Zad2 051012024

October 14, 2024

```
import pandas as pd
     import numpy as np
[2]: df = pd.read_csv('IHME_GBD_2019_SMOKING_TOB_1990_2019_NUM_SMOKERS_Y2021M05D27.

GCSV')
     df
[2]:
                                 location_id location_name
                                                              sex_id sex_name
                  measure_name
            Number of Smokers
                                            1
                                                     Global
                                                                   1
                                                                         Male
     0
            Number of Smokers
                                            1
                                                     Global
                                                                   2
     1
                                                                       Female
     2
            Number of Smokers
                                            1
                                                     Global
                                                                   3
                                                                         Both
     3
            Number of Smokers
                                            1
                                                     Global
                                                                   1
                                                                         Male
            Number of Smokers
                                                     Global
                                                                       Female
                                                                   2
     20965
            Number of Smokers
                                         522
                                                      Sudan
                                                                       Female
                                                                   3
     20966
            Number of Smokers
                                         522
                                                      Sudan
                                                                         Both
            Number of Smokers
                                                      Sudan
                                                                   1
                                                                         Male
     20967
                                         522
                                                                   2
     20968
            Number of Smokers
                                         522
                                                      Sudan
                                                                       Female
            Number of Smokers
                                                                   3
     20969
                                         522
                                                      Sudan
                                                                         Both
            age_group_id age_group_name
                                           year_id
                                                               val
                                                                            upper
     0
                       29
                                15+ years
                                               1990
                                                     8.031015e+08
                                                                    8.096221e+08
     1
                       29
                                15+ years
                                               1990
                                                                    1.930929e+08
                                                     1.891488e+08
                                                     9.922503e+08
     2
                       29
                                15+ years
                                                                    1.000161e+09
                                               1990
     3
                       29
                                15+ years
                                                     8.138972e+08
                                                                    8.200339e+08
                                               1991
     4
                                15+ years
                                                     1.905375e+08
                                                                    1.944249e+08
                       29
                                               1991
                                15+ years
     20965
                       29
                                               2018
                                                     2.435999e+05
                                                                    3.286166e+05
                                                                    2.833943e+06
     20966
                       29
                                15+ years
                                               2018
                                                     2.610672e+06
     20967
                       29
                                15+ years
                                               2019
                                                     2.439150e+06
                                                                    2.656579e+06
                                15+ years
     20968
                       29
                                               2019
                                                     2.500800e+05
                                                                    3.345384e+05
                       29
                                15+ years
                                                                    2.918332e+06
     20969
                                               2019
                                                     2.689230e+06
                    lower
     0
            7.959086e+08
            1.855595e+08
     1
     2
            9.847880e+08
     3
            8.069514e+08
```

```
20965
            1.752508e+05
     20966
            2.409108e+06
     20967
            2.236450e+06
     20968
            1.816686e+05
     20969
            2.480656e+06
     [20970 rows x 11 columns]
    df.dropna()
[3]:
                  measure_name
                                 location_id location_name
                                                             sex_id sex_name
     0
            Number of Smokers
                                            1
                                                     Global
                                                                    1
                                                                          Male
     1
            Number of Smokers
                                            1
                                                     Global
                                                                    2
                                                                        Female
     2
            Number of Smokers
                                            1
                                                     Global
                                                                    3
                                                                          Both
     3
            Number of Smokers
                                            1
                                                                    1
                                                                          Male
                                                     Global
     4
            Number of Smokers
                                                     Global
                                                                    2
                                                                        Female
                                            1
     20965
            Number of Smokers
                                          522
                                                                    2
                                                                        Female
                                                       Sudan
     20966
            Number of Smokers
                                          522
                                                       Sudan
                                                                    3
                                                                          Both
     20967
            Number of Smokers
                                                       Sudan
                                                                    1
                                                                          Male
                                          522
                                                                    2
     20968
            Number of Smokers
                                                       Sudan
                                                                        Female
                                          522
     20969
            Number of Smokers
                                          522
                                                       Sudan
                                                                    3
                                                                          Both
             age_group_id age_group_name
                                            year_id
                                                               val
                                                                            upper
                                                     8.031015e+08
     0
                       29
                                15+ years
                                               1990
                                                                     8.096221e+08
     1
                       29
                                15+ years
                                               1990
                                                     1.891488e+08
                                                                     1.930929e+08
     2
                       29
                                15+ years
                                               1990
                                                     9.922503e+08
                                                                     1.000161e+09
     3
                                15+ years
                                                                     8.200339e+08
                       29
                                               1991
                                                     8.138972e+08
     4
                       29
                                15+ years
                                                     1.905375e+08
                                                                     1.944249e+08
                                               1991
     20965
                       29
                                15+ years
                                               2018
                                                     2.435999e+05
                                                                     3.286166e+05
     20966
                       29
                                15+ years
                                               2018
                                                     2.610672e+06
                                                                     2.833943e+06
                       29
     20967
                                15+ years
                                               2019
                                                     2.439150e+06
                                                                     2.656579e+06
     20968
                       29
                                15+ years
                                                     2.500800e+05
                                                                     3.345384e+05
                                               2019
     20969
                       29
                                15+ years
                                               2019
                                                     2.689230e+06
                                                                     2.918332e+06
                    lower
     0
            7.959086e+08
     1
             1.855595e+08
     2
             9.847880e+08
     3
            8.069514e+08
     4
             1.869744e+08
            1.752508e+05
     20965
     20966
            2.409108e+06
```

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1.869744e+08

```
20967 2.236450e+06
     20968 1.816686e+05
     20969 2.480656e+06
     [20970 rows x 11 columns]
[4]: series1 = df['val']
     series1
[4]: 0
             8.031015e+08
             1.891488e+08
             9.922503e+08
    3
             8.138972e+08
             1.905375e+08
    20965 2.435999e+05
     20966 2.610672e+06
    20967 2.439150e+06
     20968
             2.500800e+05
     20969
             2.689230e+06
    Name: val, Length: 20970, dtype: float64
[5]: # obliczanie średniej
    np.mean(series1)
[5]: 12428071.383604305
[6]: #obliczanie mediany
    np.median(series1)
[6]: 577712.25205
[7]: #Odchylenie standardowe
     np.std(series1)
[7]: 64890362.21057887
[8]: #Wariancja
     np.var(series1)
[8]: 4210759107820122.0
[9]: series2 = df['upper']
```

```
series2
 [9]: 0
               8.096221e+08
      1
               1.930929e+08
      2
               1.000161e+09
      3
               8.200339e+08
               1.944249e+08
      20965
               3.286166e+05
      20966
               2.833943e+06
      20967
               2.656579e+06
               3.345384e+05
      20968
      20969
               2.918332e+06
      Name: upper, Length: 20970, dtype: float64
[10]: #Koleracja
      correlation = np.corrcoef(series1,series2) [0,1]
      print(correlation)
     0.9999762487761583
[11]: #Kowariancja
      covariance = np.cov(series1,series2) [0,1]
      covariance
[11]: 4254193895188547.0
 []:
```