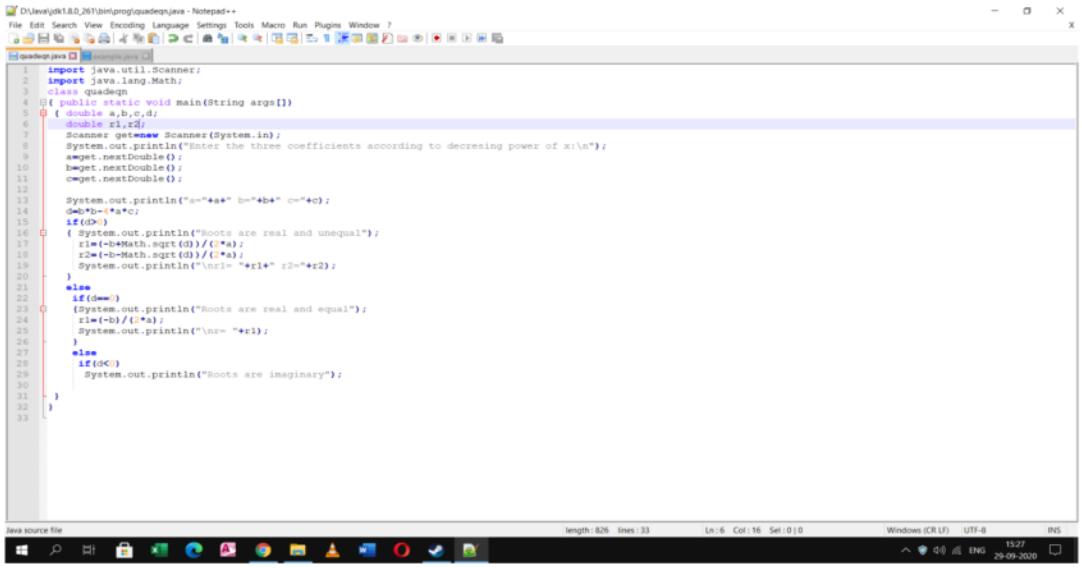
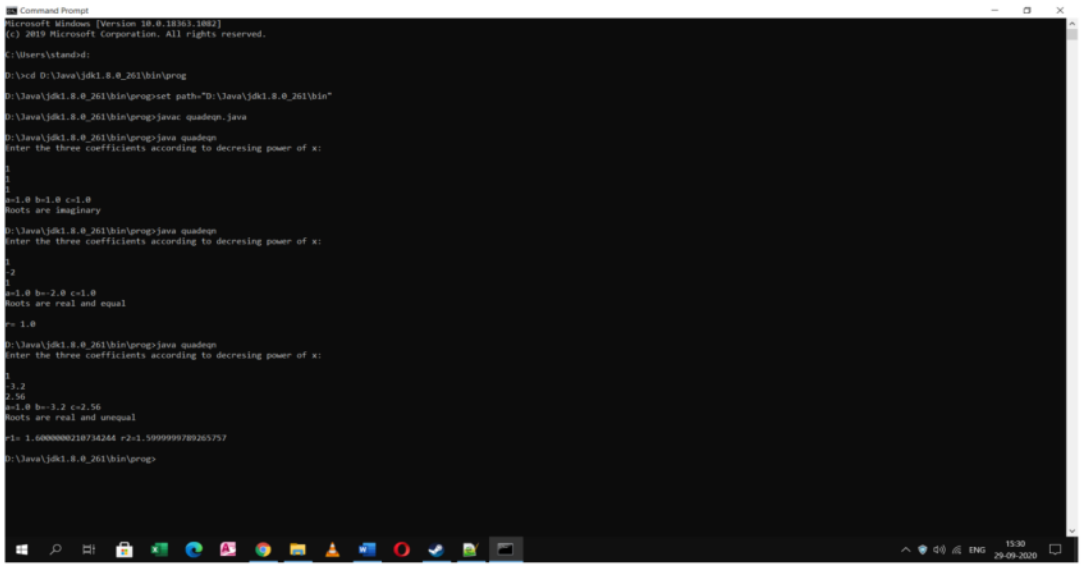
Lab 1: Develop a Java program that prints all real solutions to the quadratic equation ax2 +bx +c = 0.

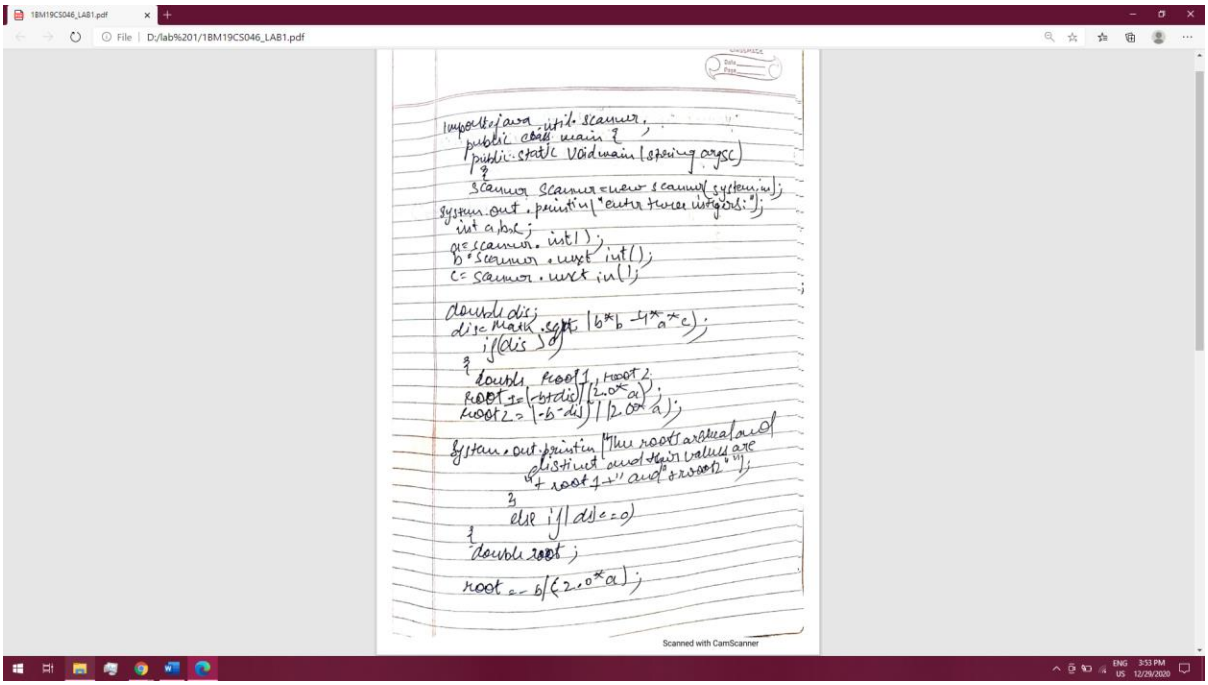
Read in a, b, c and use the quadratic formula. If the discriminate b2-4ac is negative, display a message stating that there are no real solutions.

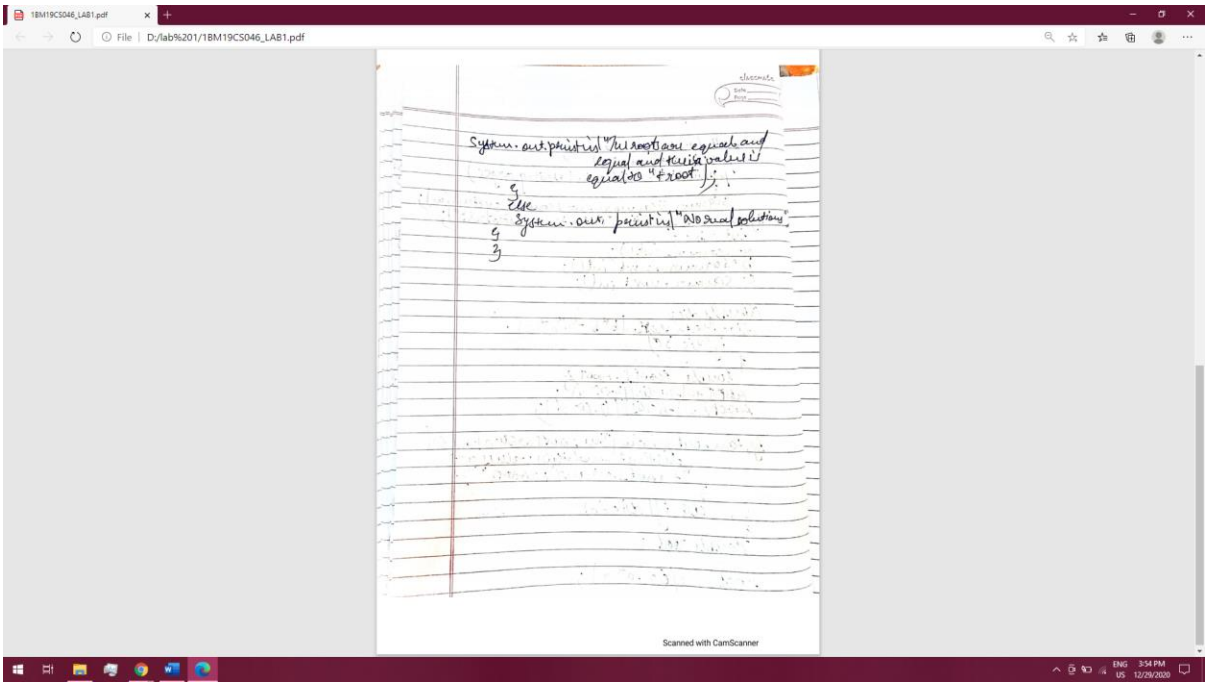


```
import java.util.Scanner;
import java.lang.Math;
class quadeqn
{ public static void main(String args[])
 { double a,b,c,d;
   double r1,r2;
   Scanner get=new Scanner(System.in);
   System.out.println("Enter the three coefficients according to decresing power of x:\n");
   a=get.nextDouble();
   b=get.nextDouble();
   c=get.nextDouble();

   System.out.println("a="+a+" b="+b+" c="+c);
   d=b*b-4*a*c;
   if(d>0)
   { System.out.println("Roots are real and unequal");
     r1=(-b+Math.sqrt(d))/(2*a);
     r2=(-b-Math.sqrt(d))/(2*a);
     System.out.println("\nr1= "+r1+" r2="+r2);
   }
   else
    if(d==0)
    {System.out.println("Roots are real and equal");
     r1=(-b)/(2*a);
     System.out.println("\nr= "+r1);
    }
    else
     if(d<0)
      System.out.println("Roots are imaginary");

 }
}
```

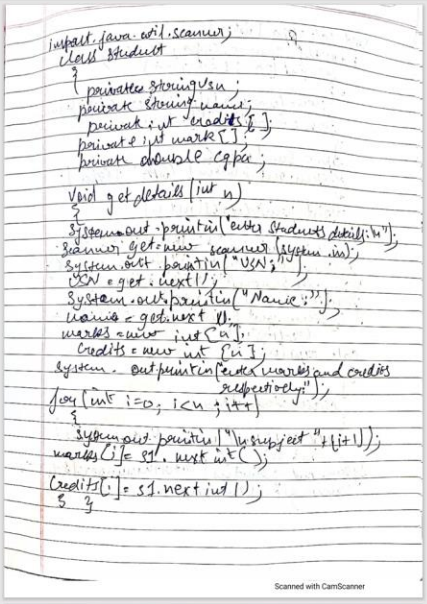


```
Microsoft Windows [Version 10.0.18363.1082]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\stand>d:

D:\>cd D:\Java\jdk1.8.0_261\bin\prog

D:\Java\jdk1.8.0_261\bin\prog>set path="D:\Java\jdk1.8.0_261\bin"

D:\Java\jdk1.8.0_261\bin\prog>javac quadeqn.java

D:\Java\jdk1.8.0_261\bin\prog>java quadeqn
Enter the three coefficients according to decresing power of x:

1
1
1
a=1.0 b=1.0 c=1.0
Roots are imaginary

D:\Java\jdk1.8.0_261\bin\prog>java quadeqn
Enter the three coefficients according to decresing power of x:

1
-2
1
a=1.0 b=-2.0 c=1.0
Roots are real and equal

r= 1.0

D:\Java\jdk1.8.0_261\bin\prog>java quadeqn
Enter the three coefficients according to decresing power of x:

1
-3.2
2.56
a=1.0 b=-3.2 c=2.56
Roots are real and unequal

r1= 1.6000000218734244 r2=1.5999999780926757

D:\Java\jdk1.8.0_261\bin\prog>
```

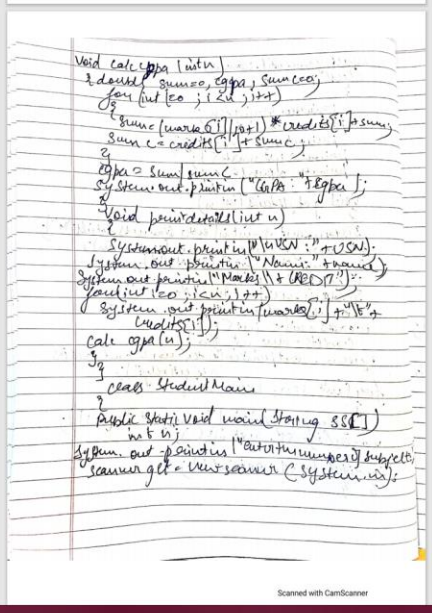




Lab 2: Develop a Java program to create a class Student with members usn, name, an array Credits and an array marks. Include methods to accept and display details and a method to Calculate SGPA of a student.

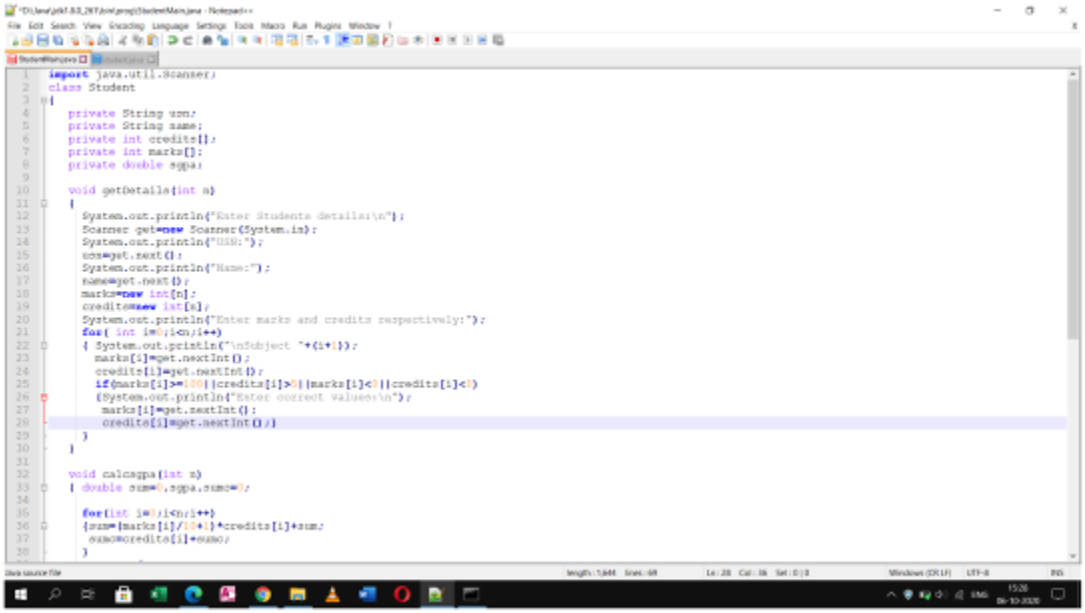


```
import java.util.scanner;
class Student
{
private String usn;
private String name;
private int credits[];
private int marks[];
private double cgpa;
Void getdetails(int n)
{
System.out.println("enter Students details:\n");
Scanner get=new scanner(System.in);
System.out.println("USN:");
USN = get.next();
System.out.println("Name:");
name = get.next();
marks = new int[n];
Credits = new int[n];
System. out.println("enter marks and credits
                    respectively");
for(int i=0; i<n ;i++)
{
System.out.println("\n subject "+(i+1));
marks[i]= sc. next int();
Credits[i]= sc.nextint());
} }
```

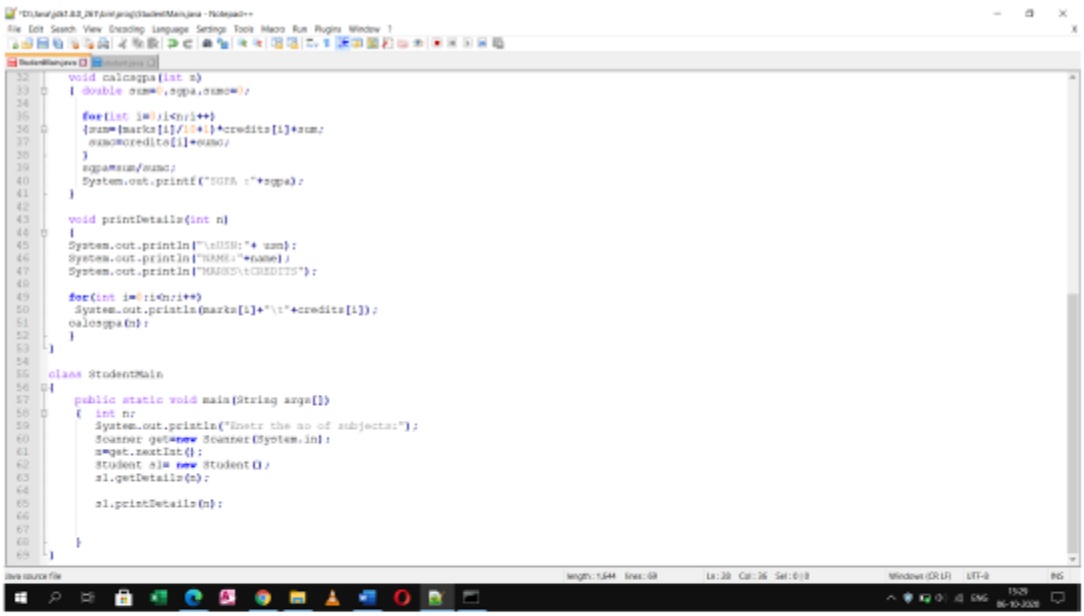



```
Void calcgpa(int n)
{double sum=0, cgpa, sumc=0;
for(int i=0 ;i<n ;i++)
{sum=(marks[i]/10+1)*credits[i]+sum;
sumc=credits[i]+sumc;
}
cgpa = sum/sumc;
System.out.println("CGPA:"+cgpa);
}
Void printdetails(int n)
{
System.out.println("\nUSN:"+USN);
System.out.println("Name:"+name);
System.out.println("Marks\t"+CREDIT");
for(int i=0 ;i<n ;i++)
{System.out.println(marks[i]+"\t"+
        Credits[i]);
Calcgpa(n);
}}
class StudentMain
{
Public Static Void main(String SS[])
    int n;
System.out.println("enter the number of subjects");
Scanner get = new scanner (System.in);
```

```
n = get_list_int ();
struct st *s = new student();
s1. get details (n);
s1. print details (n);
}
}
```

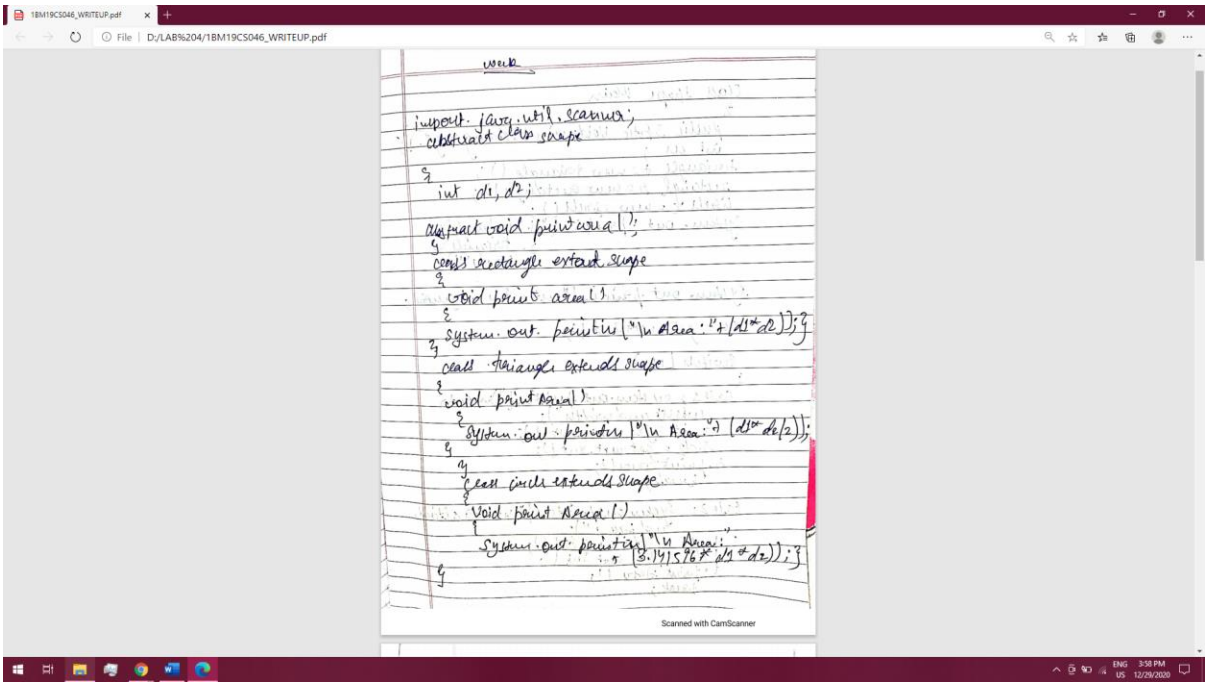


```
import java.util.Scanner;
class Student
{
   private String usn;
   private String name;
   private int credits[];
   private int marks[];
   private double sgpa;

   void getDetails(int n)
   {
     System.out.println("Enter Students details:\n");
     Scanner get=new Scanner(System.in);
     System.out.println("USN:");
     usn=get.next();
     System.out.println("Name:");
     name=get.next();
     marks=new int[n];
     credits=new int[n];
     System.out.println("Enter marks and credits respectively:");
     for( int i=0;i<n;i++)
     { System.out.println("\nSubject "+(i+1));
       marks[i]=get.nextInt();
       credits[i]=get.nextInt();
       if(marks[i]>=100||credits[i]>8||marks[i]<0||credits[i]<0)
       {System.out.println("Enter correct values\n");
        marks[i]=get.nextInt();
        credits[i]=get.nextInt();}
     }
   }

   void calcsgpa(int n)
   { double sum=0,sgpa,sumc=0;

     for(int i=0;i<n;i++)
     {sum=(marks[i]/10+1)*credits[i]+sum;
      sumc=credits[i]+sumc;
     }
```



```
   void calcsgpa(int n)
   { double sum=0,sgpa,sumc=0;

     for(int i=0;i<n;i++)
     {sum=(marks[i]/10+1)*credits[i]+sum;
      sumc=credits[i]+sumc;
     }
     sgpa=sum/sumc;
     System.out.printf("SGPA :"+sgpa);
   }

   void printDetails(int n)
   {
   System.out.println("\nUSN:"+ usn);
   System.out.println("NAME:"+name);
   System.out.println("MARKS\tCREDITS");

   for(int i=0;i<n;i++)
    System.out.println(marks[i]+"\t"+credits[i]);
   calcsgpa(n);
   }
}

class StudentMain
{
   public static void main(String args[])
   {  int n;
      System.out.println("Enetr the no of subjects:");
      Scanner get=new Scanner(System.in);
      n=get.nextInt();
      Student s1= new Student();
      s1.getDetails(n);

      s1.printDetails(n);


   }
}
```

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 print Area ( ) that prints the area of the given shape.



```
class Shape Main
{
public static void main (String args[]);
int ch;
triangle t = new triangle ();
rectangle r = new rectangle ();
circle c = new circle ();
System.out.println (" 1.rectangle \n
                     2. triangle \n
                     3. circle");
System.out.println ("enter the no. you wish");
ch = get.nextInt ();
switch (ch)
{
case 1 : System.out.println ("\n enter
         width and width");
r.d1 = get.nextInt ();
r.d2 = get.nextInt ();
r.printArea ();
break;
case 2: System.out.println ("\n enter altitude
        and base :");
t.d1 = get.nextInt ();
t.d2 = get.nextInt ();
t.printArea ();
break;
```

Scanned with CamScanner


```
case 3 : System.out.println ("enter the radius:");
c.d1 = get.nextInt ();
c.d2 = get.nextInt ();
c.printArea ();
break;
default : System.out.println ("Invalid
                               Input");
}
}
}
```

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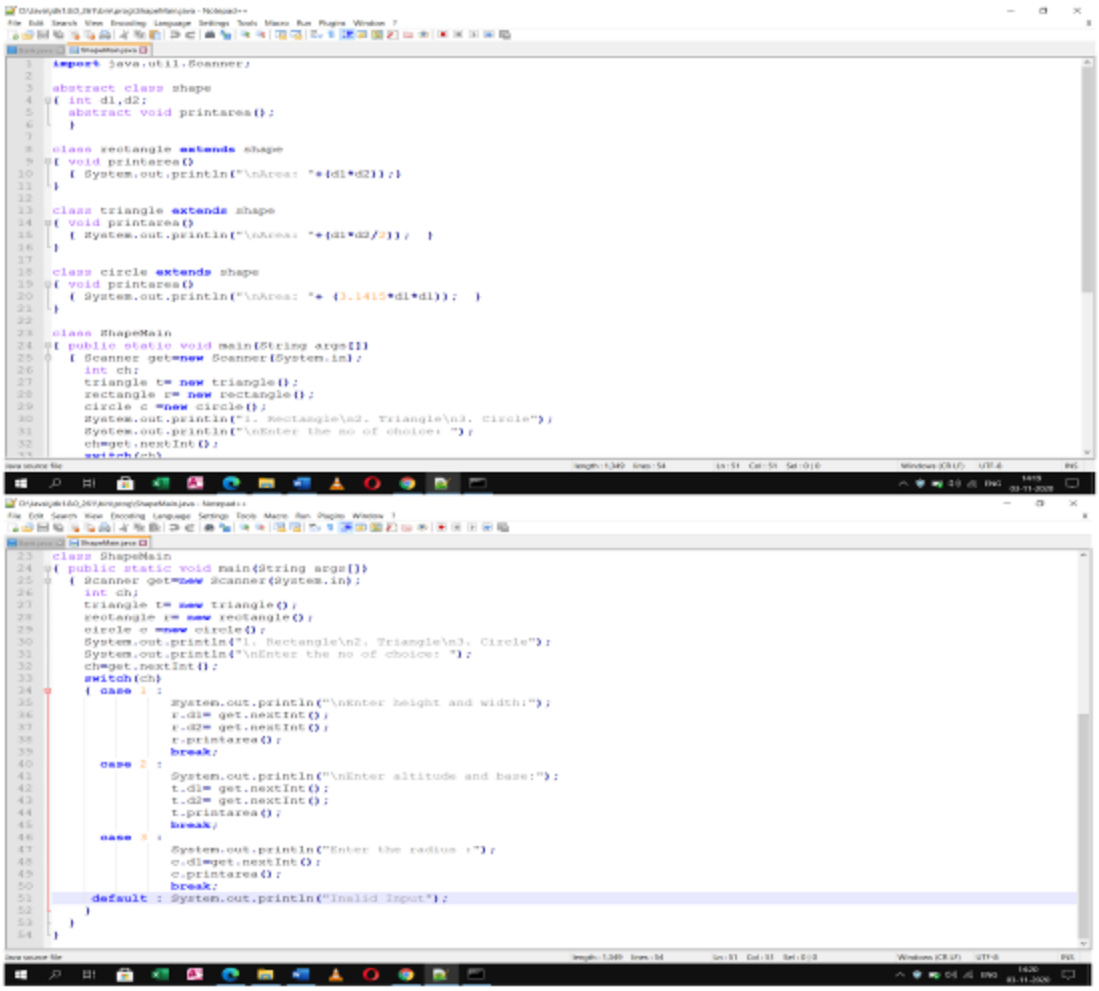
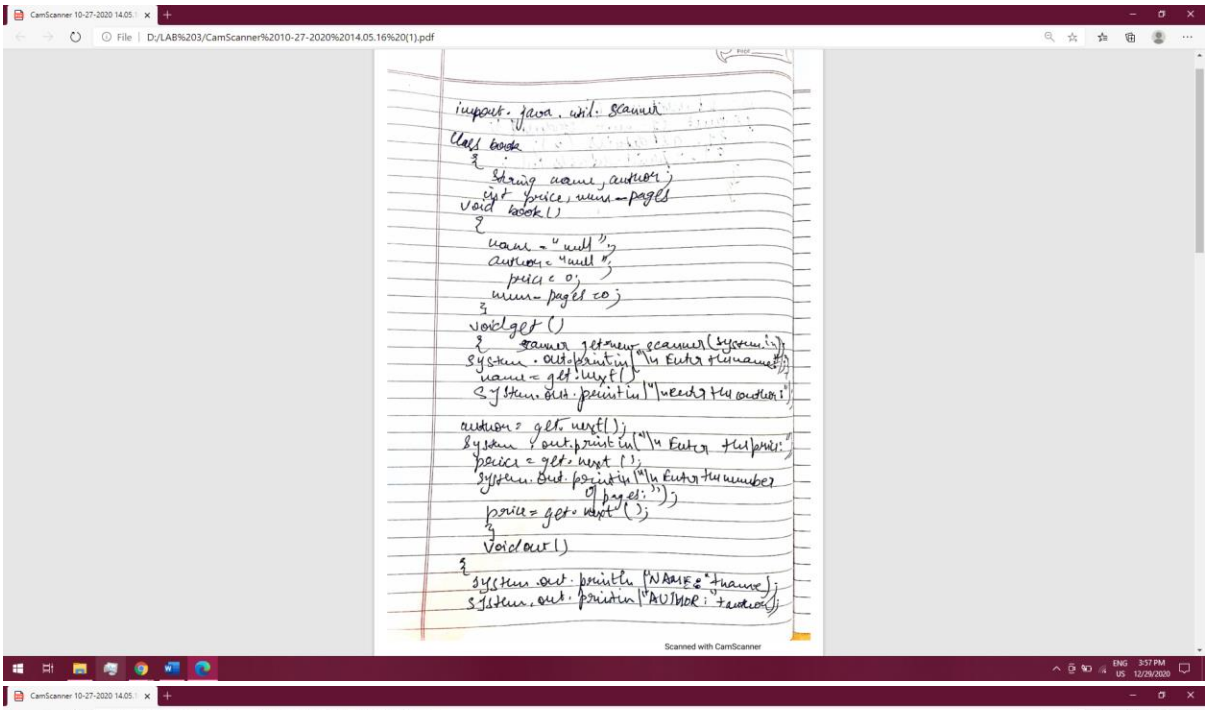
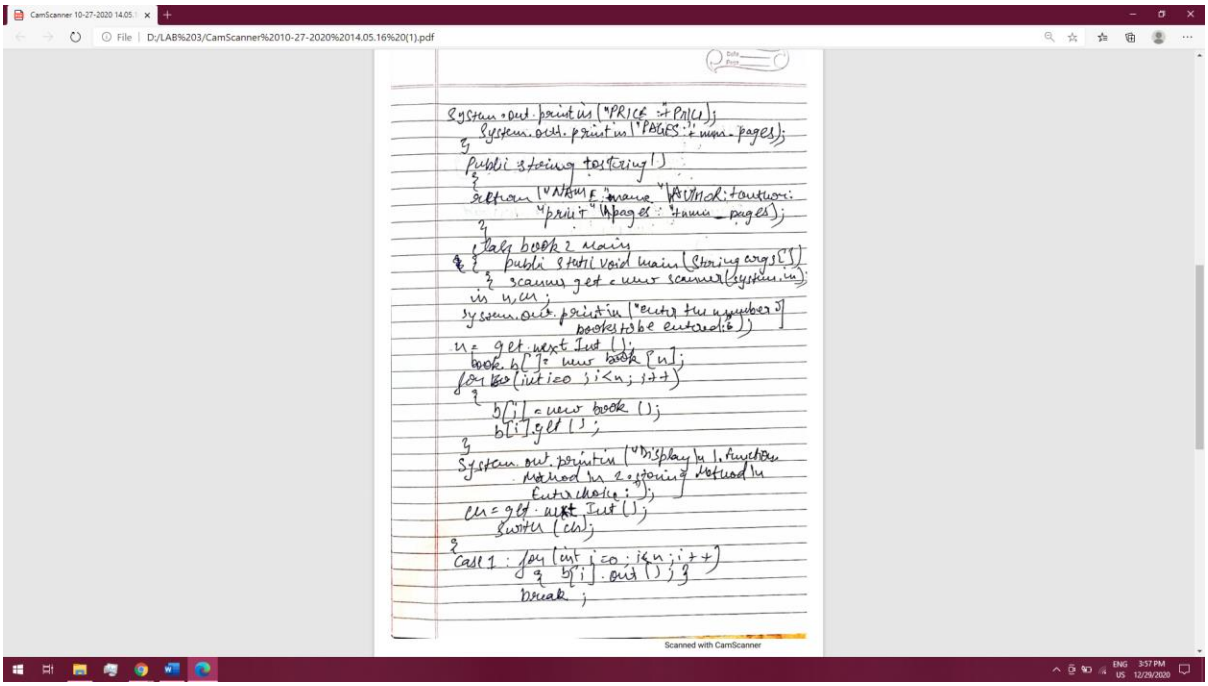


LAB PROGRAM 3: Create a class Book which contains four members: name, author, price, Num pages. Include a constructor to set the values for the members. Include Methods to set and get the details of the objects. Include a toString( ) method That could display the complete details of the book. Develop a Java program to create n book objects.

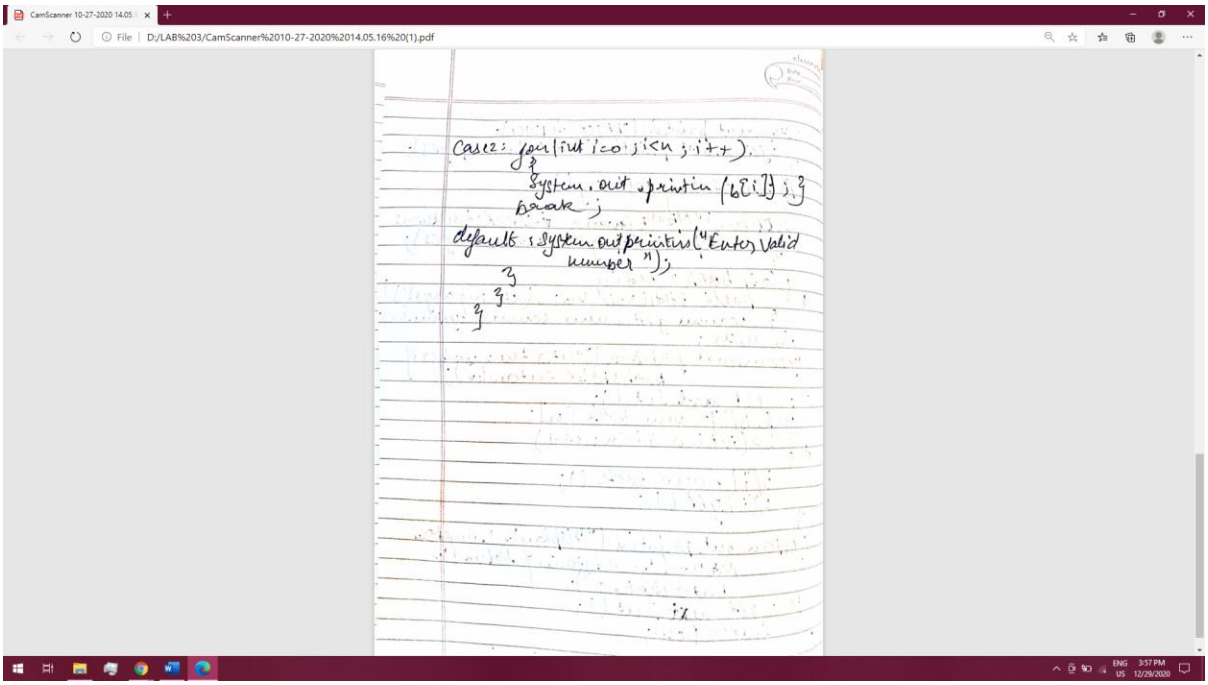


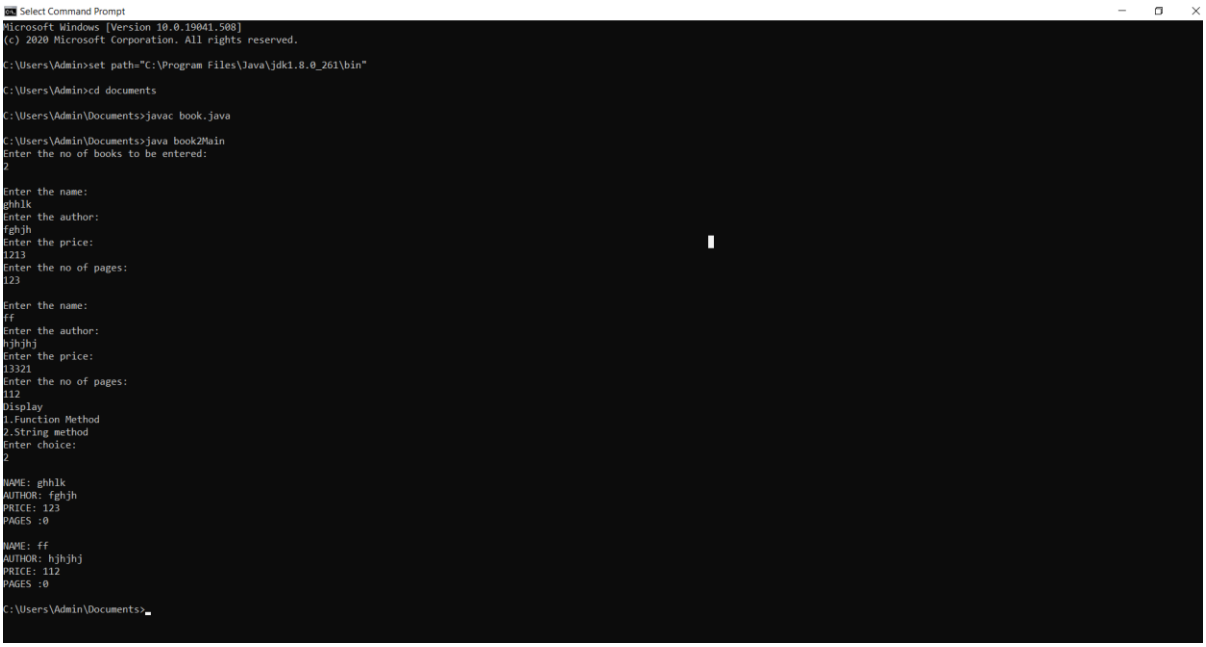
```
import java.util.Scanner;
class book
{
  String name,author;
  int price,num_pages
void book()
{
  name="null";
  author="null";
  price=0;
  num_pages=0;
}
void get()
{
  Scanner get=new scanner(System.in);
System.out.println("\n Enter the name");
  name=get.next();
System.out.println("\n enter the author:");

author=get.next();
System.out.println("\n Enter the price:");
price=get.next();
System.out.println("\n Enter the number
                    of pages:");
price=get.next();
}
Void out()
{
System.out.println("NAME:"+name);
System.out.println("AUTHOR:"+author);
```



```
System.out.println("PRICE:"+price);
System.out.println("PAGES:"+num_pages);
}
public String toString()
{
return("NAME:"+name+"\nAUTHOR:"+author+
       "price"+"\npages:"+num_pages);
}
class book2 main
{ public static void main(String args[])
{ Scanner get=new scanner(System.in);
int n,ch;
System.out.println("enter the number of
                    books to be entered:");
n=get.nextInt();
book b[]=new book[n];
for(int i=0;i<n;i++)
{
  b[i]=new book();
  b[i].get();
}
System.out.println("Display by 1.Function
    method 2.storing method\n
    Enter choice:");
ch=get.nextInt();
switch(ch);
{
case 1: for(int i=0;i<n;i++)
  { b[i].out();}
  break;
```





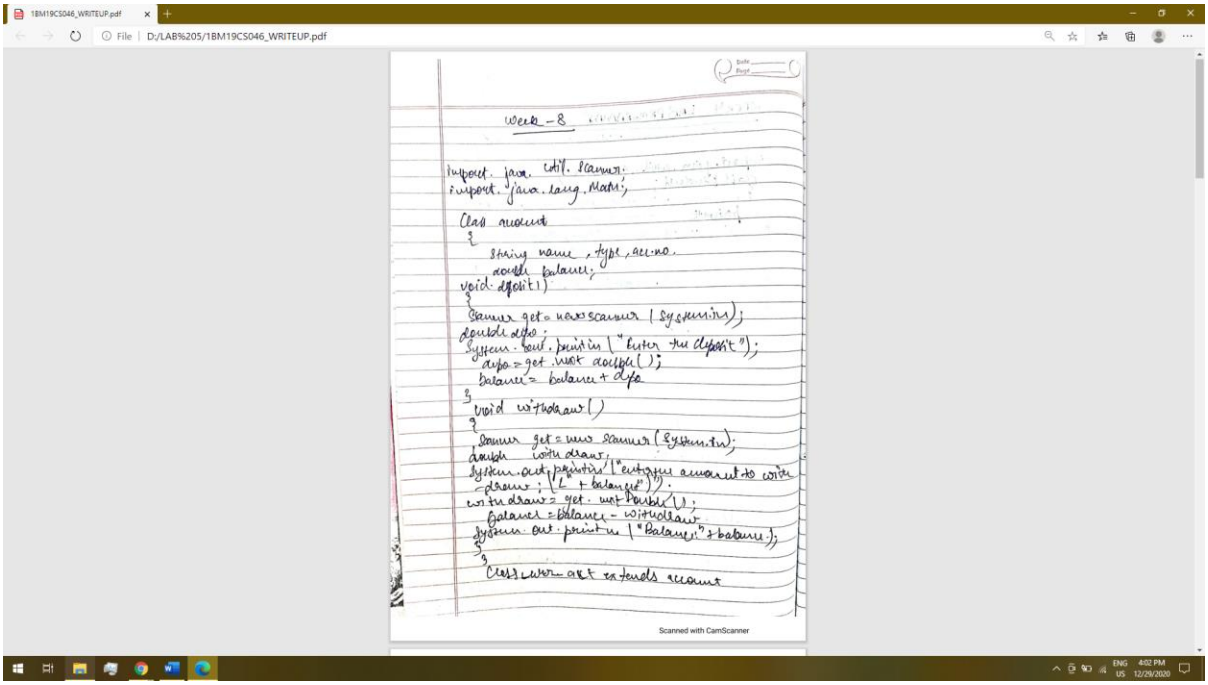
Lab program 5: Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides 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-

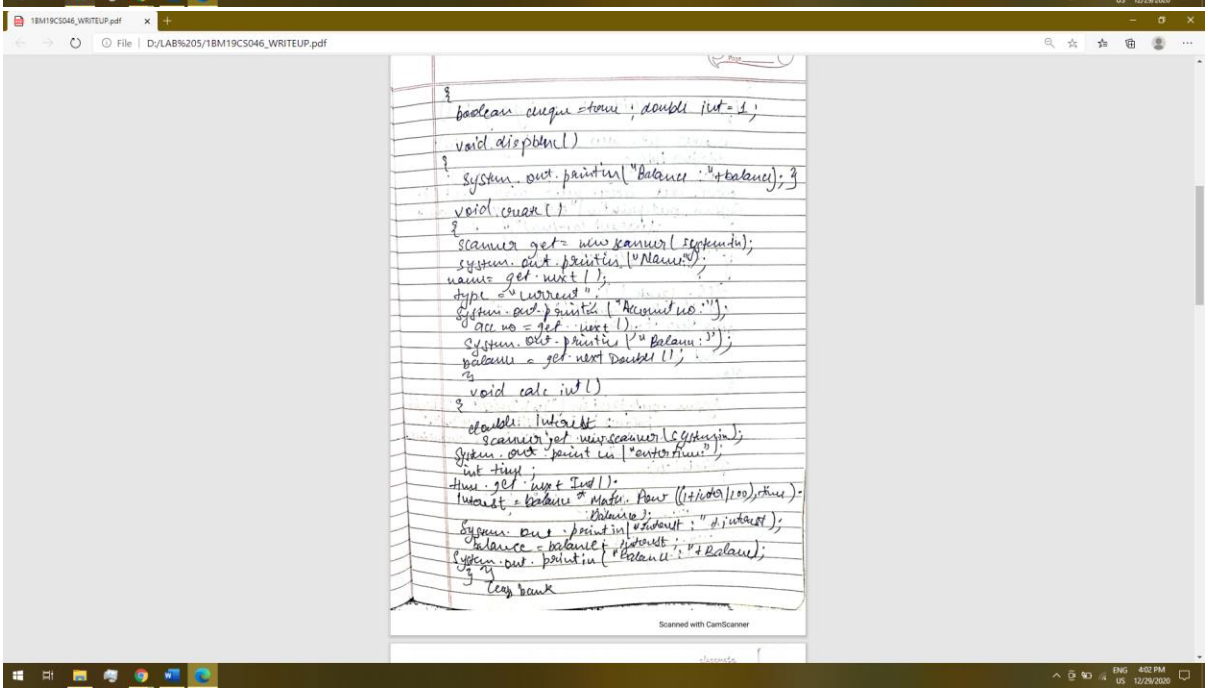
acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:

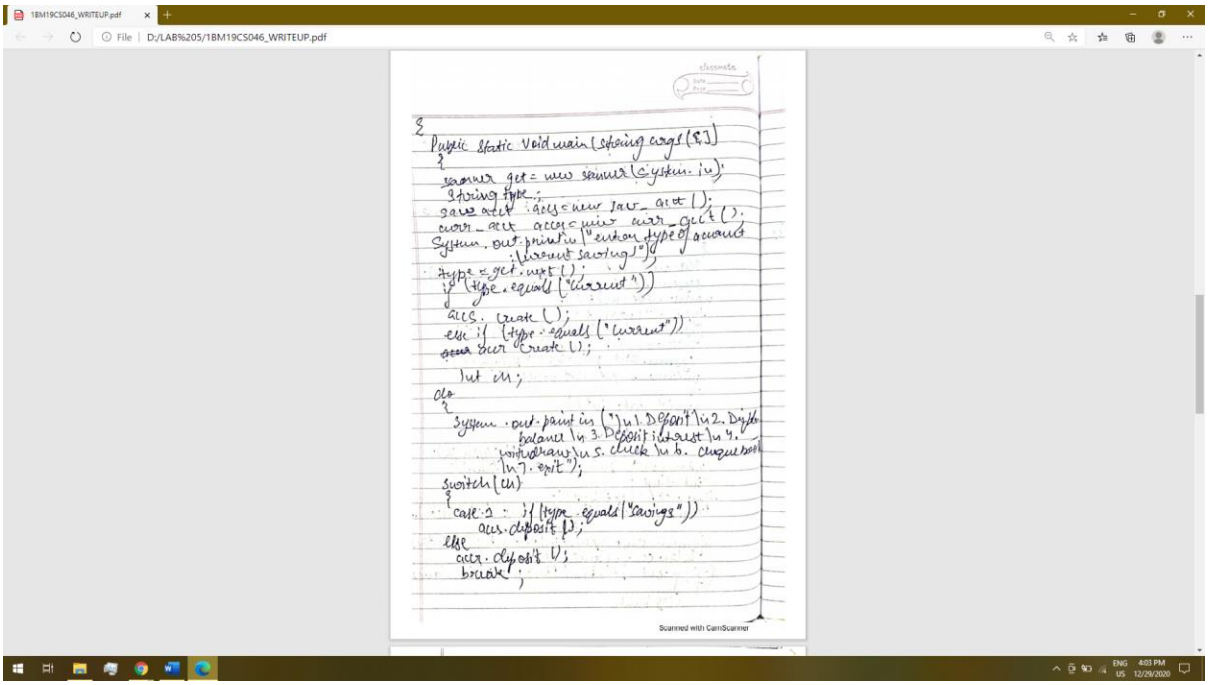
•Accept deposit from customer and update the balance. • Display the balance.

• Compute and deposit interest • Permit withdrawal and update the balance

• Check for the minimum balance, impose penalty if necessary and update the balance

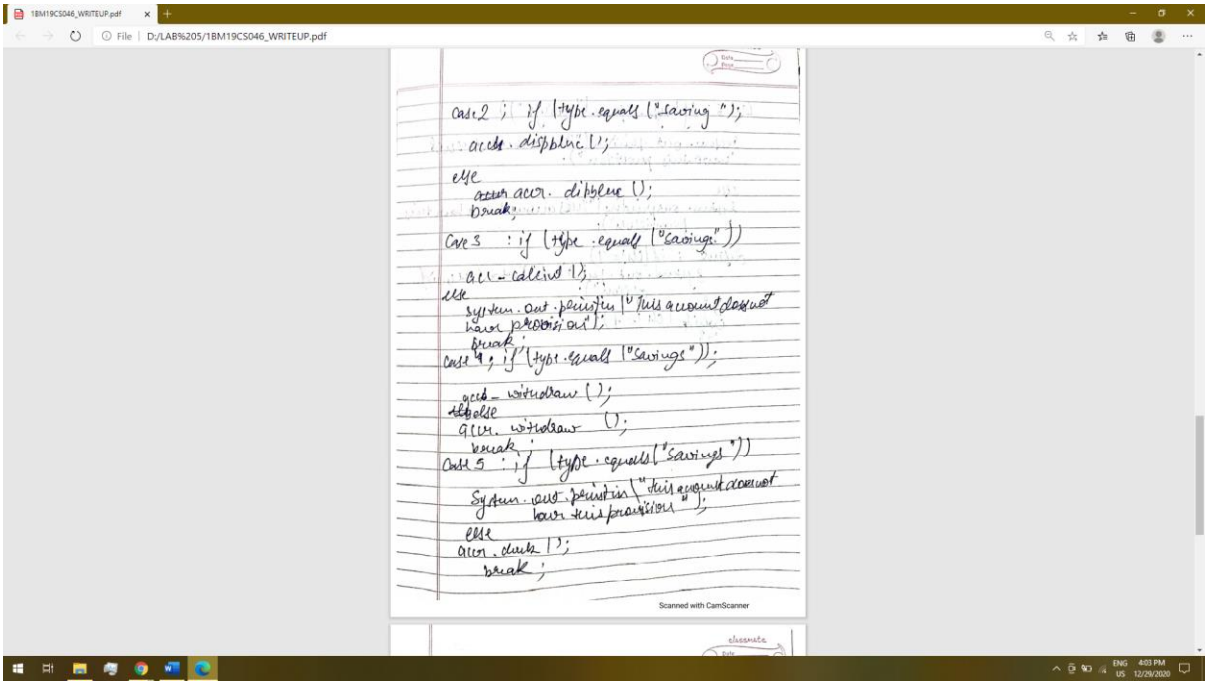




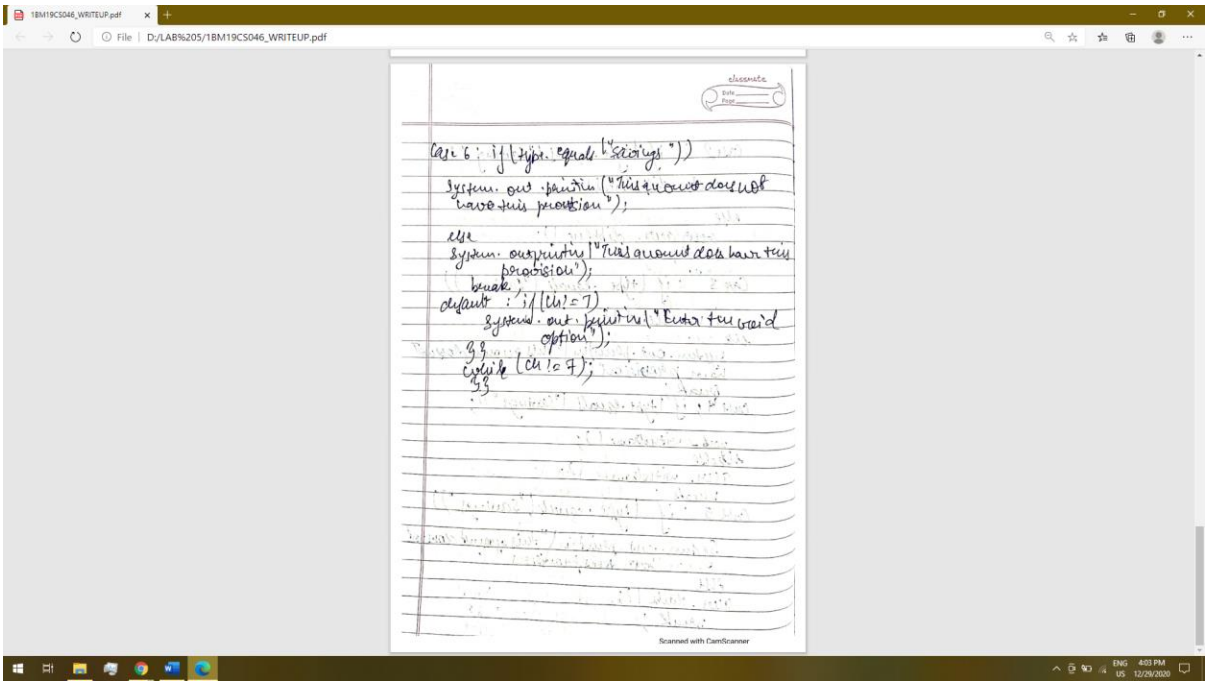


```
{
public static void main(String args[])
{
Scanner get = new Scanner(System.in);
String type;
Savings acct = new Savings();
Current acct acc = new Current();
System.out.println("enter type of account
                    (Current Saving)");
type = get.next();
if (type.equals("Current"))
{
acc.create();
else if (type.equals("Current"))
Savings Cur create();

Int ch;
do
{
System.out.println("\n1.Deposit\n2.Display
balance\n3.Deposit interest\n4.
withdraw\n5.check\n6.Cheque book
\n7.exit");
switch(ch)
{
case 1: if(type.equals("Savings"))
acc.deposit();
else
acc.deposit();
break;
```

```
case 2 ; if (type.equals("Saving");
acct.display();
else
Savings acc.display();
break;
Case 3 : if (type.equals("Savings"))
acc.calcint();
else
System.out.println("This account doesnot
have provision");
break;
Case 4 ; if (type.equals("Savings"));
acct.withdraw();
else
acc.withdraw();
break;
Case 5 : if (type.equals("Savings"))
System.out.println("this account doesnot
have this provision");
else
acc.check();
break;
```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case 6: if (typ. equals ("Savings"))
System.out.println ("This account does not have this provision");
else
System.out.println ("This account does have this provision");
break;
default: if (ch != 7)
System.out.println ("Enter the valid option");
}
while (ch != 7);
}
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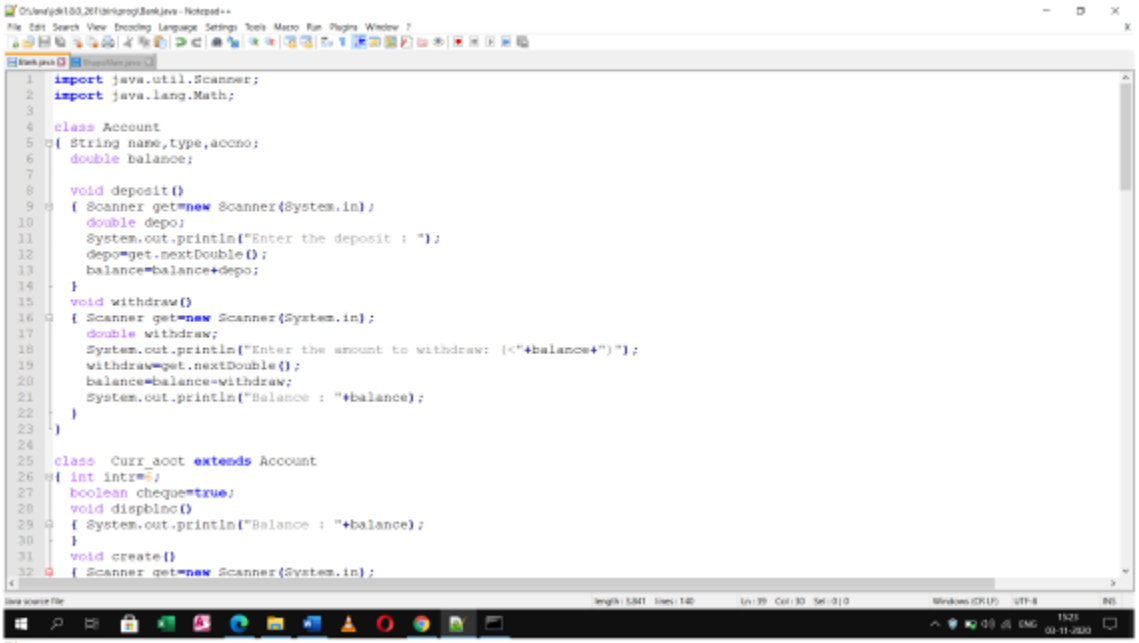
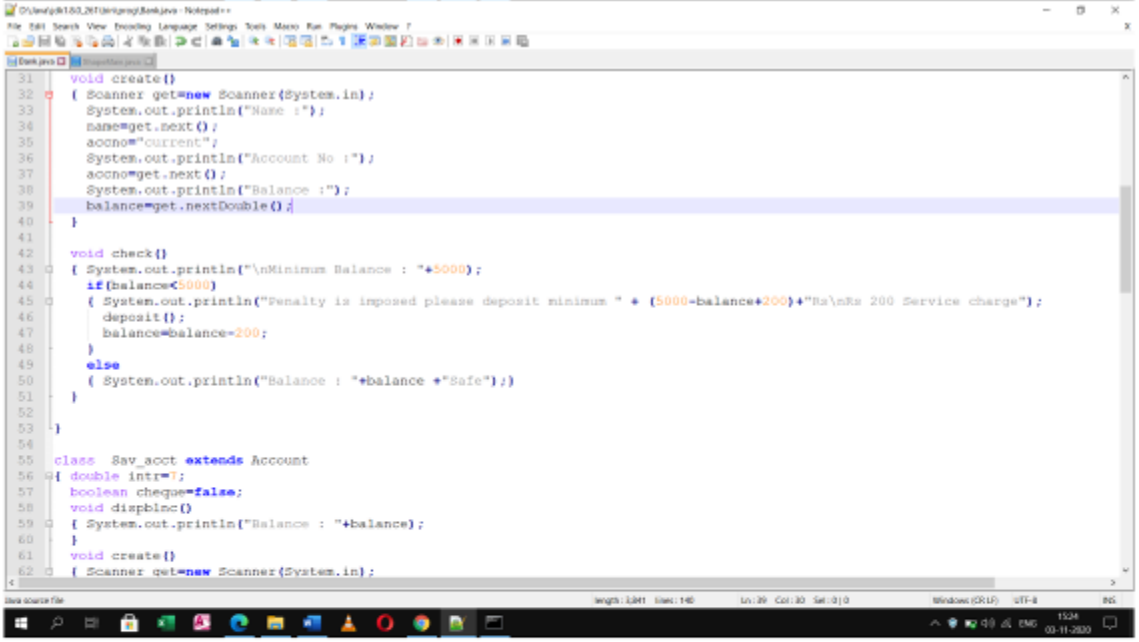
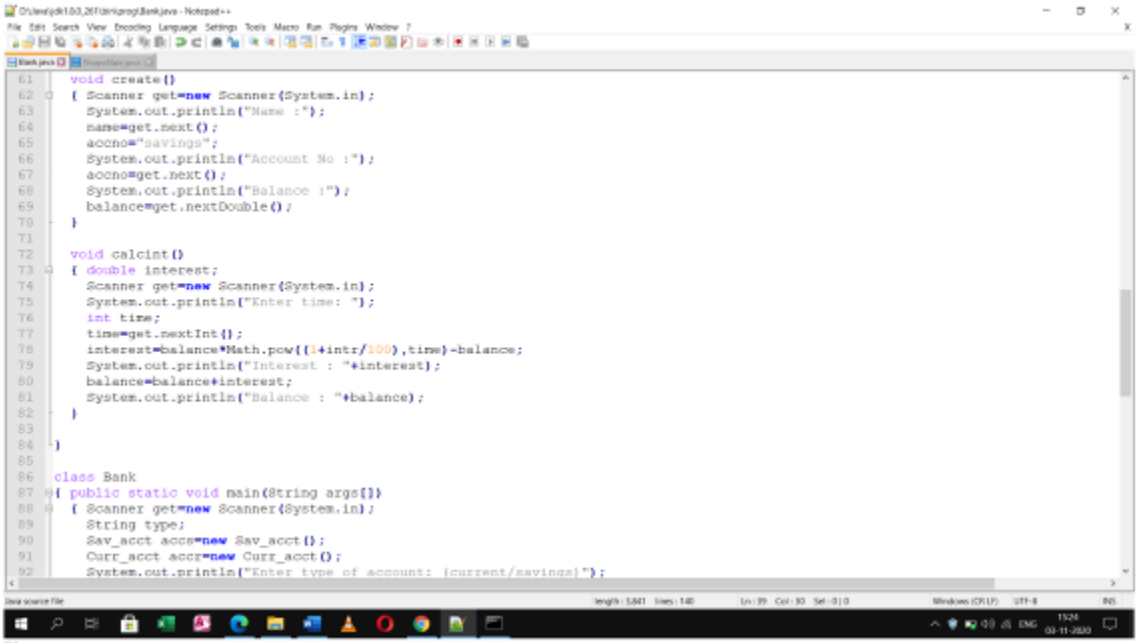


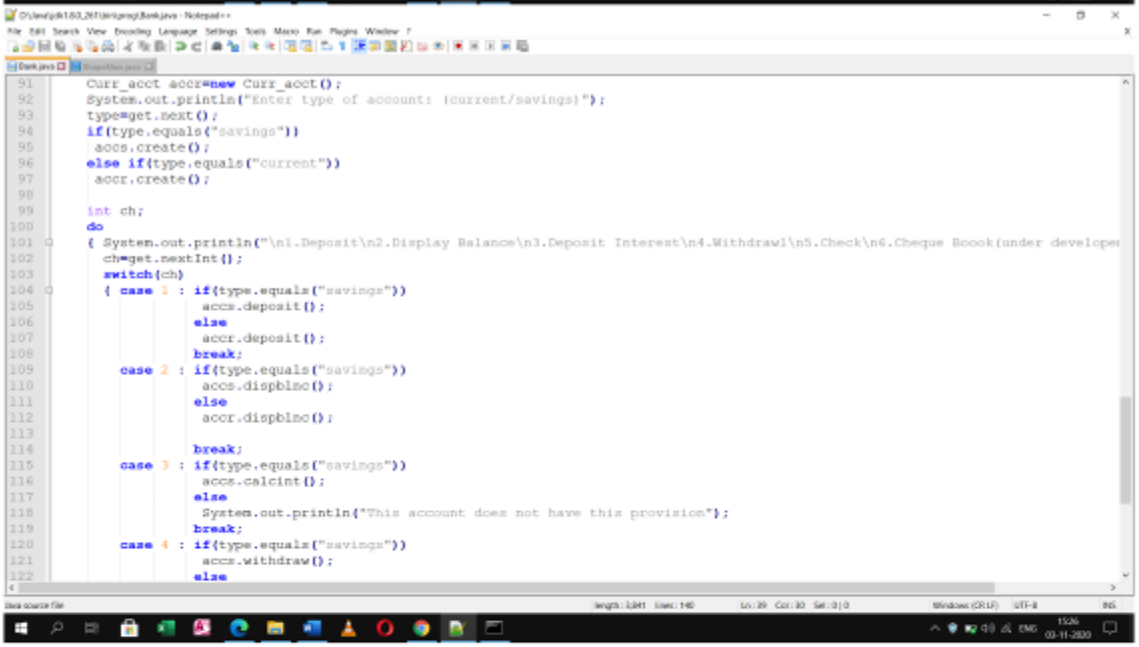
```
import java.util.Scanner;
import java.lang.Math;

class Account
{ String name,type,accno;
  double balance;

  void deposit()
  { Scanner get=new Scanner(System.in);
    double depo;
    System.out.println("Enter the deposit : ");
    depo=get.nextDouble();
    balance=balance+depo;
  }
  void withdraw()
  { Scanner get=new Scanner(System.in);
    double withdraw;
    System.out.println("Enter the amount to withdraw: (<"+balance+")");
    withdraw=get.nextDouble();
    balance=balance-withdraw;
    System.out.println("Balance : "+balance);
  }
}

class  Curr_acct extends Account
{ int intr=6;
  boolean cheque=true;
  void displbnc()
  { System.out.println("Balance : "+balance);
  }
  void create()
  { Scanner get=new Scanner(System.in);
```



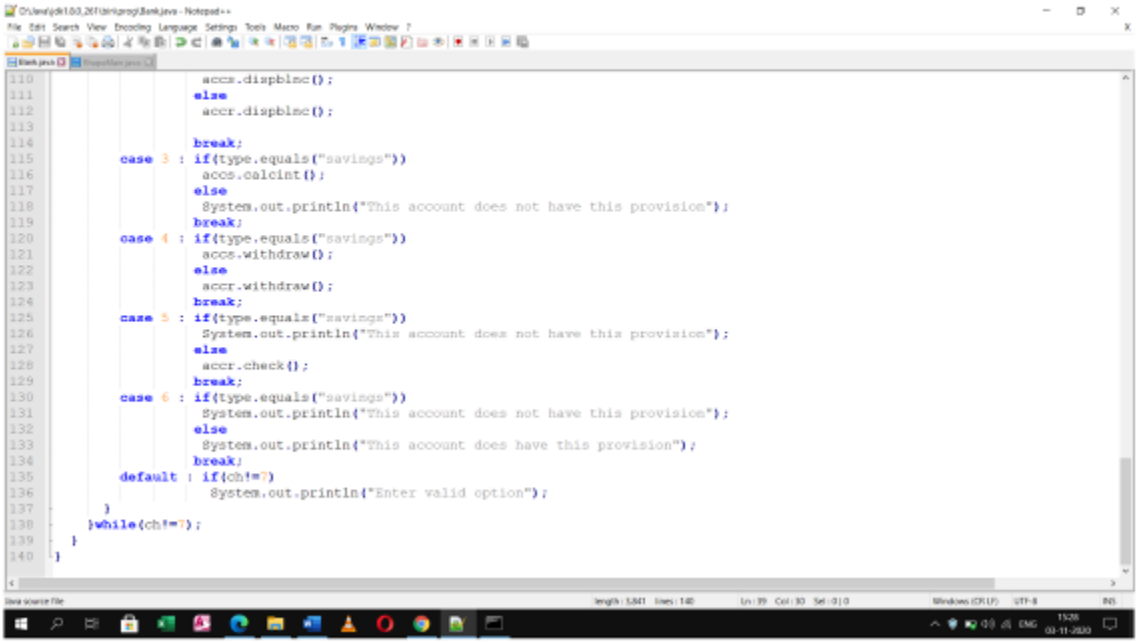
```
  void create()
  { Scanner get=new Scanner(System.in);
    System.out.println("Name :");
    name=get.next();
    accno="current";
    System.out.println("Account No :");
    accno=get.next();
    System.out.println("Balance :");
    balance=get.nextDouble();
  }

  void check()
  { System.out.println("\nMinimum Balance : "+5000);
    if(balance<5000)
    { System.out.println("Penalty is imposed please deposit minimum " + (5000-balance+200)+"Rs\nRs 200 Service charge");
      deposit();
      balance=balance-200;
    }
    else
    { System.out.println("Balance : "+balance +"Safe");}
  }

}

class  Sav_acct extends Account
{ double intr=7;
  boolean cheque=false;
  void displbnc()
  { System.out.println("Balance : "+balance);
  }
  void create()
  { Scanner get=new Scanner(System.in);
```



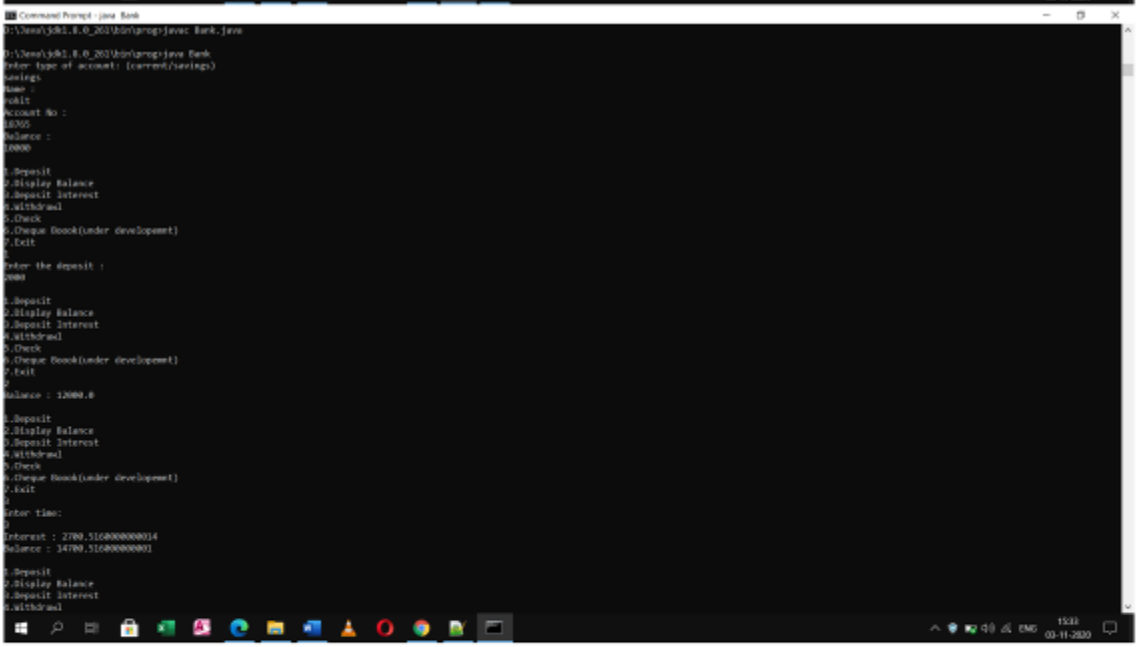
```
61    void create()
62    { Scanner get=new Scanner(System.in);
63      System.out.println("Name :");
64      name=get.next();
65      accno="savings";
66      System.out.println("Account No :");
67      accno=get.next();
68      System.out.println("Balance :");
69      balance=get.nextDouble();
70    }
71
72    void calcint()
73    { double interest;
74      Scanner get=new Scanner(System.in);
75      System.out.println("Enter time: ");
76      int time;
77      time=get.nextInt();
78      interest=balance*Math.pow((1+intr/100),time)-balance;
79      System.out.println("Interest : "+interest);
80      balance=balance+interest;
81      System.out.println("Balance : "+balance);
82    }
83
84  }
85
86  class Bank
87  { public static void main(String args[])
88    { Scanner get=new Scanner(System.in);
89      String type;
90      Sav_acct accs=new Sav_acct();
91      Curr_acct accr=new Curr_acct();
92      System.out.println("Enter type of account: (current/savings)");
```



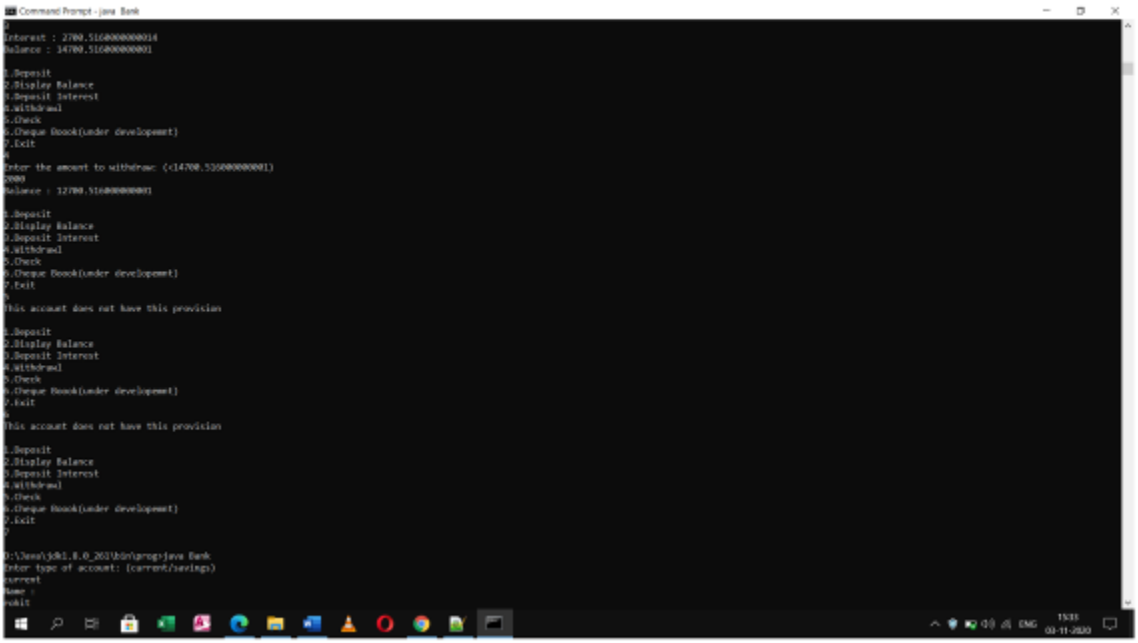
```
91      Curr_acct accr=new Curr_acct();
92      System.out.println("Enter type of account: (current/savings)");
93      type=get.next();
94      if(type.equals("savings"))
95       accs.create();
96      else if(type.equals("current"))
97       accr.create();
98
99      int ch;
100     do
101     { System.out.println("\n1.Deposit\n2.Display Balance\n3.Deposit Interest\n4.Withdrawl\n5.Check\n6.Cheque Boook(under develope
102       ch=get.nextInt();
103       switch(ch)
104       { case 1 : if(type.equals("savings"))
105                   accs.deposit();
106                  else
107                   accr.deposit();
108                  break;
109         case 2 : if(type.equals("savings"))
110                   accs.displbmc();
111                  else
112                   accr.displbmc();
113
114                  break;
115         case 3 : if(type.equals("savings"))
116                   accs.calcint();
117                  else
118                   System.out.println("This account does not have this provision");
119                  break;
120         case 4 : if(type.equals("savings"))
121                   accs.withdraw();
122                  else
```

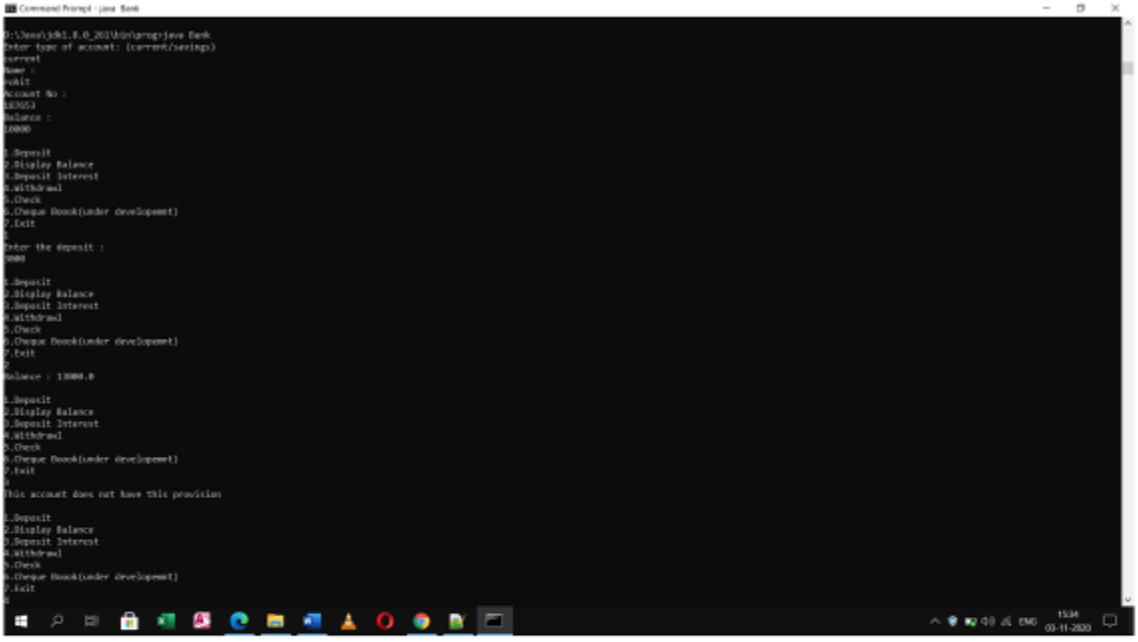


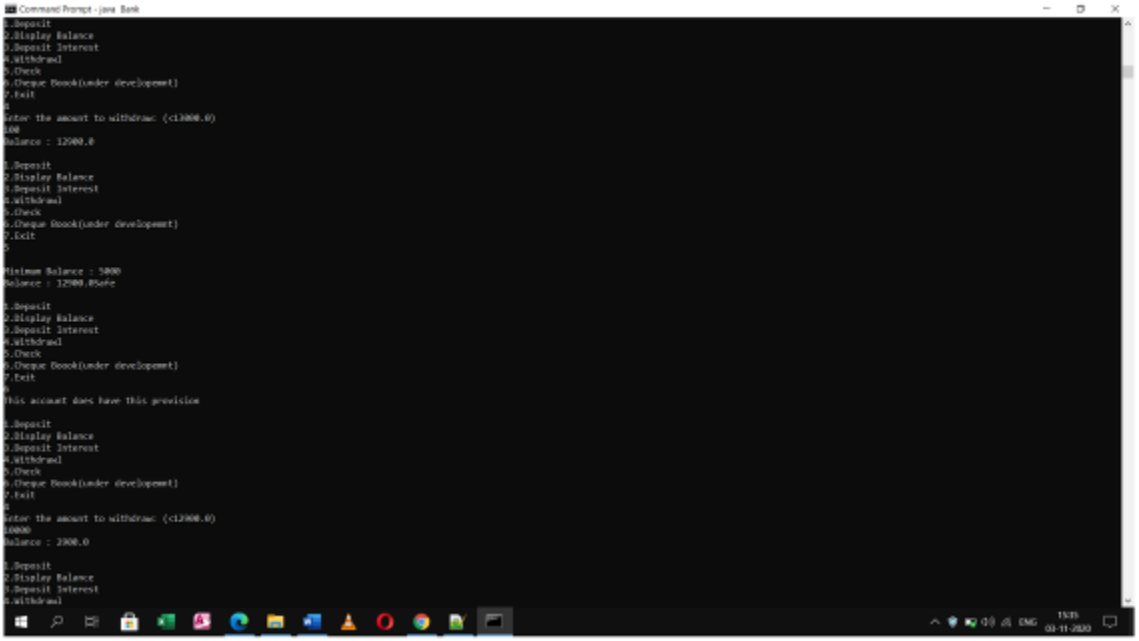
```
                    accs.displbnc();
                   else
                    accr.displbnc();

                   break;
          case 3 : if(type.equals("savings"))
                    accs.calcint();
                   else
                    System.out.println("This account does not have this provision");
                   break;
          case 4 : if(type.equals("savings"))
                    accs.withdraw();
                   else
                    accr.withdraw();
                   break;
          case 5 : if(type.equals("savings"))
                    System.out.println("This account does not have this provision");
                   else
                    accr.check();
                   break;
          case 6 : if(type.equals("savings"))
                    System.out.println("This account does not have this provision");
                   else
                    System.out.println("This account does have this provision");
                   break;
          default : if(ch!=7)
                     System.out.println("Enter valid option");
        }
      }while(ch!=7);
    }
}
```

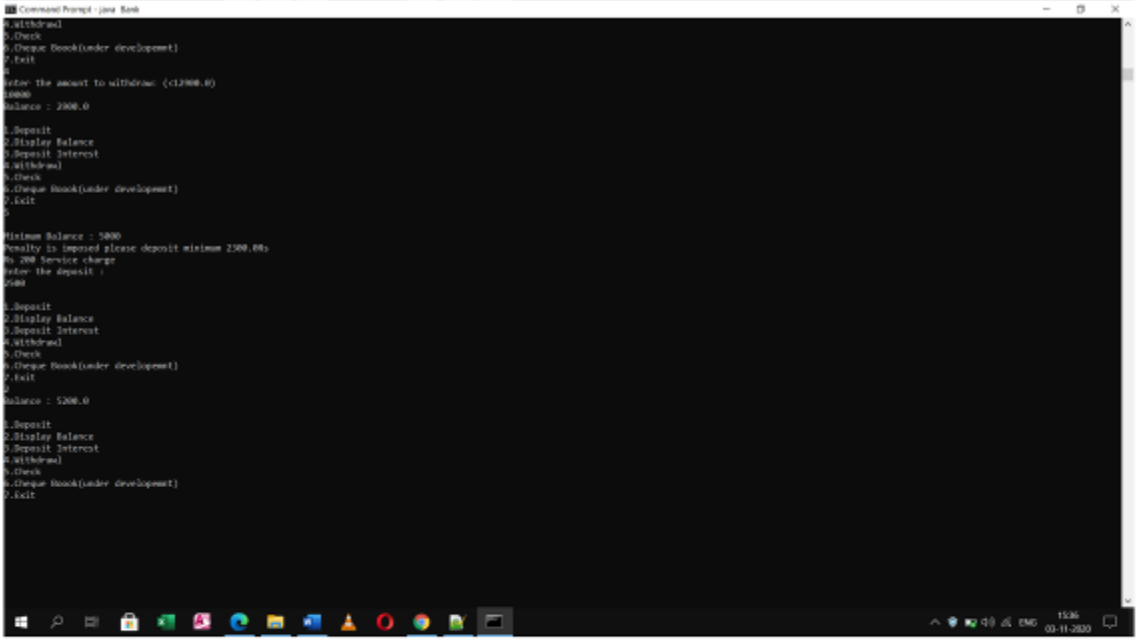


```
D:\Java\jdk1.8.0_261\bin\prog>javac Bank.java

D:\Java\jdk1.8.0_261\bin\prog>java Bank
Enter type of account: (current/savings)
savings
Name :
rohit
Account No :
10305
Balance :
10000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
1
Enter the deposit :
2000

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
2
Balance : 12000.0

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
3
Enter time:
3
Interest : 2780.5160000000014
Balance : 14780.516000000001

1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
```

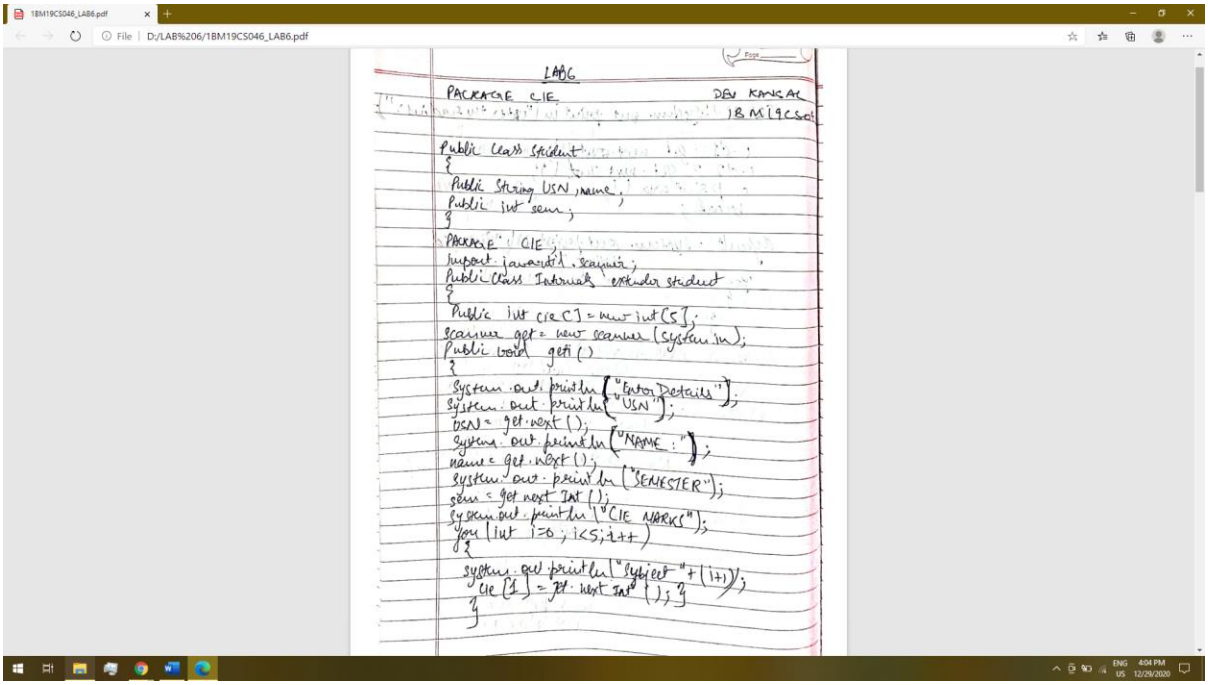

Command Prompt - java Bank
7
Interest : 2700.5160000000014
Balance : 14700.516000000001
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
4
Enter the amount to withdraw: (<14700.516000000001)
2000
Balance : 12700.516000000001
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
5
This account does not have this provision
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
6
This account does not have this provision
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
7
D:\Java\jdk1.8.0_261\bin\prog>java Bank
Enter type of account: (current/savings)
current
Name :
rohit
ENG
15:31
03-11-2020

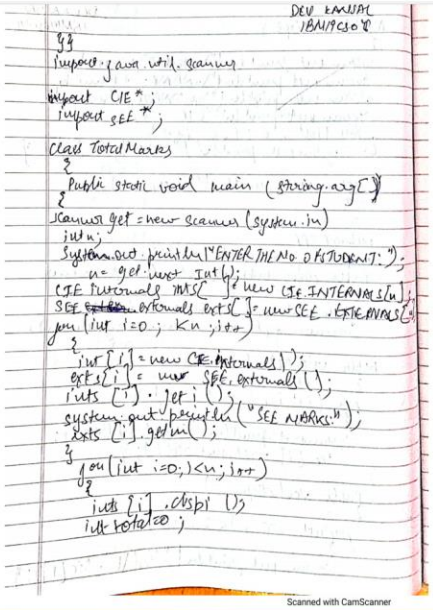

Command Prompt - java Bank
D:\Java\jdk1.8.0_261\bin\prog>java Bank
Enter type of account: (current/savings)
current
Name :
rohit
Account No :
103053
Balance :
10000
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
1
Enter the deposit :
3000
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
2
Balance : 13000.0
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
5
This account does not have this provision
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
4
ENG
15:34
03-11-2020


Command Prompt - java Bank
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
4
Enter the amount to withdraw: (<13000.0)
100
Balance : 12900.0
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
3
Minimum Balance : 5000
Balance : 12900.0Safe
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
4
This account does have this provision
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
4
Enter the amount to withdraw: (<12900.0)
10000
Balance : 2900.0
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
ENG
15:35
03-11-2020


Command Prompt - java Bank
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
4
Enter the amount to withdraw: (<12900.0)
10000
Balance : 2900.0
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
3
Minimum Balance : 5000
Penalty is imposed please deposit minimum 2300.00s
Rs 200 Service charge
Enter the deposit :
2500
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
2
Balance : 5200.0
1.Deposit
2.Display Balance
3.Deposit Interest
4.Withdrawal
5.Check
6.Cheque Book(under development)
7.Exit
ENG
15:36
03-11-2020

LAB 6: Solve this program and write the procedure you have used to execute this in your observation 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.





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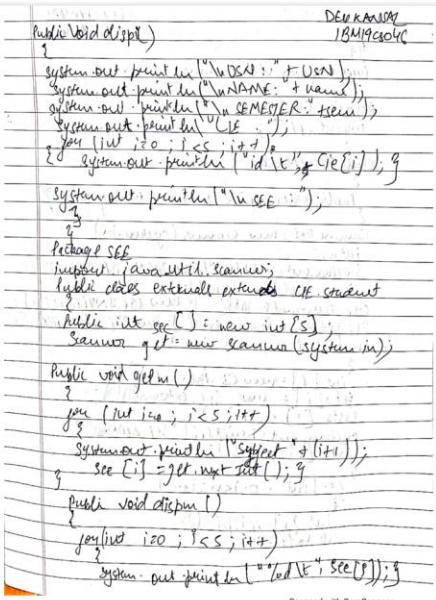
```
}}
import java.util.Scanner;
import CIE.*;
import SEE.*;
class TotalMarks
{
public static void main (String args[])
{
Scanner get = new Scanner (System.in)
int n;
System.out.println("ENTER THE NO OF STUDENT:");
n= get.next Int();
CIE Internals MAS[ ]= new CIE INTERNALS[n];
SEE External Externals ext[ ]= new SEE . EXTERNALS[n];
for(int i=0 ; i<n ;i++)
{
int[i] = new CIE.Internals();
ext[i] = new SEE.externals();
ints[i].get i();
system.out.println("SEE MARKS:");
exts [i].getm();
}
for(int i=0;i<n;i++)
{
ints[i].display();
int total=0;
```

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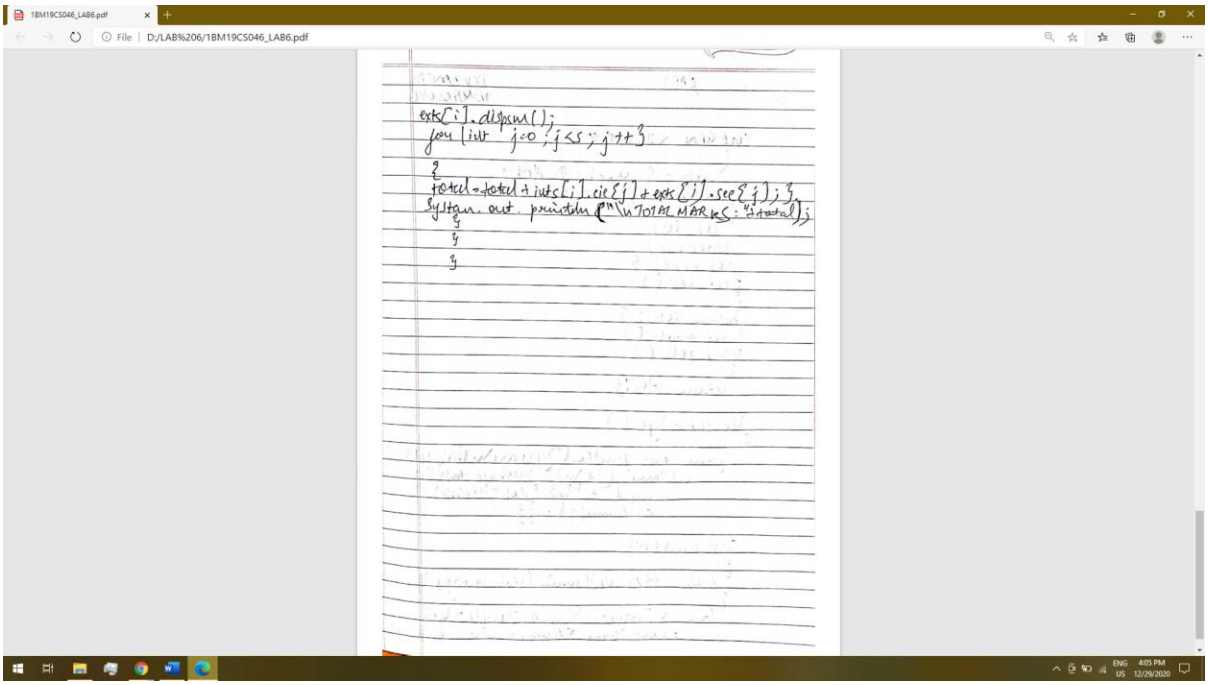
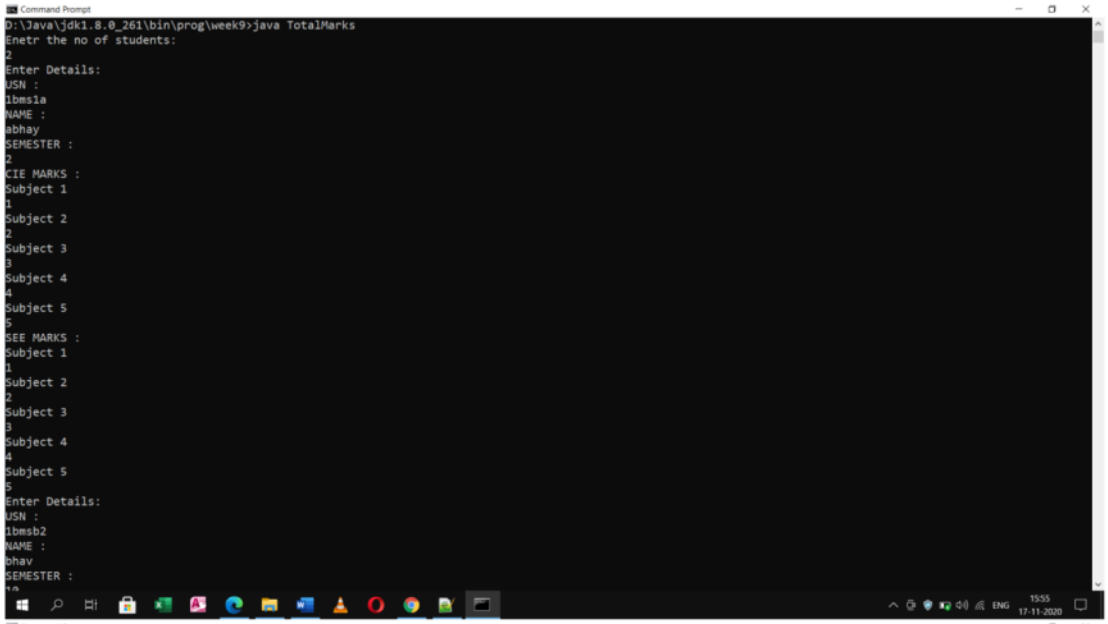
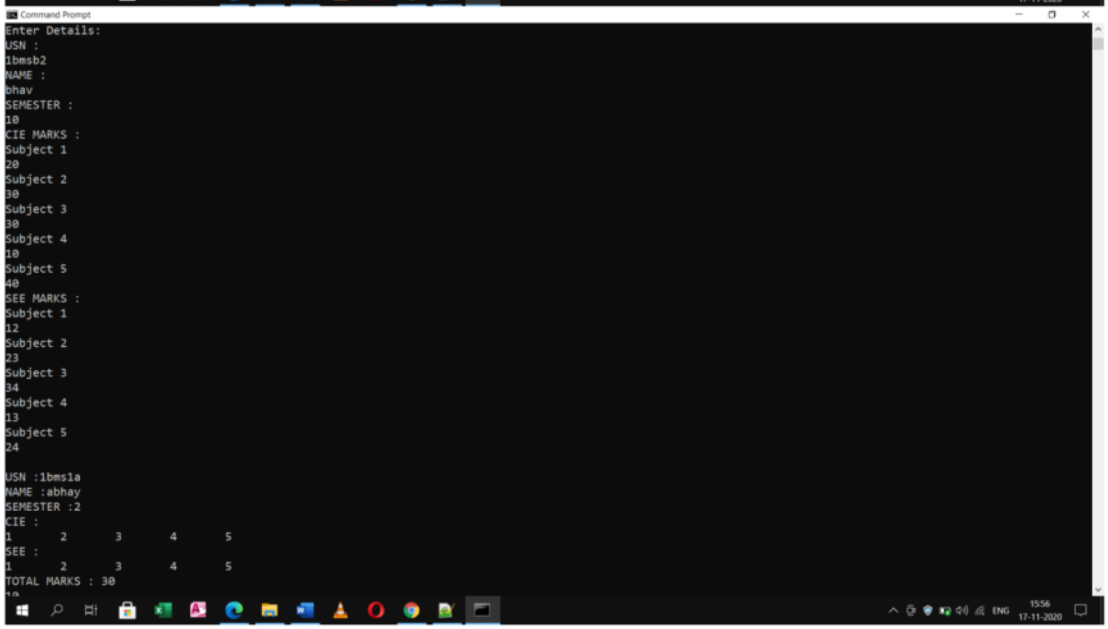
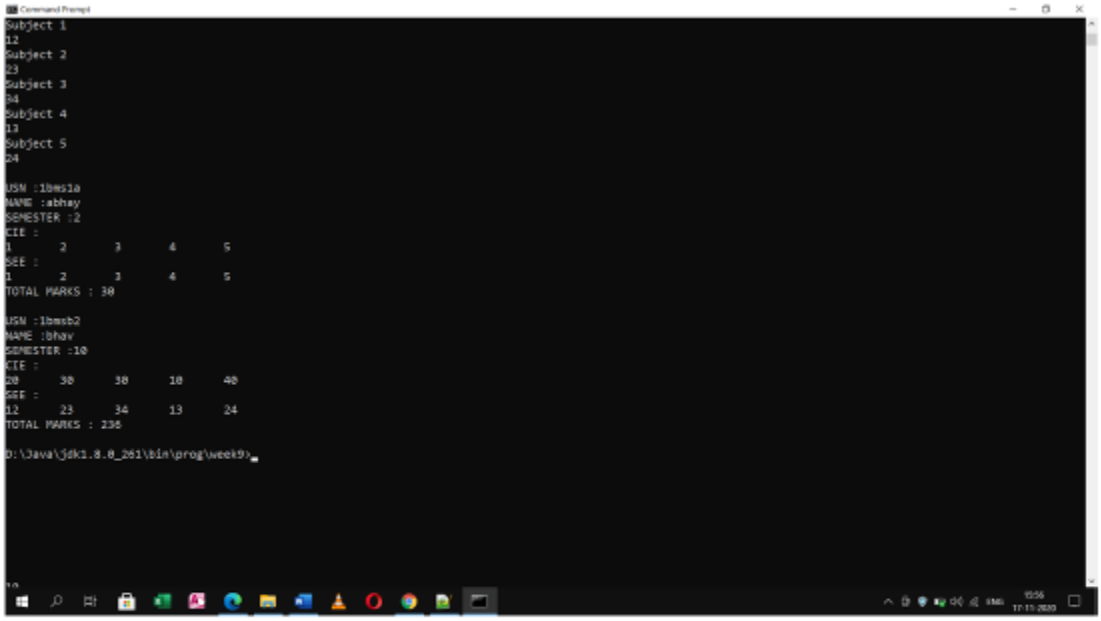
```
Public void display()
{
System.out.println("\nUSN :" + USN);
System.out.println("\nNAME: " + name);
System.out.println("\n SEMESTER:" +sem);
System.out.println("\nCIE :");
for(int i=0 ; i<5 ; i++)
{ System.out.println("id \t" + cie[i]); }
System.out.println("\n SEE :");
}
}
Package SEE
import java.util.Scanner;
Public class externals extends CIE.student
{
Public int see[ ] = new int[5];
Scanner get = new Scanner(System.in);
Public void getm()
{
for (int i=0 ; i<5 ;i++)
{
System.out.println("subject" + (i+1));
see[i] = get.next Int();}
Public void dispm()
{
for(int i=0 ; i<5 ; i++)
{
System.out.println("id \t" + see[i]);}
```


1BM19CS046_LAB6.pdf
File | D:/LAB%206/1BM19CS046_LAB6.pdf
exts[i].display();
for(int j=0;j<5;j++)
{
total=total+ints[i].cie[j]+exts[i].see[j];}
System.out.println("\nTOTAL MARKS:"+total);
}
}
ENG US 4:05 PM 12/29/2020


Command Prompt
D:\Java\jdk1.8.0_261\bin\prog\week9>java TotalMarks
Enetr the no of students:
2
Enter Details:
USN :
1bms1a
NAME :
abhay
SEMESTER :
2
CIE MARKS :
Subject 1
1
Subject 2
2
Subject 3
3
Subject 4
4
Subject 5
5
SEE MARKS :
Subject 1
1
Subject 2
2
Subject 3
3
Subject 4
4
Subject 5
5
Enter Details:
USN :
1bmsb2
NAME :
bhav
SEMESTER :
ENG
15:55
17-11-2020


Command Prompt
Enter Details:
USN :
1bmsb2
NAME :
bhav
SEMESTER :
10
CIE MARKS :
Subject 1
20
Subject 2
30
Subject 3
30
Subject 4
10
Subject 5
40
SEE MARKS :
Subject 1
12
Subject 2
23
Subject 3
34
Subject 4
13
Subject 5
24
USN :1bms1a
NAME :abhay
SEMESTER :2
CIE :
1 2 3 4 5
SEE :
1 2 3 4 5
TOTAL MARKS : 30
ENG
15:56
17-11-2020

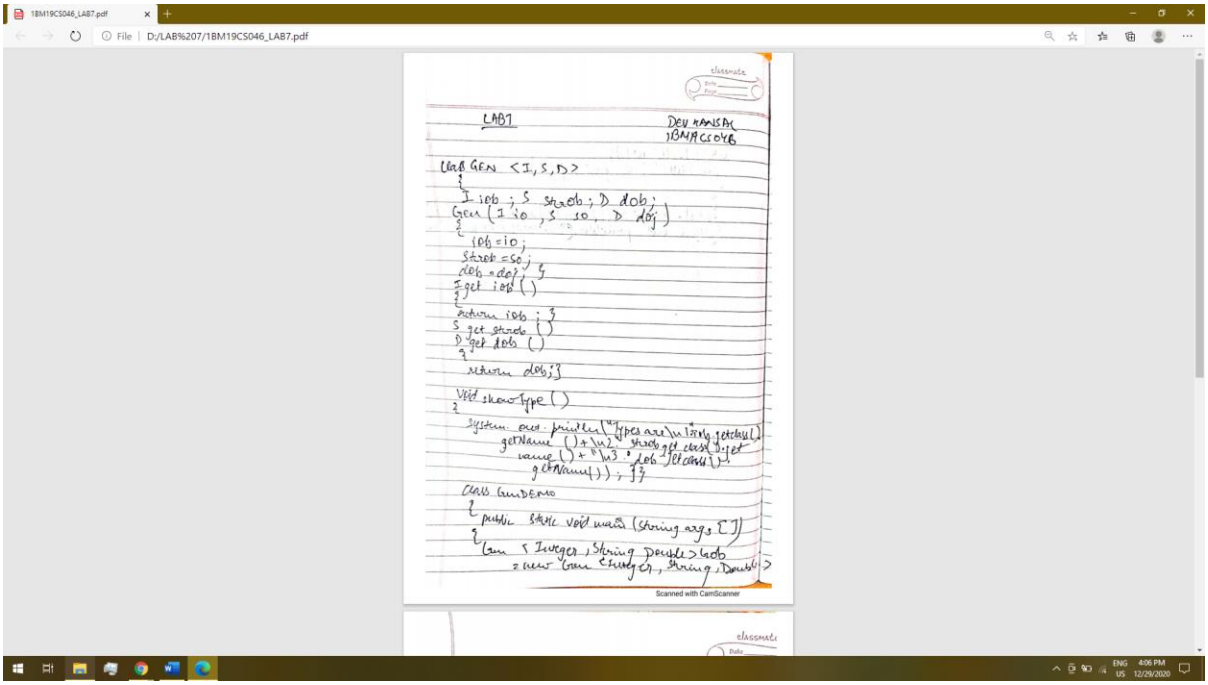

Command Prompt
Subject 1
12
Subject 2
23
Subject 3
34
Subject 4
13
Subject 5
24
USN :1bms1a
NAME :abhay
SEMESTER :2
CIE :
1 2 3 4 5
SEE :
1 2 3 4 5
TOTAL MARKS : 30
USN :1bmsb2
NAME :bhav
SEMESTER :10
CIE :
20 30 38 10 40
SEE :
12 23 34 13 24
TOTAL MARKS : 236
D:\Java\jdk1.8.0_261\bin\prog\week9>

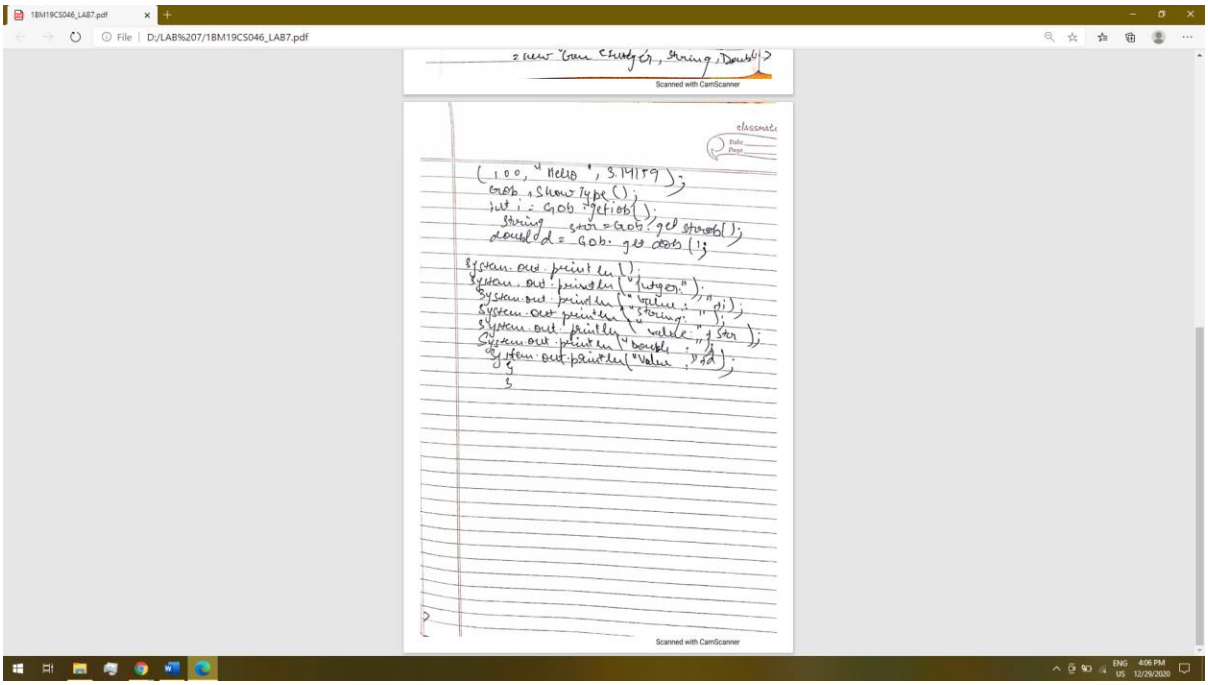
CODE:

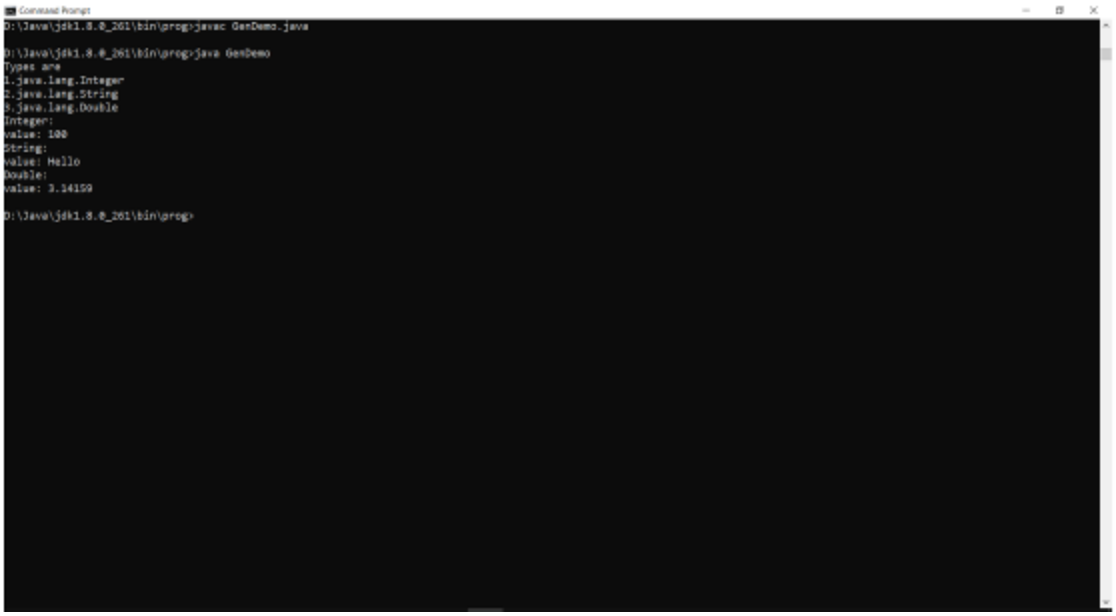
```
package CIE;
public class Student
{ public String usn,name;
 public int sem;
}
package CIE;
import java.util.Scanner;
public class Internals extends Student
{ public int cie[]=new int[5];
 Scanner get=new Scanner(System.in);
 public void geti()
 { System.out.println("Enter Details: ");
 System.out.println("USN :");
usn = get.next();
System.out.println("NAME :");
name =get.next();
System.out.println("SEMESTER :");
sem =get.nextInt();
System.out.println("CIE MARKS :");
for(int i=0;i<5;i++)
{ System.out.println("Subject "+(1+i));
 cie[i]=get.nextInt(); }
 }
 public void dispi()
 { System.out.println("\nUSN :"+usn);
 System.out.println("NAME :"+name);
System.out.println("SEMESTER :"+sem);
System.out.println("CIE :");
for(int i=0;i<5;i++)
{ System.out.printf("%d\t",cie[i]); }
System.out.println("\nSEE :");
 }
}
package SEE;
import java.util.Scanner;
public class Externals extends CIE.Student
{ public int see[]=new int[5];
 Scanner get=new Scanner(System.in);

 public void getm()
 { for(int i=0;i<5;i++)
{ System.out.println("Subject "+(1+i));
 see[i]=get.nextInt(); }
 }
 public void dispsm()
 {for(int i=0;i<5;i++)
{ System.out.printf("%d\t",see[i]); }
 }
}
import java.util.Scanner;
import CIE.*;
import SEE.*;
class TotalMarks
{ public static void main(String args[])
 { Scanner get=new Scanner(System.in);
 int n;
System.out.println("Enetr the no of students: ");
n=get.nextInt();
 CIE.Internals ints[]=new CIE.Internals[n];
SEE.Externals exts[]=new SEE.Externals[n];
 for(int i=0;i<n;i++)
{ ints[i]=new CIE.Internals();
 exts[i]=new SEE.Externals();
 ints[i].geti();
 System.out.println("SEE MARKS :");
 exts[i].getm();
}
for(int i=0;i<n;i++)
{ ints[i].dispi();
 int total=0;
 exts[i].dispsm();
 for(int j=0;j<5;j++)
 { total=total+ints[i].cie[j]+exts[i].see[j];}
 System.out.println("\nTOTAL MARKS : "+total);
}
 }
}
```

LAB PROGRAM 7: Write a program to demonstrate generics with multiple object parameters






Command Prompt
D:\Java\jdk1.8.0_261\bin\prog>javac GenDemo.java
D:\Java\jdk1.8.0_261\bin\prog>java GenDemo
Types are
1.java.lang.Integer
2.java.lang.String
3.java.lang.Double
Integer:
value: 100
String:
value: Hello
Double:
value: 3.14159
D:\Java\jdk1.8.0_261\bin\prog>

```
class Gen<I,S,D>
{ I iob; S strob; D dob;
 Gen(I io,S so,D doj)
 { iob = io;
 strob = so;
 dob= doj;}
 I getiob()
 { return iob; }
 S getstrob()
 { return strob; }
 D getdob()
 { return dob; }
 void showType()
 { System.out.println("Types are\n1." + iob.getClass().getName() +
"\n2."+strob.getClass().getName() +
"\n3."+dob.getClass().getName()); }
}
class GenDemo
{ public static void main(String args[])
 { Gen<Integer,String,Double> GOb = new
Gen<Integer,String,Double>(100,"Hello",3.14159);
 GOb.showType();
 int i = GOb.getiob();
 String str = GOb.getstrob();
 double d = GOb.getdob();
 System.out.println();
 System.out.println("Integer: ");
 System.out.println("value: " + i);
 System.out.println("String: ");
 System.out.println("value: " + str);
 System.out.println("Double: ");
 System.out.println("value: " + d);

}
}
```

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 Wrong Age( ) when the input age=father’s age.

LAB 8

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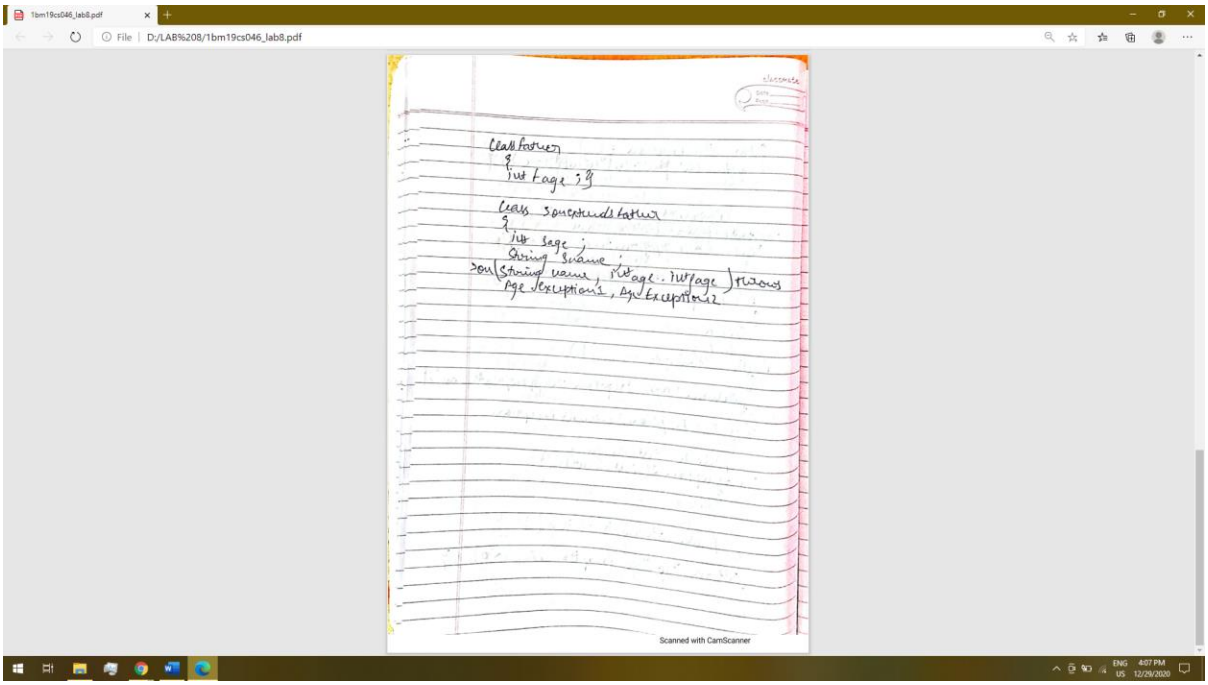
```
{ sage = age;
  Sname = name;
  Fage = fage;
  System.out.println("Son Name :" + Sname);
  System.out.println("Son age :" + age);
  System.out.println("Father age :" + Fage);
  if (age < 0 || Fage < 0)
  throw new Age Exception2(age, Fage);
  if (age < fage)
  throw new Age Exception1(age, Fage);
  if (age > fage)
  throw new Age Exception1(age, fage);
  } }
class age Exception Demo
{
  public static void main (String Args [])
  {
  int sa, fa; String name;
  Scanner get = new Scanner(System.in);
  System.out.println("Enter Son name:");
  name = get.next();
System.out.println("Enter father age");
fa = get.nextInt();
try
{
Son se new son(name Sa, fa); }
Catch (Age Exception1 e)
{ System.out.println("caught" + e); } }
```

Scanned with CamScanner


```
Catch (Age Exception e e)
{ System.out.println("caught" + e); }
}

PROGRAM
import java.util.*;
class Age Exception1 extends Exception
{
  private int sa, fa;
  Age Exception1(int a; int b)
  {
  Sa = a;
  fa = b;
Public String to string()
{
  return "age Exception. Inappropriate age";}
class Age Exception2 extends Exception
{
  private int sa, fa;
Age exception2(int a, int b)
  {
  sa = a
  fa = b
  public string to string()
{
return "age. Exception. Age (<0)";}
}
```

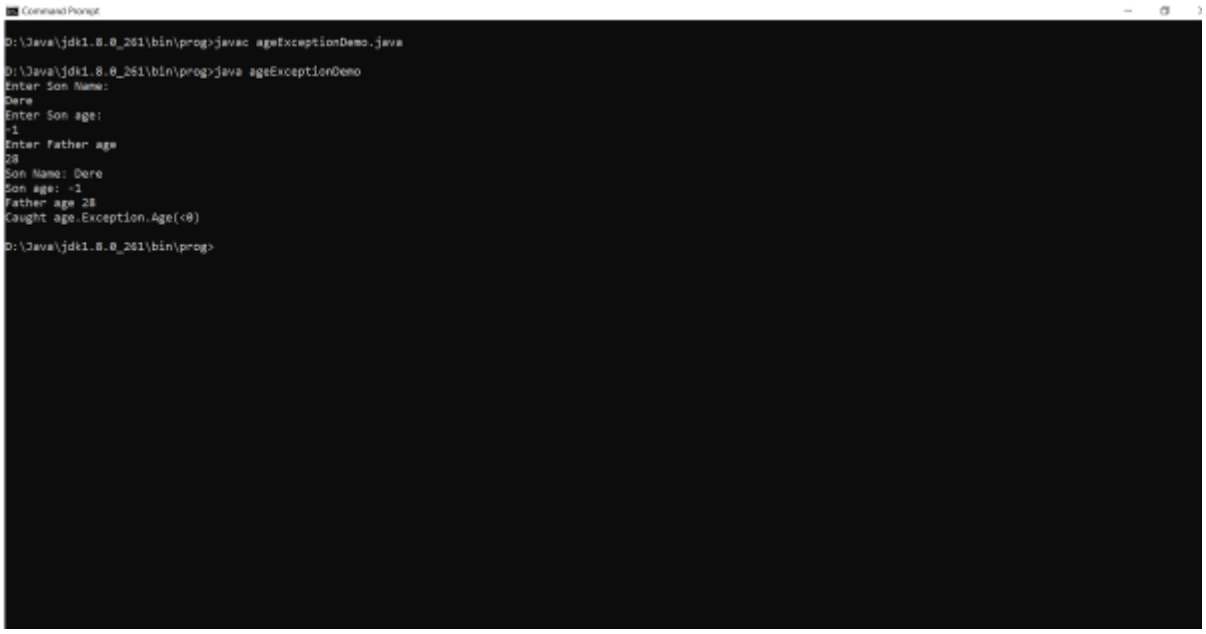
Scanned with CamScanner


1bm19cs046_lab8.pdf
File | D:/LAB%208/1bm19cs046_lab8.pdf
class father
{
int age ;}
class son extends father
{
int age ;
String name ;
son(String name , int age , int fage) throws
Age Exception1 , Age Exception2
Scanned with CamScanner
ENG US 4:07 PM 12/29/2020

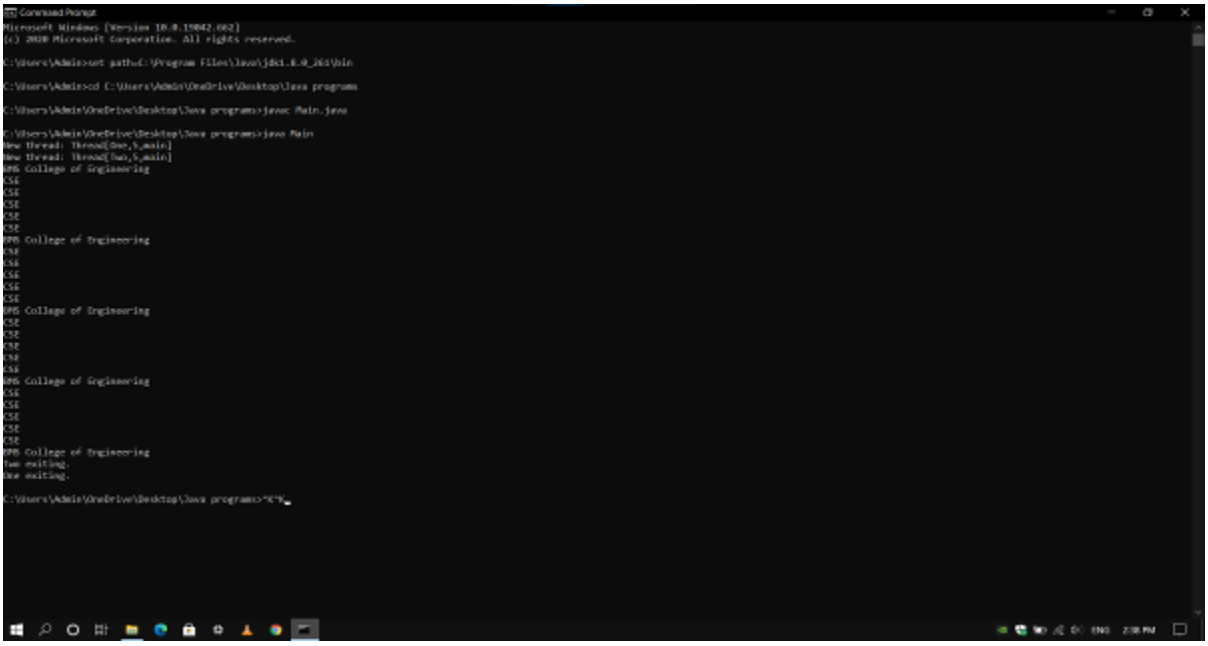
```
import java.util.Scanner;
class AgeException1 extends Exception
{ private int sa,fa;
 AgeException1(int a,int b)
 { sa = a;
 fa = b; }
 public String toString()
 { return "age.Exception.Inappropriate_age"; }
}
class AgeException2 extends Exception
{ private int sa,fa;
 AgeException2(int a,int b)
 { sa = a;
 fa = b; }
 public String toString()
 { return "age.Exception.Age(<0)"; }
}
class Father
{ int Fage; }
class Son extends Father
{ int Sage;
 String Sname;

 Son(String name,int age,int fage) throws AgeException1, AgeException2
 { Sage=age;
 Sname=name;
 Fage=fage;
 System.out.println("Son Name: " + Sname);
 System.out.println("Son age: " + Sage);
 System.out.println("Father age " + Fage);

 if(Sage<0||Fage<0)
 throw new AgeException2(age,fage);
 if(age>=fage)
 throw new AgeException1(age,fage);
 }
}
class ageExceptionDemo
{ public static void main(String args[])
 { int sa,fa; String name;
 Scanner get=new Scanner(System.in);
 System.out.println("Enter Son Name: ");
 name=get.next();
 System.out.println("Enter Son age: ");
 sa=get.nextInt();
 System.out.println("Enter Father age ");
 fa=get.nextInt();
 try
 { Son s=new Son(name,sa,fa); }
 catch (AgeException1 e)
 { System.out.println("Caught " + e); }
catch (AgeException2 e)
 { System.out.println("Caught " + e); }
 }
}
```



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.

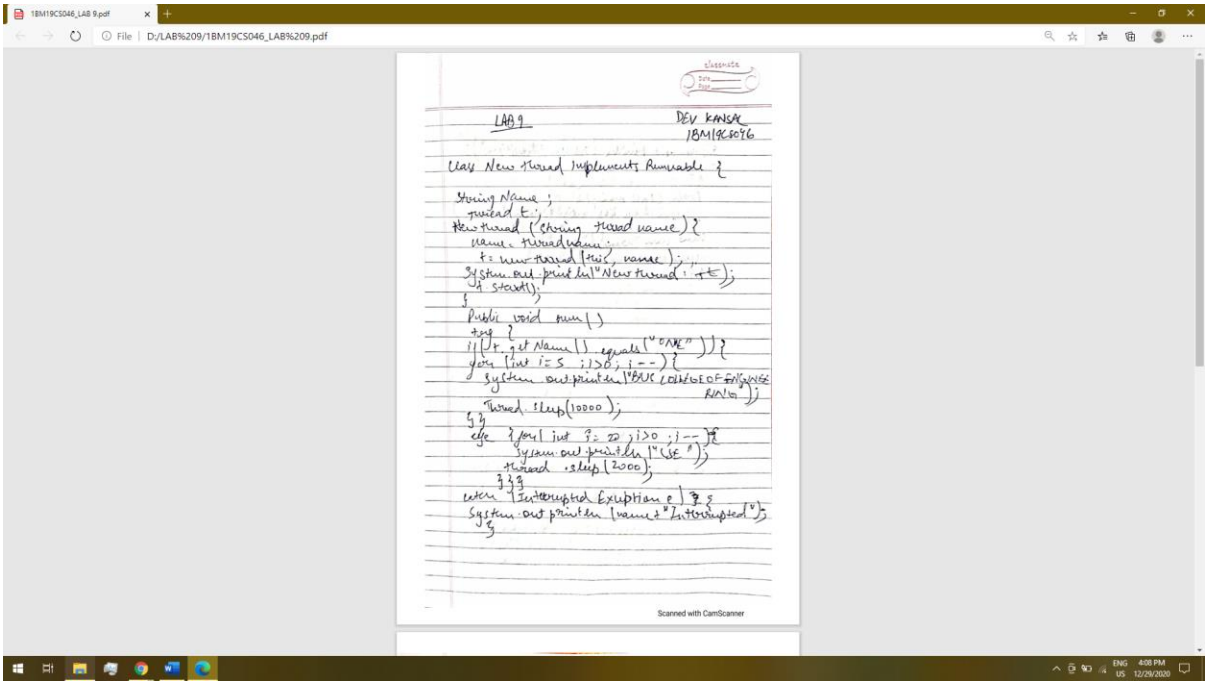


```
class NewThread implements Runnable {
    String name;
    Thread t;
    NewThread(String threadName) {
        name = threadName;
        t = new Thread(this, name);
        System.out.println("New thread: " + t);
        t.start();
    }

    public void run() {
        try {
            if (t.getName().equals("One")) {
                for (int i = 5; i > 0; i--) {
                    System.out.println("BMS College of Engineering");
                    Thread.sleep(10000);
                }
            }
            else{
                for (int i = 20; i > 0; i--) {
                    System.out.println("CSE");
                    Thread.sleep(2000);
            }
            }
        }
        catch(InterruptedException e){
            System.out.println(name + "Interrupted");
        }
        System.out.println(name + " exiting.");
    }
}

public class Main {

    public static void main(String[] args) {
        new NewThread("One");
        new NewThread("Two");
    }
}
```

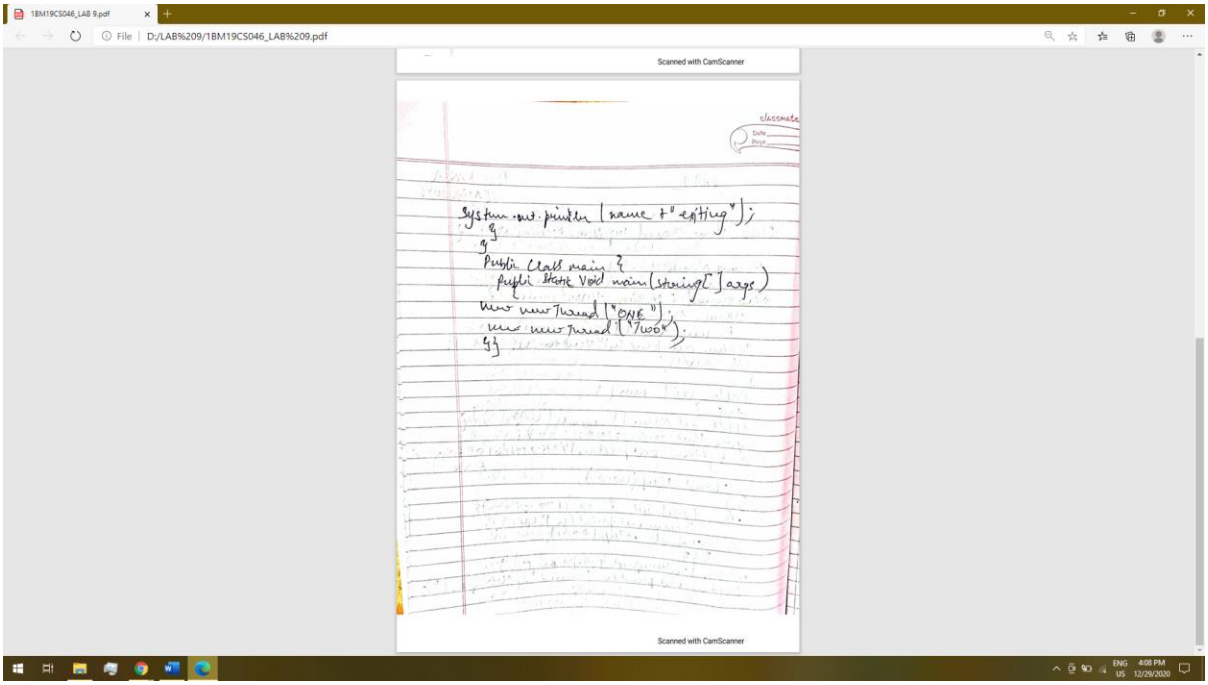


LAB 9

DEV KANSAL
1BM19CS076

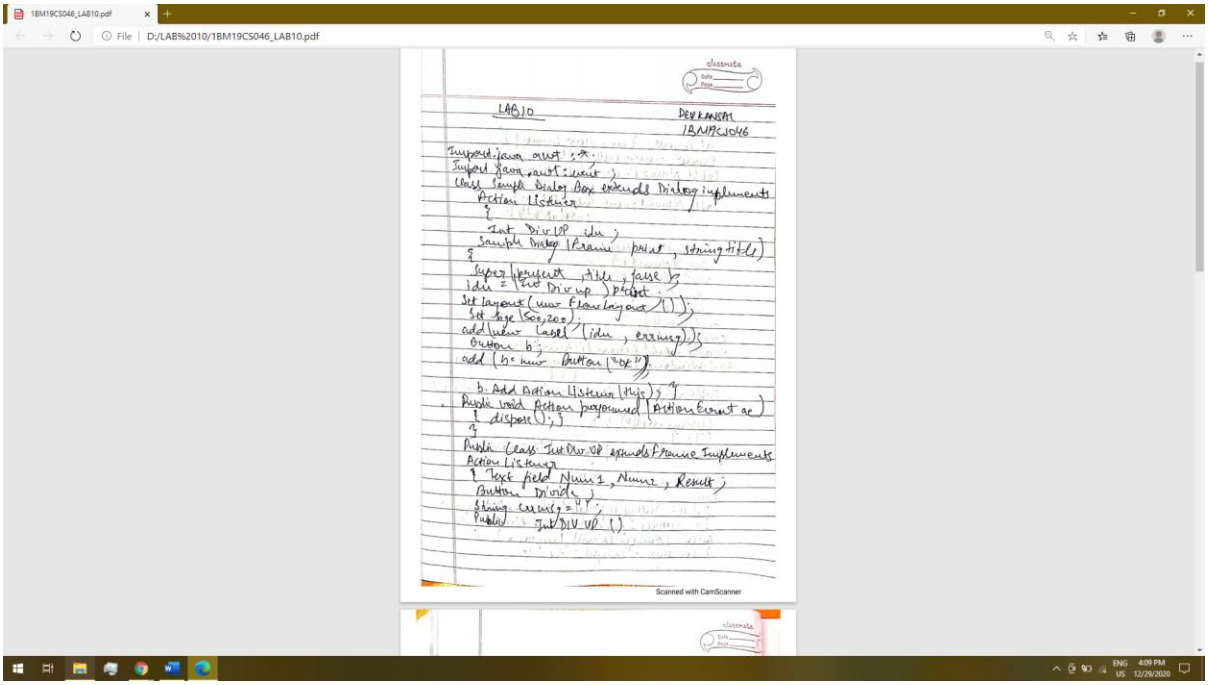
```
class NewThread implements Runnable {
    String name;
    Thread t;
    NewThread (String threadname) {
        name = threadname;
        t = new Thread(this, name);
        System.out.println("New thread: " + t);
        t.start();
    }
    public void run() {
        try {
            if(t.getName().equals("ONE"))
            for (int i = 5; i > 0; i--) {
                System.out.println("BMS COLLEGE OF ENGINEERING");
                Thread.sleep(10000);
            }
            else { for( int j = 20; j > 0; j--) {
                System.out.println("CSE");
                Thread.sleep(2000);
            }
        }
        catch (InterruptedException e) {
            System.out.println(name + "Interrupted");
        }
        System.out.println(name + "exiting");
    }
    public class main {
        public static void main(String[] args)
        new NewThread("ONE");
        new NewThread("TWO");
    }
}
```

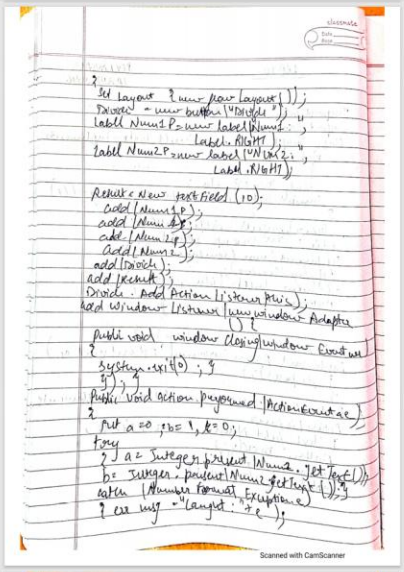
Scanned with CamScanner



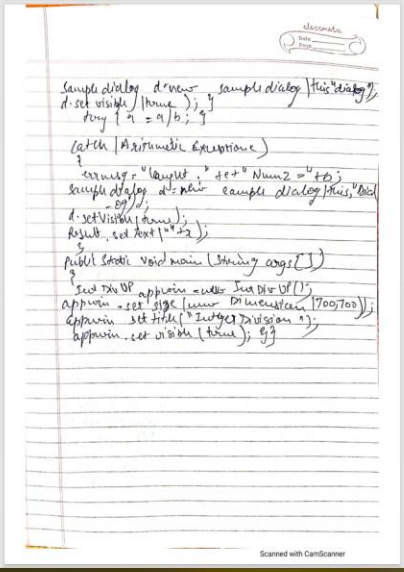
Scanned with CamScanner

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 programwould throw a NumberFormatException. If Num2 were Zero, the program would throw anArithmetic Exception Display the exception in a message dialog box





```
Set Layout ( new FlowLayout ());
Divide = new Button ("Divide");
Label Num1 P = new Label ("Num1:",
                Label.RIGHT);
Label Num2 P = new Label ("Num2:",
                Label.RIGHT);
Result = New TextField (10);
add (Num1 P);
add (Num1 tf);
add (Num2 P);
add (Num2 tf);
add (Divide);
add (Result);
Divide. Add Action Listener (this);
add WindowListener (new WindowAdapter
        ( ) {
public void windowClosing (WindowEvent e)
{
System.exit(0);
}});
Public void actionPerformed (ActionEvent ae)
{
int a=0, b=1, k=0;
try
{ a = Integer.parseInt (Num1.getText());
b = Integer.parseInt (Num2.getText());
k = a/b;
catch (NumberFormatException e)
{ err msg = "Caught:" + e );
```

```
Sample dialog d = new sample dialog (this, "dialog");
d.setVisible (true);
try { k = a/b; }
catch (ArithmeticException e)
{
err msg = "Caught:" + e.toString();
Sample dialog d = new sample dialog (this, "Divide by 0");
d.setVisible (true);
Result.setText ("" + k);
}
public static void main (String args[])
{
Sed Div UP appwin = new Sed Div UP ();
appwin.setSize (new Dimension (700,700));
appwin.setTitle ("Integer Division");
appwin.setVisible (true); }}
```

```
import java.awt.*;
import java.awt.event.*;
class SampleDialog extends Dialog implements ActionListener
{ IntDivUp idu;
SampleDialog(Frame parent, String title)
{ super(parent, title, false);
idu=(IntDivUp)parent;
setLayout(new FlowLayout());
setSize(500, 200);
add(new Label(idu.errmsg));
Button b;

add(b = new Button("OK"));
b.addActionListener(this);
}
public void actionPerformed(ActionEvent ae)
{ dispose(); }
}
public class IntDivUp extends Frame implements ActionListener
{ TextField Num1, Num2,Result;
Button Divide;
String errmsg="";
public IntDivUp()
{ setLayout(new FlowLayout());
Divide = new Button("Divide");
Label Num1p = new Label("Num1: ", Label.RIGHT);
Label Num2p = new Label("Num2: ", Label.RIGHT);
Num1 = new TextField(10);
Num2 = new TextField(10);
Result = new TextField(10);
add(Num1p);
add(Num1);
add(Num2p);
add(Num2);
add(Divide);
add(Result);
Divide.addActionListener(this);
addWindowListener(new WindowAdapter(){
public void windowClosing(WindowEvent we)
{ System.exit(0); }
});
}
public void actionPerformed(ActionEvent ae)
{
int a=0,b=1,r=0;
try
{a = Integer.parseInt(Num1.getText());
b = Integer.parseInt(Num2.getText());}
catch(NumberFormatException e)
{ errmsg= "Caught: "+e;
SampleDialog d = new SampleDialog(this, "Dialog");
d.setVisible(true); }
try
{ r=a/b; }
catch(ArithmeticException e)
{ errmsg= "Caught: "+e+" Num2= "+ b;
SampleDialog d = new SampleDialog(this, "Dialog");
d.setVisible(true); }
Result.setText(" "+r);
}
public static void main(String args[])
{ IntDivUp appwin = new IntDivUp();
appwin.setSize(new Dimension(700,700));
appwin.setTitle("Integer Division");
appwin.setVisible(true);
}
}
```

```
Microsoft Windows [Version 10.0.19042.685]
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C:\Users\Admin>set path=C:\programfiles/java/jdk1.8.0_261/bin

C:\Users\Admin>set path=C:\Program Files\Java\jdk1.8.0_261\bin

C:\Users\Admin>cd C:\Users\Admin\OneDrive\Desktop\Java programs

C:\Users\Admin\OneDrive\Desktop\Java programs>javac IntDivUp.java

C:\Users\Admin\OneDrive\Desktop\Java programs>java IntDivUp
```