**ASSIGNMENT-14**

**Question-1**

**Problem Statement:** Create a package named mathop. Define class MathsOperations with static methods to find the maximum and minimum of n numbers. Create another package statop. Define class StatsOperations with methods to find the average and median of n numbers. Import these packages to use the above methods to perform above operations on n numbers..

**Source Code**

// Mathop/MathsOperations

package mathop;

public class MathsOperations {

public static double findMaximum(double... numbers) {

double max = numbers[0];

for (double num : numbers) {

if (num > max) {

max = num;

}

}

return max;

}

public static double findMinimum(double... numbers) {

double min = numbers[0];

for (double num : numbers) {

if (num < min) {

min = num;

}

}

return min;

}

}

// Statop/StatsOperations

package statop;

import java.util.Arrays;

public class StatsOperations {

public static double findAverage(double... numbers) {

double sum = 0;

for (double num : numbers) {

sum += num;

}

return sum / numbers.length;

}

public static double findMedian(double... numbers) {

Arrays.sort(numbers);

int middle = numbers.length / 2;

if (numbers.length % 2 == 0) {

return (numbers[middle - 1] + numbers[middle]) / 2.0;

} else {

return numbers[middle];

}

}

}

//Class TestPackage(with main method)

import mathop.MathsOperations;

import statop.StatsOperations;

public class TestPackage {

public static void main(String[] args) {

double[] numbers = {10, 5, 8, 20, 15};

// Using mathop package

double max = MathsOperations.findMaximum(numbers);

double min = MathsOperations.findMinimum(numbers);

System.out.println("Maximum: " + max);

System.out.println("Minimum: " + min);

// Using statop package

double avg = StatsOperations.findAverage(numbers);

double median = StatsOperations.findMedian(numbers);

System.out.println("Average: " + avg);

System.out.println("Median: " + median);

}

}

**OUTPUT:**

Maximum: 20.0

Minimum: 5.0

Average: 11.6

Median: 10.0

**Question-2**

**Problem Statement:** Create a package called nodepack which contains the class “Node”. Create another package called listpack which contains the class “LinkedList” representing methods to 1. Create a Single Linked list, 2. Add a node to the list and 3. Traverse the list. Write a menu driven program in main to create a Single Linked list, Add nodes and display the List. The elements are passed as user input.

**Source Code**

// nodepack/Node.java

package nodepack;

public class Node {

public int data;

public Node next;

public Node(int data) {

this.data = data;

this.next = null;

}

}

// listpack/LinkedList.java

package listpack;

import nodepack.Node;

public class LinkedList {

private Node head;

public void addNode(int data) {

Node newNode = new Node(data);

if (head == null) {

head = newNode;

} else {

Node current = head;

while (current.next != null) {

current = current.next;

}

current.next = newNode;

}

}

public void traverseList() {

Node current = head;

while (current != null) {

System.out.print(current.data + " ");

current = current.next;

}

System.out.println();

}

}

//Class TestList(with main method)

import java.util.Scanner;

import listpack.LinkedList;

public class TestList {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

LinkedList list = new LinkedList();

int choice;

do {

System.out.println("Menu:");

System.out.println("1. Create a Single Linked list");

System.out.println("2. Add a node to the list");

System.out.println("3. Traverse the list");

System.out.println("4. Exit");

System.out.print("Enter your choice: ");

choice = scanner.nextInt();

switch (choice) {

case 1:

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

int n = scanner.nextInt();

System.out.println("Enter the elements:");

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

int element = scanner.nextInt();

list.addNode(element);

}

break;

case 2:

System.out.print("Enter the element to add: ");

int element = scanner.nextInt();

list.addNode(element);

break;

case 3:

System.out.println("The elements in the list are:");

list.traverseList();

break;

case 4:

System.out.println("Exiting...");

break;

default:

System.out.println("Invalid choice! Please enter again.");

}

} while (choice != 4);

scanner.close();

}

}

**OUTPUT:**

Menu:

1. Create a Single Linked list

2. Add a node to the list

3. Traverse the list

4. Exit

Enter your choice: 1

Enter the number of elements: 5

Enter the elements:

5

7

8

11

13

Menu:

1. Create a Single Linked list

2. Add a node to the list

3. Traverse the list

4. Exit

Enter your choice: 2

Enter the element to add: 3

Menu:

1. Create a Single Linked list

2. Add a node to the list

3. Traverse the list

4. Exit

Enter your choice: 3

The elements in the list are:

5 7 8 11 13 3