UNIVERSITY OF CALOOCAN CITY
COMPUTER ENGINEERING DEPARTMENT

Data Structure and Algorithm

Laboratory Activity No. 2

Algorithm Analysis and Flowchart

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I.   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

II.   Methods

    A.   Explain algorithm and flowchart

    B.   Write algorithm to find the result of equation: $f(x) = \begin{cases} -x, & x<0 \\ x, & x \geq 0 \end{cases}$ and draw its flowchart

    C.   Write a short recursive Python function that finds the minimum and maximum values in a sequence without using any loops

III.   Results

    A.

Algorithm: An algorithm is a step-by-step procedure or set of rules to solve a specific problem or perform a task.

Flowchart: A flowchart is a visual representation of an algorithm using different symbols like ovals (start/end), rectangles (process), diamonds (decisions), and arrows (flow of control).

This explains what is algorithm, flowchart and their differences.

B.

$$f(x) = \begin{cases} -x, & x < 0 \\ x, & x \geq 0 \end{cases}$$

Algorithm:

        STEP 1: Start

        STEP 2: Initialize variables f and x

        STEP 3: Input x

        STEP 4: If x < 0, then set f = -x

            Else, set f = x

        STEP 5: Output f

        STEP 6: End

This shows the step-by-step process to find the result of the given equation.
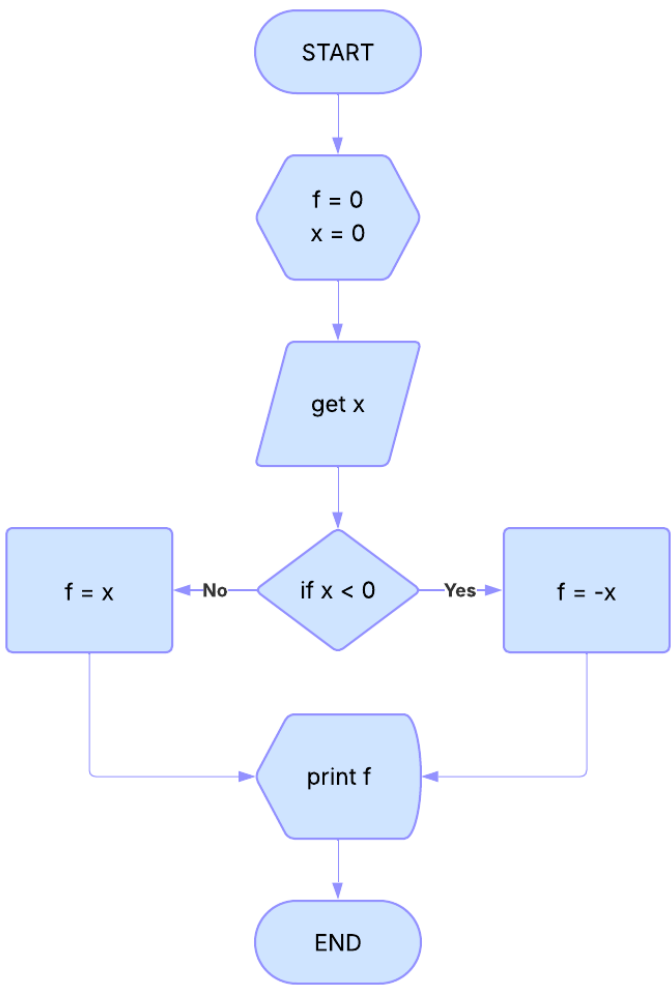
Flowchart:

Figure 1 Screenshot of program

This flowchart visually represents the algorithm above, it helps us to better understand the flow or process of the algorithm.

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C.

Source Code:

Please refer to this link:

https://colab.research.google.com/drive/1En6UbQVSySQZ1I8oLKciq7e259lWlPs_#scrollTo=cfsIbuZk5KFk&line=11&uniqifier=1

This is the link to the python program with a function that finds the min and max values without using any loops

IV. Conclusion

This activity helped us practice making clear procedures, creating algorithms to solve problems, and showing them in flowcharts, which improved our understanding of how good design makes computing work better.

References

[1] Co Arthur O.. "University of Caloocan City Computer Engineering Department Honor Code," UCC-CpE Departmental Policies, 2020.