OASIS INFOBYTE DATASCIENCE INTERNSHIP

TASK 2

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UNEMPLOYMENT ANALYSIS USING PYTHON

In [16]:
```
import numpy as np
import pandas as pd
import matplotlib as mlp
import matplotlib.pyplot as plt
import plotly.graph_objects as go
import seaborn as sns
import plotly.express as px
%matplotlib inline
import warnings
warnings.filterwarnings('ignore')
```

In [2]:
```
df=pd.read_csv('Unemployment in India.csv')
```

In [3]:
```
df.head()
```

Out[3]:

	Region	Date	Frequency	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	Area
0	Andhra Pradesh	31-05-2019	Monthly	3.65	11999139.0	43.24	Rural
1	Andhra Pradesh	30-06-2019	Monthly	3.05	11755881.0	42.05	Rural
2	Andhra Pradesh	31-07-2019	Monthly	3.75	12086707.0	43.50	Rural
3	Andhra Pradesh	31-08-2019	Monthly	3.32	12285693.0	43.97	Rural
4	Andhra Pradesh	30-09-2019	Monthly	5.17	12256762.0	44.68	Rural

In [4]:
```
df.info
```

Out[4]:
```
<bound method DataFrame.info of             Region         Date  Frequency   Estimated Unemployment Rate (%)  \
0    Andhra Pradesh   31-05-2019    Monthly                              3.65
1    Andhra Pradesh   30-06-2019    Monthly                              3.05
2    Andhra Pradesh   31-07-2019    Monthly                              3.75
3    Andhra Pradesh   31-08-2019    Monthly                              3.32
4    Andhra Pradesh   30-09-2019    Monthly                              5.17
..              ...          ...        ...                               ...
763             NaN          NaN        NaN                               NaN
764             NaN          NaN        NaN                               NaN
765             NaN          NaN        NaN                               NaN
766             NaN          NaN        NaN                               NaN
767             NaN          NaN        NaN                               NaN

      Estimated Employed   Estimated Labour Participation Rate (%)   Area
0             11999139.0                                    43.24  Rural
1             11755881.0                                    42.05  Rural
2             12086707.0                                    43.50  Rural
3             12285693.0                                    43.97  Rural
4             12256762.0                                    44.68  Rural
..                   ...                                      ...    ...
763                  NaN                                      NaN    NaN
764                  NaN                                      NaN    NaN
765                  NaN                                      NaN    NaN
766                  NaN                                      NaN    NaN
767                  NaN                                      NaN    NaN

[768 rows x 7 columns]>
```

In [5]:
```
df.shape
```

Out[5]:
```
(768, 7)
```

In [6]:
```
# checking for Null
df.isna().sum()
```

Out[6]:
```
Region                                     28
 Date                                      28
 Frequency                                 28
 Estimated Unemployment Rate (%)           28
 Estimated Employed                        28
 Estimated Labour Participation Rate (%)   28
Area                                       28
dtype: int64
```

In [7]:
```
#dropping the null values
df=df.dropna()
```

In [8]:
```
df.isna().sum()
```

Out[8]:
```
Region                                     0
 Date                                      0
 Frequency                                 0
 Estimated Unemployment Rate (%)           0
 Estimated Employed                        0
 Estimated Labour Participation Rate (%)   0
Area                                       0
dtype: int64
```

In [9]:
```
df.shape
```

Out[9]:
```
(740, 7)
```

In [10]:
```
df.duplicated().sum()
```

Out[10]:
```
0
```

In [11]:
```
df.describe()
```

Out[11]:

	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)
count	740.000000	7.400000e+02	740.000000
mean	11.787946	7.204460e+06	42.630122
std	10.721298	8.087988e+06	8.111094
min	0.000000	4.942000e+04	13.330000
25%	4.657500	1.190404e+06	38.062500
50%	8.350000	4.744178e+06	41.160000
75%	15.887500	1.127549e+07	45.505000
max	76.740000	4.577751e+07	72.570000

In [12]:
```
df.tail()
```

Out[12]:

	Region	Date	Frequency	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	Area
749	West Bengal	29-02-2020	Monthly	7.55	10871168.0	44.09	Urban
750	West Bengal	31-03-2020	Monthly	6.67	10806105.0	43.34	Urban
751	West Bengal	30-04-2020	Monthly	15.63	9299466.0	41.20	Urban
752	West Bengal	31-05-2020	Monthly	15.22	9240903.0	40.67	Urban
753	West Bengal	30-06-2020	Monthly	9.86	9088931.0	37.57	Urban

In [13]:
```
#to print the columns

df.columns=['State','Date','Frequency','Estimated Unemployment Rate','Estimated Employed','Estimated Labour Participation Rate',
```

In [14]:
```
# to print the state with highest unemployment
print("State with highest Unemployment:-",df['State'].value_counts().idxmax())
```

```
State with highest Unemployment:- Andhra Pradesh
```

In [15]:
```
# to print the state with lowest unemployment
print("State with Lowest Unemployment:-",df['State'].value_counts().idxmin())
```

```
State with Lowest Unemployment:- Chandigarh
```

In [17]:
```
#to print the month of unemployment

import datetime as dt
import calendar

df['Date'] = pd.to_datetime(df['Date'], dayfirst=True)
df['month_int'] =  df['Date'].dt.month
df['month'] =  df['month_int'].apply(lambda x: calendar.month_abbr[x])
```

In [18]:
```
#to print the month with highest unemployment

print("Month with highest Unemployment:-",df['month'].value_counts().idxmax())
```

```
Month with highest Unemployment:- May
```

In [19]:
```
#to print the month with lowest unemployment

print("Month with lowest Unemployment:-",df['month'].value_counts().idxmin())
```

```
Month with lowest Unemployment:- Apr
```

In [20]:
```
df.head()
```

Out[20]:

	State	Date	Frequency	Estimated Unemployment Rate	Estimated Employed	Estimated Labour Participation Rate	Area	month_int	month
0	Andhra Pradesh	2019-05-31	Monthly	3.65	11999139.0	43.24	Rural	5	May
1	Andhra Pradesh	2019-06-30	Monthly	3.05	11755881.0	42.05	Rural	6	Jun
2	Andhra Pradesh	2019-07-31	Monthly	3.75	12086707.0	43.50	Rural	7	Jul
3	Andhra Pradesh	2019-08-31	Monthly	3.32	12285693.0	43.97	Rural	8	Aug
4	Andhra Pradesh	2019-09-30	Monthly	5.17	12256762.0	44.68	Rural	9	Sep

In [21]:
```
#drop the unwanted columns

df.drop(columns=['Frequency','month_int'])
```

Out[21]:

	State	Date	Estimated Unemployment Rate	Estimated Employed	Estimated Labour Participation Rate	Area	month
0	Andhra Pradesh	2019-05-31	3.65	11999139.0	43.24	Rural	May
1	Andhra Pradesh	2019-06-30	3.05	11755881.0	42.05	Rural	Jun
2	Andhra Pradesh	2019-07-31	3.75	12086707.0	43.50	Rural	Jul
3	Andhra Pradesh	2019-08-31	3.32	12285693.0	43.97	Rural	Aug
4	Andhra Pradesh	2019-09-30	5.17	12256762.0	44.68	Rural	Sep
...	...	...	...	...	...	...	...
749	West Bengal	2020-02-29	7.55	10871168.0	44.09	Urban	Feb
750	West Bengal	2020-03-31	6.67	10806105.0	43.34	Urban	Mar
751	West Bengal	2020-04-30	15.63	9299466.0	41.20	Urban	Apr
752	West Bengal	2020-05-31	15.22	9240903.0	40.67	Urban	May
753	West Bengal	2020-06-30	9.86	9088931.0	37.57	Urban	Jun

740 rows × 7 columns

In [22]:
```
#top 10 states with highest unemployment

df1=df[['State','Estimated Unemployment Rate']].groupby('State').sum().sort_values(by='Estimated Unemployment Rate',ascending=Fa
```

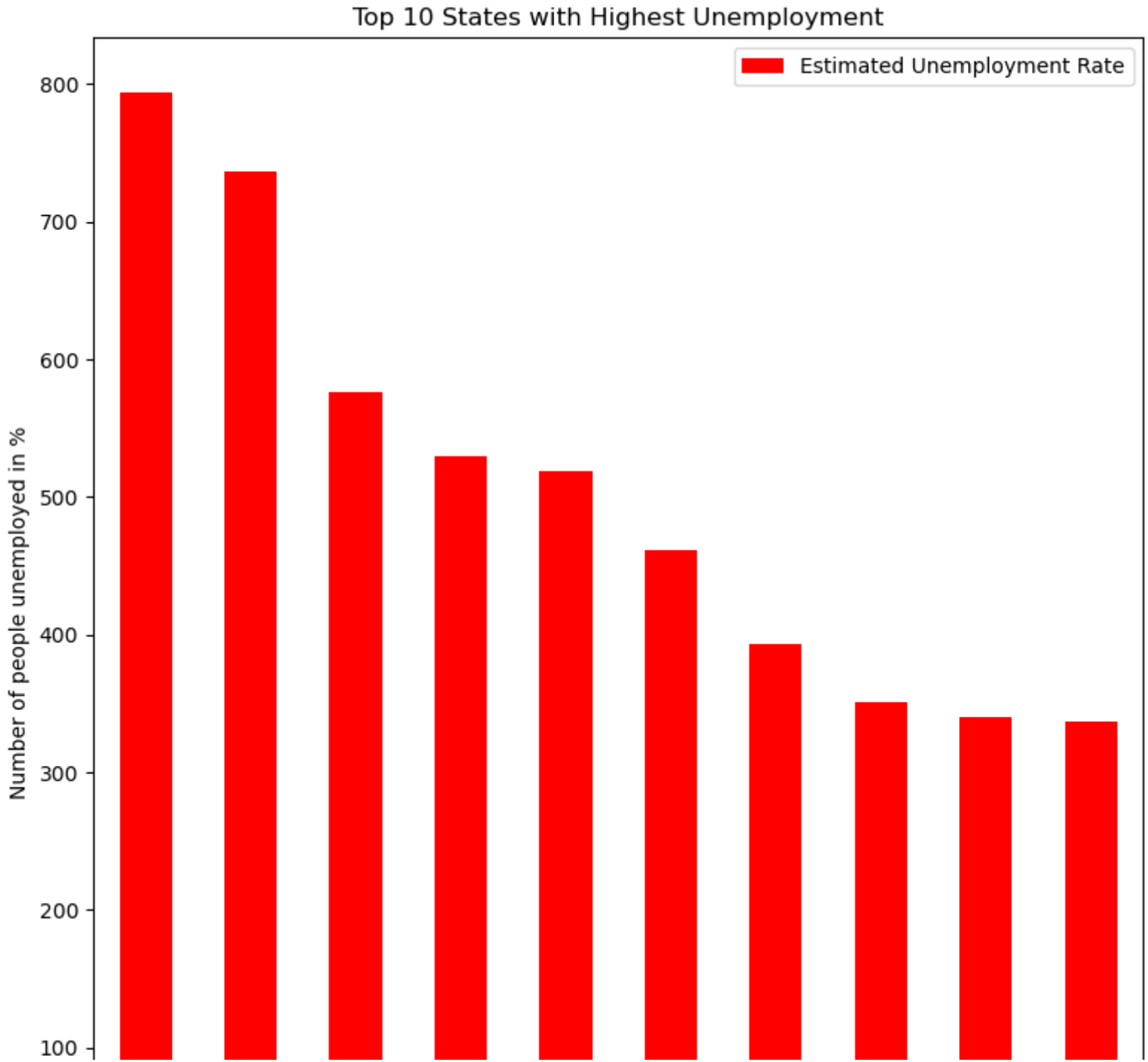
In [24]:
```
df1.head(10)
```

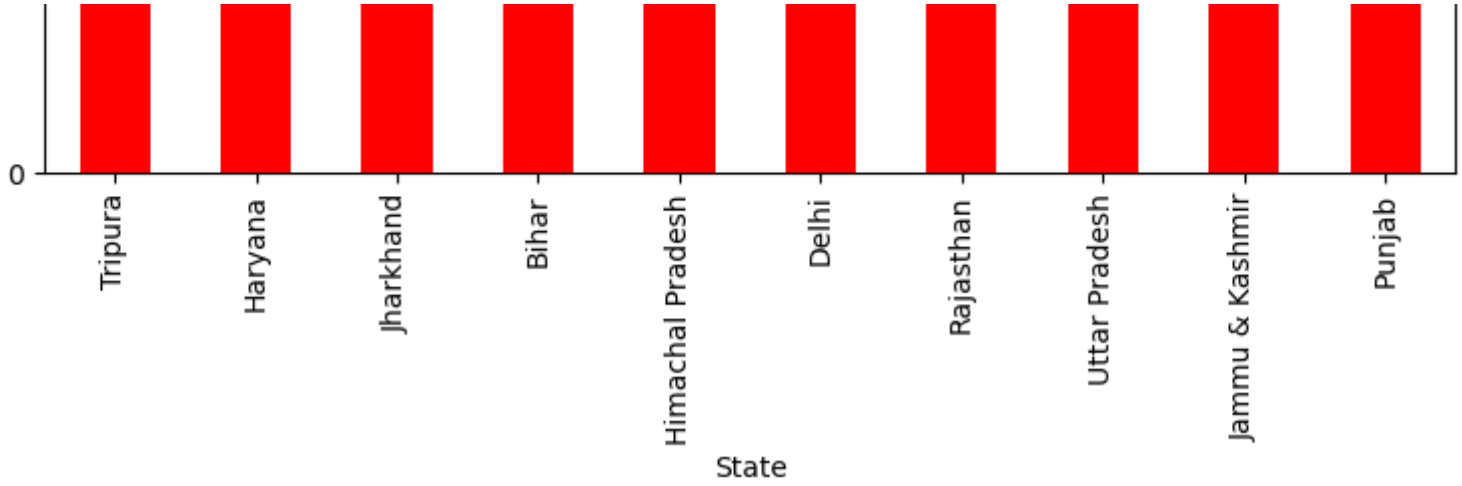
Out[24]:

State	Estimated Unemployment Rate
Tripura	793.81
Haryana	735.93
Jharkhand	576.38
Bihar	529.71
Himachal Pradesh	519.13
Delhi	461.87
Rajasthan	393.63
Uttar Pradesh	351.44
Jammu & Kashmir	339.96
Punjab	336.87

In [23]:
```
#visualization

fig=plt.figure()
ax0=fig.add_subplot(1,2,1)
df1[:10].plot(kind="bar",color="red",figsize=(20,10),ax=ax0)
ax0.set_title("Top 10 States with Highest Unemployment")
ax0.set_xlabel("State")
ax0.set_ylabel("Number of people unemployed in %")
```

Out[23]:
```
Text(0, 0.5, 'Number of people unemployed in %')
```


Top 10 States with Highest Unemployment
Estimated Unemployment Rate
Number of people unemployed in %
800
700
600
500
400
300
200
100

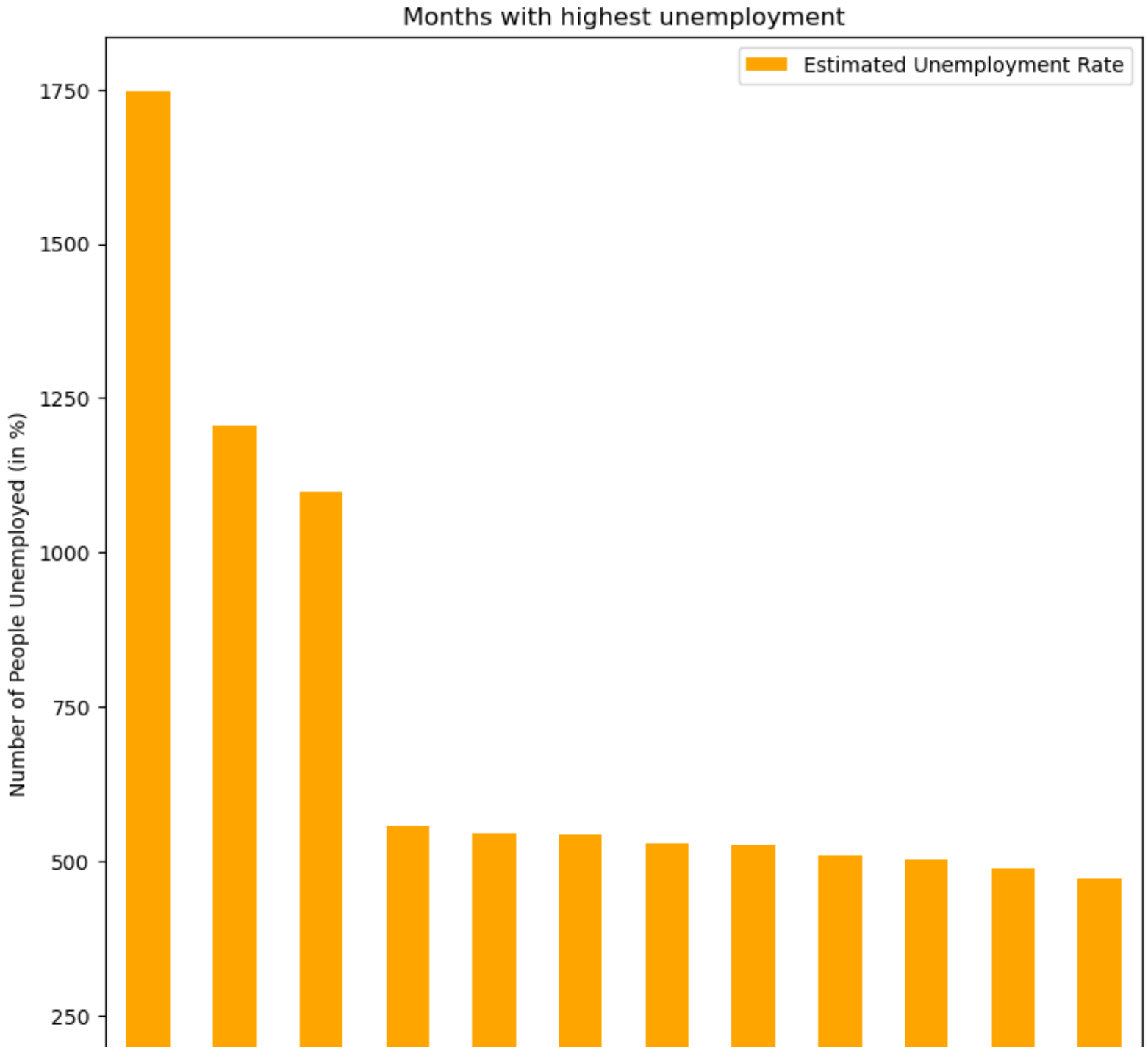


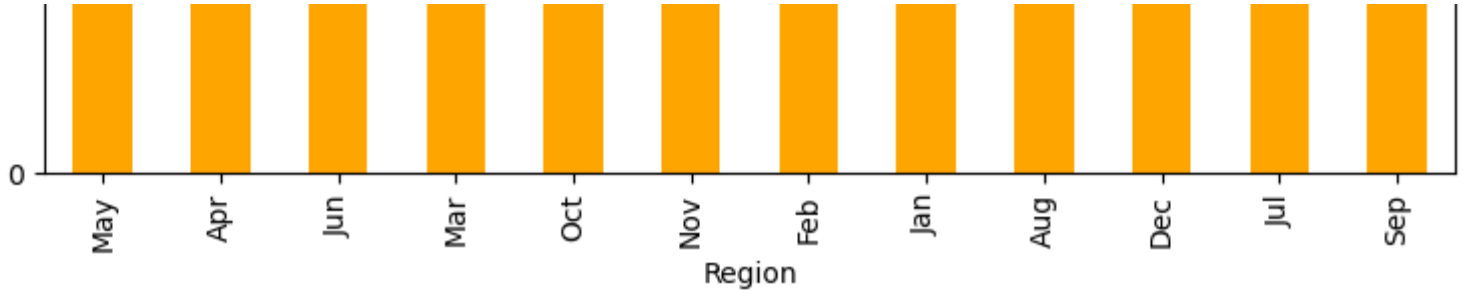
In [25]:
```
# months with highest unemployment

df2 = df[["month","Estimated Unemployment Rate"]].groupby("month").sum().sort_values(by="Estimated Unemployment Rate", ascending
df2.head(10)
```

Out[25]:

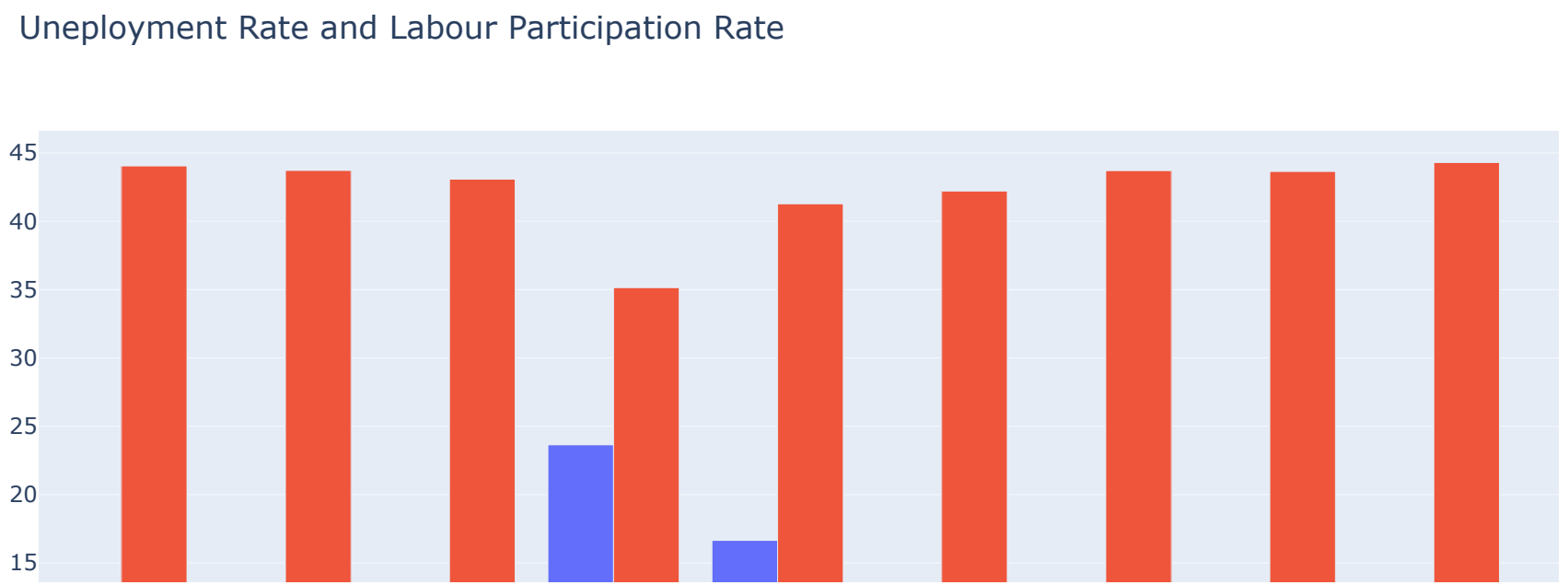
month	Estimated Unemployment Rate
May	1747.85
Apr	1205.72
Jun	1097.56
Mar	556.43
Oct	544.55
Nov	542.76
Feb	528.13
Jan	527.39
Aug	510.81
Dec	503.36

In [27]:
```
#visulaization
fig=plt.figure()
ax0=fig.add_subplot(1,2,1)
df2[:12].plot(kind="bar",color="orange",figsize=(20,10),ax=ax0)
ax0.set_title("Months with highest unemployment")
ax0.set_xlabel("Region")
ax0.set_ylabel("Number of People Unemployed (in %)");
```


Months with highest unemployment
Estimated Unemployment Rate
Number of People Unemployed (in %)
1750
1500
1250
1000
750
500
250



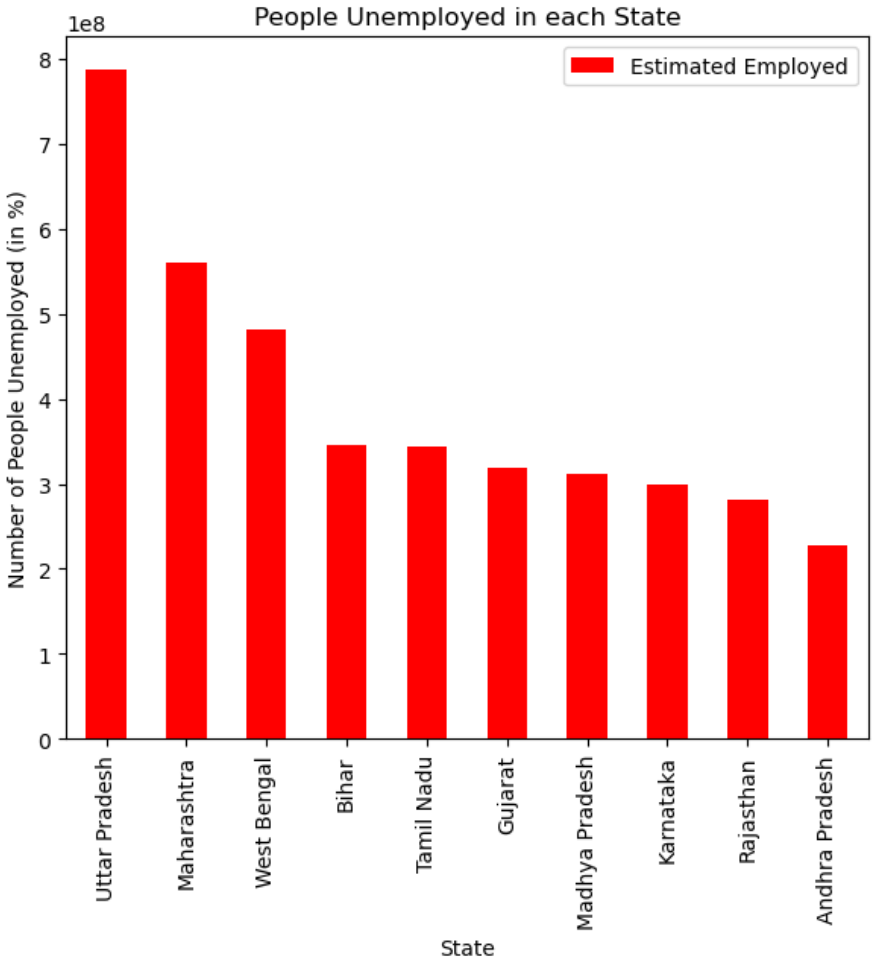
In [28]:
```
# To visulize labour participation rate & unemployment rate in each month


IND =  df.groupby(["month"])[['Estimated Unemployment Rate', "Estimated Employed", "Estimated Labour Participation Rate"]].mean(
IND = pd.DataFrame(IND).reset_index()
month = IND.month
unemployment_rate = IND["Estimated Unemployment Rate"]
labour_participation_rate = IND["Estimated Labour Participation Rate"]

fig = go.Figure()

fig.add_trace(go.Bar(x = month, y = unemployment_rate, name= "Unemployment Rate"))
fig.add_trace(go.Bar(x = month, y = labour_participation_rate, name= "Labour Participation Rate"))

fig.update_layout(title="Uneployment Rate and Labour Participation Rate",
                  xaxis={"categoryorder":"array", "categoryarray":["Jan", "Feb", "Mar", "Apr", "May", "Jun", "Jul", "Aug", "Sep"

fig.show()
```

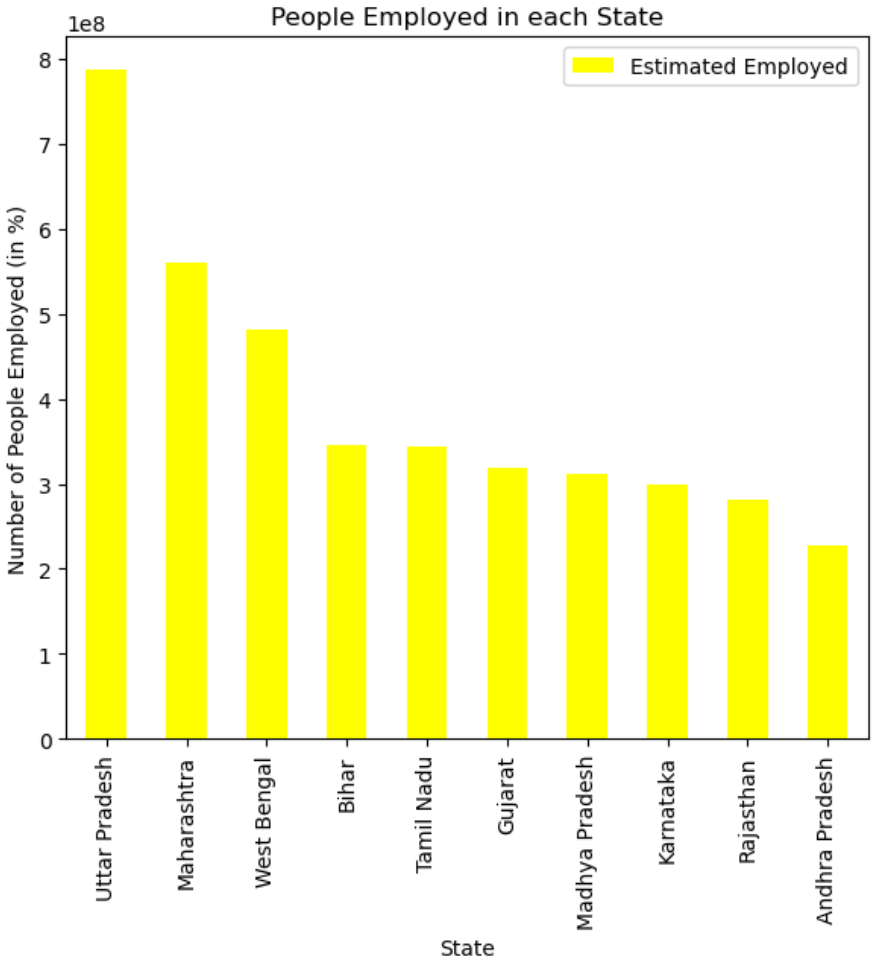


In [29]:
```
# State wise rate of unemplyement

df1 = df[["State","Estimated Employed"]].groupby("State").sum().sort_values(by="Estimated Employed", ascending =False)
df1.head(10)
fig=plt.figure()
ax0=fig.add_subplot(1,2,1)
ax1=fig.add_subplot(1,2,2)

#Unemployed
df1[:10].plot(kind="bar",color="red",figsize=(15,6),ax=ax0)
```

```
ax0.set_title("People Unemployed in each State")
ax0.set_xlabel("State")
ax0.set_ylabel("Number of People Unemployed (in %)")

#Employed
df1[:10].plot(kind="bar",color="yellow",figsize=(15,6),ax=ax1)
ax1.set_title("People Employed in each State")
ax1.set_xlabel("State")
ax1.set_ylabel("Number of People Employed (in %)")
```

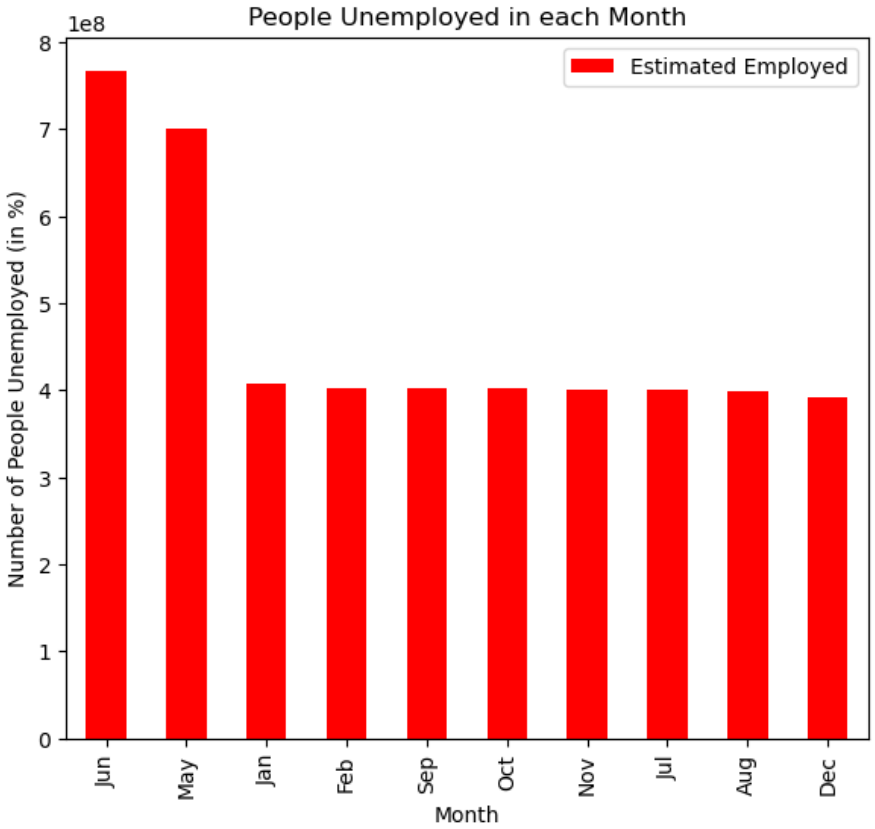
Out[29]: Text(0, 0.5, 'Number of People Employed (in %)')

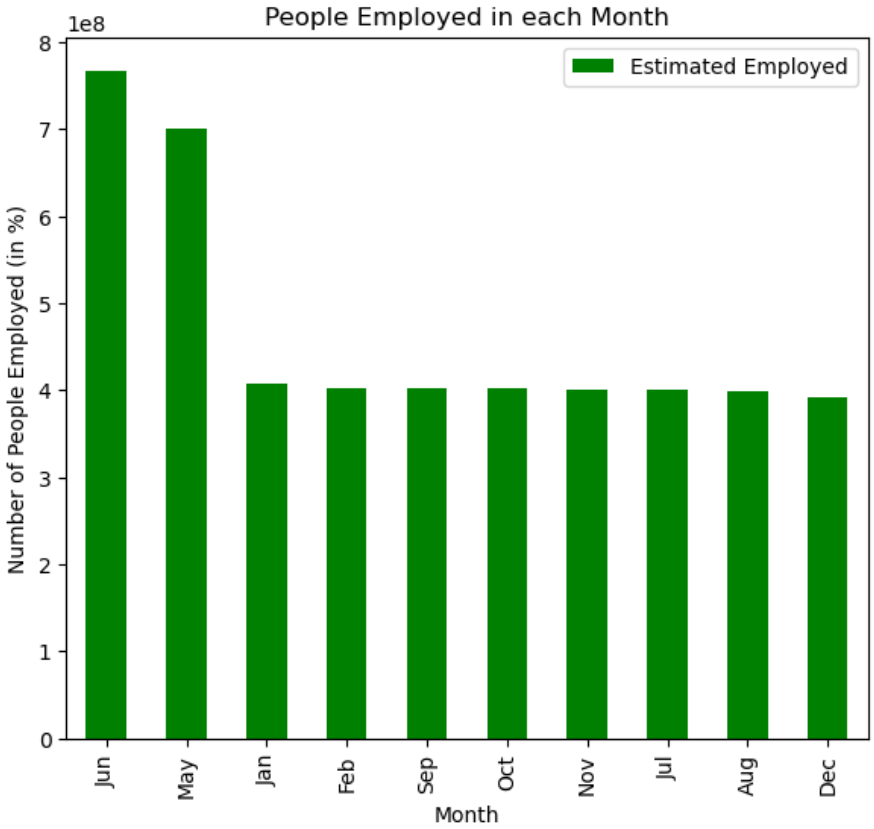




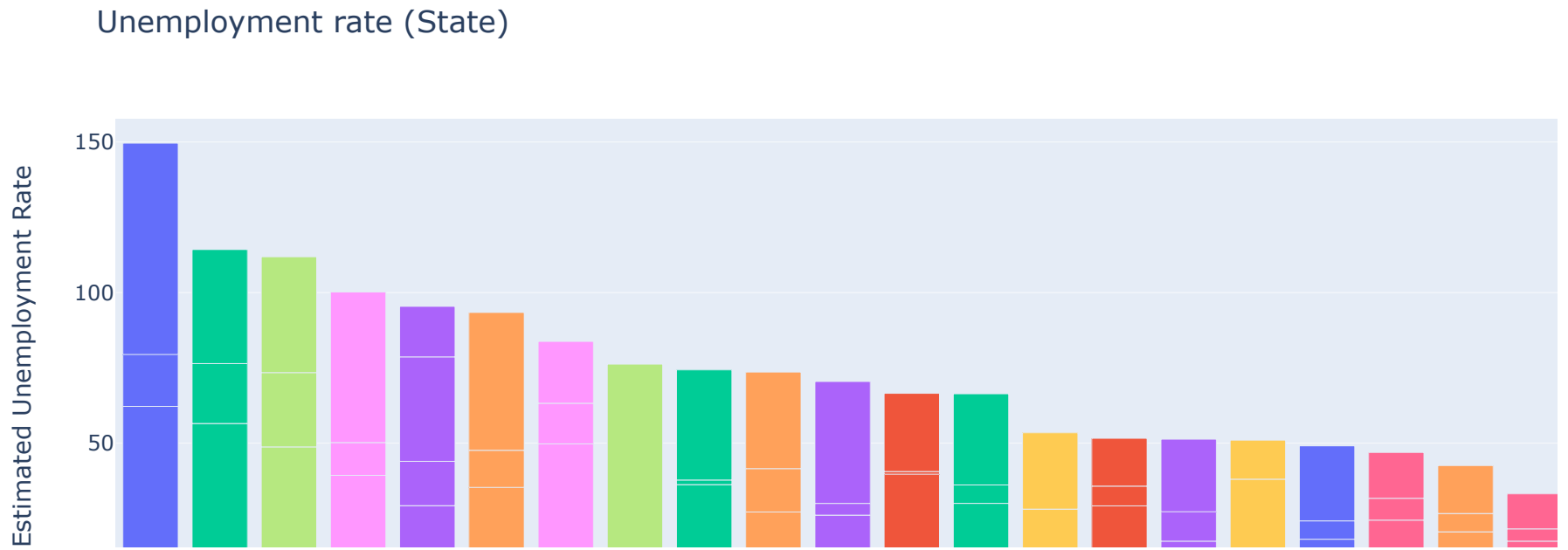
In [30]:
```
# Month wise rate of unemplyement

df2 = df[["month","Estimated Employed"]].groupby("month").sum().sort_values(by="Estimated Employed", ascending =False)
df2.head(10)
fig=plt.figure()
ax0=fig.add_subplot(1,2,1)
ax1=fig.add_subplot(1,2,2)

#Unemployed
df2[:10].plot(kind="bar",color="red",figsize=(15,6),ax=ax0)
ax0.set_title("People Unemployed in each Month")
ax0.set_xlabel("Month")
ax0.set_ylabel("Number of People Unemployed (in %)")

#Employed
df2[:10].plot(kind="bar",color="green",figsize=(15,6),ax=ax1)
ax1.set_title("People Employed in each Month")
ax1.set_xlabel("Month")
ax1.set_ylabel("Number of People Employed (in %)")
```

Out[30]:
```
Text(0, 0.5, 'Number of People Employed (in %)')
```





In [31]:
```
# bar plot unemployment rate (monthly)

fig = px.bar(df, x='State',y='Estimated Unemployment Rate', animation_frame = 'month', color='State',
             title='Unemployment rate (State)')

fig.update_layout(xaxis={'categoryorder':'total descending'})

fig.layout.updatemenus[0].buttons[0].args[1]["frame"]["duration"]=2000

fig.show()
```



CONCLUSION:

1. State with highest Unemployment:- Andhra Pradesh

2. State with Lowest Unemployment:- Chandigarh

3. Month with highest Unemployment:- May

4. Month with lowest Unemployment:- April

5. Graph Progress: Higher The labour participation Lower the unemployment rate

In [ ]: