Practical 1

Question 1:

A computer screen shot of a program

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This system gets the sum of all even numbers up to a given positive integer using two different methods: incrementing by 2 and using the modulus operator. If the input is valid, the program measures the execution time for each method using System.nanoTime(). The first method, sumIncrement, iteratively adds even numbers by incrementing by 2, while the second method, sumModulus, checks each number up to n to see if it is even using the modulus operator. After sums have been completed and their respective durations, the program displays the results and compares the execution times, indicating which method is faster.

Question 2:

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The program determines whether a given number is prime and, if it is not, finds two factors of that number. It begins by prompting the user to enter a number, which is then checked for primality using the Prime method. This method uses a series of checks to quickly eliminate non-prime numbers, including handling numbers less than or equal to 1, and checking divisibility by 2 and 3. If the number is not prime, the program calls the findFactors method to identify two factors by testing divisibility from 2 up to the square root of the number.

Question 3:

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This system is used to find the minimum and maximum values from a list of integers. It begins by getting the user to specify how many numbers they want to enter. Based on this input, the program creates an array to store the integers. In a loop, it then asks the user to input each number, storing them in the array. After collecting all the numbers, the program calls two separate methods: Min to find the smallest number and Max to find the largest number in the array the program then prints the results, displaying the smallest and largest numbers entered by the user.

Question 4:

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This system provides a temperature conversion, allowing users to convert between Celsius and Fahrenheit. Upon execution, the program presents two options: converting Celsius to Fahrenheit or vice versa. Based on the user's choice, it prompts for the relevant temperature input. If the user selects the first option, they enter a temperature in Celsius, and the program uses the celsiusToFahrenheit method to perform the conversion, displaying the result formatted to two decimal places. However if the user chooses the second option the user inputs a temperature in Fahrenheit, and the program employs the fahrenheitToCelsius method to convert and display the corresponding Celsius value.

Question 5:

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This program checks whether a given word is a palindrome. It gets the user to enter a word and then calls the isPalindrome method to perform the check. Using the method the input word is converted to lowercase to ensure the comparison is case-insensitive. The program uses a two-pointer approach: one pointer starts at the beginning of the string, and the other starts at the end. As it compares the characters at these pointers, it moves inward until they meet. If any characters differ, the method returns false, indicating the word is not a palindrome. If all characters match, it returns true.

Question 6:

Question 7:

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This Java program presents a simple menu that allows users to choose from three different patterns to display a square, a right handed triangle, or a pyramid. When ran the program asks the user to enter their choice by selecting either option 1, 2, or 3. Based on the user's selection, the program uses a switch statement to print the corresponding pattern to the console. If the user selects option 1, a square is displayed. Option 2 produces a right-handed triangle, while option 3 generates a pyramid shape. If the user inputs an invalid option, the program outputs an error message prompting them to choose a valid option.

Question 8:

Question 9:

Question 10: