University of Central Punjab

**Faculty of Information Technology**

**Data Structures and Algorithms Spring 2023**

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| **Lab 08** | |  |
| **Topic** | * Recursion |
| **Objective** | * The basic purpose of this lab is to implement ADT of Linked List and test its applications. |

**Instructions:**

* Indent your code.
* Comment your code.
* Use meaningful variable names.
* Plan your code carefully on a piece of paper before you implement it.
* Name of the program should be same as the task name. i.e. the first program should be Task\_1.cpp

# void main() is not allowed. Use int main()

* **You have to work in multiple files. i.e separate .h and .cpp files**

# You are not allowed to use system("pause")

* **You are not allowed to use any built-in functions**

# You are required to follow the naming conventions as follow:

* + **Variables:** firstName; (no underscores allowed)
  + **Function:** getName(); (no underscores allowed)
  + **ClassName:** BankAccount (no underscores allowed)

# Students are required to complete the following tasks in lab timings.

**Task 1**

Write a Recursive Function named **“sum\_of\_list”** and add it in already created C++ Doubly Linked List class. Which calculates and return the sum of all the values entered by user in the linked list.

**Task 2**

Write a Recursive Function named **“product\_of\_Prime”** and add it in already created C++ Doubly Linked List class. Which calculates the product of all the prime number present in the linked list.

**Task 3**

Write a Recursive Function named **“display\_Even\_numbers”** and add it in already created C++ Doubly Linked List class. Which displays all the even numbers from the linked list

**Task 4**

Write a Recursive Function by the name of **“occurance\_of\_key”** and add it in already created C++ Doubly Linked List class. The main functionality of the function is that it finds all the occurrences of number entered by user.

**Task 5**

Write a Recursive Function by the name **“reverse\_linkedList”** and add it in already created C++ Doubly Linked List class. Which reverses the original linked list. Print the linked list to verify.

**Task 6**

Write a Recursive Function by the name **“Palindrome\_Check”** and add it in already created C++ Doubly Linked List class. Which traverse the linked list to check whether the data present in the nodes of linked list forms a palindrome or not.