Data Structure and Algorithm

Laboratory Activity No. 6

Singly Linked Lists

|  |  |
| --- | --- |
| *Submitted by:* | *Instructor:* |
| Gabuyo, Ivan love D. | Engr. Maria Rizette H. Sayo |

AUG, 23, 2025

# 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:

A screenshot of a computer

AI-generated content may be incorrect.

Figure 1 Screenshot of source code

This program shows how a singly linked list works by storing all the prime numbers less than twenty. Each prime number is kept inside a small container called a *node*, which holds the number itself and a link to the next node, like train cars connected together. The linked list starts with a *head* (the first number) and grows as new prime numbers are added to the end. A helper function checks whether a number is prime, and if it is, the number is added to the list. After going through the numbers from 0 to 19, the program displays the full chain of primes, along with the head and tail of the list. The final output confirms the list is [2, 3, 5, 7, 11, 13, 17, 19], where 2 is the head and 19 is the tail. This makes it easier to see how linked lists connect pieces of data step by step instead of storing them all in one continuous block like normal Python lists.

.

# Conclusion

Through this activity, I was able to understand how a singly linked list works by actually building one in Python. Instead of storing data in one big block like a normal list, I saw how each number is stored in its own node and connected to the next, like links in a chain. By adding all the prime numbers less than twenty, I was able to practice inserting new nodes, finding the head and tail, and walking through the list to display the elements. The final output confirmed that the list worked as expected, starting at 2 and ending at 19. Overall, this gave me a clearer and more practical idea of how linked lists can be used to organize data step by step.

**References**

Python Software Foundation. (2023). *Python documentation: Classes*. Python.org. <https://docs.python.org/3/tutorial/classes.html>

GeeksforGeeks. (2022, November 28). *Linked list data structure*. GeeksforGeeks. https://www.geeksforgeeks.org/data-structures/linked-list/

W3Schools. (n.d.). *Python linked lists*. W3Schools. https://www.w3schools.com/python/python\_linked\_lists.asp