Lahore University of Management and Sciences

Lab-2 Manual

for

Introduction to Programming

(CS200)

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LAB GUIDELINES

- Make sure you submit the lab before 11:55 AM. Any late submission will not be graded afterwards. In case of internet connectivity or electricity issues make sure to email the TA before 2:00 PM, cases will be verified and then awarded a grade if applicable.

- For every lab, there will be a folder created on LMS. You must submit your work in the respective folder during the lab time, you and only you are responsible for your submissions.

- You will be allowed to discuss the questions in the first half of the lab session for a few questions. After that, there will be a portion of lab where you cannot converse and must work for yourself. No discussion is allowed in later time period.

- You should do your work with utmost clarity and precision. Do not waste your time trying to do something you do not understand. Ask Lab instructors for help, that is what they are there for.

- Any legitimate cheating case can and will be reported to Disciplinary Committee without any leniency. Plagiarism Software make our task easier.

- Please follow the lab etiquettes and follow code of conduct in the session.

- Do not start Personal chat during your zoom meeting and raise your hands before asking questions.

OBJECTIVES

- Structures

LAB EXERCISES

Question#1: [Marks: 30]   Est. Time: 30 mins

Create a structure "**Date**" with following member variables
1. Month
2. Day
3. Year

• Write a function to print the Date in YYYY-MM-DD format.   (15)
• Write a function to subtract one Date from another & add one date to another. (10)

For simplicity assume every month is of 30 days and make sure that number of days should not exceed 30 and number of months should not exceed 12. (5)

Sample Input:
One Date:
        Month = 7
        Day = 13
        Year = 2020
Second Date:
        Month = 4
        Day = 9
        Year = 2005

Sample Output:
Date Format: 2020-07-13
Subtract Date = 2015-03-04
Add Date = 2025-11-22

Question#1: [Marks: 40]   **Est. Time: 40 mins**

For this task you are required to build an encryption system. The function **encrypt** will have following specifications:

Input Parameters: string of length n, a non-negative integer value.

Output: An encrypted string.

To achieve this task we need a string, and an integer. That integer defines how much we want to shift our letters. For example, if **Shift=4**, then **E->A, F->B, L->H**, and so on. You must have noticed that the **Shift** parameter defines how many characters our alphabets jump back to reach its encrypted state. But what about the alphabets at the end? For them, you will have to make a loop around, e.g. for same Shift-4; **A->W, B->X, C->Y**. For an instance:

Input: EXXEGOEXSRGI
Shift: 4
Cipher: ATTACKATONCE

Text: KDDKMUYXDSDKX
Shift: 10
Cipher: ATTACKONTITAN

Similarly, you must write a function called **decrypt,** which will take in the encrypted text as input and the Shift parameter and decrypt it. For example;

Input: ATTACKATONCE
Shift: 4
Output: EXXEGOEXSRGI

Input: ATTACKONTITAN
Shift: 10
Output: KDDKMUYXDSDKX

You need to create a main which prompts user to input the string and the Shift value. Then, depending on the choice of user encrypts or decrypts the string and display the result.

Marks Distribution:

Encrypt Function (15), Decrypt Function (15), Error Handling (5), Main (5)

Note: You can figure out the decrypt functionalities. Also, for simplicity sake only make the program for **CAPITAL LETTERS**.

Question#3: [Marks: 30]   **Est. Time: 40 mins**

You have to make a struct named "**fibonacci**" with one member function named "**recursiveFib**" which should contain recursive definition for the Fibonacci sequence. In the main function, the user should be prompted to enter the number of digits of the Fibonacci sequence which they want to print.

You have to make a call to "recursiveFib" with this number as a parameter and that should print the required number of digits from the Fibonacci sequence.

NOTE: The output sequence must be in the same format as shown in the sample outputs

Sample output # 1:
Please enter the number of digits you want to print: 5
0 1 1 2 3
Sample output # 2:
Please enter the number of digits you want to print: 9
0 1 1 2 3 5 8 13 21

Marks Distribution:
Recursive Function (15), Main (5), Fibonacci Series (5), Output Format (5)

Best of Luck ☺