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.

09/10/2020

1BM19CS172
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LAB program-1

To find the roots of quadratic equation. using Java.

```
import java.util.Scanner;
class Rootsofquadraticequation{
public static void main(String[] args){
int a, b, c;
double dis, x1, x2;
Scanner myobject = new Scanner(System.in);
System.out.println("Enter the values of a,b and c");
a = myobj.nextInt();
b = myobj.nextInt();
c = myobj.nextInt();
dis = b*b - 4*a*c;
if(a==0 && b==0)
System.out.println("No roots exist");
else if(dis>=0)
{ System.out.println("The Roots of quadratic
                      equation are");
  x1 = (-b+Math.sqrt(b*b-4*a*c))/(2*a);
  x2 = (-b-Math.sqrt(b*b-4*a*c))/(2*a);
  System.out.println("x1="+x1+"\n x2="+x2);
}
else if(dis==0)
{ system.out.println("The Roots of quadratic
                      equation are");
```

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$x_1 = -b / (2*a)$;

$x_2 = -b / (2*a)$;

System.out.println("$x_1 = x_2 =$" + x_1);

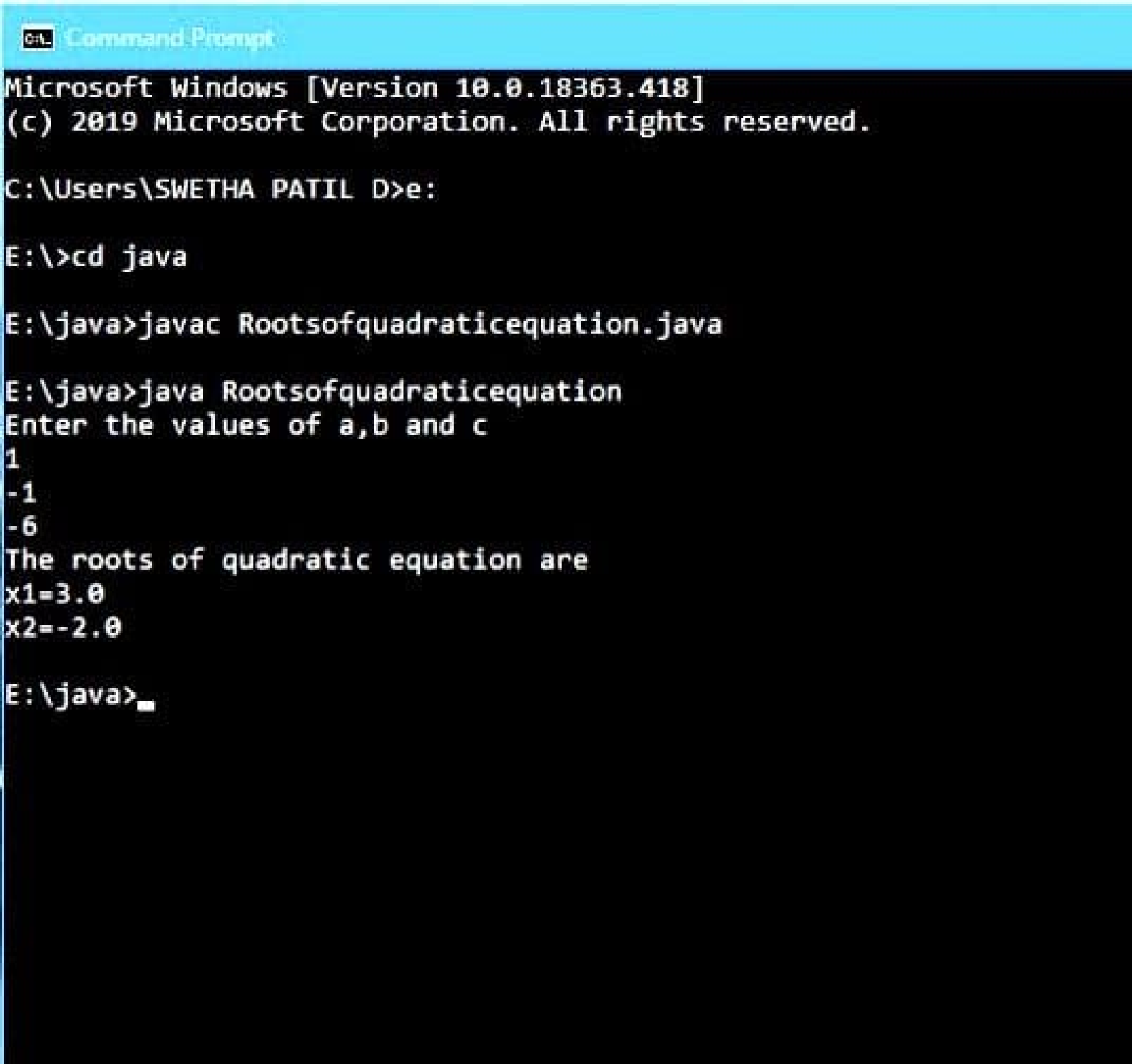
}.

if (dis < 0)

System.out.println("No real roots exist");

}

}


Command Prompt
Microsoft Windows [Version 10.0.18363.418]
(c) 2019 Microsoft Corporation. All rights reserved.
C:\Users\SWETHA PATIL D>e:
E:\>cd java
E:\java>javac Rootsofquadraticequation.java
E:\java>java Rootsofquadraticequation
Enter the values of a,b and c
1
-1
-6
The roots of quadratic equation are
x1=3.0
x2=-2.0
E:\java>

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.

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LAB program 2

```
import java.util.Scanner;
class Student {
    String USN;
    String name;
    int credits[] = new int[10];
    int marks[] = new int[10];

void accept()
{
    int i;
    Scanner myobj = new Scanner(System.in);
    System.out.println("Enter the usn of student");
    usn = myobj.nextLine();
    System.out.println("Enter name");
    name = myobj.nextLine();
    System.out.println("Enter the credits and marks");
for(i=0; i<5; i++)                    // for 5 subjects
{   System.out.println("Enter the credits for Subject"+(i+1));
    credits[i] = myobj.nextInt();
    System.out.println("Enter the marks of subject"+
                       (i+1) + ":");
    marks[i] = myobj.nextint();
  }
 }
void display()
 { System.out.println("USN:"+usn);
  System.out.println("Name:"+Name);
  for(int i=0; i<5; i++)
  { System.out.println("credits of subject"+(i+1)+":"+credits[i]
```

```
System.out.println("Marks of subject"+(i+1)+":"+marks[i]);
}
}
double calc_sgpa()
{
    int grade_points[]=new int[10], i;
    for(i=0; i<5; i++)
    { if (marks[i]>=90)
        grade_points[i]=10;
      if (marks[i]>=80 && marks[i]<90)
        grade_points[i]=9;
      if (marks[i]>=70 && marks[i]<80)
        grade_points[i]=8;
      if (marks[i]>=60 && marks[i]<70)
        grade_points[i]=7;
      if (marks[i]>=50 && marks[i]<60)
        grade_points[i]=6;
      if (marks[i]>=40 && marks[i]<50)
        grade_points[i]=4;
      if (marks[i]>=0 && marks[i]<40)
        grade_points[i]=0;
    }
    double numerator=0, sum_credits=0, sgpa;
    for(i=0; i<5; i++)
    { numerator+=grade_points[i]*credits[i];
      sum_credits+=credits[i];
    }
    sgpa=numerator/sum_credits;
    return sgpa;
  }
}
class Student_program{
public static void main(String[] args){
  double SGPA;
  Student s=new student();
  s.accept();
  s.display(); SGPA=calc_sgpa();
System.out.println("SGPA is :"+SGPA); } }
```

```
E:\java>javac Student_Program.java

E:\java>java Student_Program
Enter the usn of student
1BM19CS168
Enter the name of student
Swetha
Enter the credits and marks
Enter the credits for Subject1:
5
Enter the marks of Subject1:
95
Enter the credits for Subject2:
4
Enter the marks of Subject2:
94
Enter the credits for Subject3:
4
Enter the marks of Subject3:
89
Enter the credits for Subject4:
4
Enter the marks of Subject4:
88
Enter the credits for Subject5:
3
Enter the marks of Subject5:
91
USN:1BM19CS168
Name:Swetha
Credits of Subject1:5
Marks of Subject1:95
Credits of Subject2:4
Marks of Subject2:94
Credits of Subject3:4
Marks of Subject3:89
Credits of Subject4:4
Marks of Subject4:88
Credits of Subject5:3
Marks of Subject5:91
SGPA is: 9.6

E:\java>java Student_Program
```

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.

6/11/2020

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Lab program-3

```
import java.util.*;
class Book {
 String name;
 String author;
 int num_pages;
 double price;
  Book () {
        this.name = " ";
        this.author = " ";
        this.num_pages = 0;
        this.price = 0.0;
        }
void accept ()
 { Scanner sc = new Scanner(System.in);
    System.out.println("Enter name & author");
     name = sc.nextLine();
     author = sc.nextLine();
    System.out.println ("Enter pages & price");
     num_pages = sc.nextInt();
     price = sc.nextDouble();
    }
public string toString()
{ return("details; book name:" + name + "author=" +
          author + "price:" + price + "pages=" + pages);
}
}
```

```
class Book1 {
Public static void main(String[] args).
{  Scanner sc = new Scanner(System.in);
System.out.println("Enter numbr of books");
int num = sc.nextInt();
Book obj[] = new Book[num];
for(int i=0; i<num; i++)
{
obj[i] = new Book();
obj[i].accept();
System.out.println(obj[i]);
}
}
}
```

```
E:\javalabprograms>javac Book1.java

E:\javalabprograms>java Book1
enter number of books
2
enter name and author of book
Higher engineering mathematics
B V Ramana
enter pages and price of book
1000
1000
details:
book name:Higher engineering mathematics
 author:B V Ramana
price=1000.0
 number of pages:1000
enter name and author of book
abc
xyz
enter pages and price of book
2500
1500.5
details:
book name:abc
 author:xyz
price=1500.5
 number of pages:2500

E:\javalabprograms>
```

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.

09/11/2020

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Swetha Patil

Lab Program-4

```
import java.util.*;
abstract class shape{
  int i, j;
  abstract void printArea(double i, double j);
  }
class Rectangle extends shape {
  void printArea(double i, double j)
  { System.out.println("Area of rectangle = "+(i*j));
  } }
class Triangle extends shape {
  void printArea(double i, double j)
  { System.out.println("Area of triagle = "+(1.0/2.0*i*j));
  } }
class Circle extends Shape {
  void printArea(double i, double j)
  { System.out.println("Area of circle = "+(3.142*i*j));
  } }
class Labprogram4 {
  public static void main(String[] args){
  double l, b, base, h, r;
  Scanner sc = new Scanner(System.in);
Rectangle re = new Rectangle(); Triangle t = new Triangle();
Circle c = new Circle();
l = sc.nextDouble(); b = sc.nextDouble(); re.printArea(l,b);
base = sc.nextDouble(); h = sc.nextDouble(); t.printArea(base,h);
r = sc.nextDouble(); c.Circle(r,r);
} }
```

```
E:\>cd javalabprograms

E:\javalabprograms>javac Labprogram4.java

E:\javalabprograms>java Labprogram4
Enter the length and breadth of the rectangle
10
20
Area of rectangle= 200.0
Enter the base and height of the triangle
50
43
Area of triangle= 1075.0
Enter the radius of the circle
25
Area of circle= 1963.75

E:\javalabprograms>
```

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 inte and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Cur rent 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.

09/11/2020

Lab program-5

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```
import java.util.Scanner;
class Account{
String cus_name;
int acct_no;
int acct_type;
double balance;
double deposite;
void accept()
{ Scanner sc = new Scanner(System.in)
  System.out.println("Enter your name,Account no,balan
   cus_name = sc.nextline();
    acct_no = sc.nextInt();
     balance = sc.nextDouble();
}
void display()
   { System.out.println("Name:"+cus_name+"\n
        Account no.:"+acct_no+"\nBalance:"+balan
   }
void deposit()
  { Scanner sc, new Scanner(System.in);
    System.out.println("Enter the amount to be
          deposited");
     deposit = sc.nextDouble();
      balance = balance + deposit;
  }
class Saving_acct extends Account{
  double interest; doubl rate=10;
  double comp_interest()
  { System.out.println("Enter the time");
```

```
        double time = sc.nextDouble();
        double interest = balance * (Math.pow(1+rate/100,time)
        return interest;
    }
    void updatebalance()
    { balance = balance + comp_interest();
      System.out.println("Balance:" + balance);
      return;
    }
void withdraw()
    { double amt;
      Scanner sc = new Scanner(System.in);
      amt = sc.nextDouble();
      if (amt > balance)
        { System.out.println("withdrawal is not
            possible");
        }
      else
        { System.out.println("amount + " has been
            withdrawn");
          balance = balance - amt;
        }
    }
double displaybalance()
    { return balance;
    }
}
class Current_acct extends Account {
  double amt, penalty = 50;
  double min_balance = 500.0;
```

```
void checkbalance() {
    if (balance < min_balance)
    { System.out.println("Penalty is imposed");
      balance = balance - penalty;
    }
    else
    }   return;
}
void withdraw() {
      amt = sc.nextDouble();
       if (amt > balance)
    System.out.println("withdrawal is not possible");
       else
           { balance = balance - amt;
             checkbalance();
           }
    }
class Bank {
    public static void main(String [] args) {
    int acct_type;
    Savings_acct s = new Savings_acct;
    Current_acct c = new Current_acct;
    System.out.println("choose the type of account
                        1. Savings\n 2. Current");

    if(acct_type==1)
       { s.accept();
         s.display();
         s.deposit();
         s. withdraw updatebalance; s.withdrawal();
       }
    if (acct_type==2)
       { c.accept(); c.display(); c.deposit();
    } } c.withdraw();
```

```
E:\javalabprograms>java Bank
Choose the type of account
1.Savings acccount
2.Current account
2
Enter your name
swetha patil
Enter your account number
987654321
Enter balance
500
Name: swetha patil
Account number: 987654321
Balace: 500.0
Cheque book facility will be given
What do you like to do?
1.Deposit money
2.Withdraw money
3.Display balance
4.Exit
1
Enter the amount to be deposited
500
Rupees 500.0 has been deposited
What do you like to do?
1.Deposit money
2.Withdraw money
3.Display balance
4.Exit
2
Enter the amount to be withdrawn
600
A penalty of 50.0is imposed as your balance is less than the minimum balance
What do you like to do?
1.Deposit money
2.Withdraw money
3.Display balance
4.Exit
3
The balance amount is 350.0
What do you like to do?
1.Deposit money
2.Withdraw money
3.Display balance
```