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.

```
Java phoghum 1
                        Quadratic equations
impat java util . Scanner, impat java lang . Math,
public doss Quad ?
         public static void min (string any [])
             System.out. println ("Enter values of a, to and a of a quadratic equation");
              Scanner Science (System.in);
              int a, b, C;
              a = sc. next Int ();
              b = sc-next Int ();
              c = sc -next Int ()i
              double d, x1, x2;
                 System out println ("Equation does not have need groots"); 5
              d= 6 b - 4 a L;
              11 (dL0)
              { 21 = (-b + Hath. sight(d))/(2*a); 
22 = (-b - Hath. sight(d))/(2*a);
              else
                  System.out-printly ("Roots are: Wx1="+x1"+ mx2="+x2);
              3
         4
```

```
C:\Users\misaf\Desktop\OOJ-LAB>javac Quad.java

C:\Users\misaf\Desktop\OOJ-LAB>java Quad

Enter values of a,b and c of a quadratic equation:

1

10

4

Roots are:

x1=-0.41742430504416017

x2=-9.582575694955839

C:\Users\misaf\Desktop\OOJ-LAB>java Quad
```

```
C:\Users\misaf\Desktop\OOJ-LAB>java Quad
Enter values of a,b and c of a quadratic equation:
10
3
9
Equation does not have any real roots!
```

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.

```
Java Program 2 Student Uss :
import java wills Scanned;
dus Shedoet
     power spring un;
            Many name;
     private
                        = new inters
            inter outili
            (416) moth - new (WET)
      private
      void get Deta ()
            Scaurer SI = new Scauner (System.in);
            System out printle ("Enter student use");
       1
             System and posselles (" Enter name: ");
            un = st. next()
              name = si. next()
              jut ii
              ( system out printly ( Enter streets of sub "+ (147);
                  ordila [i] = st. nextTub(1)
                  System. out printle ("Enler moth "+ (ir));
                   mak[i] = on next Tut ();
          3
          flood decalculate ()
            int 1=0, gra;
              Hook told:0; td:01
              for(100; ics : in)
                     il (maksti)>=70)
                             314:10%
                      else if (mahy(i) > =80)
                              gra = 9;
                      che il (marter [i] >= 70)
                              gra = 8 j
                      che of (month(i) 7=60)
                                 gra = 7
                              ( milli) >= 50)
                                   gra = 6
```

```
else

JPA = 3;

total = total + creditation JPA;

total = total + creditation JPA;

total = total + creditation JPA;

reduction ( total (Ed.);

reduction ( "VIN : "+UNN);

system. out. possible ( "Name: " , name);

system. out. possible ( "SapA: " , colouble (1);

system. out. possible ( "SapA: " , colouble (1);

system. out. possible ( Storing adapt )

The public shorter void make ( Storing adapt )

Should some shorter (1);

system (1);

system (1);
```

```
Enter student usn
1BM19CS000
Enter student name
KARAN
Enter credits of subject1
Enter marks of subject1
Enter credits of subject2
Enter marks of subject2
Enter credits of subject3
Enter marks of subject3
90
Enter credits of subject4
Enter marks of subject4
60
Enter credits of subject5
Enter marks of subject5
USN :1BM19CS000
Name : KARAN
Sgpa :8.933333
C:\Users\misaf\Desktop\OOJ-LAB>
```

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.

```
Book Ulw:
impat java-util. Sunner,
day Book
      String name;
      othing author;
      String plus;
      String num- pages;
       public Book (18
             rume: "ate")
             author: "xyz";
             price = "works" i
             numprogu = "500";
       void get Osta ()
         Sannel SI = new Schuner (System. in);
          System-out-println (" Enter Book name: ");
           nume = SI.next();
          System - out printly ("Enter author name: ");
          autho : 51. next[]'
          System at product (" Enter partie: ");
          pull : si. next();
           System. out privath (" Ever pager:");
           num-pgn = 51- next(1),
          retwork "Book" + namer " ( n Audler : "sather +" ( nPrice : " + price +" ( n Number
       public String to String (1 8
                  t pages: "+num-pages);
        4
```

```
public dos BookMin
        public shake void main (string atys (7)
              Book obj = New Book(),
             System out possulla ("Contounter volues:");
             System out paidle ( obj . h Staing (1);
             System out privater ("Enter number of books:"1;
             Sunner 5 = new Scanner ( System. in );
             n = s = next Int ();
             Book [] ob= newBook (4);
             18 (1=0; iln; ix+)
                   06 (1) = new Book (1)
                   06[1] = getDIn (1),
              System. out. privatly (" Dehils: ")",
             fa (1=0 ; ich; i+1)
                 System.out-println (ob[i]. hodlering());
```

```
C:\Users\misaf\Desktop\OOJ-LAB>java BookMain
Constructor values:
Book: abc
Author: xyz
Price: 100rs
Number of pages: 500
Enter number of books:
Enter Book name:
Enter Author name:
jake
Enter Book price:
Enter number of pages:
1000
Enter Book name:
gwert
Enter Author name:
jon
Enter Book price:
Enter number of pages:
100
```

```
Details of all books:
Book: 1
Book: abc
Author: jake
Price: 300
Number of pages: 1000
Book: 2
Book: qwert
Author: jon
Price: 600
Number of pages: 100
```

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.

```
Week 8
Shoper
(ode:
  impat java. util. sunner;
   abstract does Shapes !
          int a i
          jut by;
          abstruct void print Arren (1;
    chas Kerbuyli exkert Shuges ?
           void printfree ()
           { System out printly (" Aren of Kentenyle:
     dus Grule extents Shiper !
           void print Area (1
          E system. at printle ("Arren of linde:
     Uns Triangle extends Shapes (
          { System-out-println("Area of Triangle:"+0.5 ~ arb);
      public dass Shopesthain ?
           public shall void mais (String erys [7)
```

```
Sound Sc= new Scanner (system.in);
Restaryle
        91 = new Rectaryle ();
Circle
         c = new Circle (1;
         t = new Thingh ();
int check = 1, choice;
while ( check == 1)
E system. out printly (" Enter chie : (n) Rectaylez) Circle (n3)
                       Truingle (n 4) Exit");
   choice = sc. next[wt();
  switch (choice)
  COR 1: System. act. printly ("Enter length & brendth: ");
            91. a = Sc. nextInt();
             M.b = Sc. next Intl);
             n. print Areal);
  cose 2: System out printh ("Enter guadius of Circle:");
            (.a = sc.next [ut();
            c-printAren () i
            System.out. printly ("Enter height
  WK 3:
             t.a= sc.nextInt();
             t.b = sc. next Int(1);
             t. print Aren ();
          : their = 0;
```

```
C:\Users\misaf\Desktop\OOJ-LAB\Week8>java ShapesMain
Enter choice:
1)Rectangle
2)Circle
3)Triangle
4)Exit
Enter height and base of triangle:
10
10
Area of Triangle: 50.0
C:\Users\misaf\Desktop\OOJ-LAB\Week8>java ShapesMain
Enter choice:
1)Rectangle
2)Circle
3)Triangle
4)Exit
```

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.

```
Week 8
 Bank:
importiona will Schner;
import java lary . Moth;
closs Account (
  String name
    jut au rum;
    int type i
    double bolone = 0;
    vid accept_deposit ()
        Scanner Science Scanner (System. in)
       System out printly ("Enter amount to be deposited");
       float depoi
       depo = sc. next Floot ();
        blance = blance + depo ;
     void withdrawl)
            Scanner SC= new Scanner (System in);
           System out privath (" Enter amount to withdraws");
           float wid .
           wd = sc.nextFloat 17;
            believe = belonce - wid ;
     void jet Rata ()
          Schumen St = new Schumen (Systemin)
          System out. printh (" Enter rums of customer: ");
          System out probable (" Enter Account Number: ");
         System. out. printly ("Press 1 for Sawings account in Press 2 for
          tune = Sc. nextInt(); (workent Account );
                                                 Scanned with CamScanner
```

```
Savings - all extends Accounts
                                    void calc_ci (flowl t)
                                     double n = 0.05;
                                             jut n: 12;
                                             double temp = balance;
                                            blance = balance * Hath, pow ((119/n), n>t);
                                          System out printly (" (I added: ", (bolance - semp));
                                  void display ()
                                      System. and . portula (" Balana: " , balance);
                        3
                       3
            thes Curr- are extends Account (
                                    void whe - penalty (7
                              1 balone = balone - 500; }
                                      void display()
                                                          ( System. out. privath (" Balance: " + belance); }
                                                               System art. printh ("Your account does not have minimum
                                                            else
                                                        balonce q 915 5000, hence penalty re 500 is being cheryd");
                                                              Egsten. out printh ("Balance: " + behow!);
                                    3
                                        public strin void min (String args[])
                 public des bank ?
The state of the s
```

```
Same Sc = new Scanner (System. in);
 Account a = new Account(1)
 Curt-ace (a = new (wit-ac(1)
Savings - acc 5 : new Savings - accll.
a- get Data ();
sut (, deva;
flood ti
c = a. type i
16 ( == 1)
    while ( ( == 1)
        System. out. println (" Enter code of your chase of outin
        : (n 1) View Bulonce 2) Deposit Amount (n 3) withdraw
       in 41 Exit ");
        Choia = sc. next Int();
        puito ( choire)
          con 1: System.out. printles ("Enter the number of years
                 after which believe is being deckel; ");
                  t = sc. next Flood 1);
                  s. cull_ ei (+) i
                  s. diaphy (),
                  break,
         use 2: s. accept deposit (1; brech;
         wx 3: S. withdraw (7; breek;
         dejoult: C=0;
  3
```

```
16 (1== 2)
               while (1==2)
                  System at printh ("Enter code: (n) View Bulance (n 2) Deposit
(n3) Withdraw (n4) Exit");
                   Orace: sc. new Int ();
                   switch (dire)
                       core 1: ca. desploy(); break;
core 2: ca. accept _deposit(); break;
core 3: ca. withdraw(); break;
                        rejoult: (-0;
                  3
             3
      3
   3
3
                                                                     Scanned with CamScanner
```

```
Enter name of customer:
Saffan
Enter Account number:
12345
Press 1 for Savings account
Press 2 for Curent Account
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
Enter the number of years after which balance is being checked(to calculate compound interest):
CI added:0.0
Balance:0.0
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
Enter the amount to be deposited
50000
```

```
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
Enter the number of years after which balance is being checked(to calculate compound interest):
CI added:5247.066777916341
Balance: 55247.06677791634
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
Enter the amount to be withdrawn
25000
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
Enter the number of years after which balance is being checked(to calculate compound interest):
CI added:1547.4973417137153
Balance:31794.564119630057
```

```
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
```

FOR CURRENT ACCOUNT:

```
Enter name of customer:
Saffan
Enter Account number:
12345
Press 1 for Savings account
Press 2 for Curent Account
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
Enter the amount to be deposited
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
Your account does not have minimum balance of rs5000, hence penalty rs500 is being charged
Balance: 500.0
```

```
Balance: 500.0
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
Enter the amount to be deposited
10000
Enter code of your choice of action:
1) View Balance
2)Deposit Amount
3)Withdraw
4)Exit
Enter the amount to be withdrawn
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
Balance: 7500.0
Enter code of your choice of action:
1)View Balance
2)Deposit Amount
3)Withdraw
4)Exit
```