

Name : Akshay Anand Rastogi

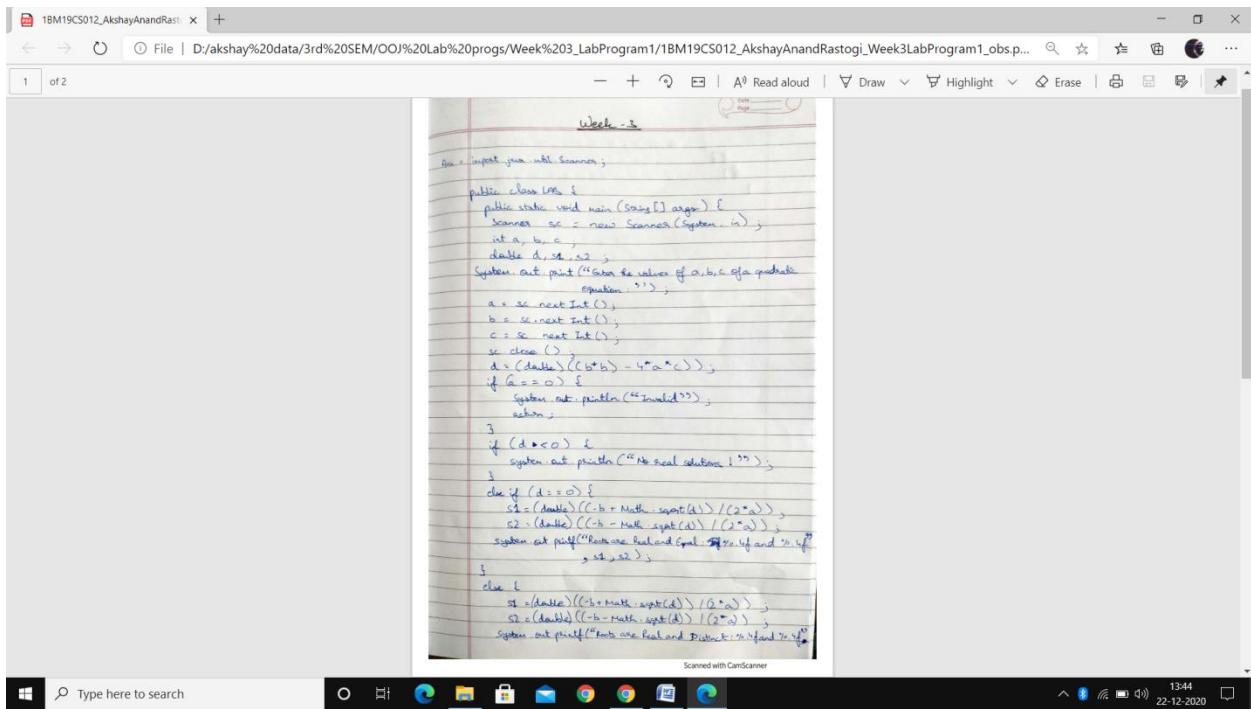
USN : 1BM19CS012

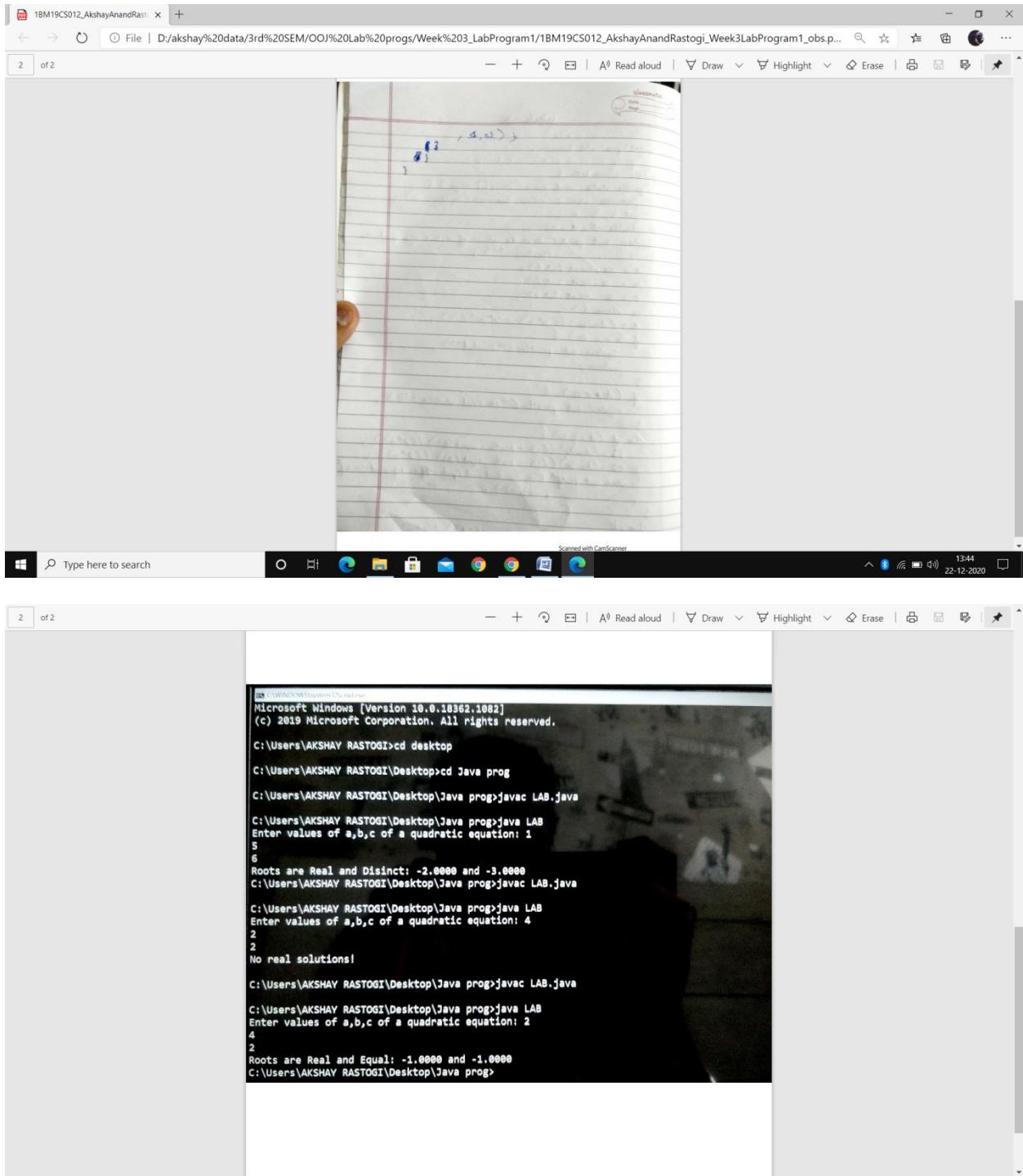
Section : 3A

# Java Lab Observation

## LAB PROGRAM – 1 :

Develop a Java program that prints all real solutions to the quadratic equation  $ax^2 + bx + c = 0$ . Read in a, b, c and use the quadratic formula. If the discriminant  $b^2 - 4ac$  is negative, display a message stating that there are no real solutions.





## 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

Week 4

```
Ans = import java.util.Scanner;
class Student {
    int i, n, sum1 = 0, sum2 = 0;
    String user;
    String name;
    double zero;
    int credits;
    double marks[][];
    int score[];
    void inputdata() {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the numbers of subjects: ? ");
        n = sc.nextInt();
        credits = new int[n];
        marks = new double[n][];
        score = new int[n];
        System.out.println("Enter your user no. = ? ");
        user = sc.nextLine();
        System.out.println("Enter your name = ? ");
        name = sc.nextLine();
        System.out.println("Enter your credits for subject = ? ");
        marks[i] = sc.nextDouble();
    }
}
```

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- + ⌂ | A Read aloud | V Draw v V Highlight v X Erase | ↻

9

```
Void outputdata () {  
    System.out.print("----- Student Details ----- \n");  
    System.out.print(" USN = " + usn + "\n");  
    System.out.print(" Name = " + name + "\n");  
    for (int i = 0; i < n; i++) {  
        System.out.println(" Your marks for subject " + i + " = " + credits[i] + "\n");  
    }  
}
```

classmate

Date \_\_\_\_\_  
Page \_\_\_\_\_

```
Void output() {  
    for (int i = 0; i < n; i++) {  
        if (marks[i] <= 100 && marks[i] >= 90) {  
            grade[i] = 'A';  
        } else if (marks[i] >= 80) {  
            grade[i] = 'B';  
        } else if (marks[i] >= 70) {  
            grade[i] = 'C';  
        } else if (marks[i] >= 60) {  
            grade[i] = 'D';  
        } else {  
            grade[i] = 'E';  
        }  
    }  
}
```

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```
else if (marks[i] >= 90)
    score[i] = 9;
else if (marks[i] >= 70)
    score[i] = 8;
else if (marks[i] >= 60)
    score[i] = 7;
else if (marks[i] >= 50)
    score[i] = 6;
else if (marks[i] >= 40)
    score[i] = 5;
else if (marks[i] < 40)
    score[i] = 0;

for (i=0; i<n; i++)
    sum1 = sum1 + credits[i];
for (i=0; i<n; i++)
    sum2 = sum2 + (credits[i] * score[i]);
}

avg = ((double) sum2 / sum1);
System.out.println("Your SGPA is " + avg + "\n");
}

class Total {
    public static void main (String [ ] args) {
    }
```

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```
classmate
Date _____
Page _____
```

Student std = new Student();
std.inputdata();
std.outputdata();
std.sgra();
}

A screenshot of a Windows desktop environment. In the center is a command-line window titled 'cmd' with the path 'C:\Users\AKSHAY RASTOGI\Desktop'. The window displays the following Java program execution:

```
C:\Users\AKSHAY RASTOGI>cd desktop
C:\Users\AKSHAY RASTOGI\Desktop>cd java prog
C:\Users\AKSHAY RASTOGI\Desktop\java prog>java Total
Enter the number of subjects
3
Enter your usn no-
18M10CS012
Enter your name-
Akshay
Enter your credits for subject-
3
Enter your marks out of 100 in subject-
89
Enter your credits for subject-
4
Enter your marks out of 100 in subject-
78
Enter your credits for subject-
3
Enter your marks out of 100 in subject-
89.0
<-----Student Details:-----
USN -18M10CS012
Name -Akshay
your credits for subject -3
your marks out of 100 in subject -89.0
your credits for subject -4
your marks out of 100 in subject -78.0
your credits for subject -3
your marks out of 100 in subject -89.0
your marks out of 100 in subject -78.0
Your SGPA is -8.3
C:\Users\AKSHAY RASTOGI\Desktop\java prog>
```

### 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.

Week 5

```
Ans: import java.util.Scanner;
class Book {
    String name, author;
    double price;
    int num_pages;

    void getData() {
        Scanner ss = new Scanner(System.in);
        System.out.println("Enter the name of Book = ? ");
        name = ss.nextLine();
        System.out.println("Enter the author of Book = ? ");
        author = ss.nextLine();
        System.out.println("Enter the price of Book = ? ");
        price = ss.nextDouble();
        System.out.println("Enter the number of pages in Book = ? ");
        num_pages = ss.nextInt();
    }

    public String toString() {
        return ("Name of Book = " + name + "Author of Book = " + author + "Price of Book = " + price + "Number of pages in Book = " + num_pages);
    }
}
```

```

price = ss.nextInt();
System.out.println("Enter the number of pages in Book = " + num_pages);
num_pages = ss.nextInt();
}

public static void main(String[] args) {
    int i = 0, n;
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter the number of Books = " + n);
    n = sc.nextInt();
    Book bks[] = new Book[n];
}

```

- + ⌂ A<sup>0</sup> Read aloud | ∇ Draw ×

for (i=0; i<n; i++)  
{  
 Bk[i] = new Book();  
 System.out.println("Enter the Details of Book " + (i+1) + "...>\n");  
 Bk[i].getdata();  
}  
for (i=0; i<n; i++)  
{  
 System.out.println("Details of Book " + (i+1) + "...>\n");  
 System.out.println(Bk[i]);  
}

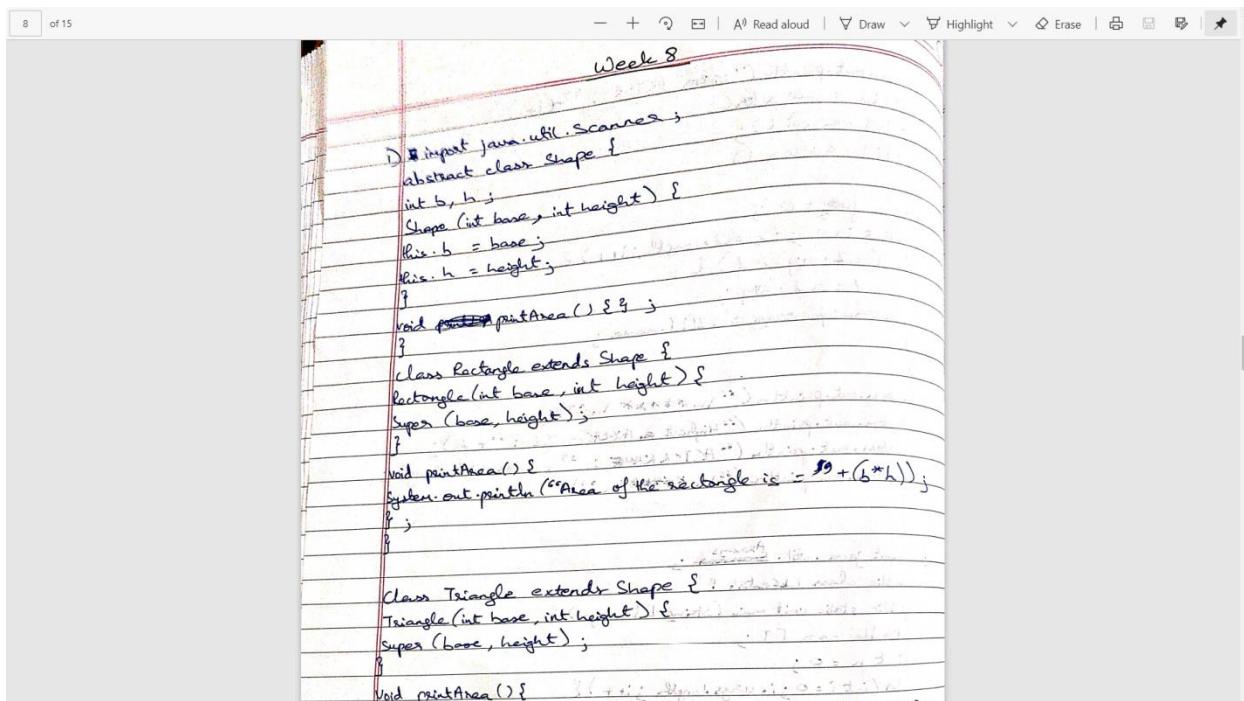
CLASSMATE  
Date \_\_\_\_\_  
Page \_\_\_\_\_

```
C:\Users\AKSHAY RASTOGI\Desktop>java prog>java Weeks
Enter the number of Books =
2
<-----Enter the Details of Book 1----->
Enter the name of Book =
Salef
Enter the author of Book =
orri
Enter the price of Book =
234
Enter the number of pages in Book =
222
<-----Enter the Details of Book 2----->
Enter the name of Book =
waleb
Enter the author of Book =
wqwe
Enter the price of Book =
234
Enter the number of pages in Book =
400
<---Details of BOOK 1---->
Name of Book =Salef
Author of Book =orri
Price of Book =234.0
Number of pages in Book =222
<---Details of BOOK 2---->
Name of Book =waleb
Author of Book =wqwe
Price of Book =234.0
Number of pages in Book =400
C:\Users\AKSHAY RASTOGI\Desktop>java prog
```

Scanned with CamScanner

#### 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.

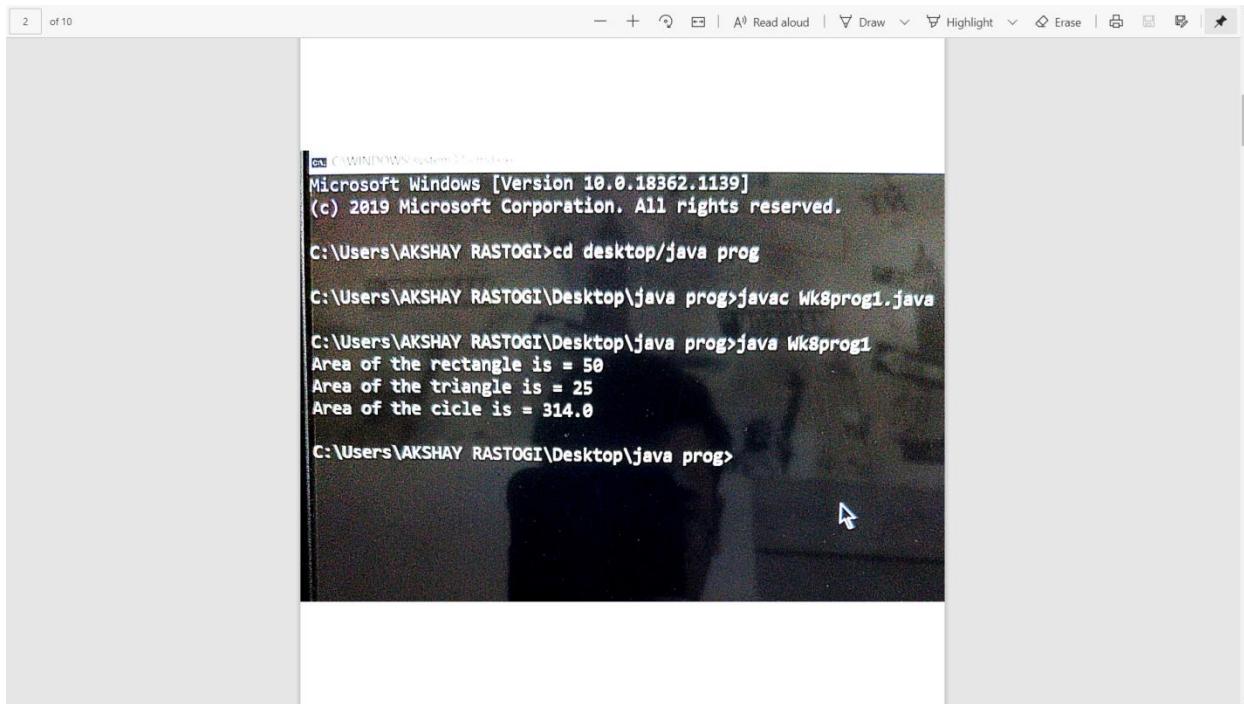


```

class Triangle extends Shape {
    int base, height;
    Triangle (int base, int height) {
        super (base, height);
    }
    void printArea () {
        System.out.println ("Area of the triangle is = " + ((B*h)/2));
    }
}

class Circle extends Shape {
    int height;
    Circle (int height) {
        super (0, height);
    }
}

```



The screenshot shows a Microsoft Word document containing a screenshot of a Windows Command Prompt window. The command prompt shows the following sequence of commands and outputs:

```
Microsoft Windows [Version 10.0.18362.1139]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\AKSHAY RASTOGI>cd desktop/java prog

C:\Users\AKSHAY RASTOGI\Desktop\java prog>javac Wk8prog1.java

C:\Users\AKSHAY RASTOGI\Desktop\java prog>java Wk8prog1
Area of the rectangle is = 50
Area of the triangle is = 25
Area of the circle is = 314.0

C:\Users\AKSHAY RASTOGI\Desktop\java prog>
```

#### 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.





```

System.out.println ("Enter amount you want to withdraw :");
amount = x2.nextInt();
withdraw (amount);
break;
default :
flag = 2;
}
}
}
}
break;
}

Case 2 :
System.out.println ("Enter Savings Account : \n");
System.out.println ("Enter the name of account holder ");
String p = x2.nextLine();
System.out.println ("Enter the account number ");
String s = x2.nextLine();
System.out.println ("Enter the balance amount ");
double b = x2.nextDouble();
Savacc s = new Savacc (p, q, "Savings", s);
Savacc s = new Savacc (p, q, "Savings", s);
int flag = 0;
while (flag == 0) {
System.out.println ("Enter your choice in 1: Deposit Amount in 2: Display
Balance and Interest in 3: Withdrawal in 4: Exit ");
int choice2 = x2.nextInt();
switch (choice2) {
case 1 : System.out.println ("Enter the amount to be deposited :");
amount = x2.nextInt();
deposit (amount);
break;
case 2 : s.display ();
s.interest ();
break;
}
}

```

```

Case 3:
System.out.println("Enter the amount you want to withdraw? ");
xx amount = xx.nextInt();
withdrawal(amount);
break;
default : flag2 = 1;
}
}
else {
break;
}
default : flag = 2;
}
}

```

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```
C:\Users\AKSHAY RASTOGI\Desktop\java prog>java Wk8prog2
Enter the type of Account:
1:Current account
2:Savings account
3:Exit
2

Savings account:

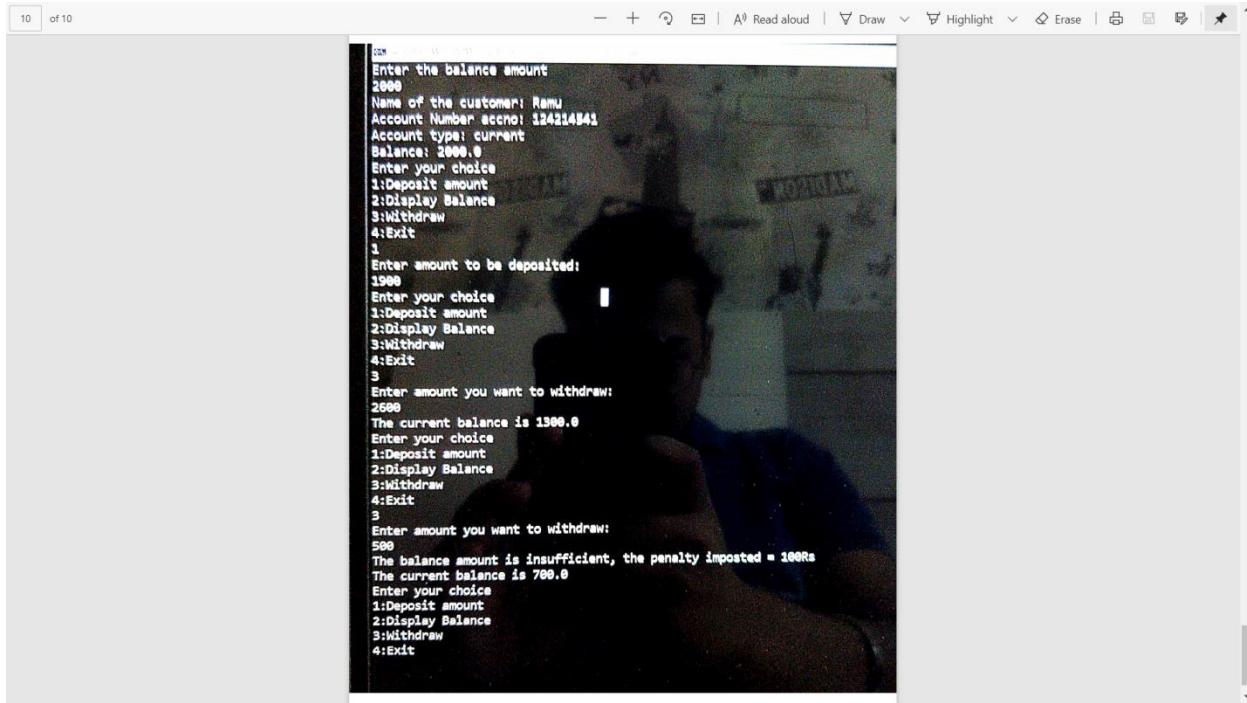
Enter the name of account holder
Akshay
Enter the account number
21432154
Enter the balance amount
10000
Name of the customer: Akshay
Account Number accno: 21432154
Account type: Savings
Balance: 10000.0
Enter your choice
1:Deposit amount
2:Display Balance and Interest
3:Withdraw
4:Exit
1
Enter amount to be deposited:
1500
The Balance is 11500.0
Enter your choice
1:Deposit amount
2:Display Balance and Interest
3:Withdraw
4:Exit
3
Enter amount you want to withdraw:
500
The current balance is 11000.0
Enter your choice
1:Deposit amount
2:Display Balance and Interest
```

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```
1:Deposit amount
2:Display Balance and Interest
3:Withdraw
4:Exit
2
2
Balance is: 11000.0
The interest amount added to balance is 1100.0
The Balance is 12100.0
Enter your choice
1:Deposit amount
2:Display Balance and Interest
3:Withdraw
4:Exit
4
Enter the type of Account:
1:Current account
2:Savings account
3:Exit
1

Current account:

Enter the name of account holder
Ramu
Enter the account number
124214541
Enter the balance amount
2000
Name of the customer: Ramu
Account Number accno: 124214541
Account type: current
Balance: 2000.0
Enter your choice
1:Deposit amount
2:Display Balance
3:Withdraw
4:Exit
1
Enter amount to be deposited:
1900
Enter your choice
```



The screenshot shows a terminal window with a light gray background. At the top, there are several icons: a minus sign, a plus sign, a magnifying glass, a document icon, a 'Read aloud' button, a 'Draw' button, a 'Highlight' button, an 'Erase' button, and other standard window controls. The main area of the terminal contains the following text:

```
Enter the balance amount  
2000  
Name of the customer: Ramu  
Account Number echo: 124214541  
Account type: current  
Balance: 2000.0  
Enter your choice  
1:Deposit amount  
2:Display Balance  
3:Withdraw  
4:Exit  
1  
Enter amount to be deposited:  
1900  
Enter your choice  
1:Deposit amount  
2:Display Balance  
3:Withdraw  
4:Exit  
3  
Enter amount you want to withdraw:  
2600  
The current balance is 1300.0  
Enter your choice  
1:Deposit amount  
2:Display Balance  
3:Withdraw  
4:Exit  
3  
Enter amount you want to withdraw:  
500  
The balance amount is insufficient, the penalty imposed = 100Rs  
The current balance is 700.0  
Enter your choice  
1:Deposit amount  
2:Display Balance  
3:Withdraw  
4:Exit
```

#### Lab Program – 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.

The screenshot shows a Microsoft Edge browser window with the title "1BM19CS012\_AkshayAnandRastogi" and a file path "D:/akshay%20data/3rd%20SEM/OOJ%20Lab%20progs/Week%209\_LabProgram%206/1BM19CS012\_AkshayAnandRastogi\_Week9LabProgram6\_o...". The browser interface includes standard controls like back, forward, and search, along with a toolbar for reading aloud, drawing, highlighting, and erasing.

Handwritten notes at the top of the page read "Week 9" and "Date \_\_\_\_\_".

Java code is handwritten in two sections:

```
1) package CIE;
import java.util.Scanner;
public class Student {
    public void gdata1() {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the name of student = ");
        String name = sc.nextLine();
        System.out.println("Enter the USN = ");
        String usn = sc.nextLine();
        System.out.println("Enter the current semester = ");
        int sem = sc.nextInt();
    }
}

package CIE;
import java.util.Scanner;
public class Internate extends Student {
    public int Internat() {
        public void gdata2() {
            Scanner sc = new Scanner(System.in);
            intmarks = new int[5];
            System.out.println("Enter the CIE marks for 5 subjects = ");
            for (int i = 0; i < 5; i++) {
                System.out.println("Enter the CIE marks for subject " + i + " = ");
                intmarks[i] = sc.nextInt();
            }
        }
    }
}
```

The screenshot shows a Microsoft Edge browser window with the title "1BM19CS012\_AkshayAnandRastogi" and a file path "D:/akshay%20data/3rd%20SEM/OOJ%20Lab%20progs/Week%209\_LabProgram%206/1BM19CS012\_AkshayAnandRastogi\_Week9LabProgram6\_o...". The browser interface includes standard controls like back, forward, and search, along with a toolbar for reading aloud, drawing, highlighting, and erasing.

Handwritten notes at the top of the page read "classmate" and "Date \_\_\_\_\_".

Java code is handwritten in one section:

```
package SEE;
import java.util.Scanner;
import CIE.*;

public class Extends CIE.Student {
    public int Smarks[] {
        public void gdata3() {
            Scanner sc = new Scanner(System.in);
            int i = 0;
            Smarks = new int[6];
            System.out.println("Enter the SEE marks for the 6 subjects = ");
            for (i = 0; i < 6; i++) {
                System.out.println("Enter the SEE marks for subject " + (i + 1) + " = ");
                Smarks[i] = sc.nextInt();
            }
        }
    }
}
```

```

import CIE.*;
import SGE.*;
import java.util.Scanner;

public class Wk9preq1 {
    public static void main (String [] args) {
        int n;
        Scanner sc = new Scanner (System.in);
        System.out.print ("Enter the number of students = ");
        n = sc.nextInt ();
        CIE.Intervals ci [ ] = new CIE.Intervals [n];
        SGE.General sg [ ] = new SGE.General [n];
        for (int k = 0; k < n; k++) {
    }
}

```

```

ci [k] = new CIE::Internals();  

se [k] = new CEE::Externals();  

ci [k] = gdata1();  

se [k] = gdata3();  

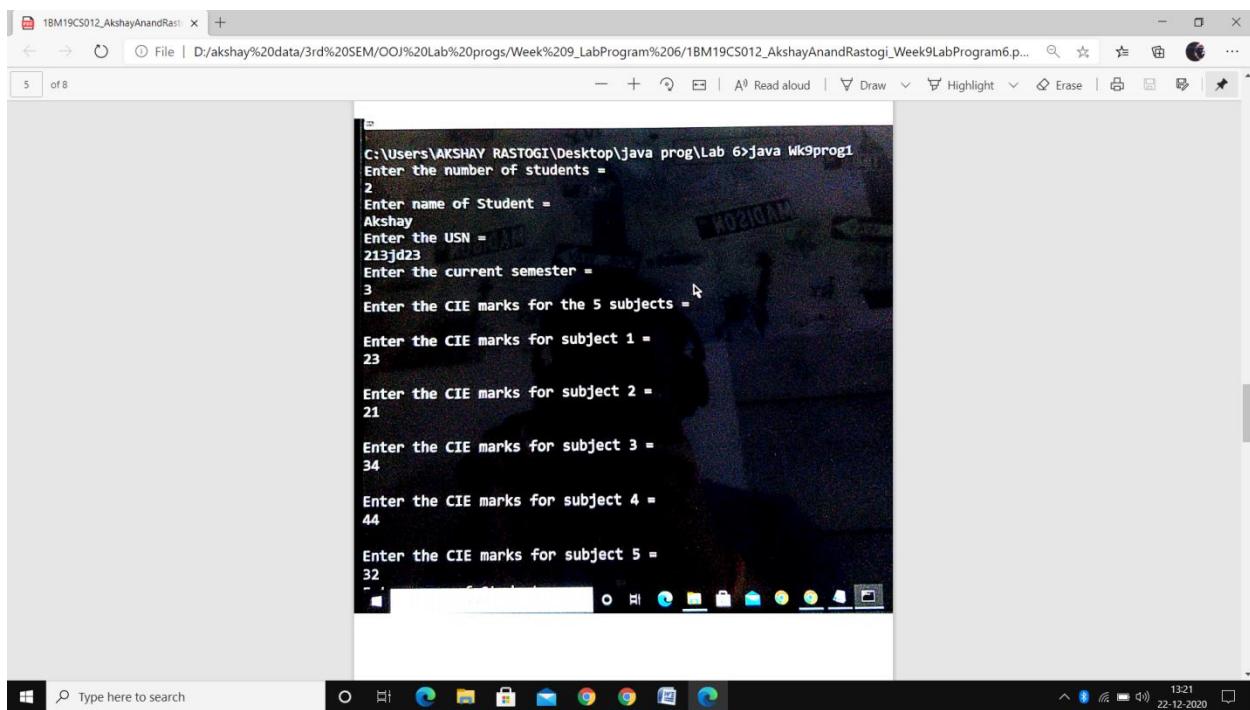
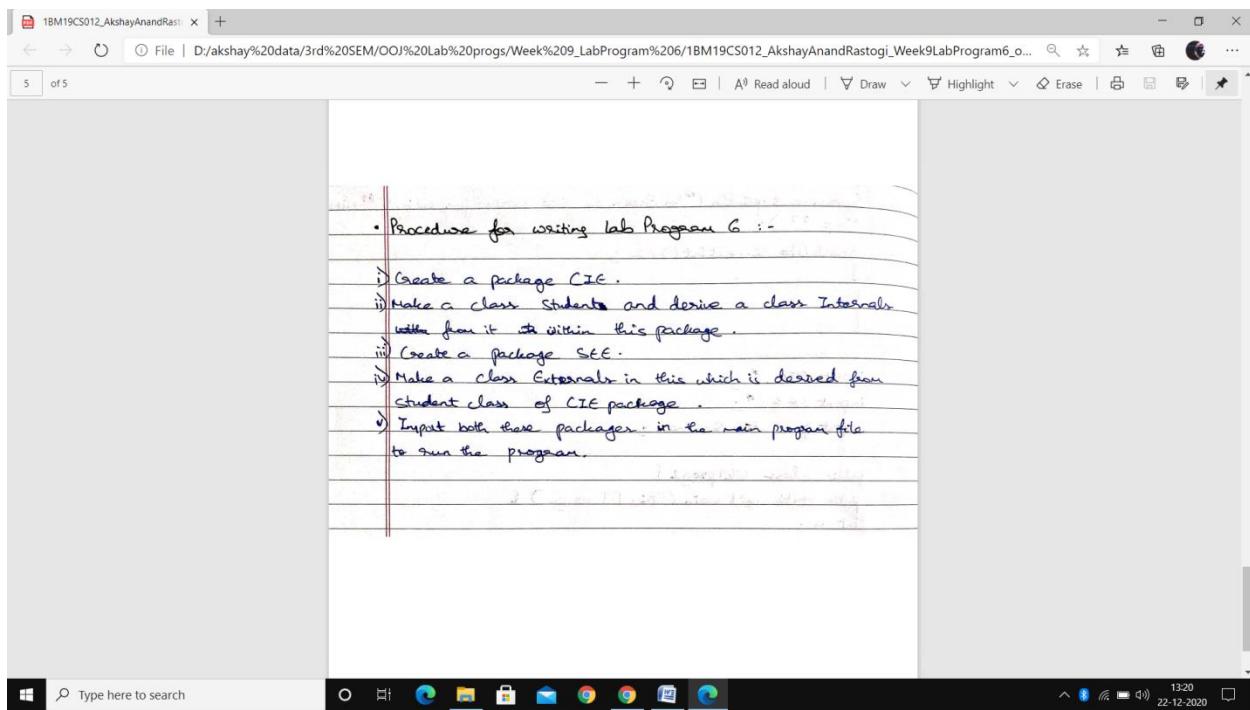
System.out.println ("n Student " +(k+1) + " has Total marks = ")  

for (int j=0; j<5; j++) {  

    System.out.println ((ci[k].Internals[j]) + se[k].Externals[j]));
}

```

1  
2



```
1BM19CS012_AkshayAnandRast... 6 of 8
File | D:/akshay%20data/3rd%20SEM/OOJ%20Lab%20progs/Week%209_LabProgram%206/1BM19CS012_AkshayAnandRastogi_Week9LabProgram6.p...
- + A Read aloud Draw Highlight Erase ...
```

```
Enter the SEE marks for the 5 subjects =
Enter the SEE marks for subject 1 =
67
Enter the SEE marks for subject 2 =
32
Enter the SEE marks for subject 3 =
66
Enter the SEE marks for subject 4 =
43
Enter the SEE marks for subject 5 =
45
Student 1 has Total marks =
56
37
67
65
54
```

```
1BM19CS012_AkshayAnandRast... 7 of 8
File | D:/akshay%20data/3rd%20SEM/OOJ%20Lab%20progs/Week%209_LabProgram%206/1BM19CS012_AkshayAnandRastogi_Week9LabProgram6.p...
- + A Read aloud Draw Highlight Erase ...
```

```
Enter name of Student =
Raj
Enter the USN =
421
Enter the current semester =
3
Enter the CIE marks for the 5 subjects =
Enter the CIE marks for subject 1 =
12
Enter the CIE marks for subject 2 =
3
Enter the CIE marks for subject 3 =
23
Enter the CIE marks for subject 4 =
44
Enter the CIE marks for subject 5 =
45
```

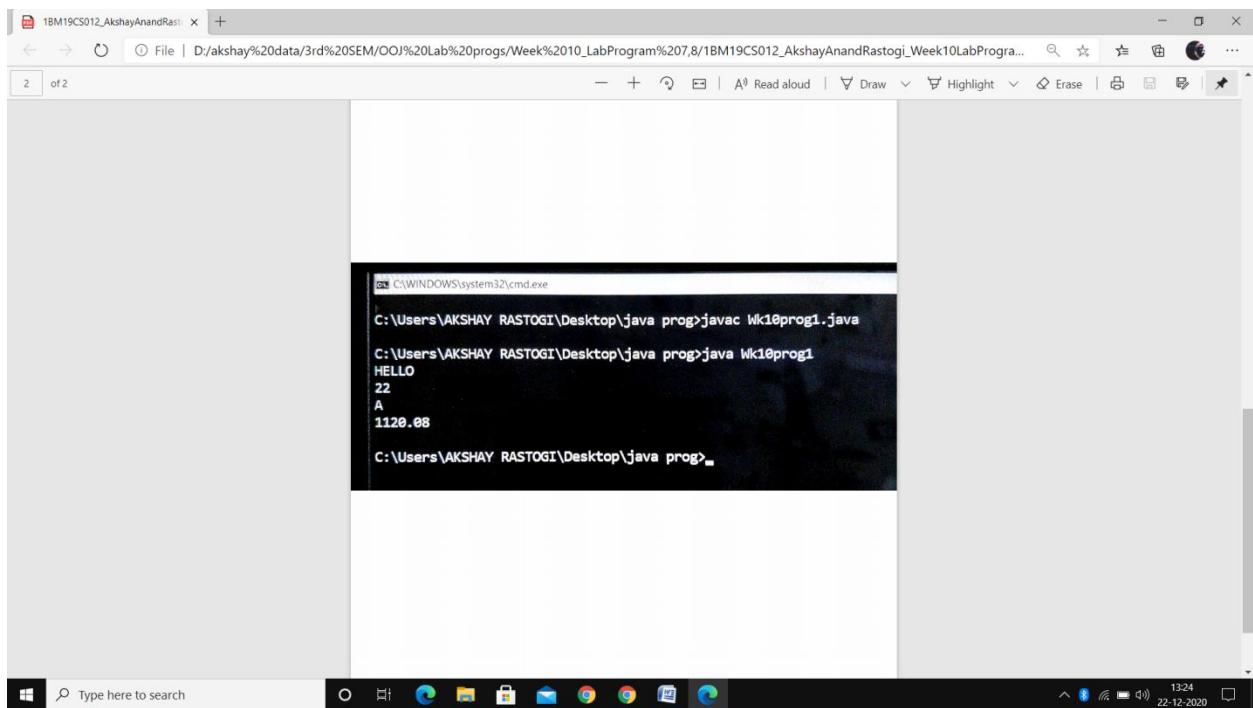
```
Enter the SEE marks for the 5 subjects =
Enter the SEE marks for subject 1 =
67
Enter the SEE marks for subject 2 =
89
Enter the SEE marks for subject 3 =
78
Enter the SEE marks for subject 4 =
45
Enter the SEE marks for subject 5 =
34
Student 2 has Total marks =
45
47
62
66
62
```

## Lab Program – 7 :

Write a program to demonstrate generics with multiple object parameters.

```
Week 10
class Gen<A,B> {
    A A1;
    B B1;
    Gen(A A2, B B2) {
        A1 = A2;
        B1 = B2;
    }
    void Display() {
        System.out.println(A1);
        System.out.println(B1);
    }
}

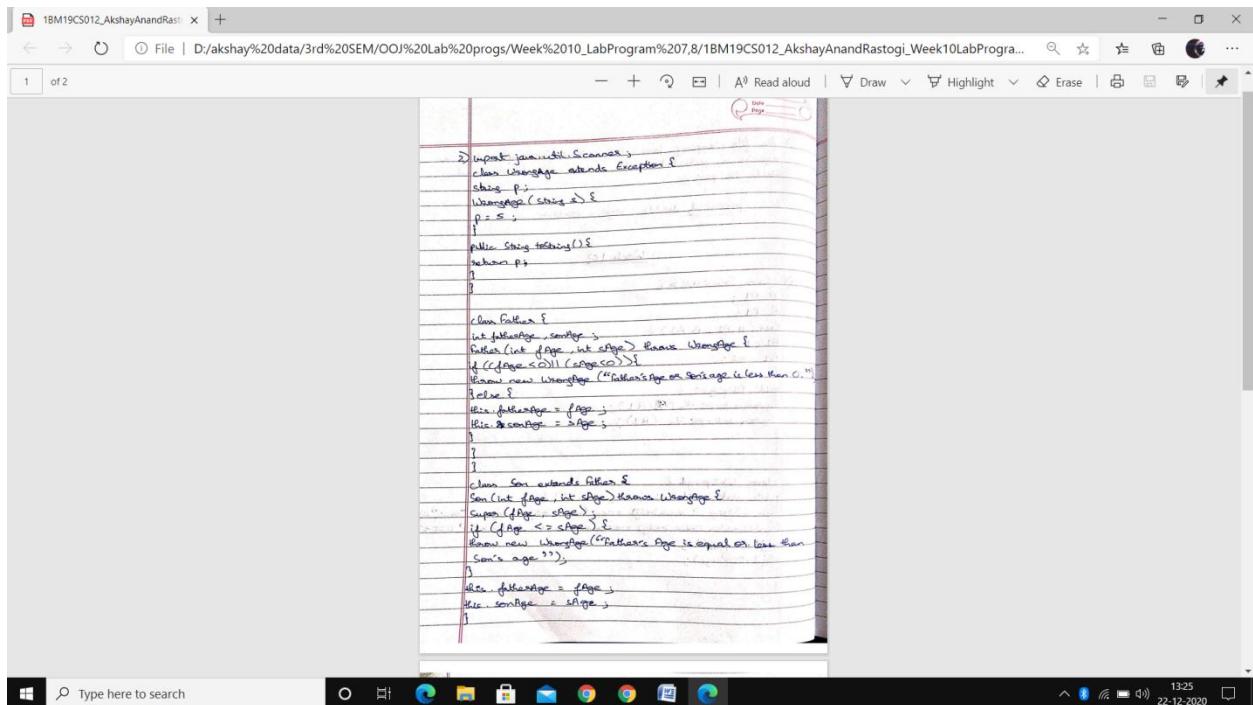
class WeekProg1 {
    public static void main (String args[]) {
        Gen<String, Integer> obj1 = new Gen<String, Integer>("HELLO", 22);
        Gen<Character, Double> obj2 = new Gen<Character, Double>('a', 12.0);
        obj1.Display();
        obj2.Display();
    }
}
```



```
C:\Users\AKSHAY RASTOGI\Desktop>java prog>javac Wk10prog1.java
C:\Users\AKSHAY RASTOGI\Desktop>java prog>java Wk10prog1
HELLO
22
A
1120.08
C:\Users\AKSHAY RASTOGI\Desktop>java prog>
```

### Lab Program – 8 :

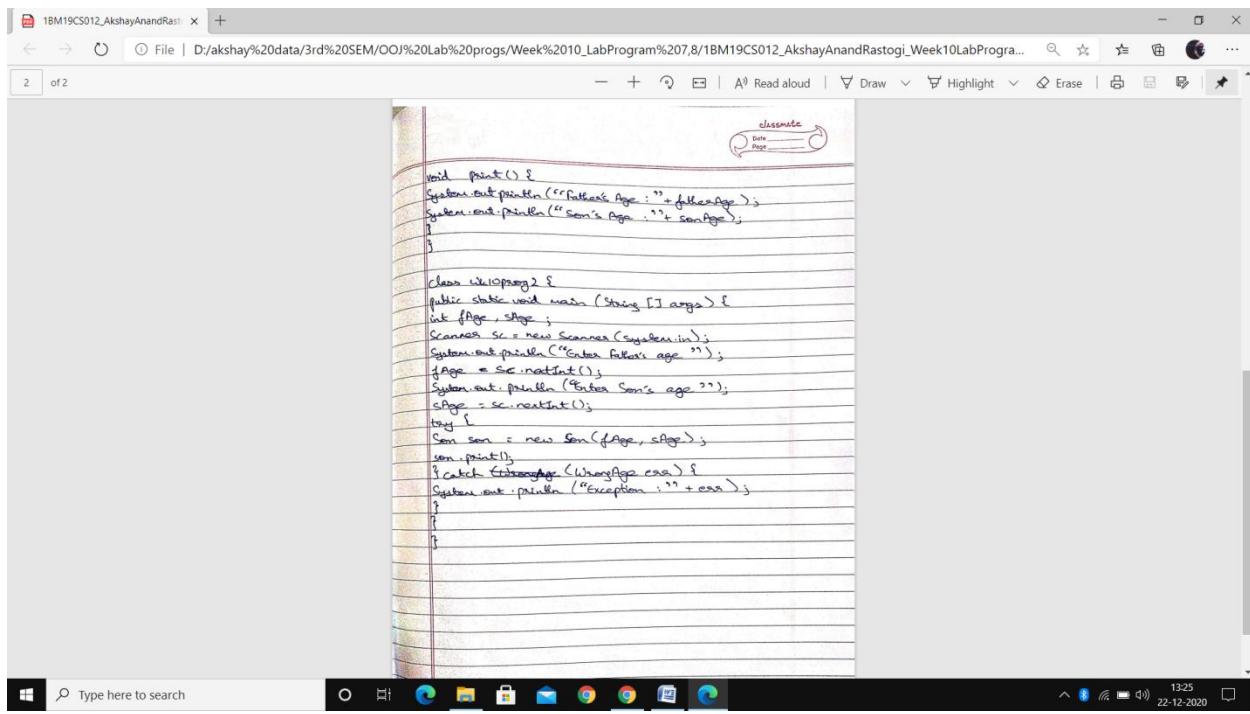
Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called “Father” and derived class called “Son” which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge( ) when the input age=father’s age.



```
import java.util.Scanner;
class Wrongage extends Exception {
    String p;
    Wrongage(String s) {
        p = s;
    }
}
public String taking() {
    return p;
}

class Father {
    int fatherAge;
    Father(int fAge, int sAge) throws Wrongage {
        if (fAge <= 0) (age <= 0)
            throw new Wrongage("Father's Age or Son's age is less than 0.");
        else {
            this.fatherAge = fAge;
            this.sonAge = sAge;
        }
    }
}

class Son extends Father {
    Son(int fAge, int sAge) throws Wrongage {
        super(fAge, sAge);
        if (fAge <= sAge)
            throw new Wrongage("Father's Age is equal or less than Son's age.");
        else {
            fatherAge = fAge;
            sonAge = sAge;
        }
    }
}
```



```
C:\Users\AKSHAY RASTOGI\Desktop\java prog>javac Wk10prog2.java
C:\Users\AKSHAY RASTOGI\Desktop\java prog>java Wk10prog2
Enter Father's age
-33
Enter Son's age
24
Exception :Father's Age or Son's Age is less than 0.

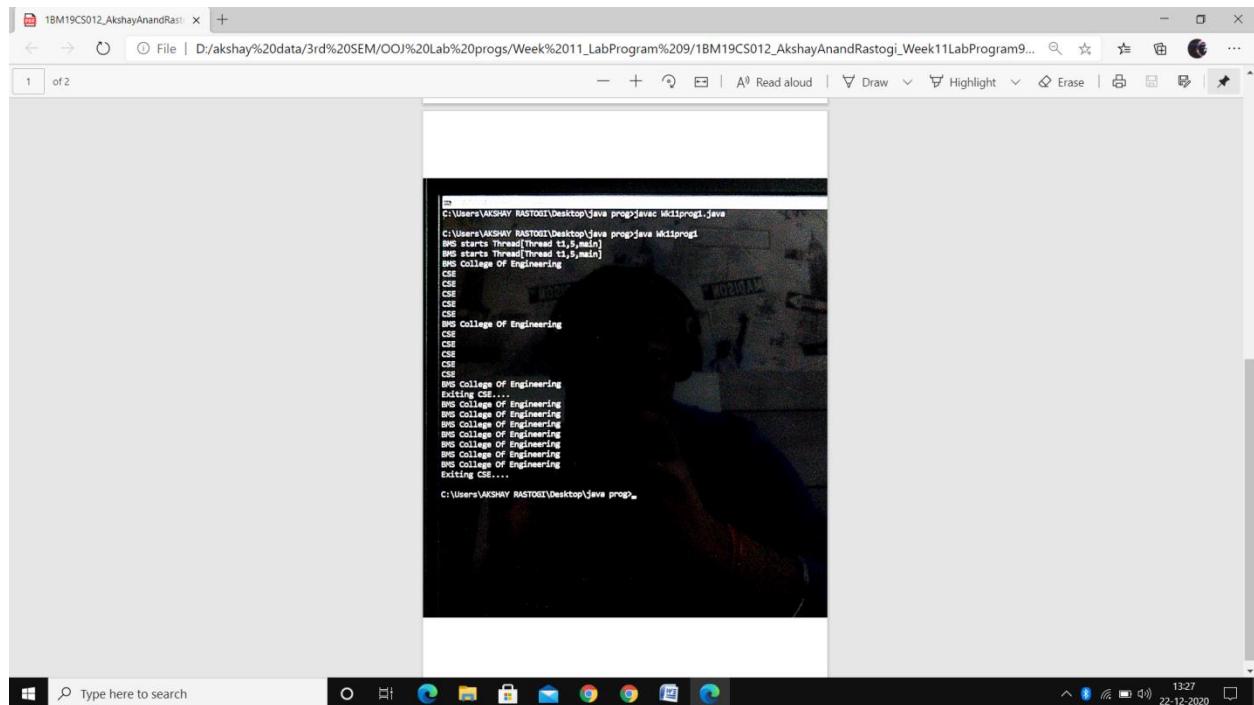
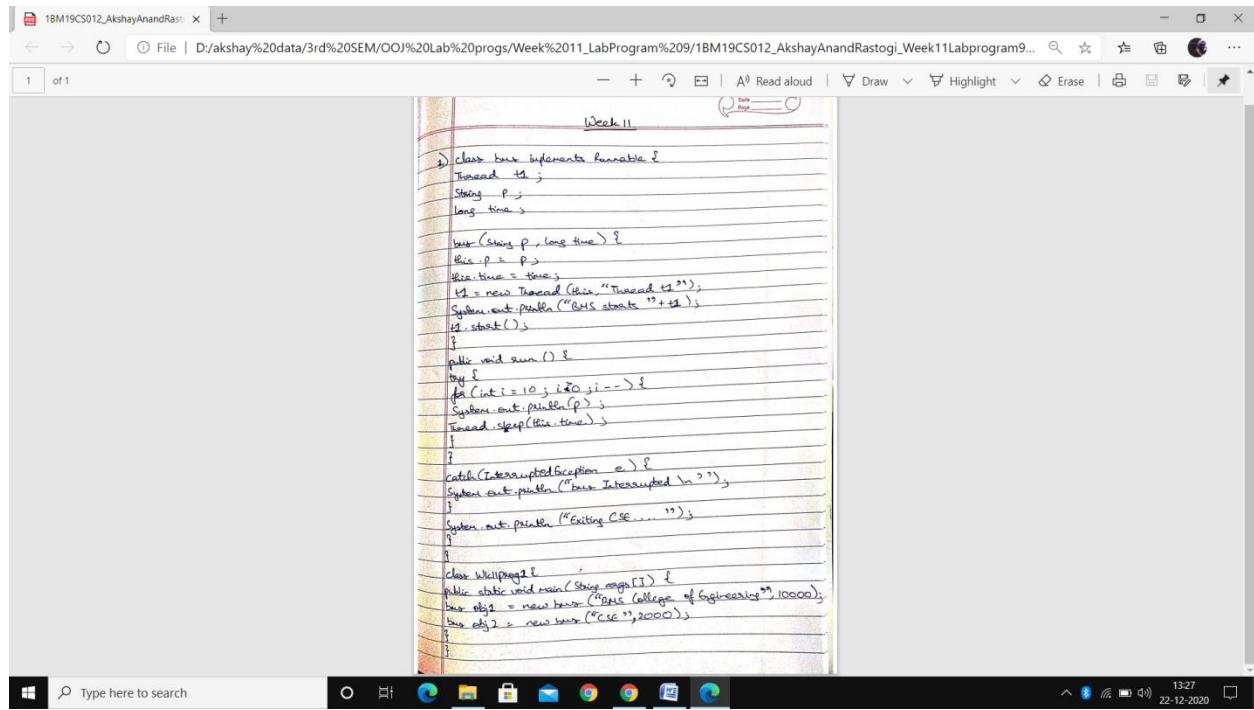
C:\Users\AKSHAY RASTOGI\Desktop\java prog>java Wk10prog2
Enter Father's age
45
Enter Son's age
30
Father's Age: 45
Son's Age: 30

C:\Users\AKSHAY RASTOGI\Desktop\java prog>java Wk10prog2
Enter Father's age
33
Enter Son's age
56
Exception :Father's Age is equal to or less than Son's Age

C:\Users\AKSHAY RASTOGI\Desktop\java prog>
```

### 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.



## 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.

Week -13

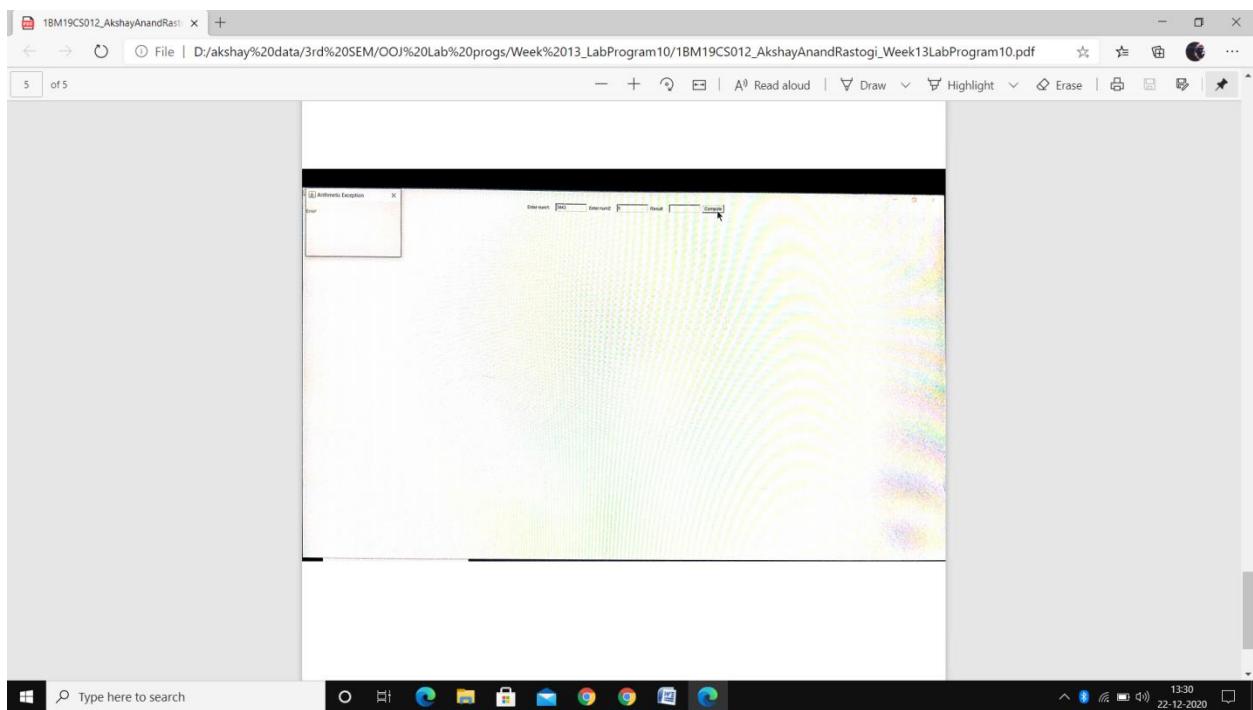
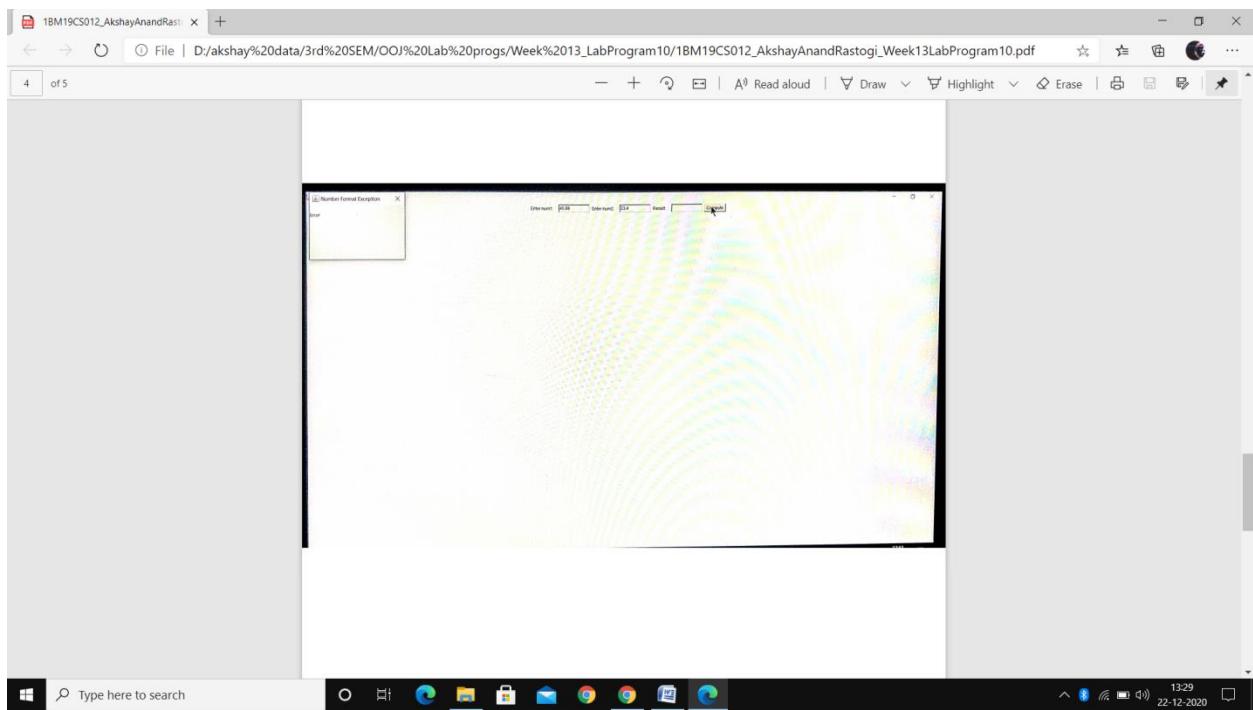
Lab Program 10

```
import java.awt.*;
import javax.swing.*;
public class LabProgram10 extends JFrame implements ActionListener {
    JButton b1;
    JTextField t1, t2, t3;
    JButton comp;
    public LabProgram10() {
        setLayout(new FlowLayout());
        setSize(800, 500);
        t1 = new JTextField("1");
        t2 = new JTextField("2");
        t3 = new JTextField("3");
        comp = new JButton("Compute");
        add(new JLabel("Enter num1 : "));
        add(t1);
        add(new JLabel("Enter num2 : "));
        add(t2);
        add(new JLabel("Result : "));
        add(t3);
        add(comp);
        comp.addActionListener(new WindowAdapter() {
            public void windowClosing(WindowEvent we) {
                System.exit(0);
            }
        });
    }
    public void actionPerformed(ActionEvent ae) {
        if (ae.getSource() == comp) {
            try {
                int num1 = Integer.parseInt(t1.getText());
                int num2 = Integer.parseInt(t2.getText());
                int result = num1 / num2;
                t3.setText(Integer.toString(result));
            } catch (ArithmaticException ae1) {
                JOptionPane.showMessageDialog(null, "Arithmatic Exception");
            } catch (NumberFormatException ne) {
                JOptionPane.showMessageDialog(null, "Number Format Exception");
            }
        }
    }
}
```

```
13. setText(Integer.toString((Integer.parseInt(t1.getText()) / num2)));
    } catch (ArithmaticException ae) {
        JOptionPane.showMessageDialog(null, "Arithmatic Exception");
    } catch (NumberFormatException ne) {
        JOptionPane.showMessageDialog(null, "Number Format Exception");
    }
}

public static void main(String args[]) {
    new LabProgram10();
}

class Dialog extends Dialog implements ActionListener {
    Dialog(String str) {
        super("Create Frame", true, true);
        setLayout(new FlowLayout());
        setSize(300, 200);
        addWindowListener(new WindowAdapter() {
            public void windowClosing(WindowEvent we) {
                System.exit(0);
            }
        });
    }
    public void actionPerformed(ActionEvent ae) {
        setVisible(true);
    }
    public void paint(Graphics g) {
        g.drawString("Exam 1 Score", 10, 70);
    }
}
```



THANK YOU