Lab Assignment . 2

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SP22-BSE-036

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—

Programming Fundamentals

—

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LAB . 5

QUESTION . 1

a)

```
import java.util.Scanner;
public class Question1A {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the starting number: ");
        int a = input.nextInt();
        System.out.print("Enter the ending number: ");
        int b = input.nextInt();
        int i = a;
        System.out.print(a);
        while (b > i) { i += 1; System.out.print(" " + i); }
    }
}
```

b)

```
import java.util.Scanner;
public class Question1B {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the starting number: ");
        int a = input.nextInt();
        System.out.print("Enter the ending number: ");
        int b = input.nextInt();
        if (a < b) {
            int i = a;
            System.out.print(a);
            while (b > i) {i += 1;System.out.print(" " + i);}
        } else if (a > b) {
            int f = a;
            System.out.print(a);
            while (f > b) {f -= 1;System.out.print(" " + f);}
        } else { System.out.print("1st and 2nd number are same and no number is lie
b/w them"); }
    }
}
```

c)

```
import java.util.Scanner;
public class Question1C {
    public static void main(String[] args) {
```

```
        Scanner input = new Scanner(System.in);
        int sum = 0, a, numbers, i = 0;
        System.out.print("How many number you want to enter? ");
        numbers = input.nextInt();
        System.out.println("");
        System.out.print("Enter " + numbers + " numbers: ");
        while (i < numbers) {a = input.nextInt();sum += a; i += 1; }
        System.out.print("The sum of all these numbers: " + sum);
    }
}
```

d)

```
import java.util.Scanner;
public class Question1D {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int sum = 0, numbers, i = 1;
        System.out.print("Enter the numbers of which you need cubic sum: ");
        numbers = input.nextInt();
        while (i <= numbers) {sum += i * i * i;i += 1; }
        System.out.print("The cubic sum of first " + numbers + " these numbers: " +
sum);
    }
}
```

output:

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q1a.java
Enter the starting number: 4
Enter the ending number: 3
4
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q1b.java
Enter the starting number: 5
Enter the ending number: 6
5 6
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q1c.java
How many number you want to enter? 2

Enter 2 numbers: 1 2
The sum of all these numbers: 3
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q1d.java
Enter the numbers of which you need cubic sum: 4
The cubic sum of first 4 these numbers: 100
```

QUESTION . 2

```
import java.util.Scanner;
import java.util.Scanner;
public class Q2 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
```

```
        System.out.print("Enter any integer to find factorial: ");
        int fact = input.nextInt();
        int i = 0, mul = 1, a = fact;
        while (fact > i) {mul *= a;a -= 1;i += 1;}
        System.out.print("factorial of " + fact + " is: " + mul);
    }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q2.java
Enter any integer to find factorial: 2
factorial of 2 is: 2
```

QUESTION . 3

```
import java.util.Scanner;
public class Q3 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int count = 0, num, numbers, i = 0;
        System.out.print("How many number you want to enter? ");
        numbers = input.nextInt();
        System.out.println("");
        System.out.print("Enter " + numbers + " numbers: ");
        while (i < numbers) {
            num = input.nextInt();
            if (num == 0) {count += 1;}
            i += 1;
        }
        System.out.print("There are " + count + " Zero in the numbers");
    }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q3.java
How many number you want to enter? 3
```

QUESTION . 4

```
import java.util.Scanner;
public class Q4 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter the length of sequence: ");
        int length = input.nextInt();
        int i = 0, seq, check = 0;
        System.out.println("Enter the sequence: ");
        while (length > i) {
            seq = input.nextInt();
            if (seq != 0) {check = i; }
            i += 1;
        }
        System.out.print("The lenght of sequence is: " + check);
    }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q4.java
Enter the length of sequence: 3
Enter the sequence:
1 2 3
The lenght of sequence is: 2
```

QUESTION . 5

```java
import java.util.Scanner;
public class Q5 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int check = 0;
        System.out.print("Enter any integer(0 to end): ");
        int num = input.nextInt();
        while (num != 0) {
            if (num > check) {check = num;}
            System.out.print("Enter any integer(0 to end): ");
            num = input.nextInt();
        }
        System.out.print("Largest number is: " + check);
    }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q5.java
Enter any integer(0 to end): 666
Enter any integer(0 to end): 44
Enter any integer(0 to end): 0
Largest number is: 666
```

QUESTION . 6

```java
import java.util.Scanner;

public class Q6 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int check = 0, i = 0;
        System.out.println("Enter the sequence(0 to end): ");
        int num = input.nextInt();
        while (num != 0) {
            if (num >= check) {check = num;i += 1;}
            num = input.nextInt();
        }
        System.out.print("The index of largest number is: " + i);
    }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q6.java
Enter the sequence(0 to end):
1
0
```

QUESTION . 7

```java
import java.util.Scanner;
public class Q7 {
```

```
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int check = 0;
        System.out.print("Enter any integer(0 to end): ");
        int num = input.nextInt();
        while (num != 0) {
            if (num % 2 == 0) {check += 1;}
            System.out.print("Enter any integer(0 to end): ");
            num = input.nextInt();
        }
        System.out.print("Total even number : " + check);
    }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q7.java
Enter any integer(0 to end): 2
Enter any integer(0 to end): 3
Enter any integer(0 to end): 4
Enter any integer(0 to end): 5
Enter any integer(0 to end): 0
Total even number : 2
```

QUESTION . 8

```
import java.util.Scanner;
public class Q8 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.println("Enter sequence(0 to end): ");
        int seq = input.nextInt();
        int check = 0, neighbor = 0;
        while (seq != 0) {
            seq = input.nextInt();
            if (seq > check) {neighbor += 1;}
            check = seq;
        }
        System.out.print("Number greater than its previous number is:" + neighbor);

    }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab5>java Q8.java
Enter sequence(0 to end):
1 2
2
0
Number greater than its previous number is:1
```

QUESTION . 9

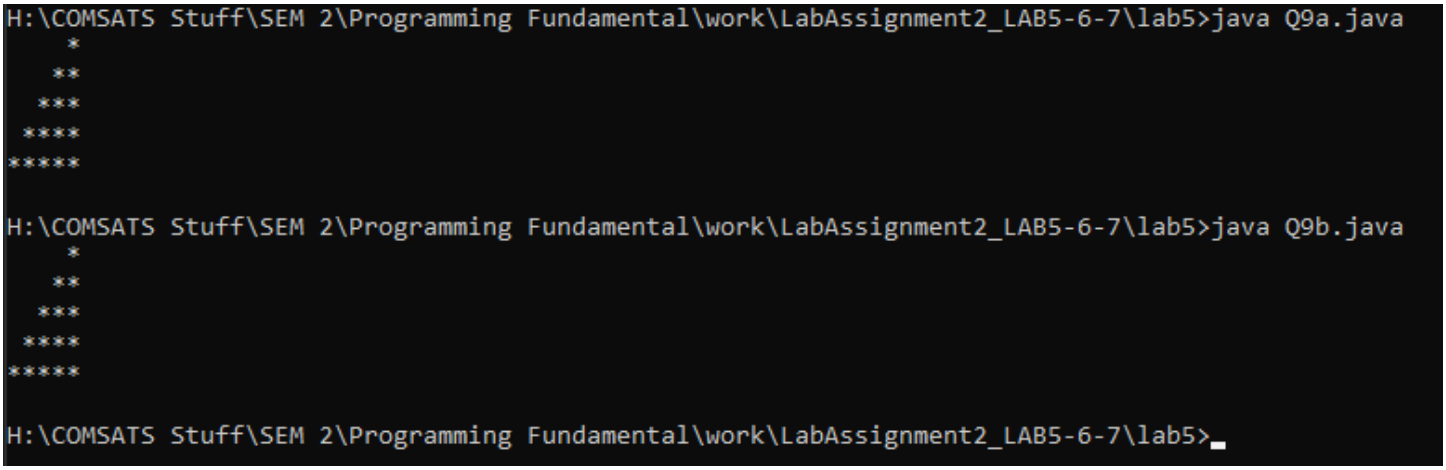
a)

```
public class Q9a {
    public static void main(String[] args) {
        for (int i = 1; i <= 5; i++) {
            for (int k = 4; k >= i; k--) { System.out.print(" ");}
```

```
            for (int j = 1; j <= i; j++) {System.out.print("*");}
            System.out.print("\n");
        }
    }
}
```

b)

```
public class Q9b {
        public static void main(String[] args) {
            for (int i = 1; i <= 5; i++) {
                for (int k = 4; k >= i; k--) {System.out.print(" ");}
                for (int j = 1; j <= i; j++) {System.out.print("*");}
                System.out.print("\n");
            }
        }
    }
```



LAB . 6

QUESTION . 1

```
import java.util.Scanner;
public class Task1{
   public static void main(String[] args) {
      Scanner myObj = new Scanner(System.in);
      System.out.print("Enter point X1: ");
      double x1 = myObj.nextDouble();
      double y1 = myObj.nextDouble();
      System.out.print("Enter point X2: ");
      double x2 = myObj.nextDouble();
      double y2 = myObj.nextDouble();
```

```
      System.out.println("Point X1 is " + x1 + " "+  y1);
      System.out.println("Point X2 is " + x2 + " "+  y2);
      double radius = 6371.01;
      double d = radius * Math.acos(Math.sin(x1) * Math.sin(x2) +( Math.cos(x1) *
Math.cos(x2) * Math.cos(y1 - y2)));
      System.out.print("The distance between two points is "+ d);
   }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab6>java Task1.java
Enter point X1: 1
2
Enter point X2: 3
4
Point X1 is 1.0 2.0
Point X2 is 3.0 4.0
The distance between two points is 7788.24506757977
```

QUESTION . 2

```
import java.util.Scanner;
public class Task2{
   public static void main(String[] args) {
      Scanner myObj = new Scanner(System.in);
      System.out.println("Enter a number from (0 -- 127): ");
      int Character = myObj.nextInt();
      char alphabet = (char)Character;
      System.out.print("The Character for ascii Code "+ Character + " is: " +
alphabet);

      System.out.print("Enter an alphabet: ");
      String string = myObj.next();
      char alpha;
      System.out.print(alpha);
   }
}
```

QUESTION . 3

```
public class Task4{
   public static void main(String[] args) {
      int number = (int)(Math.random() * 127) ;
      char alphabet = (char)number;
      System.out.println(number);
      System.out.println(alphabet);

   }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab6>java Task3.java
Error: Could not find or load main class Task3.java
Caused by: java.lang.ClassNotFoundException: Task3.java
```

QUESTION . 4

```
import java.util.Scanner;
public class Task5{
public static void main(String[] args) {
   Scanner myObj = new Scanner(System.in);
   System.out.print("Enter a Word: ");
   String word = myObj.next();
   int length = word.length();
   String newWord = "";
   for (int i = (length-1); i >= 0; i--) {
      char newChar = word.charAt(i);
      newWord += newChar;
   }
   if (word.equalsIgnoreCase(newWord)) {
      System.out.println("Palindrome");
   }
   else{
      System.out.println("Not a Palindrome");
   }
   }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab6>java Task4.java
52
4
```

QUESTION . 5

```
import java.util.Scanner;
public class Task6{
   public static void main(String[] args) {
      Scanner myObj = new Scanner(System.in);
      System.out.print("Enter a String: ");
      String Sentence = myObj.nextLine();
      System.out.println(Sentence);
      int length = Sentence.length();
      String sub = Sentence.substring(0,length);
            int firstIndex = sub.indexOf(' ');
      int lastIndex = sub.lastIndexOf(' ');
      System.out.print(sub.substring(firstIndex,length) + ' ' +
sub.substring(0,firstIndex).trim());


   }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab6>java Task5.java
Enter a Word: hello
Not a Palindrome
```

QUESTION . 6

```java
import java.util.Scanner;
public class Task7{
   public static void main(String[] args) {
      Scanner myObj = new Scanner(System.in);
      System.out.println("Enter a Word: ");
      String word = myObj.next();
      int firstIndex = word.indexOf('f');
      int lastIndex = word.lastIndexOf('f');


      System.out.print("f occurs at indices " + firstIndex + ' ' +  lastIndex);

   }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab6>java Task6.java
Enter a String: thisis a str
thisis a str
 a str thisis
```

QUESTION . 7

```java
import java.util.Scanner;
public class Task8{
   public static void main(String[] args) {
      Scanner myObj = new Scanner(System.in);
      System.out.print("Enter a Sentence: ");
      String sentence = myObj.nextLine();
      int length = sentence.length();
      int firstindex = sentence.indexOf('h');
      int lastIndex = sentence.lastIndexOf('h');

System.out.print(sentence.substring(0,firstindex)+sentence.substring(lastIndex+1,leng
th));
   }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab6>java Task7.java
Enter a Word:
woird
f occurs at indices -1 -1
```

QUESTION . 8

```java
import java.util.Scanner;
public class Task9{
   public static void main(String[] args) {
      Scanner myObj = new Scanner(System.in);
      System.out.println("Enter a Sentence: ");
      String Sentence = myObj.nextLine();
      int length = Sentence.length();
      int firstIndex = Sentence.indexOf('h');
      int lastIndex = Sentence.lastIndexOf('h');
      String sub = Sentence.substring(firstIndex+1,lastIndex-1);
      String newSentence = sub.replace('h','H');
```

```
      System.out.print(Sentence.substring(0,firstIndex+1) + newSentence +" "+
Sentence.substring(lastIndex,length));
   }
}
```

QUESTION . 9

```
import java.util.Scanner;
public class Task10{
   public static void main(String[] args) {
      Scanner myObj = new Scanner(System.in);
      System.out.print("Enter a String: ");
      String sentence = myObj.nextLine();
      System.out.println(sentence.charAt(2));
      int length = sentence.length();
      System.out.println(sentence.charAt(length-1));
      for (int i = 0 ; i < length; i++) {System.out.print(sentence.charAt(i));}
      System.out.println();
      for(int i = 0;i<length-2;i++){System.out.print(sentence.charAt(i));}
      System.out.println();
      for (int i = 0;i<length;i++) {
         if(i % 2 != 0){continue;}
         else{System.out.print(sentence.charAt(i));}
      }
      System.out.println();
      for (int i = 0;i<length;i++) {
         if(i % 2 == 0){continue;}
         else{System.out.print(sentence.charAt(i));}
      }
      System.out.println();
      for (int i = (length-1);i>=0;i--) {System.out.print(sentence.charAt(i));}
      System.out.println();
      for (int i = (length-1);i>=0;i--) {
         if (i % 2 != 0) {continue;}
         else System.out.print(sentence.charAt(i));
      }
      System.out.println();
      System.out.println(length);
   }
}
```

```
H:\COMSATS Stuff\SEM 2\Programming Fundamental\work\LabAssignment2_LAB5-6-7\lab6>java Task10.java
Enter a String: str
r
r
str
s
sr
t
rts
rs
3
```

LAB . 7

Code

```
// - START

// ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

// NAME: MUHAMMAD MUJTABA SP22-BSE-036
// WORK: LAB 7 ACTIVITIES
// TEACHER: SIR RIZWAN RASHID

// NOTE:
// I wrote all lab activities in class Activities { }
//  and all graded activities in class Graded { }
//  then I tested all of these in class LAB7 { }
// which is our main class.

// ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::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// ALL LAB ACTIVITIES HERE:


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

class Activities {


    // ACTIVITY . 1:
    public static int max(int num1, int num2){
        if (num1 == num2) return -1; // if both are equal?
        return num1 > num2 ? num1 : num2;
    }


    // ACTIVITY . 2:
    public static void printGrade(double score){
```

```
    if(score >= 90.0){ System.out.println('A'); }
    else if(score >= 80.0){ System.out.println('B'); }
    else if (score >= 70.0){ System.out.println('C'); }
    else if (score >= 60.0){ System.out.println('D'); }
    else { System.out.println('F'); }
}


// ACTIVITY . 3:
public static void swap(int n1, int n2) {
    System.out.println("\tInside the swap method");
    System.out.println("\t\tBefore swapping, n1 is " + n1 + " and n2 is " + n2);
    int temp = n1;
    n1 = n2;
    n2 = temp;
    System.out.println("\t\tAfter swapping, n1 is " + n1 + " and n2 is " + n2);
 }


 // ACTIVITY . 4:
public static double max(double num1, double num2){
    if (num1 == num2) return -1; // if both are equal?
    return num1 > num2 ? num1 : num2;
}
public static double max(double num1, double num2, double num3){
    return max(max(num1, num2), num3);
 }


 // ACTIVITY . 5:
 public static long factorial(int n){
    if (n == 0) return 1; // Base case
    else return n * factorial(n - 1); // Recursive call
}


// ACTIVITY . 6:
public static long fib(long index) {
    if (index == 0) return 0; // Base case
    else if (index == 1) return 1; // Base case
    else return fib(index - 1) + fib(index - 2); // Reduction and recursive calls
}

// MAIN METHOD (FOR TESTING ALL FUNCTIONS, WILL BE CALLED IN ANOTHER CLASS):
public static void test() {

    // ACTIVITY . 1 TEST:
    int i = 5, j = 2;
    int k = max(i, j);
    System.out.println("The maximum of " + i + " and " + j + " is " + k);
```

```
        // ACTIVITY . 2 TEST:
        System.out.print("The grade is ");
        printGrade(78.5);
        System.out.print("The grade is ");
        printGrade(59.5);


        // ACTIVITY . 3 TEST:
        // Declare and initialize variables
        int num1 = 1;
        int num2 = 2;
        System.out.println("Before invoking the swap method, num1 is " + num1 + " and
num2 is " + num2);
        // Invoke the swap method to attempt to swap two variables
        swap(num1, num2);
        System.out.println("After invoking the swap method, num1 is" + num1 + " and
num2 is " + num2);


        // ACTIVITY . 4,5,6 TEST:
        System.out.println(max(4.0,7.2,6.0));
        System.out.println(factorial(8));
        System.out.println(fib(8));
    }

}

// ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
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// ALL GRADED ACTIVITIES HERE:

class Graded {

    // ACTIVITY . 1:
    public static int sumDigits(long n){
        int sum = 0;
        while (n != 0){ sum += n % 10; n /= 10; }
        return sum;
    }
    public static int reverse(int num){
        int reversed = 0;
        while(num != 0) {
            int lastDigit = num % 10;
            reversed *= 10 + lastDigit;
```

```
            num /= 10; // remove last digit
        }
        return reversed;
    }


    // ACTIVITY . 2:
    public static boolean isPalindrome(int number){ return number == reverse(number);
}


    // ACTIVITY . 3:
    public static void displaySortedNumbers(double x, double y, double z){
        double max = Math.max(x, Math.max(y, z));
        double min = Math.min(x, Math.min(y, z));
        double mid = x + y + z - max - min;
        System.out.printf("In order %f %f %f%n", min, mid, max);
    }


     // ACTIVITY . 4:
    public static int numberOfDaysInAYear(int year){ return 365; }


     // ACTIVITY . 5:
     public static int countLetters(String s){ return s.length(); }


    // ACTIVITY . 6:
    public static void capitalize(String s){
        StringBuilder str = new StringBuilder(s);
        char c = s.charAt(0);
        for (int i = 0; i < s.length() - 1; c = s.charAt(i)){
            if (i == 0){ str.setCharAt(i, Character.toUpperCase(c)); i++; continue; }
            if (Character.isAlphabetic(c) && (s.charAt(i - 1) == ' ')){
str.setCharAt(i, Character.toUpperCase(c)); }
            i++;
        }
        System.out.print(str);
    }


    // ACTIVITY . 7:
    public static void matNxN(int N){
        for (int i = 0; i < N; i++){
            for (int j = 0; j < N; j++){
                System.out.print(" " + (int)(Math.random() * 2));
            }
            System.out.print('\n');
        }
```

```
    }

    // ACTIVITY . 8:
    public static int countVowels(String s){
        int n = 0;
        char c = s.charAt(0);
        for (int i = 0; i < s.length() - 1; c = s.charAt(i)){
            if (Character.toUpperCase(c) == 'A' || Character.toUpperCase(c) == 'E'
            || Character.toUpperCase(c) == 'I' || Character.toUpperCase(c) == 'O'
            || Character.toUpperCase(c) == 'U'){ n++; }
            i++;
        }
        return n;
    }

    // ACTIVITY . 9:
    public static int power(int A, int N){
        if(N <= 0) return 0;
        return A * (power(A, N - 1));
    }

    // ACTIVITY . 10: *** DIFFICULT *** DIFFICULT *** DIFFICULT ***
    // USE RECURSION HERE, LEFT FOR LATER
    public static void patterns_reverse_int2bin_binSearch(){
        // -
    }

    public static void test(){
        System.out.println(sumDigits(123));
        System.out.println(reverse(123));
        System.out.println(isPalindrome(121));
        displaySortedNumbers(4.0, 1.0, 76.0);
        System.out.println(numberOfDaysInAYear(2022));
        System.out.println(countLetters("Hi, My name is Mujtaba."));
        capitalize("hi, my name is mujtaba.");
        matNxN(4);
        System.out.println(countVowels("hi, my name is mujtaba."));
        System.out.println(power(2,4));
    }

}

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// Main class:
```
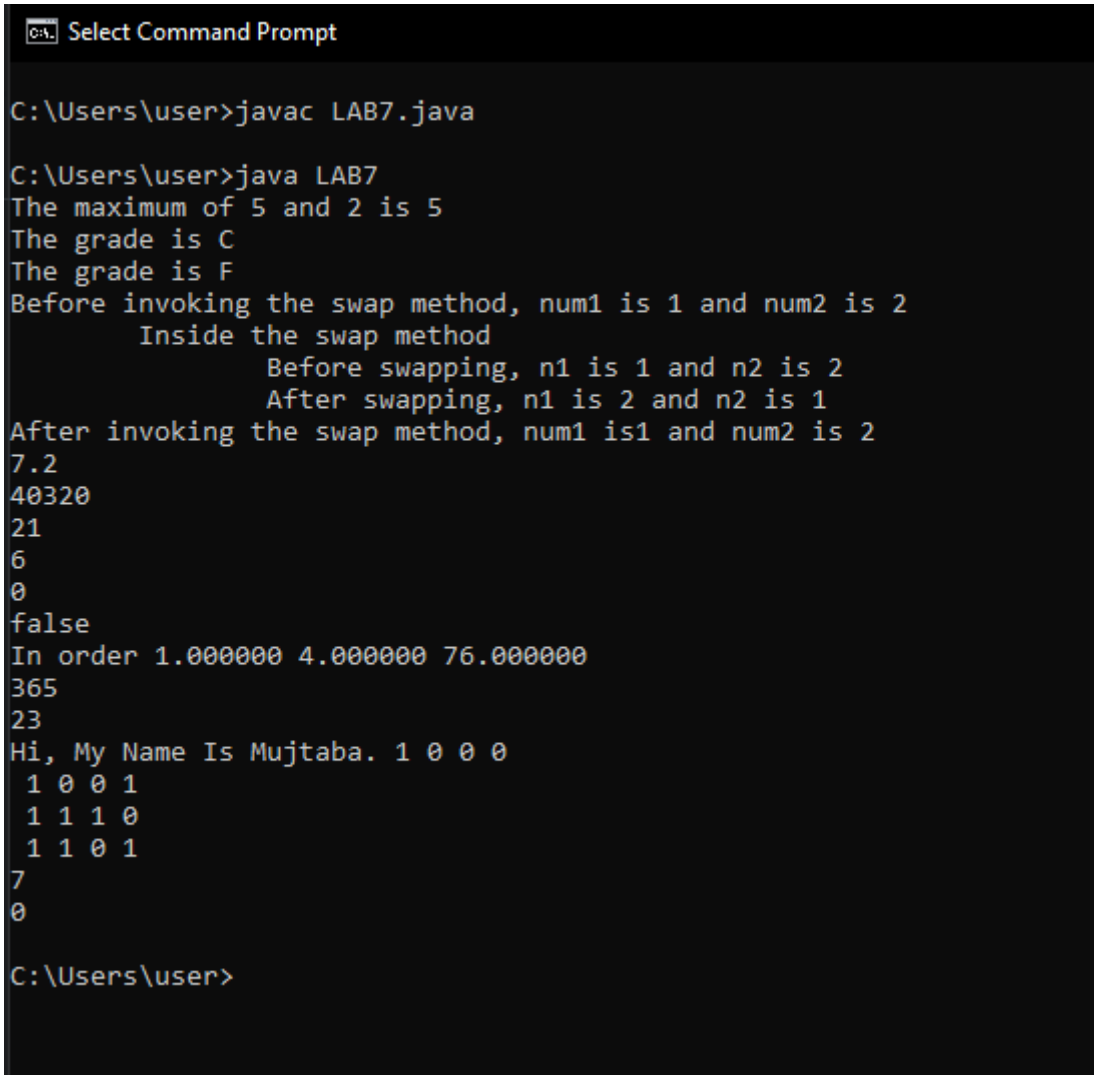

```java
public class LAB7 {
    public static void main(String [] args){
        Activities.test();
        Graded.test();
    }
}
// - END
```

Output



THANK YOU