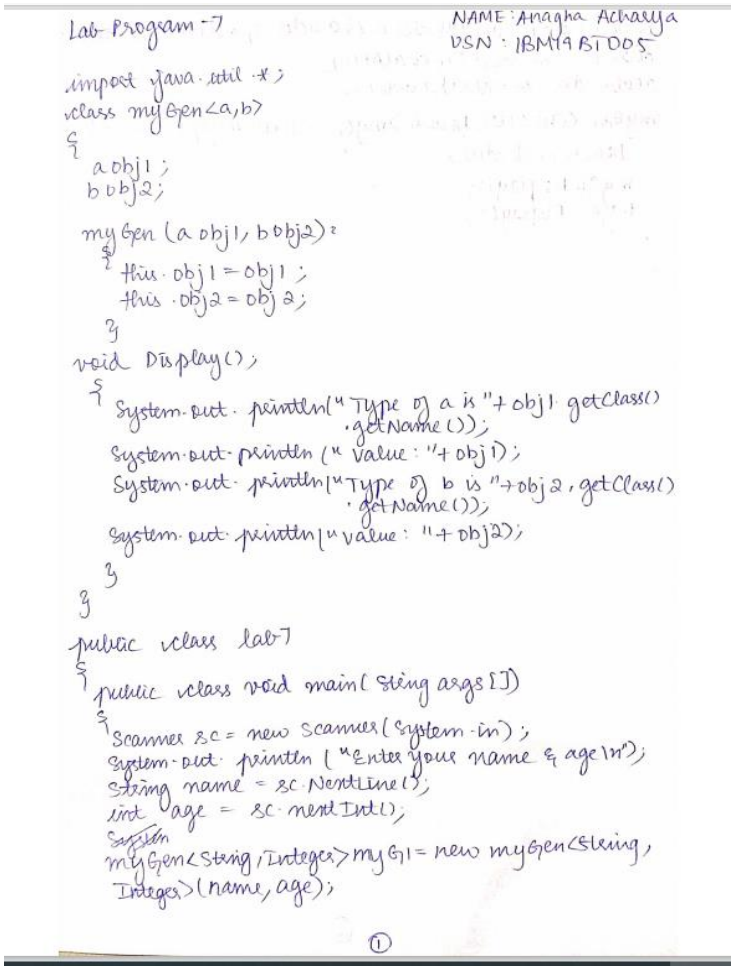

Command Prompt
Enter the see marks for subject 1:
90
Enter the see marks for subject 2:
88
Enter the see marks for subject 3:
85
Enter the see marks for subject 4:
86
Enter the see marks for subject 5:
83
Student details:
Name:anagha
USN:1bm19
Semester:3
Final total marks for subject 1: 90.0
Final total marks for subject 2: 84.0
Final total marks for subject 3: 81.5
Final total marks for subject 4: 90.0
Final total marks for subject 5: 87.5
Student 2
Enter your usn and name
1bm20
aditi
Enter your semester
3
CIE marks:
Enter the cie marks for subject 1:
39
Enter the cie marks for subject 2:
40
Enter the cie marks for subject 3:
42
Enter the cie marks for subject 4:
38
Enter the cie marks for subject 5:
35
SEE marks:
Enter the see marks for subject 1:
Type here to search
ENG
16:36
20-11-2020


Command Prompt
Enter the cie marks for subject 1:
39
Enter the cie marks for subject 2:
40
Enter the cie marks for subject 3:
42
Enter the cie marks for subject 4:
38
Enter the cie marks for subject 5:
35
SEE marks:
Enter the see marks for subject 1:
90
Enter the see marks for subject 2:
78
Enter the see marks for subject 3:
79
Enter the see marks for subject 4:
88
Enter the see marks for subject 5:
85
Student details:
Name:aditi
USN:1bm20
Semester:3
Final total marks for subject 1: 84.0
Final total marks for subject 2: 79.0
Final total marks for subject 3: 81.5
Final total marks for subject 4: 82.0
Final total marks for subject 5: 77.5
C:\Users\Anagha\Documents\JavaPrograms>
Type here to search
ENG
16:37
20-11-2020

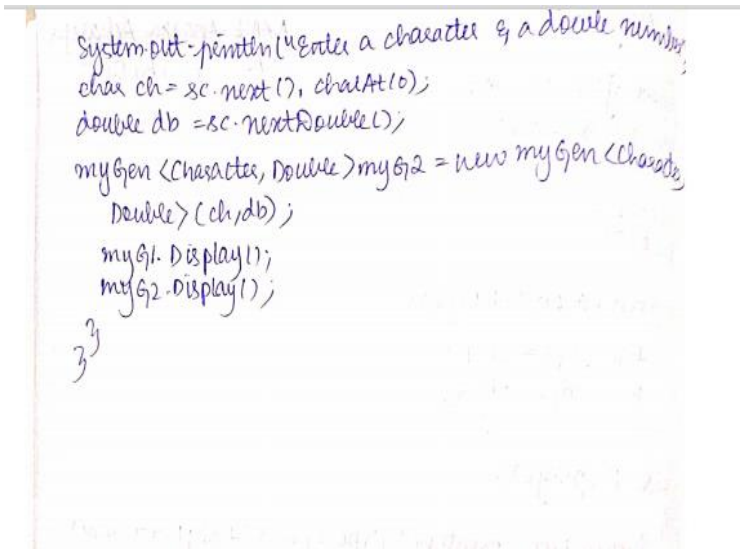
Lab program - 7

Write a program to demonstrate generics with multiple object parameters.

OBSERVATION:



```
Lab Program -7                                NAME : Anagha Acharya
                                              USN : 1BM19BTD05

import java.util.*;
class myGen<a,b>
{
  a obj1;
  b obj2;
  myGen (a obj1, b obj2){
    this.obj1 = obj1;
    this.obj2 = obj2;
  }
void Display();
  {
    System.out.println("Type of a is "+obj1.getClass()
                       .getName());
    System.out.println("Value : "+obj1);
    System.out.println("Type of b is "+obj2.getClass()
                       .getName());
    System.out.println("value : "+obj2);
  }
}
public class lab7
{
  public class void main(String args[])
  {
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter your name & age\n");
    String name = sc.NextLine();
    int age = sc.nextInt();
    System
    myGen<String,Integer> myG1 = new myGen<String,
    Integer>(name, age);
```

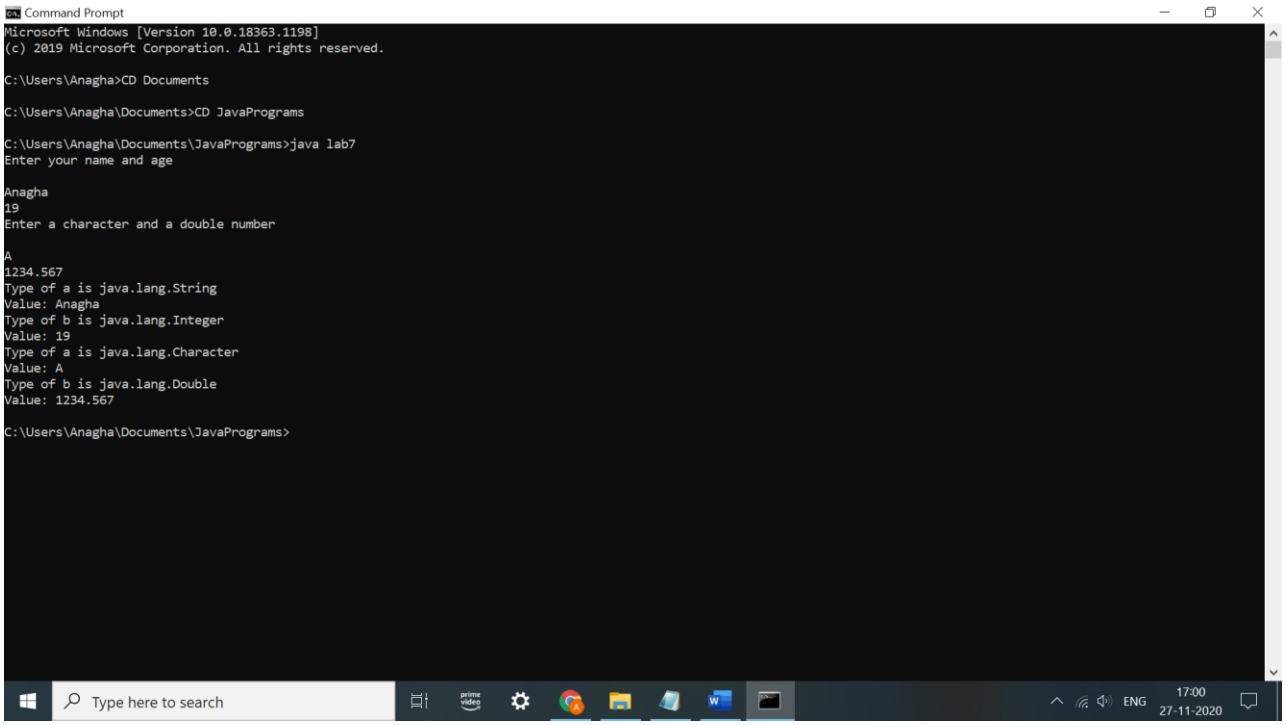
```
System.out.println("Enter a character & a double number");
char ch = sc.next().charAt(0);
double db = sc.nextDouble();
myGen <Character, Double> myG2 = new myGen <Character,
  Double>(ch,db);
  myG1.Display();
  myG2.Display();
}
}
```

PROGRAM:

```
import java.util.*;
class myGen<a,b>{
   a obj1;
   b obj2;

 myGen(a obj1, b obj2)
 {
    this.obj1 = obj1;
    this.obj2 = obj2;
 }
 void Display()
 {
    System.out.println("Type of a is " +obj1.getClass().getName());
    System.out.println("Value: "+obj1);
    System.out.println("Type of b is " +obj2.getClass().getName());
    System.out.println("Value: "+obj2);
 }

}
public class lab7{
   public static void main(String args[])
   {
      Scanner sc=new Scanner(System.in);
      System.out.println("Enter your name and age\n");
      String name=sc.nextLine();
      int age=sc.nextInt();
      myGen<String,Integer>myG1 = new myGen<String,Integer>(name,age);
      System.out.println("Enter a character and a double number\n");
      char ch=sc.next().charAt(0);
      double db=sc.nextDouble();
```

```
        myGen<Character,Double>myG2 = new myGen<Character,Double>(ch,db);
        myG1.Display();
        myG2.Display();
    }
}
```

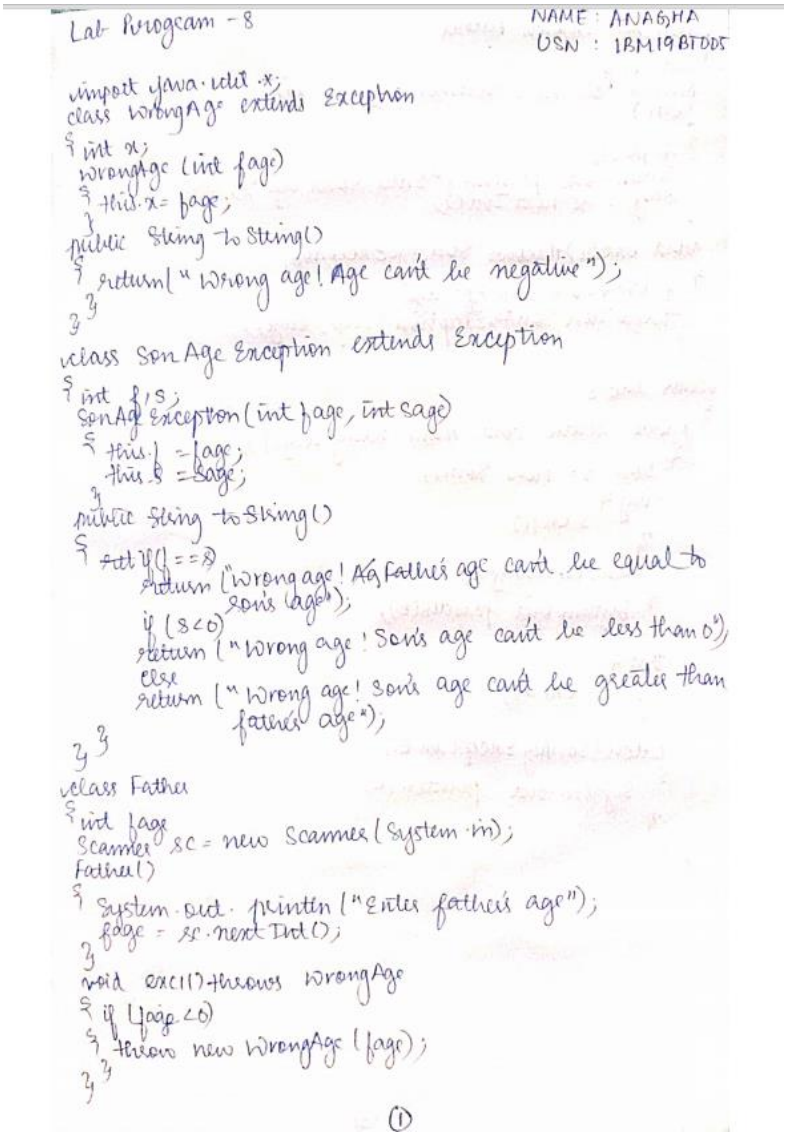
OUTPUT:



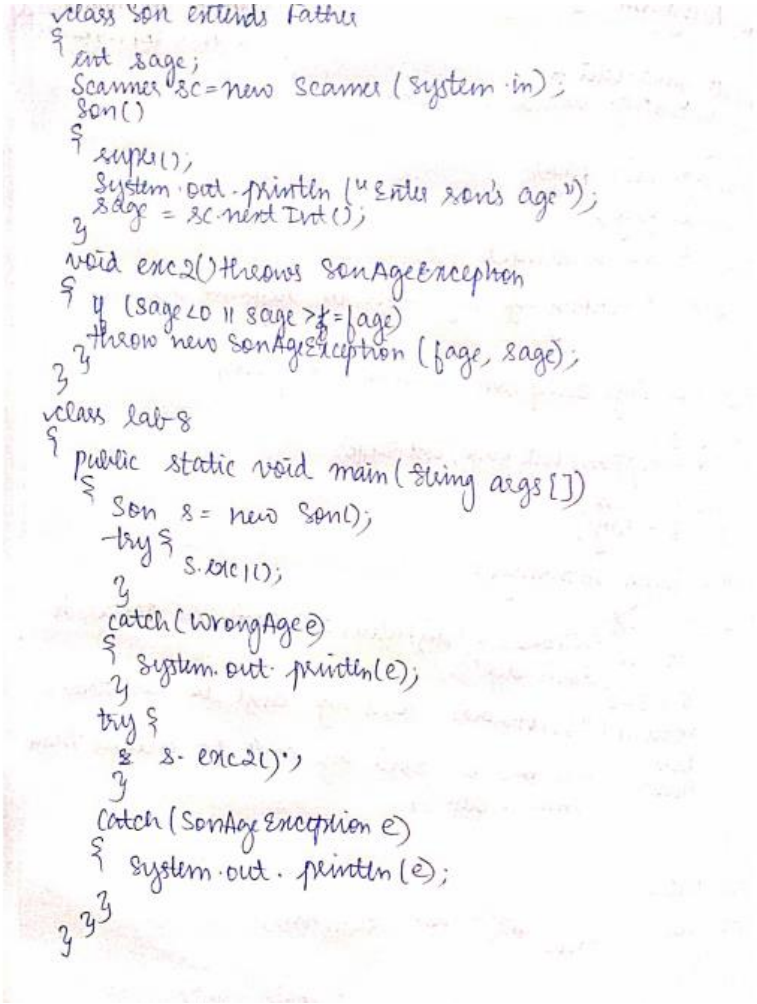
Lab Program - 8

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.

OBSERVATION:



```
Lab Program - 8                                NAME : ANAGHA
                                               USN : 1BM19BTD05

import java.util.*;
class WrongAge extends Exception
{ int x;
  WrongAge (int fage)
  { this.x= fage;
  }
public String toString()
  { return(" Wrong age! Age can't be negative");
  }
}
class SonAge Exception extends Exception
{ int f,s;
  SonAge Exception(int fage, int sage)
  { this.f =fage;
    this.s =sage;
  }
public String toString()
{ int if(f==s)
      return ("Wrong age! Ag Father's age can't be equal to
               Son's age");
      if (s<0)
      return ("Wrong age! Son's age can't be less than 0");
      else
      return ("Wrong age! son's age can't be greater than
               father's age");
}}
class Father
{ int fage
  Scanner sc = new Scanner(System.in);
  Father()
  { System.out.println("Enter father's age");
    fage = sc.nextInt();
  }
  void exc()throws WrongAge
  { if (fage<0)
    { throw new WrongAge (fage);
  }}
```



PROGRAM:

```
import java.util.*;
class WrongAge extends Exception
{
 int x;
 WrongAge(int fage)
 {
  this.x=fage;
 }
 public String toString()
 {
  return("Wrong age!Father's age can't be negative");
 }
```

```
}

class SonAgeException extends Exception
{
 int f,s;
 SonAgeException(int fage,int sage)
 {
  this.f=fage;
  this.s=sage;
 }
 public String toString()
  {
   if(f==s)
   return("Wrong age!Father's age can't be equal to son's age");
   if(s<0)
   return("Wrong age!Son's age can't be less than 0");
   else
   return("Wrong age!Son's age can't be greater than father's age");
  }
}

class Father
{
int fage;
Scanner sc=new Scanner(System.in);
 Father()
 {
  System.out.println("Enter the father's age");
  fage=sc.nextInt();
 }
 void exc1() throws WrongAge
```

```
 {
  if(fage<0)
   throw new WrongAge(fage);
 }
}
class Son extends Father
{
 int sage;
 Scanner sc=new Scanner(System.in);
 Son()
 {
  super();
  System.out.println("Enter the son's age");
  sage=sc.nextInt();
 }
 void exc2()throws SonAgeException
 {
  if(sage<0 || sage>=fage)
  throw new SonAgeException(fage,sage);
 }
}
class lab8
{
 public static void main(String args[])
 {
  Son s=new Son();
  try{
      s.exc1();
  }
  catch(WrongAge e)
  {
```

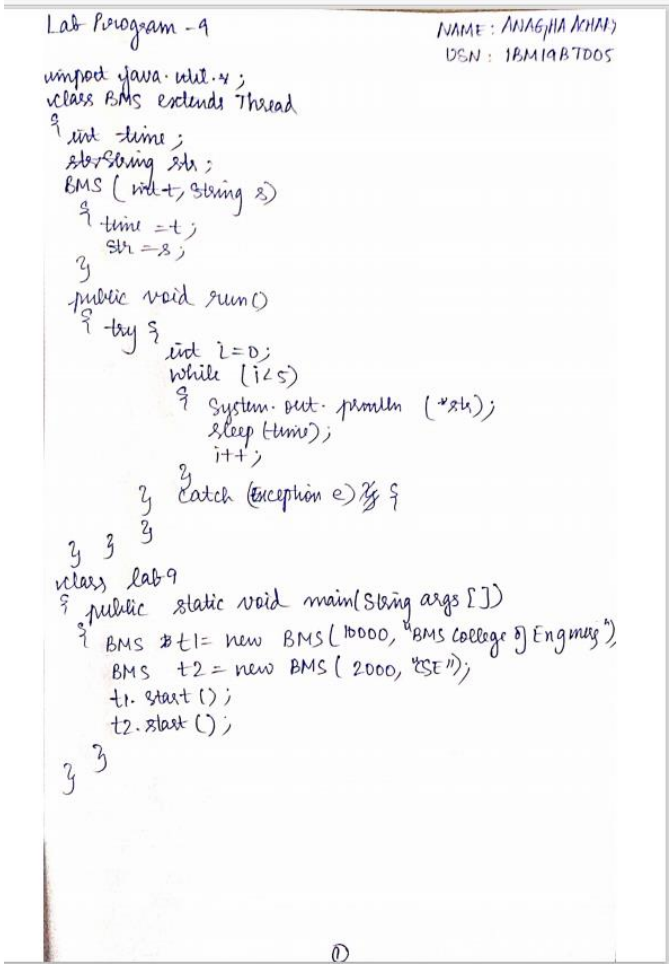
```
  System.out.println(e);
 }
 try{
    s.exc2();
 }
 catch(SonAgeException e)
 {
  System.out.println(e);
 }

}
}
```

OUTPUT

Lab Program- 9

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.

OBSERVATION:

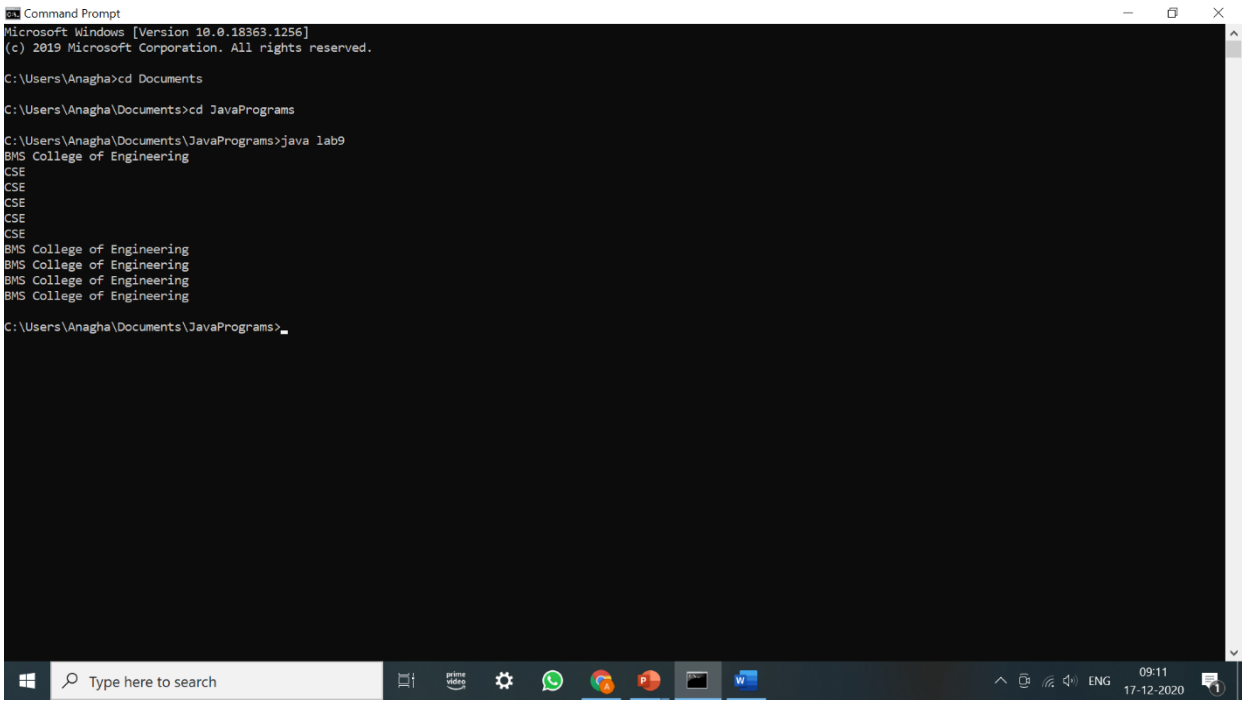


PROGRAM:

```
import java.util.Scanner;

class BMS extends Thread

{

 int time;

 String str;

 BMS(int t,String s)

 {

  time = t;
```

```
   str = s;
  }
  public void run()
  {
      try{
         int i=0;
         while (i<5)
         {
           System.out.println(str);
           sleep(time);
           i++;
         }
      } catch (Exception e){
      }
  }
}
class lab9
{
  public static void main(String args[])
  {
    BMS t1 = new BMS(10000,"BMS College of Engineering");
    BMS t2 = new BMS(2000,"CSE");
    t1.start();
    t2.start();
  }
}
```

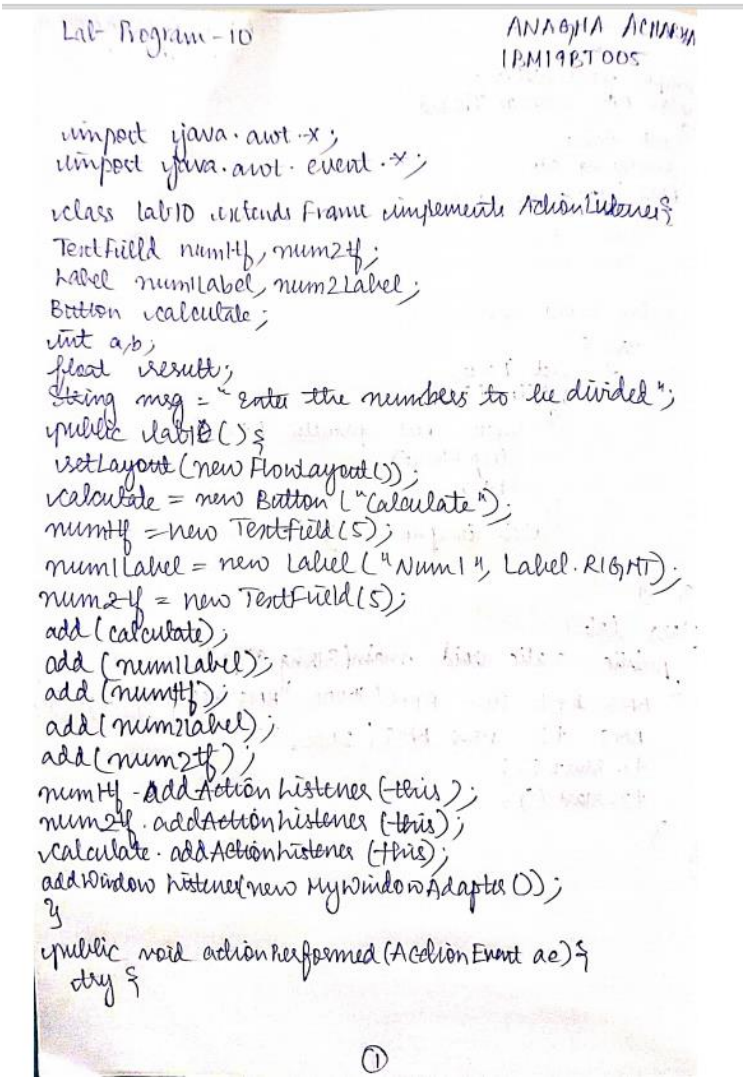
OUTPUT


Command Prompt
Microsoft Windows [Version 10.0.18363.1256]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\Anagha>cd Documents
C:\Users\Anagha\Documents>cd JavaPrograms
C:\Users\Anagha\Documents\JavaPrograms>java lab9
BMS College of Engineering
CSE
CSE
CSE
CSE
CSE
BMS College of Engineering
BMS College of Engineering
BMS College of Engineering
BMS College of Engineering
C:\Users\Anagha\Documents\JavaPrograms>
Type here to search
ENG
09:11
17-12-2020

LAB PROGRAM 10

Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

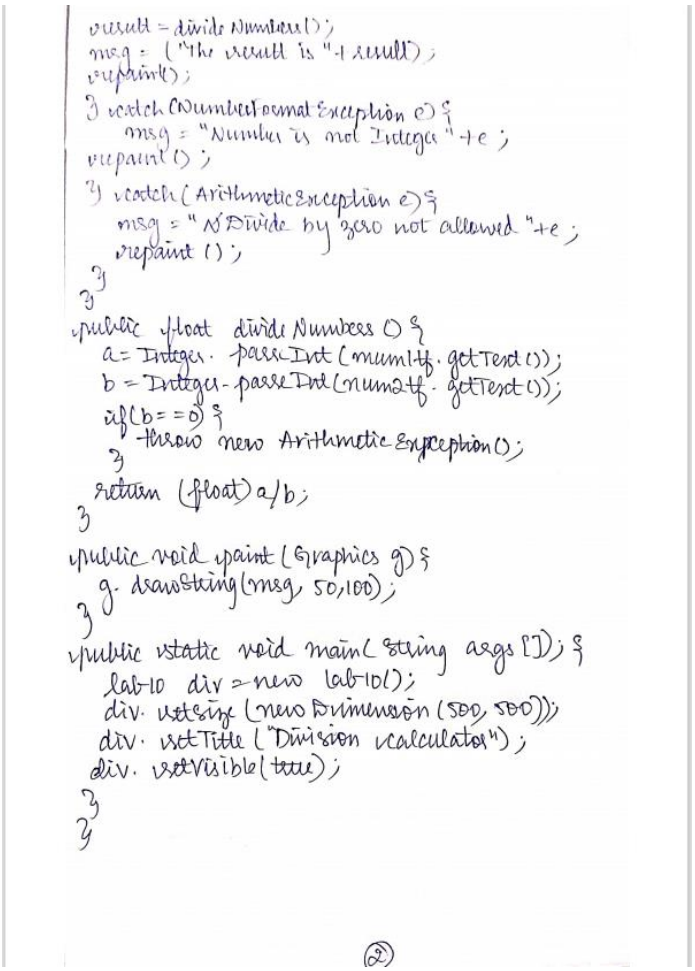
OBSERVATION:



Lab Program - 10

ANAGHA ACHARYA
1BM19BT005

```
import java.awt.*;
import java.awt.event.*;
class lab10 extends Frame implements ActionListener{
TextField num1tf, num2tf;
Label num1Label, num2Label;
Button calculate;
int a,b;
float result;
String msg = "Enter the numbers to be divided";
public lab10(){
setLayout(new FlowLayout());
calculate = new Button("Calculate");
num1tf = new TextField(5);
num1Label = new Label("Num1", Label.RIGHT);
num2tf = new TextField(5);
add(calculate);
add(num1Label);
add(num1tf);
add(num2label);
add(num2tf);
num1tf.addActionListener(this);
num2tf.addActionListener(this);
calculate.addActionListener(this);
addWindowListener(new MyWindowAdapter());
}
public void actionPerformed(ActionEvent ae){
  try{
```



```
result = divideNumbers();
msg = ("The result is "+result);
repaint();
} catch(NumberFormatException e){
    msg = "Number is not Integer "+e;
repaint();
} catch(ArithmeticException e){
    msg = "\nDivide by zero not allowed "+e;
    repaint();
}
}
public float divideNumbers(){
  a=Integer.parseInt(num1tf.getText());
  b=Integer.parseInt(num2tf.getText());
  if(b==0){
    throw new ArithmeticException();
  }
  return (float)a/b;
}
public void paint(Graphics g){
  g.drawString(msg,50,100);
}
public static void main(String args[]){
  lab10 div=new lab10();
  div.setSize(new Dimension(500,500));
  div.setTitle("Division Calculator");
  div.setVisible(true);
}
}
```

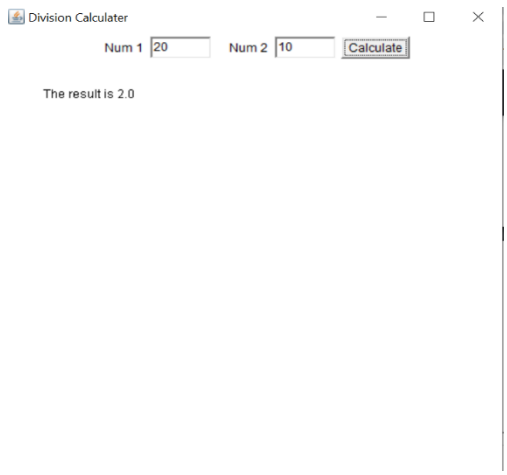
PROGRAM:

```
import java.awt.*;
import java.awt.event.*;
class lab10 extends Frame implements ActionListener{
 TextField num1tf;
 TextField num2tf;
 Label num1Label,num2Label;
 Button calculate;
 int a,b;
 float result;
 String msg="Enter the numbers to be divided";
 public lab10()
```

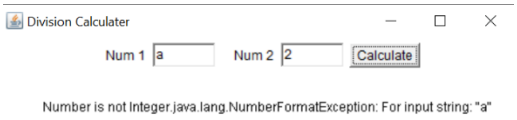
```
{
setLayout(new FlowLayout());
calculate=new Button("Calculate");
num1tf=new TextField(5);
num1Label=new Label("Num 1",Label.RIGHT);
num2tf=new TextField(5);
num2Label=new Label("Num 2",Label.RIGHT);
add(num1Label);
add(num1tf);
add(num2Label);
add(num2tf);
add(calculate);
num1tf.addActionListener(this);
num2tf.addActionListener(this);
calculate.addActionListener(this);
addWindowListener(new MyWindowAdapter());
}
public void actionPerformed(ActionEvent ae){
try{
result=divideNumbers();
msg=("The result is "+result);
repaint();
}catch(NumberFormatException e){
msg="Number is not Integer."+e;
repaint();
}catch(ArithmeticException e){
msg="Divide By zero not allowed."+e;
repaint();
}
}
public float divideNumbers(){
```

```
a=Integer.parseInt(num1tf.getText());
b=Integer.parseInt(num2tf.getText());
if(b==0){
throw new ArithmeticException();
}
return (float)a/b;
}
public void paint(Graphics g){
g.drawString(msg,50,100);
}
public static void main(String args[]){
lab10 div=new lab10();
div.setSize(new Dimension(500,500));
div.setTitle("Division Calculater");
div.setVisible(true);
}
}
class MyWindowAdapter extends WindowAdapter{
public void windowClosing(WindowEvent event){
System.exit(0);
}
}
```

OUTPUT:




Division Calculater
Num 1
20
Num 2
0
Calculate
Divide By zero not allowed.java.lang.ArithmeticException


Division Calculater
Num 1
a
Num 2
2
Calculate
Number is not Integer.java.lang.NumberFormatException: For input string: "a"