COMSATS UNIVERSITY, ISLAMABAD



**Programming Fundamentals**

--CSC103--

**Name**: Talha Rizwan

**Reg no**. SP20-BSE-093

**Section**: B

**Submitted to**: Dr. Behjat Zuhaira

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**Lab Assignment03**

Q –1. Write recursive implementation for the following problems.

1. Suppose you are at some height above sea level. Now you want to come down, to the ground, that is at the sea level. Solve this recursively. When you are halfway, display the message, “You are halfway down!”.

package com.company**;**import java.util.Scanner**;**public class assignment2A {  
 public static int seaLevel(int currentLevel**,** int halfWay){  
 int sealevel = **400;** if(currentLevel == halfWay + sealevel){  
 System.out.println("You are at half way there " +currentLevel + "," + halfWay + " meters left")**;** }  
 else if(currentLevel == sealevel){  
 return currentLevel**;** }  
 currentLevel -= **1;** currentLevel = seaLevel(currentLevel**,**halfWay)**;** return currentLevel**;** }  
 public static void main (String args[]) {  
 Scanner scan = new Scanner(System.in)**;** int yourLevel**;** System.out.println("Enter your level where you currently at in meters: ")**;** yourLevel = scan.nextInt()**;** int halfLevel = (yourLevel - **400**)/**2;** yourLevel = seaLevel(yourLevel**,**halfLevel)**;** System.out.println("You are at ground level " + yourLevel + " meters")**;** }  
}

Text

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1. Write a recursive method for adding two numbers. Take the numbers from the user. Display the result in the caller method.
2. package com.company**;**import java.util.Scanner**;**public class assignment2B {  
    public static int add (int n1**,** int n2){  
    if (n2 == **0**){  
    return n1**;** }  
    int sum**;** sum = *add*(n1**,** n2-**1**) + **1;** return sum**;** }  
    public static void main (String args[]) {  
    Scanner scan = new Scanner(System.*in*)**;** int num1**,**num2**,**sum**;** System.*out*.println("Enter first number: ")**;** num1 = scan.nextInt()**;** System.*out*.println("Enter first number: ")**;** num2 = scan.nextInt()**;** sum = *add*(num1**,**num2)**;** System.*out*.println("Sum of two numbers is: "+ sum)**;** }  
   }

Text

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c) Take a number for user, say N, and pass it to a recursive method that will calculate the sum of all the numbers from 1 to N. Display the result in main().

a. Example: N = 5

b. Processing:5 + 4 + 3 + 2 + 1

c. Output:15

package com.company**;**import java.util.Scanner**;**public class assignment2C {  
 public static int sum (int num){  
 if (num<=**1**)  
 return num**;** return num + *sum*(num-**1**)**;** }  
 public static void main (String args[]) {  
 Scanner scan = new Scanner(System.*in*)**;** int N**;** System.*out*.println("Enter number to find sum from 1 to N: ")**;** N = scan.nextInt()**;** int sum**;** sum = *sum*(N)**;** System.*out*.println("Sum from 1 to "+N+" is "+ sum)**;** }

}

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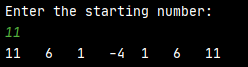
1. Write a recursive method that will take a number, say N, and display the pattern as follows:

a. Example: N = 16

b. Pattern: 16 11 6 1 -4 1 6 11 16

c. Explanation: Subtract 5 from N each time and display the resulting number, until the number is zero or less than zero. After that, the reversed pattern is printed.

package com.company**;**import java.util.Scanner**;**public class assignment2D {  
 public static void printPattern(int num){  
  
 if (num > **0** ){  
  
 num = num - **5;** System.*out*.print("\t "+num)**;** *printPattern*(num)**;** num = num + **5;** System.*out*.print("\t "+num)**;** }  
 }  
 public static void main (String args[]) {  
 Scanner scan = new Scanner(System.*in*)**;** int n**;** System.*out*.println("Enter the starting number: ")**;** n = scan.nextInt()**;** System.*out*.print(n)**;** *printPattern*(n)**;** }  
}



Q –2. Draw the class stacks of part b, c, and Diagram, engineering drawing

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Diagram, engineering drawing, schematic

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