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19BCE245

Practical 10

OOP Lab

Practical 10 A

Implement three classes: Storage, Counter and Printer.
The Storage class should store an integer.
The Counter class should create a thread and starts counting from 0 (0, 1, 2, 3…) and stores each value in the Storage class.
The Printer Class should create a thread that keeps reading the value in the Storage class and printing it.
Write a program that creates an instance of the Storage class and set up a Counter and Printer object to operate on it.
Identify that, whether synchronization is required or not in this assignment. If yes, implement it.

CODE

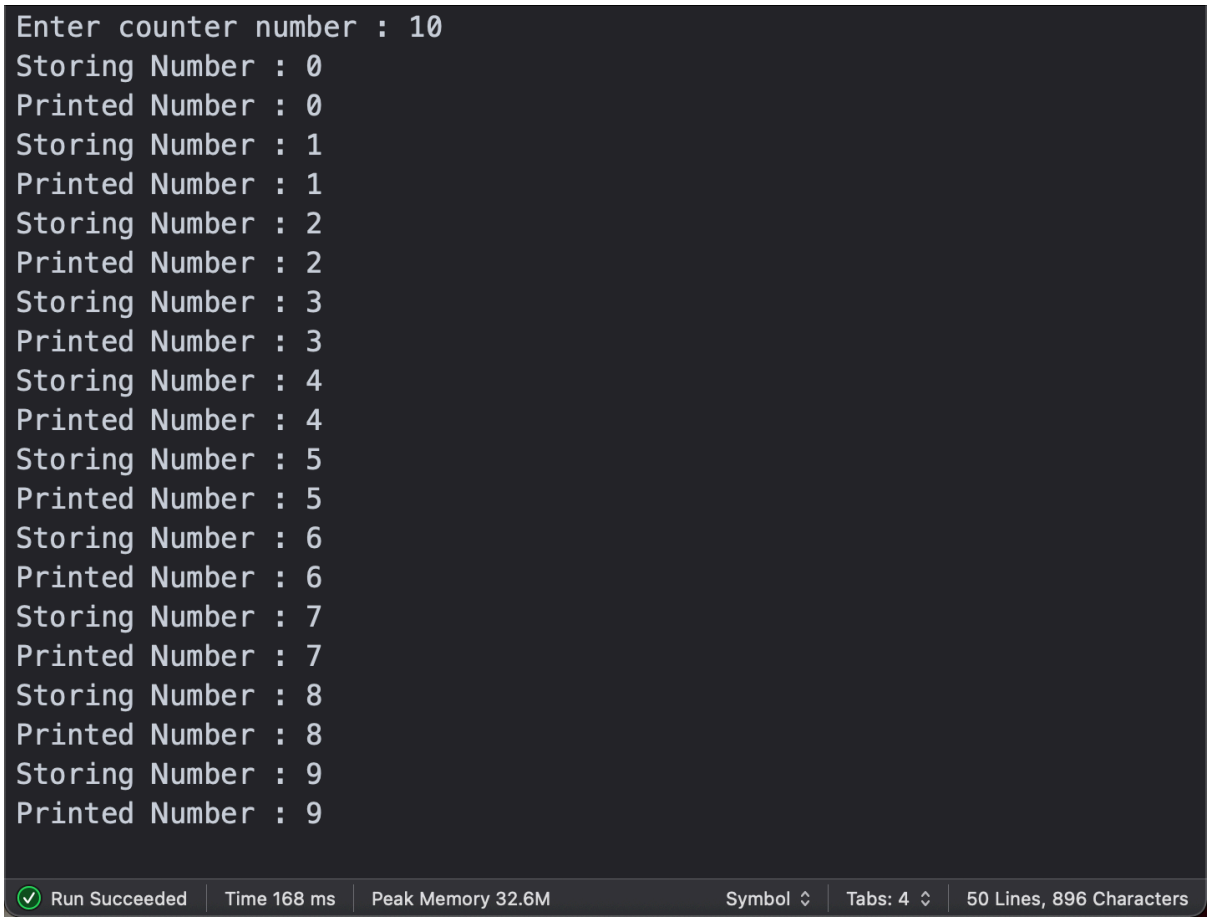
```
import java.util.*;

class Storage{
	int number;
	Storage(int number){
		this.number = number;
	}
	void setNumber(int number){
		this.number = number;
	}
	int getNumber(){
		return this.number;
	}
}
class Printer implements Runnable{
	Storage s;
	Printer(Storage s){
		this.s = s;
	}
	public void run(){
		System.out.println("Printed Number : " + s.getNumber());
	}
```

```
}
class Counter implements Runnable{
	int N;
	Storage s;
	Printer p;
	Counter(int N){
		this.N = N;
	}
	public void run(){
		for (int i=0;i<this.N;i++) {
			System.out.println("Storing Number : " + i);
			s = new Storage(i);
			Thread t2 = new Thread(new Printer(s));
			t2.run();
		}
	}
}
class Main {
	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter counter number : ");
		int N = sc.nextInt();
		Counter c = new Counter(N);
		Thread t1 = new Thread(c);
		t1.run();
	}
}
```

INPUT :

10

OUTPUT :



Practical 10 B

Modify the above program i.e 10 (a) to ensure that each number is printed exactly once, by adding suitable synchronization.

CODE

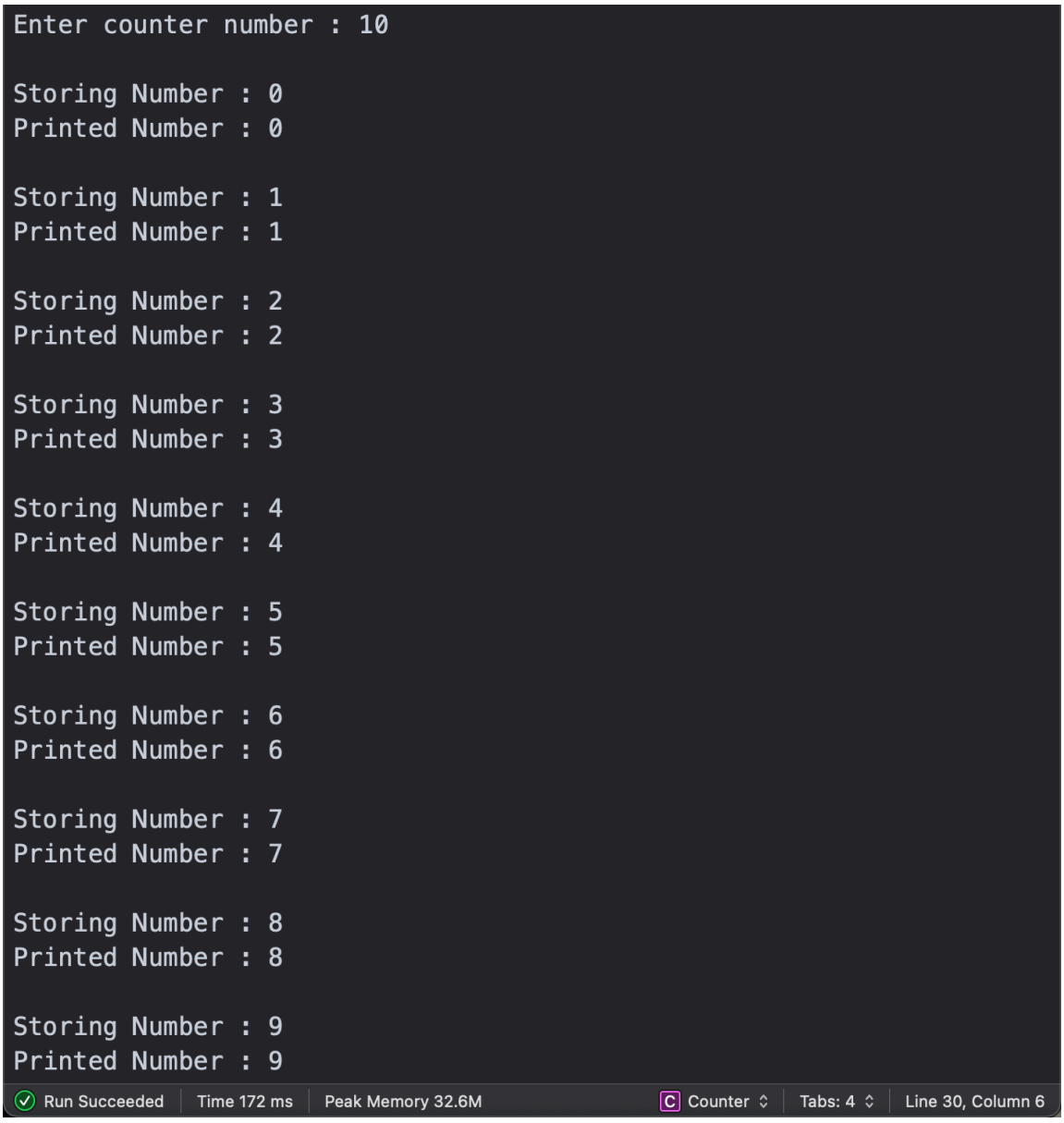
```
import java.util.*;
```

```
class Storage{
	int number;
	Storage(int number){
		this.number = number;
	}
	void setNumber(int number){
		this.number = number;
	}
	int getNumber(){
		return this.number;
	}
}
class Printer implements Runnable{
	Storage s;
	Printer(Storage s){
		this.s = s;
	}
	public synchronized void run(){
		System.out.println("Printed Number : " + s.getNumber());
	}
}
class Counter implements Runnable{
	int N;
	Storage s;
	Printer p;
	Counter(int N){
		this.N = N;
	}
	public synchronized void run(){
		for (int i=0;i<this.N;i++) {
			System.out.println("\nStoring Number : " + i);
			s = new Storage(i);
			Thread t2 = new Thread(new Printer(s));
			t2.run();
		}
	}
}
class Main {
	public static void main(String[] args) {
		Scanner sc = new Scanner(System.in);
		System.out.print("Enter counter number : ");
		int N = sc.nextInt();
		Counter c = new Counter(N);
		Thread t1 = new Thread(c);
		t1.run();
	}
}
```

INPUT :

10

OUTPUT :



Practical 10 C

Write a multithreaded program that will accept 4 strings from the command line and search in a particular file for a given string and display the status of each search on the screen. Note that, all threads are operating on the same file.

CODE :

```
import java.util.Scanner;
import java.io.*;

class ReadFile extends Thread{
	String str;
	ReadFile(String str){
		this.str = str;
	}
	public void run(){
		try {
			FileReader fr = new FileReader("./" + str);
			synchronized(fr){
				BufferedReader br = new BufferedReader(fr);
				String str1;
				System.out.println("\t\tFor File : " + str);
				while((str1=br.readLine())!=null)
				System.out.println(str1);
			}
			fr.close();
		} catch (IOException e) {
			//catch block
		}
	}
}
class Main{
	public static void main(String[] args) {

		Scanner sc = new Scanner(System.in);
		Thread.currentThread().setPriority(Thread.MAX_PRIORITY);

		System.out.println("Enter first file name : ");
		String s1 = sc.next();
		System.out.println("Enter second file name : ");
		String s2 = sc.next();

		Thread t1 = new Thread(new ReadFile(s1));
		t1.setPriority(Thread.NORM_PRIORITY + 2);		//which means 5+2=7
		Thread t2 = new Thread(new ReadFile(s2));
		t1.setPriority(Thread.NORM_PRIORITY - 2);		//which means 5-2=3

		t1.run();
		t2.run();
	}
}
```

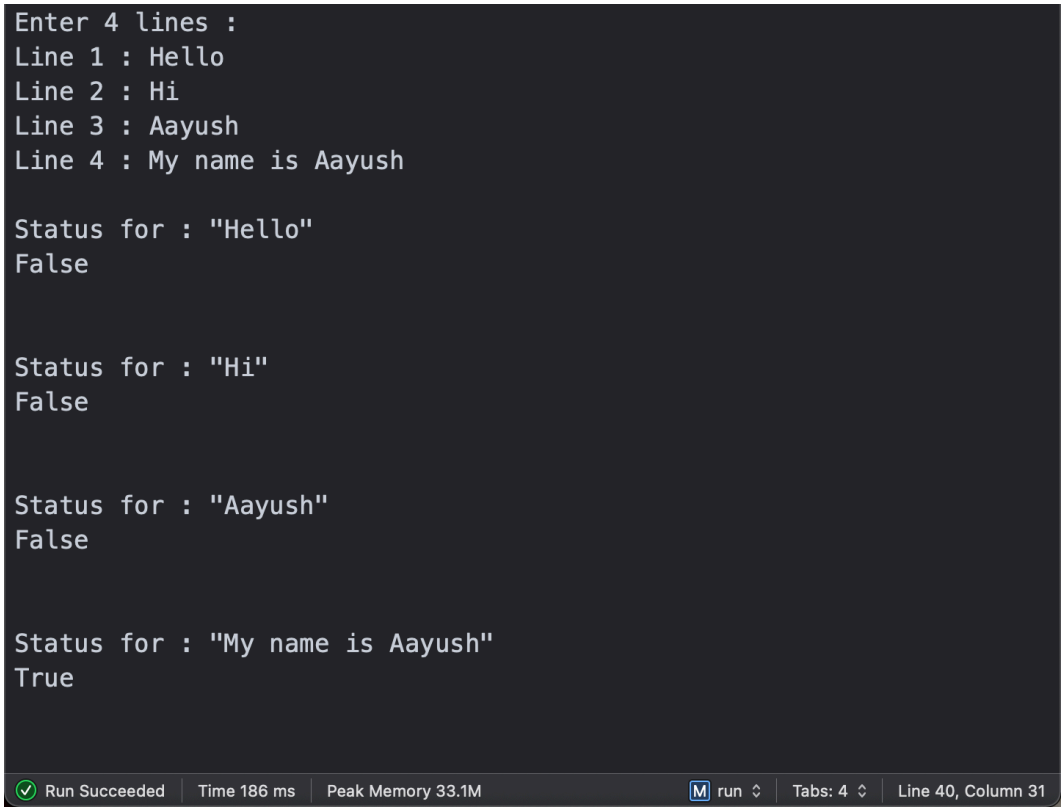
SourceFile.txt content :

My name is Aayush

INPUT :

Hello
Hi
Aayush
My name is Aayush

OUTPUT :



Practical 10 D

Write a Java application that will accept two filenames (text files) as command line arguments and use two threads to read contents from the two text files. Each of the threads should sleep for a random time after displaying filename with each line.

CODE :

```
import java.util.*;
import java.io.*;

class ReadFile implements Runnable{
	String str;
	ReadFile(String str){
		this.str = str;
	}
	public void run(){
		try {
			//Line wise
			FileReader fr = new FileReader("./" + str);
			synchronized (fr){
				BufferedReader br = new BufferedReader(fr);
				String str1;
				while((str1 = br.readLine()) != null)
				System.out.println(str1 + "\t\tFor File : " + this.str);
			}


			/*
				Character wise :
					FileInputStream fis = new FileInputStream("./" + str);
					int i = (char)fis.read();
					do {
						System.out.print((char)i);
						i = fis.read();
					} while (i!=-1);
			*/
			fr.close();
		} catch (IOException e) {
//			System.out.println("Catch block");
```

```
                }
        }
}
class Main {
        public static void main(String[] args) throws InterruptedException{
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter first file name : ");
                String s1 = sc.next();
                System.out.println("Enter second file name : ");
                String s2 = sc.next();

                Thread t1 = new Thread(new ReadFile(s1));
                Thread t2 = new Thread(new ReadFile(s2));
                t1.run();
                t2.run();
                System.out.println("Sleeping for 5 seconds... [thread 1]");
                t1.sleep(5000);
                System.out.println("Sleeping for 3 seconds... [thread 2]");
                t2.sleep(3000);
        }
}
```

SourceFile1.txt contents :

Hello I am Aayush.
Lorem Ipsum is simply dummy text of the printing and typesetting industry.
Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book.
It has survived not only five centuries, but also the leap into electronic typesetting, remaining essentially unchanged.
It was popularised in the 1960s with the release of Letraset sheets containing Lorem Ipsum passages, and more recently with desktop publishing software like Aldus PageMaker including versions of Lorem Ipsum.

SourceFile2.txt contents :

I am a Student.
It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout.

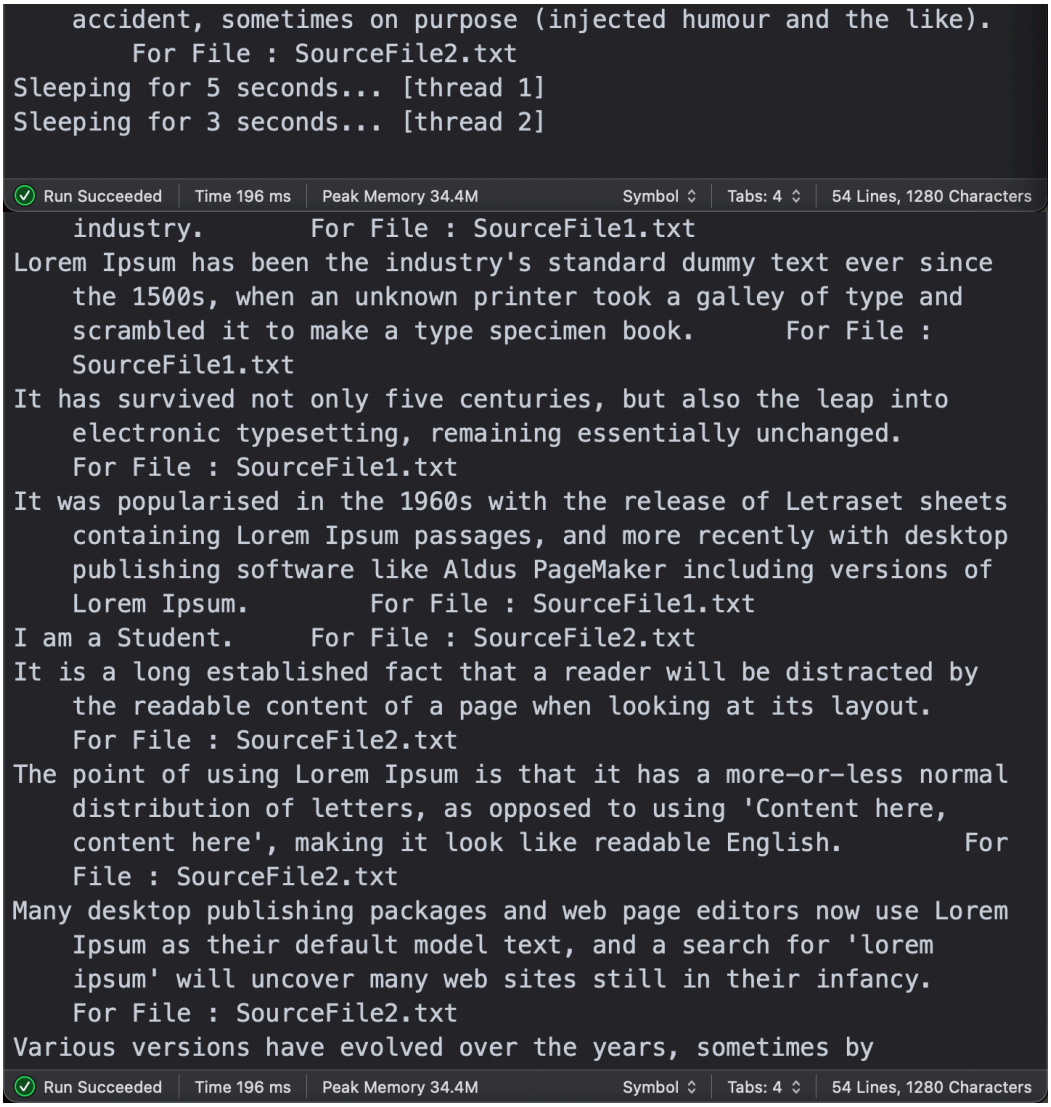
The point of using Lorem Ipsum is that it has a more-or-less normal distribution of letters, as opposed to using 'Content here, content here', making it look like readable English.
Many desktop publishing packages and web page editors now use Lorem Ipsum as their default model text, and a search for 'lorem ipsum' will uncover many web sites still in their infancy.
Various versions have evolved over the years, sometimes by accident, sometimes on purpose (injected humour and the like).

INPUT :

SourceFile1.txt
SourceFile2.txt

OUTPUT :

CODE :




```
import java.util.Scanner;
import java.io.*;

class ReadFile extends Thread{
	String str;
	ReadFile(String str){
		this.str = str;
	}
	public void run(){
		try {
			FileReader fr = new FileReader("./" + str);
			synchronized(fr){
				BufferedReader br = new BufferedReader(fr);
				String str1;
				System.out.println("\t\tFor File : " + str);
				while((str1=br.readLine())!=null)
				System.out.println(str1);
			}
```

```
                fr.close();
            } catch (IOException e) {
                //catch block
            }
        }
}
class Main{
    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);
        Thread.currentThread().setPriority(Thread.MAX_PRIORITY);

        System.out.println("Enter first file name : ");
        String s1 = sc.next();
        System.out.println("Enter second file name : ");
        String s2 = sc.next();

        Thread t1 = new Thread(new ReadFile(s1));
        t1.setPriority(Thread.NORM_PRIORITY + 2);        //which means 5+2=7
        Thread t2 = new Thread(new ReadFile(s2));
        t1.setPriority(Thread.NORM_PRIORITY - 2);        //which means 5-2=3

        t1.run();
        t2.run();
    }
}
```

SourceFile1.txt contents :

Hello I am Aayush.
Lorem Ipsum is simply dummy text of the printing and typesetting industry.
Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book.
It has survived not only five centuries, but also the leap into electronic typesetting, remaining essentially unchanged.
It was popularised in the 1960s with the release of Letraset sheets containing Lorem Ipsum passages, and more recently with desktop publishing software like Aldus PageMaker including versions of Lorem Ipsum.

SourceFile2.txt contents :

I am a Student.
It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout.
The point of using Lorem Ipsum is that it has a more-or-less normal distribution of letters, as opposed to using 'Content here, content here', making it look like readable English.
Many desktop publishing packages and web page editors now use Lorem Ipsum as their default model text, and a search for 'lorem ipsum' will uncover many web sites still in their infancy.

Various versions have evolved over the years, sometimes by accident, sometimes on purpose (injected humour and the like).

INPUT :

SourceFile1.txt
SourceFile2.txt

OUTPUT :

```
Enter first file name :
SourceFile1.txt
Enter second file name :
SourceFile2.txt
        For File : SourceFile1.txt
Hello I am Aayush.
Lorem Ipsum is simply dummy text of the printing and typesetting
    industry.
Lorem Ipsum has been the industry's standard dummy text ever since
    the 1500s, when an unknown printer took a galley of type and
    scrambled it to make a type specimen book.
It has survived not only five centuries, but also the leap into
    electronic typesetting, remaining essentially unchanged.
It was popularised in the 1960s with the release of Letraset sheets
    containing Lorem Ipsum passages, and more recently with desktop
    publishing software like Aldus PageMaker including versions of
    Lorem Ipsum.
        For File : SourceFile2.txt
I am a Student.
It is a long established fact that a reader will be distracted by
    the readable content of a page when looking at its layout.
The point of using Lorem Ipsum is that it has a more-or-less normal
    distribution of letters, as opposed to using 'Content here,
    content here', making it look like readable English.
Many desktop publishing packages and web page editors now use Lorem
    Ipsum as their default model text, and a search for 'lorem
    ipsum' will uncover many web sites still in their infancy.
Various versions have evolved over the years, sometimes by
    accident, sometimes on purpose (injected humour and the like).

Run Succeeded | Time 166 ms | Peak Memory 32.3M | Symbol | Tabs: 4 | 45 Lines, 1046 Characters
```

Practical 10 F

Write a stream based program which will accept Roll Number, Name, Age and Address from user. Age and Roll-no should be numeric. Handle with built-in exception. None of the field should be blank. Handle with custom exception. Ask user, whether to write the data in the file. If answer is yes, then data is saved into a file as an object (User can write many records in the file), otherwise terminate the current program. Write another program to display all the records saved into the file.

CODE :

```
import java.io.*;
import java.util.Scanner;

class EmptyFieldException extends Exception{
   EmptyFieldException(String s){
      super(s);
   }

}

public class Main{
   public static void main(String[] args) throws IOException{
      while(true){
         Scanner sc = new Scanner(System.in);
         StringBuilder sb = new StringBuilder();
         BufferedReader br = new BufferedReader(new
InputStreamReader(System.in));
         String input;
         System.out.println("Enter your roll no., name, age and address one by one:");

         try{
            for(int i = 0; i < 4; i++){
               if (i != 0)
                  sb.append("|");
               sb.append(input = br.readLine());
```

```
                if((i == 0 || i == 2)){
                    int x = Integer.parseInt(input);
                }
                if(input.isEmpty())
                    throw new EmptyFieldException("This field cannot be empty");

                if (i == 3)
                    sb.append("\n");
            }

            System.out.println(sb);
            System.out.println("Do you want to write data in file? (yes/no)");
            String ch = sc.nextLine();

            if(ch.equals("yes")){
                File f = new File("./newFile.txt");

                FileWriter file = new FileWriter("./newFile.txt", true);

                if (!f.exists())
                    System.out.println("File not found");

                file.write(String.valueOf(sb));
                System.out.println("Data written in file");
                file.close();
            }
            else
            {
              break;
            }

            System.out.println("Enter 1 to continue and 0 to quit: ");
            int n = sc.nextInt();

            if(n == 0){
                break;
            }
        }catch (EmptyFieldException e){
            System.out.println(e);
        }catch(NumberFormatException e){
            System.out.println(e + " Entered value should be an integer");
        }
    }
  }
}
```

F2

```
import java.io.*;

class Reader{
    String name, address;
    int rollNo,age;

    Reader(String[] s){
        rollNo = Integer.parseInt(s[0]);
        name = s[1];
        age = Integer.parseInt(s[2]);
        address = s[3];
    }

    void print(){
        System.out.println(rollNo + "\t\t\t\t" + name + "\t\t\t" + age + "\t\t\t" +
address);
    }
}

public class Pract_10FB{
    public static void main(String[] args) throws IOException {
        File f = new File("E:\\Java\\OOP_lab10\\src\\newFile.txt");

        if(!f.exists())
            System.out.println("File not found");

        BufferedReader br = new BufferedReader(new FileReader("E:\\Java\
\OOP_lab10\\src\\newFile.txt"));
        String line = br.readLine();

        System.out.println("Roll no.\t\tName\t\t\tAge  \t\tAddress");

        while(line != null){
```

```
            String[] s = line.split("\\|");
            Reader r = new Reader(s);

            r.print();
            line = br.readLine();
        }

    }
}
```

Inputs :

```
Enter your roll no., name, age and address one by one:
245
Aayush
20
Vadodara
245|Aayush|20|Vadodara

Do you want to write data in file? (yes/no)
yes
Data written in file
Enter 1 to continue and 0 to quit:
0
```

CONCLUSION :

For the practical 10 , We learnt about threads and its real life application.