Data Structure and Algorithm

Laboratory Activity No. 2

**Algorithm Analysis and Flowchart**

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August, 1, 2025

* Objectives

Introduction

Data structure is a systematic way of organizing and accessing data, and an algorithm is a step-by-step procedure for performing some task in a finite amount of time. These concepts are central to computing, but to be able to classify some data structures and algorithms as “good,” we must have precise ways of analyzing them.

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

* Writing a well-structured procedure in programming
* Writing algorithm that best suits to solve computing problems to improve the efficiency of computers
* Convert algorithms into flowcharting symbols
* Methods
* Explain algorithm and flowchart
* Write algorithm to find the result of equation: f (x) = and draw its flowchart
* Write a short recursive Python function that finds the minimum and maximum values in a sequence without using any loops
* Results

A.

**Algorithm**

An algorithm is a step-by-step set of instructions designed to solve a specific problem or perform a task. It is expressed in a way that is independent of programming language and can be implemented in code later.



Figure 1 Example of Algorithm

<https://study.com/academy/lesson/what-is-an-algorithm-in-programming-definition-examples-analysis.html>

**Flowchart**

A flowchart is a graphical representation of an algorithm using symbols.



Figure 2 Example of Flowchart

<https://en.wikipedia.org/wiki/Flowchart>

B.

**Example of Flowchart and Algorithm using a Function f(x)**

For example we have function f(x) = x^2 + 2x + 1

**Algorithm**:

1. Start

2. Input value of x

3. Calculate f(x) = x^2 + 2x + 1

4. Output f(x)

5. End

**Flowchart:**



Figure 3 Example of Flowchart for Function

C.



Figure 4: Code for finding minimum and maximum in a sequence

* Conclusion

Throughout the activity i have better understood the concepts of algorithm and flowchart usage, especially in programming. It is a tool to be used for a more efficient workflow. I have learnt to better understood how to use the list in python as i've used a some sort of sequence for my code(refer to Part C). i have learned how to better find the minimum and maximum of a sequence of numbers in python without the use of 'for' loops

**References**

[1]Google, “Google Colaboratory,” Google Colab. [Online]. Available:https://colab.research.google.com/. [Accessed: Aug. 1, 2025].

[2]Wikipedia, “Flowchart,” Wikipedia. [Online]. Available: <https://en.wikipedia.org/wiki/Flowchart>. [Accessed: Aug. 1, 2025].

[3]Study.com, “What is an Algorithm in Programming? - Definition, Examples & Analysis,” Study.com. [Online]. Available: <https://study.com/academy/lesson/what-is-an-algorithm-in-programming-definition-examples-analysis.html>. [Accessed: Aug. 1, 2025].

[4]Miro, “Miro Online Collaborative Whiteboard,” Miro. [Online]. Available: <https://miro.com/app/board>. [Accessed: Aug. 1, 2025].