

There are 1 questions for a total of 10 points.

- (10) 1. (*Rising Stock Prices*): When digging through archives, the daily price of stocks for n days of a long-forgotten company was found and made available in a list $L[0 \dots n - 1]$. It is known that the stock price was stable during the initial few days, and then, due to some global event, the price started rising significantly every day until the last day. We are trying to go over this data and figure out the trigger day (*i.e.*, the date on which the price started rising significantly). You are asked to design an algorithm for this task.

You are given a list L of size > 3 , and a stability parameter S , which is a positive number. The list is such that for an (unknown) index $0 < T < n - 1$, $|A[i] - A[i - 1]| \leq S$ for all $0 < i \leq T$ and $|A[i] - A[i - 1]| > S$ for all $i > T$. Note that $|\cdot|$ denotes absolute value, and T is the trigger day or index. Design an algorithm for finding the trigger index T .

Your programs should produce an output within 0.05 seconds for this assignment. You may assume that the list size $3 < n < 10000000$. The format for program execution is as follows.

EXECUTION: The way we will execute your code will be different than in the previous assignment. For this assignment, you have to create a Python module named `stockanalysis` that contains the function `FindTriggerIndex(L, S)` that takes as input a list L and a number S (denoting the stability parameter), and returns the trigger index.

For example, for the input $([45, 44, 46, 48, 47, 45, 47, 49, 55, 60, 63, 68, 71, 75], 2.5)$, the output should be 7.

We will use the following commands to check the output and the time:

```
from stockanalysis import FindTriggerIndex
start = time.time()
FindTriggerIndex(L, S)
end = time.time()
```

SUBMISSION INSTRUCTIONS: All your program files should be in a directory `module_3_prog`. You will be asked to create a zip of this directory and submit this zip file. Since you are asked to create a module, your Python program should be in a file named `stockanalysis.py`.