NAAN MUDHULVAN PHASE-4

DEVELOPMENT PART 2

Project name: COVID Vaccines Analysis

DATA ANALYTICS OF COVID VACCINES ANALYSIS

Program implementation:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
data = pd.read_csv("C:\Users\student\Documents\country_vaccinations.csv")
data.head()
```

```
country iso_code        date  total_vaccinations  people_vaccinated  \
0  Afghanistan      AFG  2021-02-22                 0.0                0.0
1  Afghanistan      AFG  2021-02-23                 NaN                NaN
2  Afghanistan      AFG  2021-02-24                 NaN                NaN
3  Afghanistan      AFG  2021-02-25                 NaN                NaN
4  Afghanistan      AFG  2021-02-26                 NaN                NaN

   people_fully_vaccinated  daily_vaccinations_raw  daily_vaccinations  \
0                      NaN                     NaN                 NaN
1                      NaN                     NaN              1367.0
2                      NaN                     NaN              1367.0
3                      NaN                     NaN              1367.0
4                      NaN                     NaN              1367.0

   total_vaccinations_per_hundred  people_vaccinated_per_hundred  \
0                             0.0                            0.0
1                             NaN                            NaN
2                             NaN                            NaN
3                             NaN                            NaN
4                             NaN                            NaN

   people_fully_vaccinated_per_hundred  daily_vaccinations_per_million  \
0                                  NaN                             NaN
1                                  NaN                            34.0
2                                  NaN                            34.0
3                                  NaN                            34.0
```

```
4                                    NaN                                34.0

                                              vaccines  \
0  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...
1  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...
2  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...
3  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...
4  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...

                 source_name            source_website
0  World Health Organization  https://covid19.who.int/
1  World Health Organization  https://covid19.who.int/
2  World Health Organization  https://covid19.who.int/
3  World Health Organization  https://covid19.who.int/
4  World Health Organization  https://covid19.who.int/
```

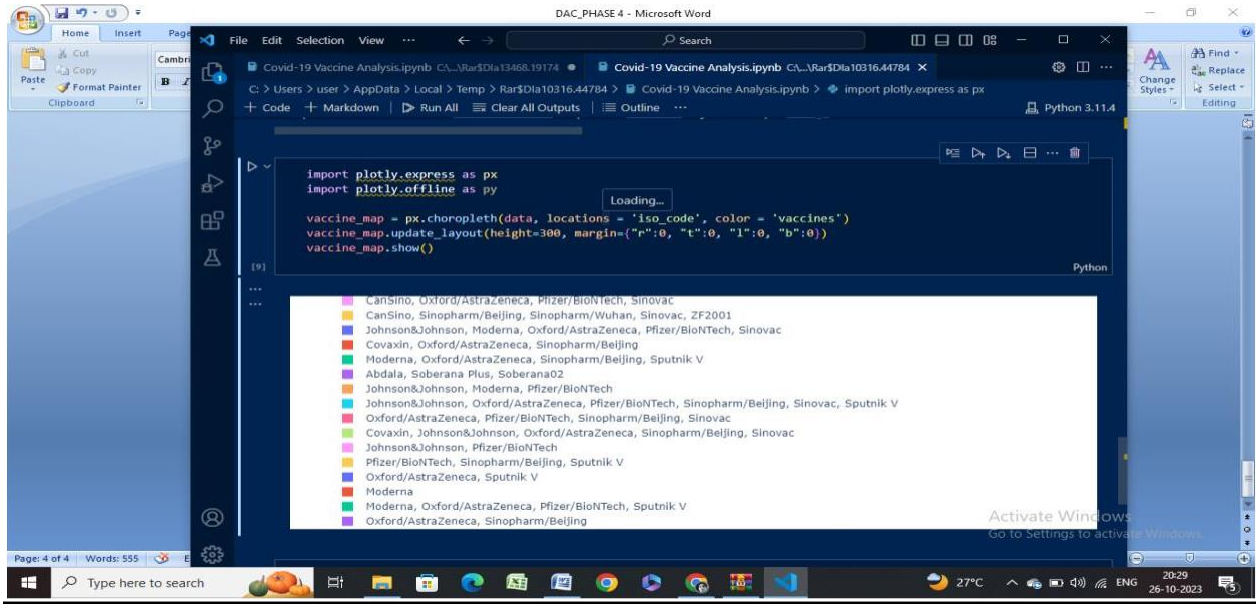
```
data.describe()
```

```
       total_vaccinations  people_vaccinated  people_fully_vaccinated  \
count        4.360700e+04       4.129400e+04              3.880200e+04
mean         4.592964e+07       1.770508e+07              1.413830e+07
std          2.246004e+08       7.078731e+07              5.713920e+07
min          0.000000e+00       0.000000e+00              1.000000e+00
25%          5.264100e+05       3.494642e+05              2.439622e+05
50%          3.590096e+06       2.187310e+06              1.722140e+06
75%          1.701230e+07       9.152520e+06              7.559870e+06
max          3.263129e+09       1.275541e+09              1.240777e+09


       daily_vaccinations_raw  daily_vaccinations  \
count            3.536200e+04        8.621300e+04
mean             2.705996e+05        1.313055e+05
std              1.212427e+06        7.682388e+05
min              0.000000e+00        0.000000e+00
25%              4.668000e+03        9.000000e+02
50%              2.530900e+04        7.343000e+03
75%              1.234925e+05        4.409800e+04
max              2.474100e+07        2.242429e+07


       total_vaccinations_per_hundred  people_vaccinated_per_hundred  \
count                    43607.000000                   41294.000000
mean                        80.188543                      40.927317
std                         67.913577                      29.290759
min                          0.000000                       0.000000
25%                         16.050000                      11.370000
```

```
50%                          67.520000                    41.435000
75%                         132.735000                    67.910000
max                         345.370000                   124.760000

       people_fully_vaccinated_per_hundred  daily_vaccinations_per_million
count                          38802.000000                    86213.000000
mean                              35.523243                     3257.049157
std                               28.376252                     3934.312440
min                                0.000000                        0.000000
25%                                7.020000                      636.000000
50%                               31.750000                     2050.000000
75%                               62.080000                     4682.000000
max                              122.370000                   117497.000000
```

```
pd.to_datetime(data.date)
data.country.value_counts()
```

```
country
Norway                                482
Latvia                                480
Denmark                               476
United States                         471
Russia                                470
                                     ...
Bonaire Sint Eustatius and Saba       146
Tokelau                               114
Saint Helena                           92
Pitcairn                               85
Falkland Islands                       67
Name: count, Length: 223, dtype: int 64
```



Statistical Analysis:

1. Hypothesis Testing: -

Perform hypothesis tests to determine if there are statistically significant differences in vaccination rates between different groups or regions. For example, you can use t-tests or ANOVA to compare vaccination rates by age groups or between different states.

2. Regression Analysis:-

Perform regression analysis to model the factors that influence vaccination rates. Multiple linear regression or logistic regression can help you understand which variables have the most significant impact on vaccination rates.

```
data.vaccines.value_counts()

vaccines
Johnson&Johnson, Moderna, Oxford/AstraZeneca, Pfizer/BioNTech                 7608
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech                                  6263
Oxford/AstraZeneca                                                            6022

Oxford/AstraZeneca, Pfizer/BioNTech                                           4629
Johnson&Johnson, Moderna, Novavax, Oxford/AstraZeneca, Pfizer/BioNTech        3564
                                                                               ...
Johnson&Johnson, Oxford/AstraZeneca, Sinovac                                   312
Moderna, Oxford/AstraZeneca, Pfizer/BioNTech, Sinovac, Sputnik V               311
Johnson&Johnson, Moderna                                                       251
Johnson&Johnson, Pfizer/BioNTech, Sinopharm/Beijing                            228
EpiVacCorona, Oxford/AstraZeneca, QazVac, Sinopharm/Beijing, Sputnik V, ZF2001 190
Name: count, Length: 84, dtype: int64

df = data[["vaccines", "country"]]

df.head()
                                    vaccines      country
0  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...  Afghanistan
1  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...  Afghanistan
2  Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi...  Afghanistan
```

3 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi... Afghanistan

4 Johnson&Johnson, Oxford/AstraZeneca, Pfizer/Bi... Afghanistan

Exploratory Data Analysis:

Data Virtualization:

It an approach to data management that allows an application to retrieve and manipulate data without requiring technical details about the data, such as how it is formatted at source, or where it is physically located, and can provide a single customer view of the overall data.