Data Structure and Algorithm

Laboratory Activity No. 6

Singly Linked Lists

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# Objectives

Introduction

A linked list is an organization of a list where each item in the list is in a separate node. Linked lists look like the links in a chain. Each link is attached to the next link by a reference that points to the next link in the chain. When working with a linked list, each link in the chain is called a Node. Each node consists of two pieces of information, an item, which is the data associated with the node, and a link to the next node in the linked list, often called next.

This laboratory activity aims to implement the principles and techniques in:

* Writing algorithms using Linked list
* Writing a python program that will perform the common operations in a singly linked list

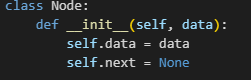
# Methods

* Write a Python program to create a singly linked list of prime numbers less than 20. By iterating through the list, display all the prime numbers, the head, and the tail of the list. (using Google Colab)
* Save your source codes to GitHub

# Results

Present the visualized procedures done. Also present the results with corresponding data visualizations such as graphs, charts, tables, or image . Please provide insights, commentaries, or explanations regarding the data. If an explanation requires the support of literature such as academic journals, books, magazines, reports, or web articles please cite and reference them using the IEEE format.

Please take note of the styles on the style ribbon as these would serve as the style format of this laboratory report. The body style is Times New Roman size 12, line spacing: 1.5. Body text should be in Justified alignment, while captions should be center-aligned. Images should be readable and include captions. Please refer to the sample below:



**Figure 1:** This figure shows the basic building block of a linked list. Each node contains data and a pointer (or reference) to the next node in the sequence.  
   
 A screen shot of a computer program

AI-generated content may be incorrect.  
**Figure 2:** This figure illustrates the LinkedList class, which manages the entire list. It provides methods to append new nodes, display the list with their values, and retrieve the tail node.

A computer screen with colorful text

AI-generated content may be incorrect.

**Figure 3:** This function determines whether a number is prime. It is used to filter and select prime numbers less than 20 to be stored in the linked list.

A computer screen shot of a black background

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**Figure 4:** In this section, the linked list is initialized, and all prime numbers below 20 are appended using a loop in combination with the is\_prime function.

A black background with white text

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**Figure 5:** Finally, the contents of the linked list are displayed, along with the head (first element) and tail (last element), to confirm that all nodes were added correctly.

# Conclusion

* In this activity, I successfully implemented a singly linked list in Python to store and display prime numbers less than 20. This allowed me to demonstrate how to define a node structure, create and manage a linked list, and perform key operations such as appending nodes, displaying the list, and retrieving the head and tail elements. This activity strengthened my understanding of linked list operations and their practical use in data management.

**References**

[1] GeeksforGeeks. (2024). *Python Program for Prime Numbers.*

<https://www.geeksforgeeks.org/python-program-to-check-whether-a-number-is-prime-or-not/>

[2] Programiz. (2024). *Python Linked List.*

<https://www.programiz.com/dsa/linked-list>