**Problem Statement 1:**

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

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

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

These values should therefore be [1, 2, 0, 1, 2, 3, 4, 0, 1, 2]. Make this a new column 'Y'.

Note: Solution submitted via github must contain all the detailed steps.

**Solution**

import pandas as pd

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

# make a new column Y with zeros at zeros and nans elsewhere

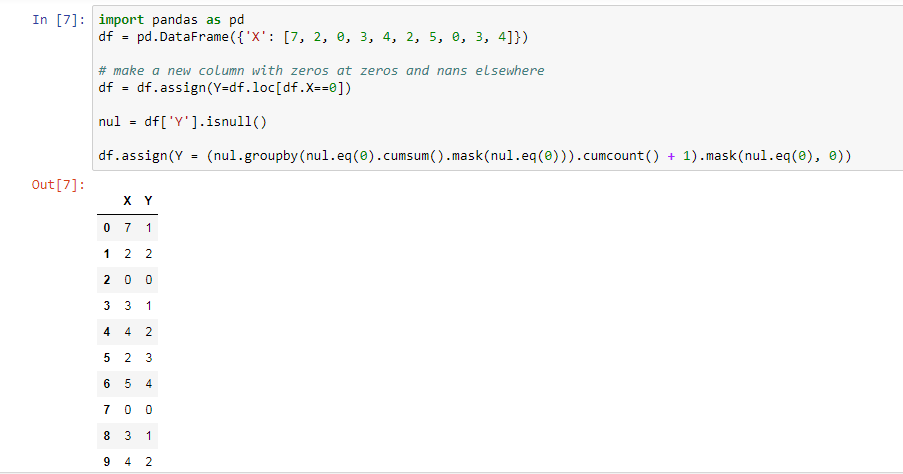
df = df.assign(Y=df.loc[df.X==0])

#Identify all NaNs

nul = df['Y'].isnull()

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

df.assign(Y = (nul.groupby(nul.eq(0).cumsum().mask(nul.eq(0))).cumcount() + 1).mask(nul.eq(0), 0))

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