CL-1002
Programming Fundamentals
Lab # 4

Objectives:

- Practice on pseudocode
- conditional statements
- Flow charts

Note: Carefully read the following instructions (*Each instruction contains a weightage*)

1. Use understandable names of variables.
2. First think about statement problems and then write/draw your logic on copy.
3. Please submit your file in this format **23F-1234_L1**.
4. Do not submit your assignment **after the deadline**.
5. **Do not copy code from any source otherwise you will be penalized with negative marks.**

Problem 1: Gas Mileage

Drivers are concerned with the mileage obtained by their automobiles. One driver has kept track of several trips by recording miles driven and gallons used for each trip. Make a pseudocode and flow chart that uses a while statement to input the miles driven and gallons used for each trip. The program should calculate and display the miles per gallon obtained for each trip and print the combined miles per gallon obtained for all tankful's up to this point.

Problem 2: Salary Calculator

Make a pseudocode and flow chart that uses a while statement to determine the gross pay for each of several employees. The company pays "straight time" for the first 40 hours worked by each employee and pays "time-and-a-half" for all hours worked more than 40 hours. You are given a list of the employees of the company, the number of hours each employee worked last week and the hourly rate of each employee. Your program should input this information for each employee and should determine and display the employee's gross pay.

Problem 3: Find the Largest

The process of finding the largest number (i.e., the maximum of a group of numbers) is used frequently in computer applications. For example, a program that determines the winner of a sales contest inputs the number of units sold by each salesperson. The salesperson who sells the most units win the contest. Make a pseudocode and flow chart that uses a while statement to determine and print the largest number of 10 numbers input by the user. Your program should use three variables, as follows:

1. counter: A counter to count to 10 (i.e., to keep track of how many numbers have been input and to determine when all 10 numbers have been processed).
2. number: The current number input to the program.
3. largest: The largest number found so far.

Problem 4: Find the Second and third Largest

Using an approach similar to that in problem 3, find the second and third largest values among the 10 numbers. [Note: You must input each number only once.]

Problem 5: Palindromes

A palindrome is a number or a text phrase that reads the same backward as forward. For example, each of the following five-digit integers is a palindrome: 12321, 55555, 45554 and 11611. Write a program that reads in a five-digit integer and determines whether it's a palindrome. [Hint: Use the division and modulus operators to separate the number into its individual digits.]

Problem 6: Printing the Decimal Equivalent of a Binary Number

Input an integer containing only 0s and 1s (i.e., a "binary" integer) and print its decimal equivalent. Use the modulus and division operators to pick off the "binary" number's digits one at a time from right to left. Much as in the decimal number system, where the rightmost digit has a positional value of 1, the next digit left has a positional value of 10, then 100, then 1000, and so on, in the binary number system the rightmost digit has a positional value of 1, the next digit left has a positional value of 2, then 4, then 8, and so on. Thus, the decimal number 234 can be interpreted as 2 * 100 + 3 * 10 + 4 * 1. The decimal equivalent of binary 1101 is 1 * 1 + 0 * 2 + 1 * 4 + 1 * 8 or 1 + 0 + 4 + 8, or 13.

Problem 7: Enforcing Privacy with Cryptography (Encryption)

The explosive growth of Internet communications and data storage on Internet-connected computers has greatly increased privacy concerns. The field of cryptography is concerned with coding data to make it difficult (and hopefully—with the most advanced schemes—impossible) for unauthorized users to read. In this exercise you'll investigate a simple scheme for encrypting and decrypting data. A company that wants to send data over the Internet has asked you to write a program that will encrypt it so that it may be transmitted more securely. All the data is transmitted as four-digit integers. Your application should read a four-digit integer entered by the user and encrypt it as follows: Replace each digit with the result of adding 7 to the digit and getting the remainder after dividing the new value by 10. Then swap the first digit with the third and swap the second digit with the fourth. Then print the encrypted integer.
Design the pseudo-code and flowchart for a program that will compute the sum of 15 numbers. You need to increment number by 2 in previous value and so on. List the variables needed for this program.
Input a number from the user and prints its table. Also input start and end value from the user.

Problem 8: Vowels and consonants

Write down a pseudo-code and flowchart that will input a character. Display the count if entered character is vowels like a, e, I, o, u and if enter number is consonant then display the count of consonant. Input character until user enter 'n' character. If 'n' character is entered, then print number of vowels enter and number of consonants entered as well. List the necessary variables for this program.

Problem 9

Take date of birth from user and calculate his/her age. (You have to tell the age of person considering last calculated month is October 2020)
For example, if input is
Day 10
Month 7
Year 2013
Output must be
Your age is 7 years two months and 20 days

Problem 10

Input a number from user and will compute and display the factorial of that number.
Enter number= 4
Factorial = 4x3x2x1=24

Best of luck ☺

You are done with your exercise, submit on classroom at given time