**Module 3 – Critical Thinking Project**

**Option#2 Minimum Number**

**Date – 2/3/2024**

Overview:

Write two Python functions to find the minimum number in a list. The first function should compare each number to every other number on the list *O(n2)*. The second function should be linear *O(n)*.

Principles:

* Create a python program with 2 loops for number comparisons.
* Create the program using 1 loop for linear comparisons
* Comparing numbers with a large number like 99999 to find the min value.

Code:

1 Function

def findMin1(inputList):

    '''

    10,7,2,6,-1,5,4

    Write two Python functions to find the minimum number in a list. The first function should compare each number to every other number on the list O(n2).

    The second function should be linear O(n).

    '''

    temp = 99999

    for i in range(len(inputList)):

        for j in range(len(inputList)):

            #print("pass",inputList[i],inputList[j])

            if inputList[i]<inputList[j] and inputList[i]<temp:

                temp = inputList[i]

    return temp

2 Function

def findMin2(inputList):

    temp = 99999

    for i in range(len(inputList)):

        if inputList[i]<temp:

            temp = inputList[i]

    return temp

Discussion

* In the First approach I am using 2 loops i, j to compare each number with one another
* The second loop will loop through the entire List which will compare each element to every other element in the loop resulting in time complexity of O(n2)
* In the Second approach I am using a single loop and using a static variable whose value is a big number 99999.
* In every pass I am resetting this variable with the least value resulting in time complexity of O(n)

Improvements

* I think math.(‘INF’) can be used in the temp variable instead of a big number like 99999 that will cover the edge case just in case the input reached to that limit.
* We can also put a check for empty input and return None
* Also if there is only 1 element in the input that will become the result by default.

Ref – None