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

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.  ALGORITHM**

1.  Start
2.  Input the value of x
3.  If x < 0, then f = -x
4.  Else, f = x
5.  Output the value of f

6.    End

## B.    FLOWCHART



START
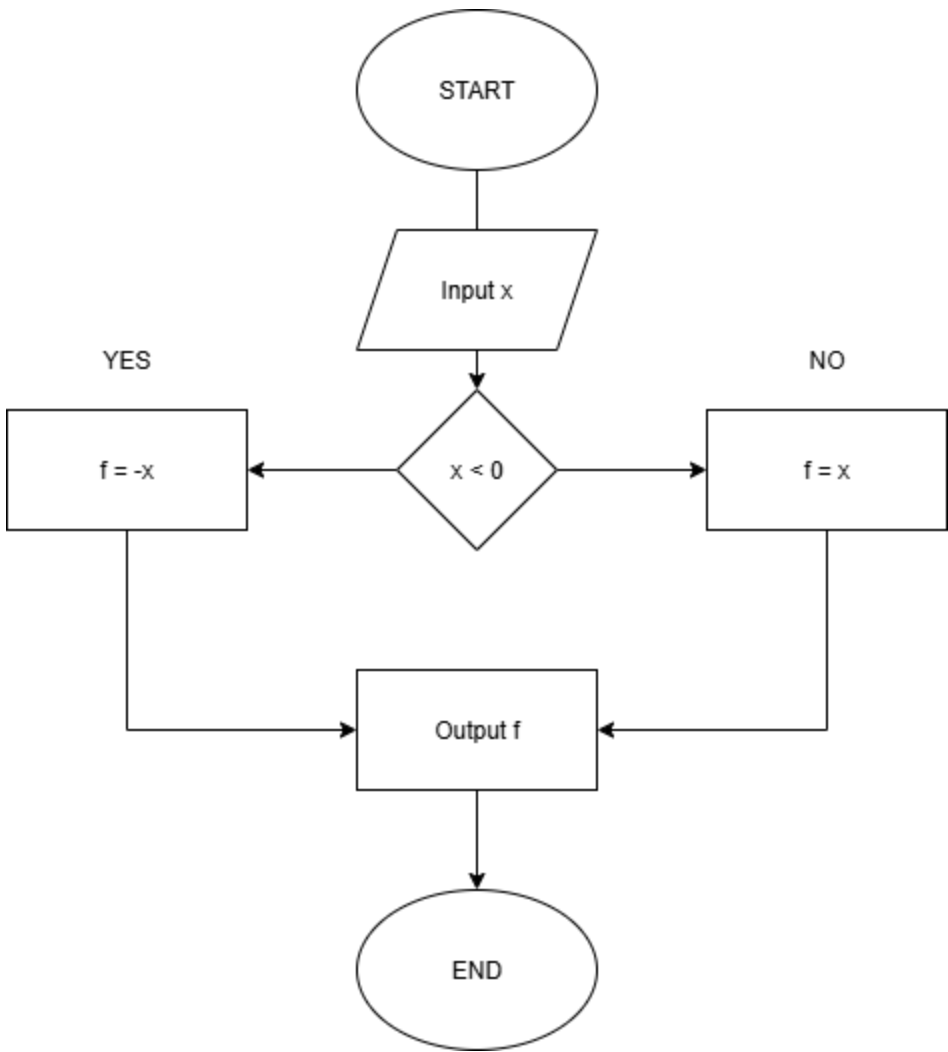
Input x

YES

NO

f = -x

x < 0

f = x

Output f

END

Figure 1.0 Flowchart of the problem

The flowchart shows the flow of the program. Input the value of x and it make a decision. If the x is less than 0 the function will be negative vice versa making it to determine the minimum and maximum value of x.

```python
def min_max(seq):
    if len(seq) == 1:
        return seq[0], seq[0]
    else:
        min_rest, max_rest = min_max(seq[1:])
        return min(seq[0], min_rest), max(seq[0], max_rest)

nums = [4,6,3,8,-4,7,2,9]
minimum, maximum = min_max(nums)
print("Minimum:", minimum)
print("Maximum:", maximum)
```

PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

PS C:\Users\Administrator\Desktop\VS CODE> & C:/Users/Administrator/AppData
Laboratory 2.py"
Minimum: -4
Maximum: 9
PS C:\Users\Administrator\Desktop\VS CODE>

Figure 2.0 Program

2

The program demonstrates the function of x that find the minimum and maximum value of x using list and function in python.

If an image is taken from another literature or intellectual property, please cite them accordingly in the caption. Always keep in mind the Honor Code [1] of our course to prevent failure due to academic dishonesty.

## IV. Conclusion

In conclusion, seq acts as the input sequence in the list to find its minimum and maximum values. It helped me to learn how to create a flowchart and algorithm. I also learned recursion that allow me to find the minimum and maximum value of x without using any loops.

# References

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