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Course: Cop 4331 003
Homework: 1

Question 1

Filename: Fib.java

```java
/*
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Project Properties.
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 * and open the template in the editor.
 */
package Q1;
import java.util.Scanner;
/**
 *
 * @author Ace
 */
public class Fib {

    // constructor
    public Fib(int f0, int f1)
    {
            f0 = 0;
            f1 = 0;
    }


    // computes F(n) using an ***iterative*** algorithm, where
F(n) = F(n-1) + F(n-2) is the recursive definition.
    // use instance variables that store F(0) and F(1).
    // check parameter and throw exception if n < 0. Don't worry
about arithmetic overflow.
    public int f(int n) {

            if(n == 1 || n == 2){
                return 1;
            }
            int fib0=1, fib1=1, fibonacci=1;
            for(int i= 3; i<= n; i++){
                fibonacci = fib0 + fib1; //Fibonacci number is
sum of previous two Fibonacci number
                fib0 = fib1;
                fib1 = fibonacci;
```

```java
        }
        return fibonacci; //Fibonacci number

    }


    // computes F(n) using the ***recursive*** algorithm, where
F(n) = F(n-1) + F(n-2) is the recursive definition.
    // use instance variables that store F(0) and F(1).
    // check parameter and throw exception if n < 0. Don't worry
about arithmetic overflow.
    public int fRec(int n) {

            if(n == 1 || n == 2){
                return 1;
             }
            int fib0 = fRec(3-1);
            int fib1 = fRec(4-2);

            return fRec(n-1) + fRec(n-2); //tail recursion
        }




    public static void main(String[] args)
    {

      // get numbers F(0) and F(1) from args[0] and args[1].
      // use either the Scanner class or
Integer.parseInt(args[...])
        // you must handle possible exception

                int f0 = 0;
                int f1 = 0;

                try{
                    // Ask user for first number Fib series
                        System.out.print("Enter the first number
of the Fib series: ");
                        f0 = new Scanner(System.in).nextInt();
                } catch (Exception eim) {

                    System.out.println(eim.getMessage());
                }

                // Ask the user for second Fib series
                System.out.print("Enter the second number of the
Fib series: ");
```

```java
            f1 = new Scanner(System.in).nextInt();

      // get n from args[2]:
            System.out.print("Enter the number of number for
the Fib series: ");
            int n = new Scanner(System.in).nextInt();


      // create a Fib object with params F(0) and F(1)
            Fib test = new Fib(f0,f1);


//
//    calculate F(0), ..., F(n) and display them with
System.out.println(...) using
//    the iterative methode f(i)

            for(int i=0; i<= n; i++){
                System.out.println( test.f(i) );
            }


      // calculate F(0), ..., F(n) and display them with
System.out.println(...) using
      // the recursive methode fRec(i)

            for(int j=0; j<= n; j++){
                System.out.println( test.fRec(j) );
            }



    }



};
```

Question 2

Filename: Greeter.java

```java
/*
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Project Properties.
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 * and open the template in the editor.
 */
package Q2;

/**
 *
 * @author Ace
 */
/**
   A class for producing simple greetings.
*/

public class Greeter
{
   /**
      Constructs a Greeter object that can greet a person or
      entity.
      @param aName the name of the person or entity who should
      be addressed in the greetings.
   */

    public Greeter(String aName){
        name = aName;
    }

    // Function that says hello
    public String sayHello(){
        return "Hello, " + name + "!";
    }

    private String name;

// Function that swap names
    public void swapNames(Greeter other){
        String swappy;
        swappy = other.getName();
        other.setName(this.name);
        this.name = swappy;
    }
```

```java
        //function that create a qualified greeting
        public Greeter createQualifiedGreeter(String qualifier)
        {
            String person;
            person = qualifier;
            Greeter stat = new Greeter (qualifier + " " + this.name);

            return stat;

        }

        // a function that set name for the swap function
        private void setName(String aux) {
            Greeter.this.name = aux;
        }

        // a function that get name for the swap function
        private String getName() {
            return name;
        }


}
```

Filename: GreeterTester.java

```java
/*
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Project Properties.
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 * and open the template in the editor.
 */
package Q2;

/**
 *
 * @author Ace
 */
public class GreeterTester {

    public static void main(String[] args)
    {

        // process that get name and use the function SwapNames
        // to swap and display it on the screen
        Greeter greetsJohn = new Greeter( "John Smith" );
        Greeter greetsJane = new Greeter( "Jane Doe" );
        System.out.println( greetsJohn.sayHello() );
        System.out.println( greetsJane.sayHello() );
        greetsJohn.swapNames(greetsJane);
```

```java
        System.out.println( greetsJohn.sayHello() );
        System.out.println( greetsJane.sayHello() );

        // gets a greeting and create Qualified Greeting and
        // display on the console.
        System.out.println("\n");
        Greeter g = new Greeter("world");
        Greeter g2 = g.createQualifiedGreeter("beautiful");
        System.out.println(g2.sayHello());



    }


}
```

Question 3

Filename: DataAnalyzer.java

```java
/*
 * To change this license header, choose License Headers in
Project Properties.
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 * and open the template in the editor.
 */
package Q3;

import java.io.File;
import java.util.LinkedList;
import java.io.FileNotFoundException;
import java.io.PrintWriter;
import java.io.UnsupportedEncodingException;
import java.util.Collections;
import java.util.ListIterator;
import java.util.logging.Level;
import java.util.logging.Logger;


/**
 *
 * @author Ace
 */
public class DataAnalyzer {

    // constructs a Data Analyzer method that saves the list of
```

```java
numbers to
    // a file.
    public DataAnalyzer(LinkedList<Integer> numList,File inFile)
    {
        try (PrintWriter writer = new PrintWriter(inFile, "UTF-
8")) {
            //LinkedList NumList = new LinkedList();//not sure
what your list is called
            int currentPosition = 0;
            while (currentPosition < numList.size())
            {

                //iterate over list {
                writer.println(numList.get(currentPosition));
                currentPosition++;

            }
            writer.close();//saves file

        } catch (FileNotFoundException ex) {

Logger.getLogger(DataAnalyzer.class.getName()).log(Level.SEVERE,
null, ex);
        } catch (UnsupportedEncodingException ex) {

Logger.getLogger(DataAnalyzer.class.getName()).log(Level.SEVERE,
null, ex);
        }
    }

    //a function that get min value of the List
    public int min(LinkedList<Integer> numList)
    {
        Integer min = Collections.min(numList);
        return min;

    }

    // a function that get max value of the List
    public int max(LinkedList<Integer> numList)
    {
        Integer max = Collections.max(numList);
        return max;
    }

    // a function that get the average of the list
     public float average(LinkedList<Integer> numList)
    {
        float Average = 0;
        ListIterator<Integer> it =
```

```java
        numList.listIterator(numList.size());
        while (it.hasPrevious())
        {
            float sum = it.previous();
            Average += sum/numList.size();
        }

        return Average;
    }



}
```

Filename: DataAnalyzerTester.java

```java
/*
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Project Properties.
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 */
package Q3;

import Q3.DataAnalyzer;
import java.io.File;
import java.util.Collections;
import java.util.Scanner;
import java.util.LinkedList;

/**
 *
 * @author Ace
 */
public class DataAnalyzerTester {

    public static void main(String[] args)
    {
        // get the list from the user.
        Scanner input = new Scanner(System.in);
        System.out.println("Please type a positive integers
separated by a space."
        + "(Use an neg number to indicate end of list)");
        int num = input.nextInt();
        LinkedList<Integer> numList = new LinkedList<>();
```

```java
        while(num > 0){

            numList.add(num);
            num = input.nextInt();
        }


        // creates a file
        System.out.println("Enter File Name: ");
        String filename = input.next();
        int num1 = 0;
        if(!" ".equals(filename))
        {
            num1 = 1;
        }

        File inFile = null;
        if (num1 > args.length) {
        inFile = new File(filename);
        } else {
        System.err.println("Invalid arguments count:" +
args.length);
        }

        // data analyzer object
        DataAnalyzer display = new DataAnalyzer(numList,inFile);

        //display the max,min and average on console
        System.out.println(display.max(numList));
        System.out.println(display.min(numList));
        System.out.println(display.average(numList));


    }


}
```

Question 4

The value of x at the end of the program is 3. In the program both greeter object are assign the same string "Alice" but when the programs goes to the comparing line it makes g2 null because java pass variables by reference, even though they possess the same string "Alice" both greeters are pointing/referring to a different location in memory so therefore its not equal. The programs continue by assigning 1 to x. the programs then try to print an output but because g2 = null it throws an exception and adds 1 to , which makes x = 2, then it goes to finally where it adds 1 more that gives us 3.