Name: Gaurang Vaghela
Rollno: TEAD-22561
SL-3 Lab
Miniproject
Problem Statement: Use the following covid_vaccine_statewise.csv dataset and perform following analytics on the given dataset
https://www.kaggle.com/sudalairajkumar/covid19-in-india?select=covid_vaccine_statewise.csv

1. Describe the dataset

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

```
data = pd.read_csv("C:/Users/Gaurang Vaghela/OneDrive/Desktop/Dataset/archive1/covid_vaccine_statewise.csv")
data
```

	Updated On	State	Total Doses Administered	Sessions	Sites	First Dose Administered	Second Dose Administered	Male (Doses Administered)	Female (Doses Administered)	Transgender (Doses Administered)	...	18-44 Years (Doses Administered)	45-60 Yea (Dos Administere
0	16-01-2021	India	48276.0	3455.0	2957.0	48276.0	0.0	NaN	NaN	NaN	...	NaN	N
1	17-01-2021	India	58604.0	8532.0	4954.0	58604.0	0.0	NaN	NaN	NaN	...	NaN	N
2	18-01-2021	India	99449.0	13611.0	6583.0	99449.0	0.0	NaN	NaN	NaN	...	NaN	N
3	19-01-2021	India	195525.0	17855.0	7951.0	195525.0	0.0	NaN	NaN	NaN	...	NaN	N
4	20-01-2021	India	251280.0	25472.0	10504.0	251280.0	0.0	NaN	NaN	NaN	...	NaN	N
...	...	...	...	...	...	...	...	...	...	...	...	...	
7840	11-08-2021	West Bengal	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	N
7841	12-08-2021	West Bengal	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	...	NaN	N

```
data.describe()
```

	Total Doses Administered	Sessions	Sites	First Dose Administered	Second Dose Administered	Male (Doses Administered)	Female (Doses Administered)	Transgender (Doses Administered)	Covaxin (Doses Administered)	CoviShield (Doses Administered)	...	Ad
count	7.621000e+03	7.621000e+03	7621.000000	7.621000e+03	7.621000e+03	7.461000e+03	7.461000e+03	7461.000000	7.621000e+03	7.621000e+03	...	1.7
mean	9.188171e+06	4.792358e+05	2282.872064	7.414415e+06	1.773755e+06	3.620156e+06	3.168416e+06	1162.978019	1.044669e+06	8.126553e+06	...	8.7
std	3.746180e+07	1.911511e+06	7275.973730	2.995209e+07	7.570382e+06	1.737938e+07	1.515310e+07	5931.353995	4.452259e+06	3.298414e+07	...	2.6
min	7.000000e+00	0.000000e+00	0.000000	7.000000e+00	0.000000e+00	0.000000e+00	2.000000e+00	0.000000	0.000000e+00	7.000000e+00	...	2.6
25%	1.356570e+05	6.004000e+03	69.000000	1.166320e+05	1.283100e+04	5.655500e+04	5.210700e+04	8.000000	0.000000e+00	1.331340e+05	...	4.3
50%	8.182020e+05	4.547000e+04	597.000000	6.614590e+05	1.388180e+05	3.897850e+05	3.342380e+05	113.000000	1.185100e+04	7.567360e+05	...	3.0
75%	6.625243e+06	3.428690e+05	1708.000000	5.387805e+06	1.166434e+06	2.735777e+06	2.561513e+06	800.000000	7.579300e+05	6.007817e+06	...	7.3
max	5.132284e+08	3.501031e+07	73933.000000	4.001504e+08	1.130780e+08	2.701636e+08	2.395186e+08	98275.000000	6.236742e+07	4.468251e+08	...	2.2

8 rows × 22 columns

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7845 entries, 0 to 7844
Data columns (total 24 columns):
 #   Column                                Non-Null Count  Dtype  
---  ------                                --------------  -----  
 0   Updated On                            7845 non-null   object 
 1   State                                 7845 non-null   object 
 2   Total Doses Administered              7621 non-null   float64
 3   Sessions                              7621 non-null   float64
 4    Sites                                7621 non-null   float64
 5   First Dose Administered               7621 non-null   float64
 6   Second Dose Administered              7621 non-null   float64
 7   Male (Doses Administered)             7461 non-null   float64
 8   Female (Doses Administered)           7461 non-null   float64
 9   Transgender (Doses Administered)      7461 non-null   float64
 10   Covaxin (Doses Administered)         7621 non-null   float64
 11  CoviShield (Doses Administered)       7621 non-null   float64
 12  Sputnik V (Doses Administered)        2995 non-null   float64
 13  AEFI                                  5438 non-null   float64
 14  18-44 Years (Doses Administered)      1702 non-null   float64
 15  45-60 Years (Doses Administered)      1702 non-null   float64
 16  60+ Years (Doses Administered)        1702 non-null   float64
 17  18-44 Years(Individuals Vaccinated)   3733 non-null   float64
 18  45-60 Years(Individuals Vaccinated)   3734 non-null   float64
 19  60+ Years(Individuals Vaccinated)     3734 non-null   float64
 20  Male(Individuals Vaccinated)          160 non-null    float64
 21  Female(Individuals Vaccinated)        160 non-null    float64
 22  Transgender(Individuals Vaccinated)   160 non-null    float64
 23  Total Individuals Vaccinated          5919 non-null   float64
dtypes: float64(22), object(2)
memory usage: 1.4+ MB
```

```
data.isnull().sum()
```

```
Updated On                               0
State                                    0
Total Doses Administered               224
Sessions                               224
 Sites                                 224
First Dose Administered                224
Second Dose Administered               224
Male (Doses Administered)              384
Female (Doses Administered)            384
Transgender (Doses Administered)       384
 Covaxin (Doses Administered)          224
CoviShield (Doses Administered)        224
Sputnik V (Doses Administered)        4850
AEFI                                  2407
18-44 Years (Doses Administered)      6143
45-60 Years (Doses Administered)      6143
60+ Years (Doses Administered)        6143
18-44 Years(Individuals Vaccinated)   4112
45-60 Years(Individuals Vaccinated)   4111
60+ Years(Individuals Vaccinated)     4111
Male(Individuals Vaccinated)          7685
Female(Individuals Vaccinated)        7685
Transgender(Individuals Vaccinated)   7685
Total Individuals Vaccinated          1926
dtype: int64
```

```
data = data.drop(data[data["State"] == "India"].index)
data = data.drop(columns=['18-44 Years (Doses Administered)','45-60 Years (Doses Administered)','60+ Years (Doses Administered)',
                          '18-44 Years(Individuals Vaccinated)','45-60 Years(Individuals Vaccinated)','60+ Years(Individuals Vaccinated)',
                         'Male(Individuals Vaccinated)','Female(Individuals Vaccinated)','Transgender(Individuals Vaccinated)'])
data
```

	Updated On	State	Total Doses Administered	Sessions	Sites	First Dose Administered	Second Dose Administered	Male (Doses Administered)	Female (Doses Administered)	Transgender (Doses Administered)	Covaxin (Doses Administered)	CoviShield (Doses Administered)
212	16-01-2021	Andaman and Nicobar Islands	23.0	2.0	2.0	23.0	0.0	12.0	11.0	0.0	0.0	23.0
213	17-01-2021	Andaman and Nicobar Islands	23.0	2.0	2.0	23.0	0.0	12.0	11.0	0.0	0.0	23.0
214	18-01-2021	Andaman and Nicobar Islands	42.0	9.0	2.0	42.0	0.0	29.0	13.0	0.0	0.0	42.0
215	19-01-2021	Andaman and Nicobar Islands	89.0	12.0	2.0	89.0	0.0	53.0	36.0	0.0	0.0	89.0
216	20-01-2021	Andaman and Nicobar Islands	124.0	16.0	3.0	124.0	0.0	67.0	57.0	0.0	0.0	124.0

```
data.isnull().sum()
```

```
Updated On                          0
State                               0
Total Doses Administered          218
Sessions                          218
 Sites                            218
First Dose Administered           218
Second Dose Administered          218
Male (Doses Administered)         218
Female (Doses Administered)       218
Transgender (Doses Administered)  218
 Covaxin (Doses Administered)     218
CoviShield (Doses Administered)   218
Sputnik V (Doses Administered)   4719
AEFI                             2342
Total Individuals Vaccinated     1874
dtype: int64
```

```
data.fillna(0,inplace=True)
data.isnull().sum()
```

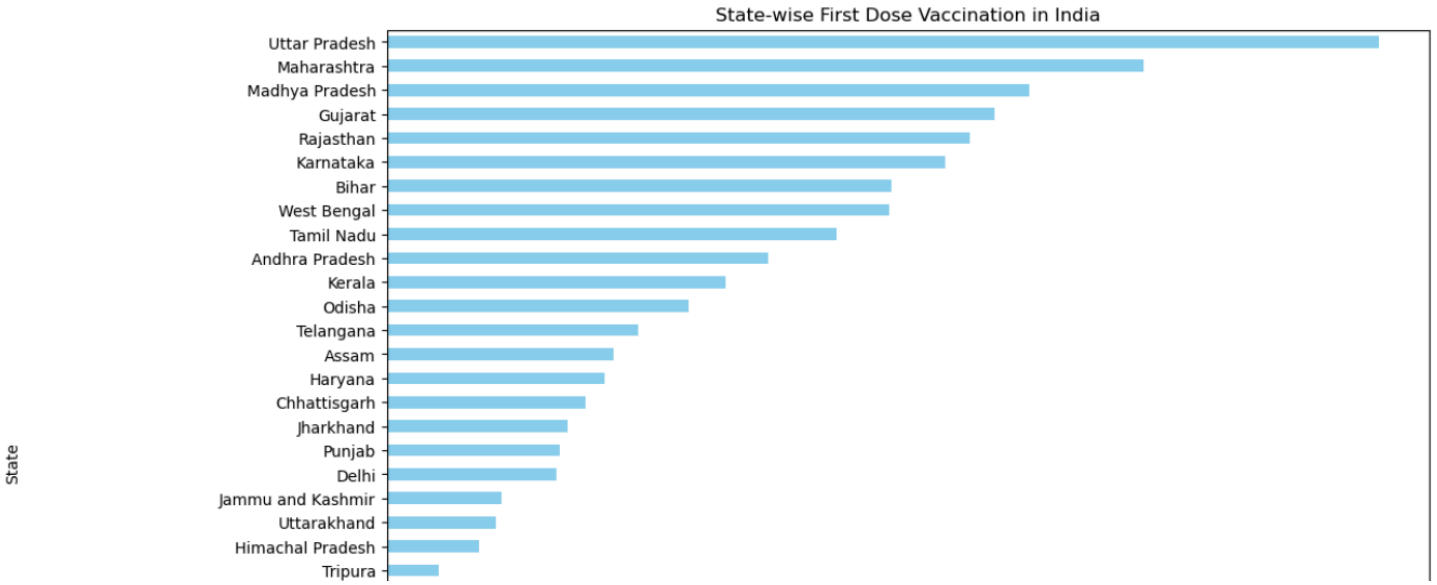
```
Updated On                       0
State                            0
Total Doses Administered         0
Sessions                         0
 Sites                           0
First Dose Administered          0
Second Dose Administered         0
Male (Doses Administered)        0
Female (Doses Administered)      0
Transgender (Doses Administered) 0
 Covaxin (Doses Administered)    0
CoviShield (Doses Administered)  0
Sputnik V (Doses Administered)   0
AEFI                             0
Total Individuals Vaccinated     0
dtype: int64
```

Number of Persons State-Wise Vaccinated for First Dose

```
first_dose = data.groupby("State")["First Dose Administered"].max().sort_values(ascending=False)
first_dose
```

```
State
Uttar Pradesh                   45932488.0
Maharashtra                     35040812.0
Madhya Pradesh                  29723036.0
Gujarat                         28101222.0
Rajasthan                       27008606.0
Karnataka                       25847691.0
Bihar                           23350171.0
West Bengal                     23257417.0
Tamil Nadu                      20836674.0
Andhra Pradesh                  17628583.0
Kerala                          15670747.0
Odisha                          13954592.0
Telangana                       11649268.0
Assam                           10495293.0
Haryana                         10086831.0
Chhattisgarh                     9181482.0
Jharkhand                        8382280.0
Punjab                           8005636.0
Delhi                            7835546.0
Jammu and Kashmir                5318516.0
Uttarakhand                      5070544.0
Himachal Pradesh                 4249849.0
Tripura                          2411195.0
Manipur                          1159424.0
Goa                              1094392.0
Meghalaya                         938572.0
Chandigarh                        700285.0
```

```
first_dose.plot(kind='barh', figsize=(12, 10), color='skyblue')
plt.title("State-wise First Dose Vaccination in India")
plt.xlabel("Number of People")
plt.ylabel("State")
plt.gca().invert_yaxis()
plt.show()
```

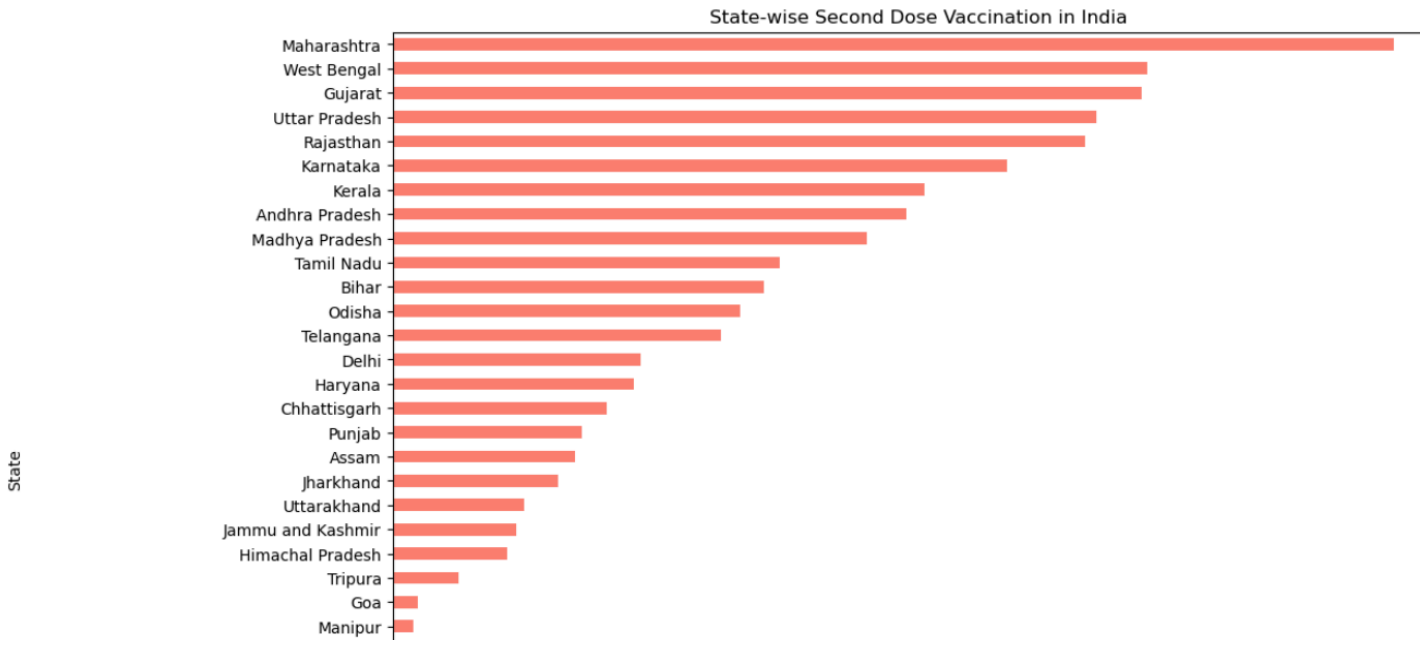


Number of Persons State-Wise Vaccinated for Second Dose

```
second_dose = data.groupby("State")["Second Dose Administered"].max().sort_values(ascending=False)
second_dose
```

```
State
Maharashtra                    12112554.0
West Bengal                     9132961.0
Gujarat                         9051153.0
Uttar Pradesh                   8515236.0
Rajasthan                       8375056.0
Karnataka                       7432852.0
Kerala                          6426984.0
Andhra Pradesh                  6214312.0
Madhya Pradesh                  5733640.0
Tamil Nadu                      4686034.0
Bihar                           4484768.0
Odisha                          4200094.0
Telangana                       3965624.0
Delhi                           3000536.0
Haryana                         2923550.0
Chhattisgarh                    2587695.0
Punjab                          2285629.0
Assam                           2208577.0
Jharkhand                       1996014.0
Uttarakhand                     1596572.0
Jammu and Kashmir               1489826.0
Himachal Pradesh                1382592.0
Tripura                          804099.0
Goa                              302519.0
Manipur                          246694.0
Meghalaya                        231982.0
Chandigarh                       223534.0
```

```
second_dose.plot(kind='barh', figsize=(12, 10), color='salmon')
plt.title("State-wise Second Dose Vaccination in India")
plt.xlabel("Number of People")
plt.ylabel("State")
plt.gca().invert_yaxis()
plt.show()
```

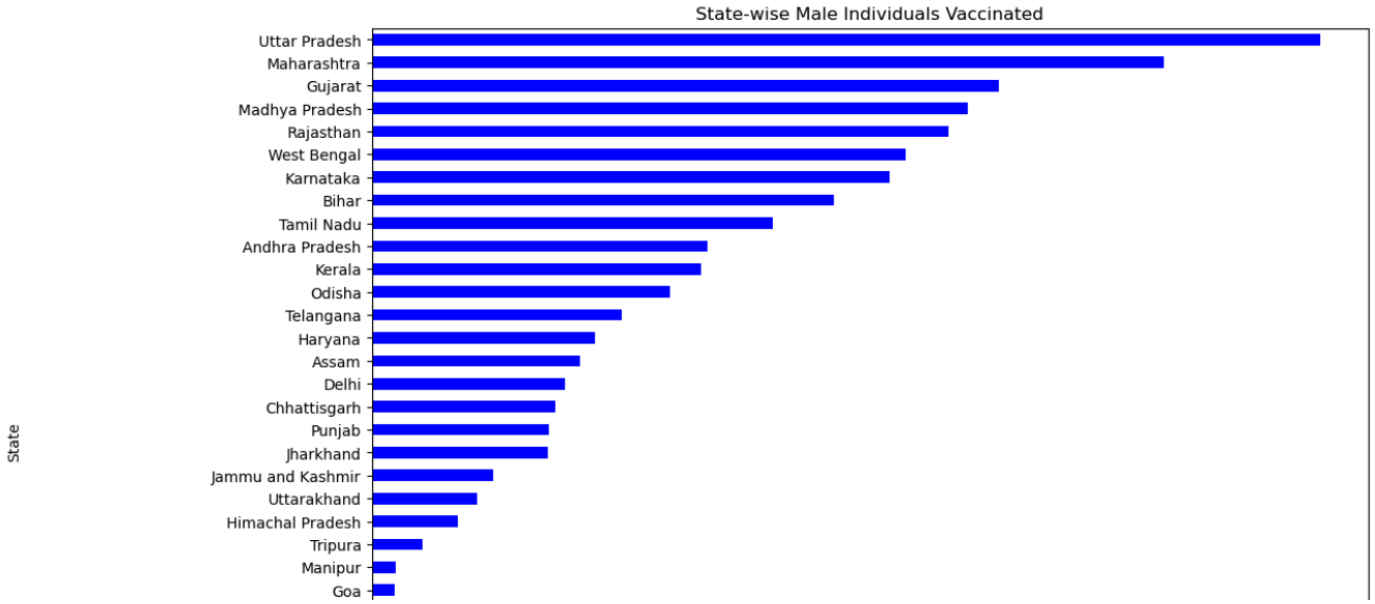


Number of Males Vaccinated (Individuals)

```
male_vaccinated = data.groupby("State")["Male (Doses Administered)"].max().sort_values(ascending=False)
male_vaccinated
```

```
State
Uttar Pradesh                30643444.0
Maharashtra                  25563569.0
Gujarat                      20266401.0
Madhya Pradesh               19265405.0
Rajasthan                    18618674.0
West Bengal                  17234284.0
Karnataka                    16724770.0
Bihar                        14926420.0
Tamil Nadu                   12952604.0
Andhra Pradesh               10852932.0
Kerala                       10623457.0
Odisha                        9617376.0
Telangana                     8068394.0
Haryana                       7206601.0
Assam                         6739027.0
Delhi                         6228216.0
Chhattisgarh                  5916437.0
Punjab                        5734736.0
Jharkhand                     5699723.0
Jammu and Kashmir             3919555.0
Uttarakhand                   3405375.0
Himachal Pradesh              2772475.0
Tripura                       1646249.0
Manipur                        759282.0
Goa                            748770.0
Meghalaya                      618575.0
Chandigarh                     524263.0
Arunachal Pradesh              486874.0
```

```
male_vaccinated.plot(kind='barh', figsize=(12, 10), color='blue')
plt.title("State-wise Male Individuals Vaccinated")
plt.xlabel("Number of Males")
plt.ylabel("State")
plt.gca().invert_yaxis()
plt.show()
```



Number of Females Vaccinated (Individuals)

```
male_vaccinated = data.groupby("State")["Female (Doses Administered)"].max().sort_values(ascending=False)
male_vaccinated
```

```
State
Uttar Pradesh                    23785865.0
Maharashtra                      21582082.0
Gujarat                          16880326.0
Rajasthan                        16758710.0
Karnataka                        16550206.0
Madhya Pradesh                   16184296.0
West Bengal                      15151152.0
Andhra Pradesh                   12986129.0
Bihar                            12902990.0
Tamil Nadu                       12565628.0
Kerala                           11470142.0
Odisha                            8533720.0
Telangana                         7543612.0
Assam                             5962985.0
Chhattisgarh                      5851349.0
Haryana                           5801370.0
Jharkhand                         4676520.0
Delhi                             4605508.0
Punjab                            4555264.0
Uttarakhand                       3259384.0
Jammu and Kashmir                 2887608.0
Himachal Pradesh                  2858812.0
Tripura                           1568576.0
Goa                                648014.0
Manipur                            646498.0
Meghalaya                          551829.0
Mizoram                            428257.0
Chandigarh                         399424.0
```

```
male_vaccinated.plot(kind='barh', figsize=(12, 10), color='red')
plt.title("State-wise Female Individuals Vaccinated")
plt.xlabel("Number of Females")
plt.ylabel("State")
plt.gca().invert_yaxis()
plt.show()
```