**Java programming**

**Assignment on Methods**

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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: ");

double num1 = scanner.nextDouble();

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

double num2 = scanner.nextDouble();

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

double num3 = scanner.nextDouble();

// Determine the largest and smallest numbers

double largest = Math.max(Math.max(num1, num2), num3);

double smallest = Math.min(Math.min(num1, num2), num3);

// Display the results

System.out.println("\nThe smallest number: " + smallest);

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

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

// Close the scanner

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: ?**

//package com.mycompany.lecturerdatasheet;

import java.util.Scanner;

/\*\*

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\* @author Group A

\*/

public class LecturerDataSheet {

public static void main(String[] args) {

computeAverageMarks();

}

public static void computeAverageMarks() {

Scanner scanner = new Scanner(System.in);

System.out.print("Please enter marks for Java Programming: ");

double javaMarks = scanner.nextDouble();

System.out.print("Please enter marks for Networking: ");

double networkingMarks = scanner.nextDouble();

System.out.print("Please enter marks for Maths: ");

double mathsMarks = scanner.nextDouble();

double averageMarks = (javaMarks + networkingMarks + mathsMarks) / 3;

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

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

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

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

}

}

***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.**

public class YearChecker {

public static void main(String[] args) {

YearChecker yearChecker = new YearChecker();

yearChecker.checkLeapYear();

}

public void checkLeapYear() {

// Use System.console() to read input from the user

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

String input = System.console().readLine();

int year = Integer.parseInt(input);

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.");

}

}

}

**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 thee 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 an display it to the user.**

public class Triangle {

private double base;

private double height;

// Method to ask user for base and height

public void inputBaseAndHeight() {

try {

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

base = readDouble();

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

height = readDouble();

} catch (NumberFormatException e) {

System.err.println("Error: Invalid input. Please enter valid numbers.");

}

}

// Custom method to read a double value from console

private double readDouble() throws NumberFormatException {

String input = System.console().readLine();

return Double.parseDouble(input);

}

// Method to compute area of the triangle

public double calculateArea() {

return 0.5 \* base \* height;

}

// Method to output and display the calculated area

public void displayArea() {

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

}

public static void main(String[] args) {

Triangle triangle = new Triangle();

triangle.inputBaseAndHeight();

triangle.displayArea();

}

}

***QUESTION 4***

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

public class ExampleClass {

private int number;

// Constructor

public ExampleClass(int number) {

this.number = number;

}

// Non-static method

public void displayNumber() {

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

}

// Static method 1

public static int addNumbers(int a, int b) {

return a + b;

}

// Static method 2

public static void printMessage(String message) {

System.out.println(message);

}

public static void main(String[] args) {

// Create an instance of ExampleClass using the constructor

ExampleClass example = new ExampleClass(10);

// Call the non-static method

example.displayNumber();

// Call the static methods

int result = ExampleClass.addNumbers(5, 3);

System.out.println("The sum is: " + result);

ExampleClass.printMessage("Hello, this is a static method!");

}

}

**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.**

public class PrimeNumbers {

public static void main(String[] args) {

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

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

if (isPrime(i)) {

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

}

}

}

public static boolean isPrime(int number) {

if (number <= 1) {

return false;

}

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

if (number % i == 0) {

return false;

}

}

return true;

}

}

1. **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, ...**

public class FibonacciSequence {

public static void main(String[] args) {

int n = 10; // Number of terms to display

int firstTerm = 1, secondTerm = 2;

System.out.println("First " + n + " terms of the Fibonacci sequence:");

for (int i = 1; i <= n; ++i) {

System.out.print(firstTerm + " ");

// Compute the next term

int nextTerm = firstTerm + secondTerm;

firstTerm = secondTerm;

secondTerm = nextTerm;

}

}

}

1. **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 FibonacciSequence {

public class EvenFibonacciSum {

public static void main(String[] args) {

System.out.println("Sum of even-valued Fibonacci terms not exceeding four million: " + sumEvenFibonacci(4000000));

}

public static int sumEvenFibonacci(int limit) {

int sum = 0;

int firstTerm = 1;

int secondTerm = 2;

while (firstTerm <= limit) {

if (firstTerm % 2 == 0) {

sum += firstTerm;

}

// Compute the next term

int nextTerm = firstTerm + secondTerm;

firstTerm = secondTerm;

secondTerm = nextTerm;

}

return 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.**

public class PalindromeCheckerGUI {

public static void main(String[] args) {

if (java.awt.GraphicsEnvironment.isHeadless()) {

System.out.println("No graphical environment detected. Please run this program in a graphical environment.");

return;

}

// Create the frame

javax.swing.JFrame frame = new javax.swing.JFrame("Palindrome Checker");

frame.setSize(400, 200);

frame.setDefaultCloseOperation(javax.swing.JFrame.EXIT\_ON\_CLOSE);

frame.setLayout(null);

// Create the label and text field for input

javax.swing.JLabel label = new javax.swing.JLabel("Enter a number:");

label.setBounds(50, 30, 100, 30);

frame.add(label);

javax.swing.JTextField textField = new javax.swing.JTextField();

textField.setBounds(160, 30, 150, 30);

frame.add(textField);

// Create the button to check palindrome

javax.swing.JButton button = new javax.swing.JButton("Check");

button.setBounds(150, 80, 100, 30);

frame.add(button);

// Create the label to display the result

javax.swing.JLabel resultLabel = new javax.swing.JLabel("");

resultLabel.setBounds(50, 120, 300, 30);

frame.add(resultLabel);

// Add action listener to the button

button.addActionListener(new java.awt.event.ActionListener() {

@Override

public void actionPerformed(java.awt.event.ActionEvent e) {

String input = textField.getText();

if (isPalindrome(input)) {

resultLabel.setText(input + " is a palindrome.");

} else {

resultLabel.setText(input + " is not a palindrome.");

}

}

});

// Set the frame visibility

frame.setVisible(true);

}

public static boolean isPalindrome(String number) {

int length = number.length();

for (int i = 0; i < length / 2; i++) {

if (number.charAt(i) != number.charAt(length - 1 - i)) {

return false;

}

}

return true;

}

}

**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.**

public class ArrayOperations {

public static void main(String[] args) {

java.util.Scanner scanner = new java.util.Scanner(System.in);

int[] array = new int[15];

// a) Take 15 integer inputs from the user and store them in the array

System.out.println("Enter 15 integers:");

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

array[i] = scanner.nextInt();

}

// Print the values stored in the array

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

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

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

}

System.out.println();

// b) Check if a number entered by the user is present in the array

System.out.print("Enter a number to search in the array: ");

int searchNumber = scanner.nextInt();

boolean found = false;

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

if (array[i] == searchNumber) {

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

found = true;

break;

}

}

if (!found) {

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

}

// c) Copy elements to another array in reverse order and print

int[] reversedArray = new int[15];

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

reversedArray[i] = array[14 - i];

}

System.out.println("Values in the new array in reverse order:");

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

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

}

System.out.println();

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

int sum = 0;

int 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();

}

}