FAST

الذی علم بالقلم۔ علم الانسان ما لم یعلم۔

National University of Computer and Emerging Sciences

DEPARMENT OF COMPUTER SCIENCE

Object Oriented Programming Lab

Assignment-01

OOP-LAB ASSIGNMENT-01

Assignment Due Date: 12th April, 2021
Max. Marks: 60

Engr. Khuram Shahzad
(Instructor)

Guidelines for the submission of assignment

✓ **You must have to follow these guidelines for the submission of assignment.**

- ❑ **No late submissions will be entertained.**
- ❑ **All submissions should be made on Google Class Room.**
- ❑ **Emailed assignment will be marked as 0.**
- ❑ **Proper comments must be added within the code to explain the logic.**
- ❑ **An individual/group may be assigned a straight-forward 0 if the submitted assessed Task is copied/cheated from another individual/group.**
- ❑ **Individual viva can be held before finalization of this assignment marks.**
- ❑ **Upload only a PDF/MS word file including all tasks code and output respectively.**

Assignment-01: Task-01

- ✓ There's a staircase with N steps, and you can climb 1 or 2 steps at a time. Given N, write a function that returns the number of unique ways you can climb the staircase. The order of the steps matters. **(15 marks)**
  - For example, if N is 4, then there are 5 unique ways:
    - 1, 1, 1, 1
    - 2, 1, 1
    - 1, 2, 1
    - 1, 1, 2
    - 2, 2

What if, instead of being able to climb 1 or 2 steps at a time, you could climb any number from a set of positive integers X? For example, if X = {1, 3, 5}, you could climb 1, 3, or 5 steps at a time. Generalize your function to take in X.

Assignment-01: Task-02

- ✓ The two sum problem is a common interview question, and it is a variation of the subset sum problem. There is a popular dynamic programming solution for the subset sum problem, but for the two sum problem we can actually write an algorithm that runs in $O(n)$ time. The challenge is to find all the pairs of two integers in an unsorted array that sum up to a given S. **(15 marks)**
  - For example, if the array is [3, 5, 2, -4, 8, 11] and the sum is 7, your program should return [[11, -4], [2, 5]] because 11 + -4 = 7 and 2 + 5 = 7.

Assignment-01: Task-03

- ✓ Write a code that can calculate the inverse of a 2D matrix, the user will enter the value of matrix at runtime and there must be some logic inside the code that will tell the user that inverse of the typed matrix (at run time) is possible or not. **(10 Marks)**

Assignment-01: Task-04

- ✓ Write a program using ARRAY(S) OR STRUCTURE(S) and initialize the values inside the program with: **(20 Marks)**
    1. Your first name
    2. Your last name
    3. Your age
    4. Your ID (you can take any random number)
    5. Your favorite sport
    6. Your favorite food
    7. Your current GPA

Add 06 different Records in the code with all 7 fields, inside the program with static values.

At the run time user will be given an option to search from any one such as search by first name, last name, age up-to search by GPA. According to the selection of user, the required operation must be performed and if user will enter your name or your age (according to his choice), he will be able to see all 7 details about you. At the end user must be given an option to either quit or perform another search.

GOOD LUCK ☺