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***QUESTION ONE:***

Create a java project, name it methods\_in\_java, in the project create a package named java\_methods and in the package, create a class and named methods.

b. in the classmethods, write a method that asks user to enter three numbers, using if statement determine the largest number, the smallest number and display the results in the following format.   
The smallest number: ?  
The largest number number: ?  
 is your largest and ? smallest number.

package java\_methods;

*import java.util.Scanner;*

*public class methods {*

*public static void main(String[] args) {*

*Scanner scanner = new Scanner(System.in);*

*// Prompt the user to enter three numbers*

*System.out.print("Enter the first number: ");*

*int num1 = scanner.nextInt();*

*System.out.print("Enter the second number: ");*

*int num2 = scanner.nextInt();*

*System.out.print("Enter the third number: ");*

*int num3 = scanner.nextInt();*

*// Determine the smallest and largest numbers*

*int smallest, largest;*

*// Determine the smallest number*

*if (num1 <= num2 && num1 <= num3) {*

*smallest = num1;*

*} else if (num2 <= num1 && num2 <= num3) {*

*smallest = num2;*

*} else {*

*smallest = num3;*

*}*

*// Determine the largest number*

*if (num1 >= num2 && num1 >= num3) {*

*largest = num1;*

*} else if (num2 >= num1 && num2 >= num3) {*

*largest = num2;*

*} else {*

*largest = num3;*

*}*

*// Display the results*

*System.out.println("The smallest number: " + smallest);*

*System.out.println("The largest number: " + largest);*

*System.out.println(largest + " is your largest and " + smallest + " smallest number.");*

*scanner.close();*

*}*

*}*

***QUESTION 2:***

Create a java project, package and class. In the class, write a method that asks a lecturer to enter marks for three units, java programming, networking and maths. The method should compute the average marks for three units and output the data in the following format.

marks for java programming is: ?  
marks for networking is: ?

marks for maths is: ?

the average is: ?

***import java.util.Scanner;***

***public class MarksCalculator {***

***public static void main(String[] args) {***

***Scanner scanner = new Scanner(System.in);***

***// Prompt the lecturer to enter marks for three units***

***System.out.print("Enter marks for Java Programming: ");***

***int javaMarks = scanner.nextInt();***

***System.out.print("Enter marks for Networking: ");***

***int networkingMarks = scanner.nextInt();***

***System.out.print("Enter marks for Maths: ");***

***int mathsMarks = scanner.nextInt();***

***// Calculate the average marks***

***double average = (javaMarks + networkingMarks + mathsMarks) / 3.0;***

***// Display the results***

***System.out.println("Marks for Java Programming: " + javaMarks);***

***System.out.println("Marks for Networking: " + networkingMarks);***

***System.out.println("Marks for Maths: " + mathsMarks);***

***System.out.println("The average is: " + average);***

***scanner.close();***

***}***

***}***

***QUESTION 3:***

Write a method that asks user to enter the year, the program should check if the year is a leap year, and output the text the year you entered is a leap year.

***import java.util.Scanner;***

***public class LeapYearChecker {***

***public static void main(String[] args) {***

***Scanner scanner = new Scanner(System.in);***

***System.out.print("Enter a year: ");***

***int year = scanner.nextInt();***

***if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {***

***System.out.println("The year you entered is a leap year.");***

***} else {***

***System.out.println("The year you entered is not a leap year.");***

***}***

***scanner.close();***

***}***

***}***

Create a java project, a package and a class, in the class, write a program to calculate the area of a triangle. The program should have the non-static methods:

One of the methods should ask the user to enter the base and the height of a triangle.

The other method should compute the area of the rectangle.

The other method should output the calculated area of the triangle and display it to the user

***Package triangle\_area;***

***import java.util.Scanner;***

***public class TriangleAreaCalculator {***

***private double base;***

***private double height;***

***public void getDimensions() {***

***Scanner scanner = new Scanner(System.in);***

***System.out.print("Enter the base of the triangle: ");***

***base = scanner.nextDouble();***

***System.out.print("Enter the height of the triangle: ");***

***height = scanner.nextDouble();***

***}***

***public double computeArea() {***

***return 0.5 \* base \* height;***

***}***

***public void displayArea(double area) {***

***System.out.println("The area of the triangle is: " + area);***

***}***

***public static void main(String[] args) {***

***TriangleAreaCalculator calculator = new TriangleAreaCalculator();***

***calculator.getDimensions();***

***double area = calculator.computeArea();***

***calculator.displayArea(area);***

***}***

***}***

***QUESTION 4***

Create a java program that has one non-static method, two static methods and a constructor.

***public class MyClass {***

***private int number;***

***// Constructor***

***public MyClass(int number) {***

***this.number = number;***

***}***

***// Non-static method***

***public void displayNumber() {***

***System.out.println("The number is: " + number);***

***}***

***// Static method 1***

***public static void printMessage(String message) {***

***System.out.println("Message: " + message);***

***}***

***// Static method 2***

***public static int addNumbers(int num1, int num2) {***

***return num1 + num2;***

***}***

***public static void main(String[] args) {***

***// Creating an object of MyClass***

***MyClass obj = new MyClass(42);***

***// Calling the non-static method using the object***

***obj.displayNumber();***

***// Calling static methods***

***MyClass.printMessage("Hello, world!");***

***int sum = MyClass.addNumbers(5, 7);***

***System.out.println("The sum of 5 and 7 is: " + sum);***

***}***

***}***

**Question one: [15 marks]**

1. A prime number is a number that is evenly divisible only by itself and 1. For example, the number 5 is prime because it can be evenly divided only by 1 and 5. The number 6, however, is not prime because it can be divided evenly by 1, 2, 4, and 6.   
   Write a method named isPrime, which takes an integer as an argument and returns true if the argument is a prime number, or false otherwise. Also write main method that displays prime numbers between 1 to 500.
2. Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be: 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...
3. By considering the terms in the Fibonacci sequence whose values do not exceed four million, write a Java method to find the sum of all the even- valued terms.

***public class NumberOperations {***

***// Task a: Check if a number is prime***

***public static boolean isPrime(int num) {***

***if (num <= 1) {***

***return false;***

***}***

***for (int i = 2; i <= Math.sqrt(num); i++) {***

***if (num % i == 0) {***

***return false;***

***}***

***}***

***return true;***

***}***

***// Task b: Generate Fibonacci sequence***

***public static void generateFibonacci(int terms) {***

***int a = 1, b = 2;***

***System.out.print("First " + terms + " terms of Fibonacci sequence: ");***

***for (int i = 1; i <= terms; i++) {***

***System.out.print(a + " ");***

***int next = a + b;***

***a = b;***

***b = next;***

***}***

***System.out.println();***

***}***

***// Task c: Sum of even-valued terms in Fibonacci sequence up to four million***

***public static int sumEvenFibonacci(int limit) {***

***int a = 1, b = 2, sum = 0;***

***while (a <= limit) {***

***if (a % 2 == 0) {***

***sum += a;***

***}***

***int next = a + b;***

***a = b;***

***b = next;***

***}***

***return sum;***

***}***

***public static void main(String[] args) {***

***// Task a: Display prime numbers between 1 and 500***

***System.out.println("Prime numbers between 1 and 500:");***

***for (int i = 1; i <= 500; i++) {***

***if (isPrime(i)) {***

***System.out.print(i + " ");***

***}***

***}***

***System.out.println();***

***// Task b: Generate and display first 10 terms of Fibonacci sequence***

***generateFibonacci(10);***

***// Task c: Sum of even-valued terms in Fibonacci sequence whose values do not exceed four million***

***int limit = 4000000;***

***int sum = sumEvenFibonacci(limit);***

***System.out.println("Sum of even-valued Fibonacci terms not exceeding " + limit + ": " + sum);***

***}***

***}***

**Question two: [15 marks]**

A palindrome number is a number that remain the same when read from behind or front ( a number that is equal to reverse of number) for example, 353 is palindrome because reverse of 353 is 353 (you see the number remains the same). But a number like 591 is not palindrome because reverse of 591 is 195 which is not equal to 591. Write Java program to check if a number entered by the user is palindrome or not. You should provide the user with a GUI interface to enter the number and display the results on the same interface

***package gui;***

***import javax.swing.\*;***

***import java.awt.event.ActionEvent;***

***import java.awt.event.ActionListener;***

***public class PalindromeChecker extends JFrame {***

***private JTextField numberField;***

***private JLabel resultLabel;***

***public PalindromeChecker() {***

***// Set up the frame***

***setTitle("Palindrome Checker");***

***setSize(300, 150);***

***setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);***

***setLocationRelativeTo(null);***

***setLayout(null);***

***// Create components***

***JLabel promptLabel = new JLabel("Enter a number:");***

***promptLabel.setBounds(10, 10, 100, 25);***

***add(promptLabel);***

***numberField = new JTextField();***

***numberField.setBounds(120, 10, 150, 25);***

***add(numberField);***

***JButton checkButton = new JButton("Check");***

***checkButton.setBounds(10, 50, 260, 25);***

***add(checkButton);***

***resultLabel = new JLabel("");***

***resultLabel.setBounds(10, 90, 260, 25);***

***add(resultLabel);***

***// Add action listener to the button***

***checkButton.addActionListener(new ActionListener() {***

***@Override***

***public void actionPerformed(ActionEvent e) {***

***checkPalindrome();***

***}***

***});***

***}***

**Question three: [15 marks]**

Write a Java program that takes 15 values of type integer as inputs from user, store the values in an array.

a) Print the values stored in the array on screen.  
b) Ask user to enter a number, check if that number (entered by user) is present in array

or not. If it is present print, “the number found at index (index of the number) ” and the text “number not found in this array”

c) Create another array, copy all the elements from the existing array to the new array but in reverse order. Now print the elements of the new array on the screen

d) Get the sum and product of all elements of your array. Print product and the sum each on its own line

.

***import java.util.Scanner;***

***public class ArrayOperations {***

***public static void main(String[] args) {***

***Scanner scanner = new Scanner(System.in);***

***int[] array = new int[15];***

***// Taking 15 integer inputs from the user***

***System.out.println("Enter 15 integer values:");***

***for (int i = 0; i < 15; i++) {***

***array[i] = scanner.nextInt();***

***}***

***// a) Printing the values stored in the array***

***System.out.println("Values in the array:");***

***for (int i = 0; i < 15; i++) {***

***System.out.print(array[i] + " ");***

***}***

***System.out.println();***

***// b) Checking if a number is present in the array***

***System.out.println("Enter a number to check if it is in the array:");***

***int number = scanner.nextInt();***

***boolean found = false;***

***for (int i = 0; i < 15; i++) {***

***if (array[i] == number) {***

***System.out.println("The number found at index " + i);***

***found = true;***

***break;***

***}***

***}***

***if (!found) {***

***System.out.println("Number not found in this array.");***

***}***

***// c) Creating another array with elements in reverse order***

***int[] reverseArray = new int[15];***

***for (int i = 0; i < 15; i++) {***

***reverseArray[i] = array[14 - i];***

***}***

***System.out.println("Values in the reversed array:");***

***for (int i = 0; i < 15; i++) {***

***System.out.print(reverseArray[i] + " ");***

***}***

***System.out.println();***

***// d) Getting the sum and product of all elements in the array***

***int sum = 0;***

***long product = 1;***

***for (int i = 0; i < 15; i++) {***

***sum += array[i];***

***product \*= array[i];***

***}***

***System.out.println("Sum of all elements: " + sum);***

***System.out.println("Product of all elements: " + product);***

***scanner.close();***

***}***

***}***