Problem Statement/Assignment 1

Algorithmic Trading Winter Project
Finance And Analytics Club, IIT Kanpur

December 13, 2024

Disclaimer: This assignment is to let you play with your Python IDE and have a firm understanding of how python works: we have kept this assignment in EASY MODE. Have a clear understanding in mind that AI(chatGPT or equivalent) should not be used for the sake of completion of the assignment as it only leads to self regret later on. As for the submission, you are required to submit exactly one .ipynb file with every solution, each in a box of its own. Do remember to make a comment of the question number for our convinience.

Question 1. The first question involves arithmetic with a small application of loops. You are given an array of n integers, that is, $a_1, a_2, \ldots, a_n$, and you are required to output the maximum and minimum among them. Hint: Try with n=3, then generalise your arguement.

Question 2. This question is for familiarity with strings. You are needed to input a string and check if it is a palindrome. Hint: Read a bit about two pointer method.

Question 3. You will need a basic understanding of sorting for this question. Note that there is a direct python function to sort a sequence of integers. You are given an array of n integers, that is, $a_1, a_2, \ldots, a_n$, and a number x. You need to find a pair of elements whose absolute difference is x. You are assured that such a pair exists in the array. Hint: What if you sort the array.

Question 4. (Optional) You are given an array of length n, and distinct integers a, b, and c. All elements of the array are one of a, b or c. You are required to sort the array without the use of a conventional sorting algorithm. Hint: Think of three pointers.

We do not want you to be acquainted with the numerous data structures in python. We have specifically prepared the assignment with questions on pointers and sorting algorithm, as it is what you will use majority of the time: traversing linearly through a time series data.