COMSATS University, Islamabad

Mujtaba

SP22-BSE-036

Sir Rizwan Rashid

Programming Fundamentals

Lab Work

&

Graded Activities

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

Output

