Session 4

Assignment 1 Question

Session 4: Assignment 1

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1. Introduction

This assignment will help you to consolidate the concepts learnt in the session.

2. Problem Statement

Task 1:

1.

Given a sequence of n values x1, x2, ..., xn and a window size k>0, the k-th moving average of the given sequence is defined as follows:

The moving average sequence has n-k+1 elements as shown below.

The moving averages with k=4 of a ten-value sequence (n=10) is shown below

```
  i    1   2   3   4   5   6   7   8   9 10
===== ==  ==  ==  ==  ==  ==  ==  ==  ==  ==
Input  10  20  30  40  50  60  70  80  90 100
y1     25 = (10+20+30+40)/4
y2         35 = (20+30+40+50)/4
y3             45 = (30+40+50+60)/4
y4                 55 = (40+50+60+70)/4
y5                     65 = (50+60+70+80)/4
y6                         75 = (60+70+80+90)/4
y7                             85 = (70+80+90+100)/4
```

Thus, the moving average sequence has n-k+1=10-4+1=7 values.

Problem Statement:

Write a function to find moving average in an array over a window:

Test it over [3, 5, 7, 2, 8, 10, 11, 65, 72, 81, 99, 100, 150] and window of 3.

Task 2:

1.

How-to-count-distance-to-the-previous-zero

For each value, count the difference back to the previous zero (or the start of the Series, whichever is closer)

create a new column 'Y'

Consider a DataFrame df where there is an integer column 'X'

```
import pandas as pd

df = pd.DataFrame({'X': [7, 2, 0, 3, 4, 2, 5, 0, 3, 4]})
```

2.

Create a DatetimeIndex that contains each business day of 2015 and use it to index a Series of random numbers.

3.

Find the sum of the values in s for every Wednesday

4.

Average For each calendar month

5.

For each group of four consecutive calendar months in s, find the date on which the highest value occurred.

NOTE: The solution shared through Github should contain the source code used and the screenshot of the output.

3. Output

N/A