Unemployment Claims in the United States

Review the unemployment claims in the United State in 2019 and 2020.

Original data from https://oui.doleta.gov/unemploy/claims.asp

Import Dependencies

In [1]:
```
import pandas as pd
import seaborn as sns
from matplotlib import pyplot as plt
import math
import numpy as np
import warnings

print('pandas version:  ',pd. __version__)
print('seaborn version: ',sns. __version__)
print('numpy version:   ',np. __version__)
```

```
pandas version:   1.2.4
seaborn version:  0.11.1
numpy version:    1.20.1
```

Grab Data

Read the csv file and store it. Display the first 5 rows as a preview.

In [2]:
```
unemployment_data = pd.read_csv(r'./data/State_by_Year.csv')

# Check the first few rows
unemployment_data.head()
```

Out[2]:

	State	Year	Claims	Claims_in_millions	Unnamed: 4
0	California	2020	11537768	11.5	NaN
1	New York	2020	4708666	4.7	NaN
2	Florida	2020	4310784	4.3	NaN
3	Georgia	2020	4286913	4.3	NaN
4	Texas	2020	4210238	4.2	NaN

Summarize the Numeric Columns

We can use `describe()` to summarize the numeric columns.

This will include the **Year** column, however, only the **Claims** column makes sense here.

In [3]:
```
# Summarize the numeric columns
```

```
print('Total Row Count =', len(unemployment_data))
unemployment_data.describe()
```

```
Total Row Count = 106
```

Out[3]:

	Year	Claims	Claims_in_millions	Unnamed: 4
count	106.000000	1.060000e+02	106.000000	0.0
mean	2019.500000	7.702800e+05	0.771698	NaN
std	0.502375	1.432701e+06	1.431134	NaN
min	2019.000000	1.532000e+03	0.000000	NaN
25%	2019.000000	1.010010e+05	0.100000	NaN
50%	2019.500000	2.830210e+05	0.300000	NaN
75%	2020.000000	8.377425e+05	0.800000	NaN
max	2020.000000	1.153777e+07	11.500000	NaN

Confirm Years in Data

Confirm that our data set only contains data for **2019** and **2020**.

In [4]:

```
# Confirm the number of years in the data.

data_years = unemployment_data['Year'].unique()
print('Years: ', data_years)

expected_number_of_years = 2
print('Number of years is 2? ',len(data_years) == 2)
```

```
Years:  [2020 2019]
Number of years is 2?  True
```

Summarize Claims Column

In [5]:

```
# Define the column that we'll be plotting
desired_column = 'Claims_in_millions'

# Summarize the Claims column
unemployment_data[desired_column].describe()
```

Out[5]:

```
count    106.000000
mean       0.771698
std        1.431134
min        0.000000
25%        0.100000
50%        0.300000
75%        0.800000
max       11.500000
Name: Claims_in_millions, dtype: float64
```

Exclude Outliers

Looking at the Claims data, we can assume some outliers beyond the lower 25% and upper 75%.

- 25% --> 0.1
- 75% --> 0.8

Let's round to get some cutoffs:

- Minimum --> 0
- Maximum --> 1

We'll also create two new data sets.

- 2019 --> `unemployment_2019`
- 2020 --> `unemployment_2020`

In [6]:
```
# Exclude outliers
cutoff_min = 0
cutoff_max = 1
unemployment_data_limited = unemployment_data[unemployment_data[desired_column].

# Check the first few rows
unemployment_data_limited.head()
```

Out[6]:

	State	Year	Claims	Claims_in_millions	Unnamed: 4
22	Missouri	2020	1014897	1.0	NaN
23	Tennessee	2020	981814	1.0	NaN
24	Oklahoma	2020	972453	1.0	NaN
25	Alabama	2020	917838	0.9	NaN
26	South Carolina	2020	842348	0.8	NaN

In [7]:
```
# Create a collection of claims for each year (2019)
unemployment_2019 = unemployment_data_limited[(unemployment_data_limited.Year ==

# Check the first few rows of each (2019)
unemployment_2019.head()
```

Out[7]:

	State	Year	Claims	Claims_in_millions	Unnamed: 4
27	New York	2019	823926	0.8	NaN
31	Pennsylvania	2019	739399	0.7	NaN
32	Texas	2019	701860	0.7	NaN
37	New Jersey	2019	492540	0.5	NaN
38	Illinois	2019	489831	0.5	NaN

In [8]:
```
# Create a collection of claims for each year (2020)
unemployment_2020 = unemployment_data_limited[(unemployment_data_limited.Year ==
```

```
# Check the first few rows of each (2020)
unemployment_2020.head()
```

Out[8]:

	State	Year	Claims	Claims_in_millions	Unnamed: 4
22	Missouri	2020	1014897	1.0	NaN
23	Tennessee	2020	981814	1.0	NaN
24	Oklahoma	2020	972453	1.0	NaN
25	Alabama	2020	917838	0.9	NaN
26	South Carolina	2020	842348	0.8	NaN

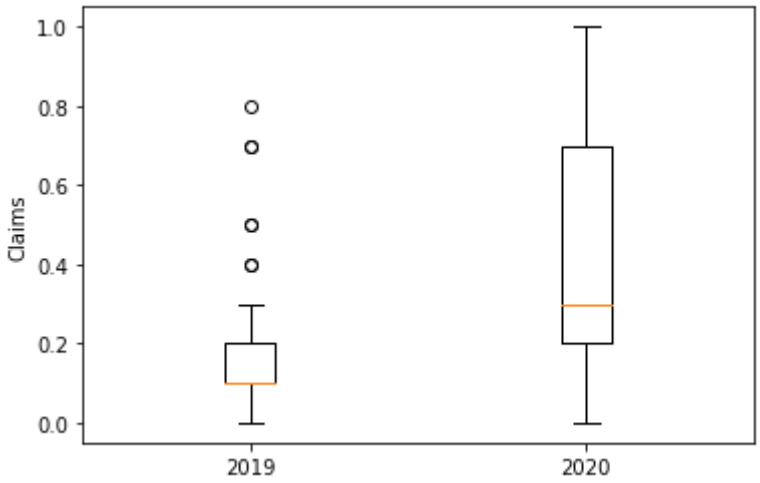
Create Boxplots

Create a boxplot with our new datasets, `unemployment_2019` and `unemployment_2020`.

In [9]:

```
# Create a box plot for each year.
plt.boxplot([unemployment_2019[desired_column], unemployment_2020[desired_column
plt.ylabel('Claims')
```

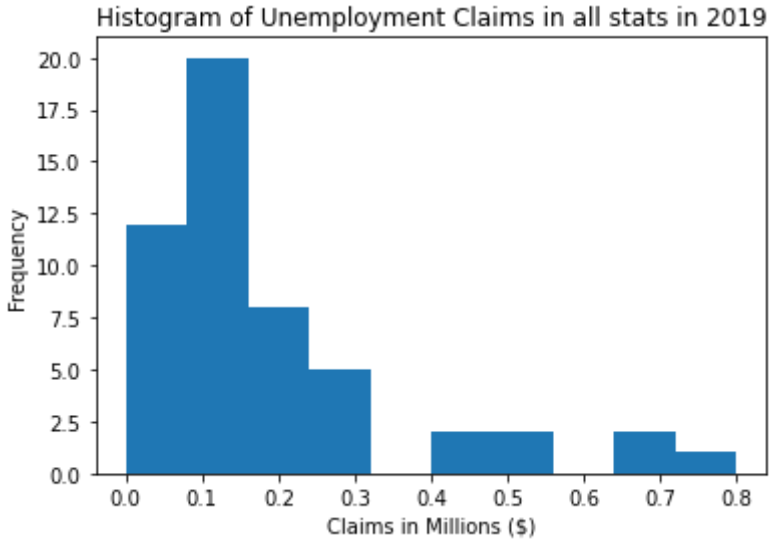
Out[9]: `Text(0, 0.5, 'Claims')`



Create Histogram for 2019

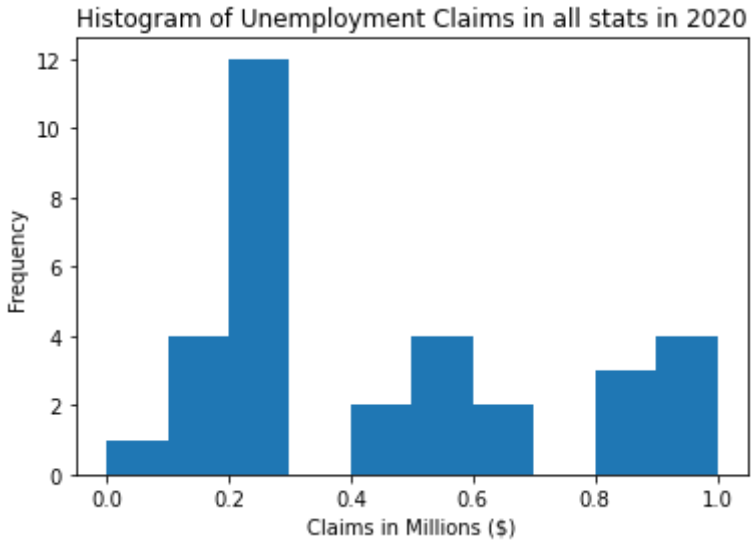
In [17]:

```
# bin_size = 5
# maximum = max(unemployment_2019[desired_column])
# minimum = min(unemployment_2019[desired_column])
# bins = math.ceil((maximum - minimum) / bin_size)

plt.hist(unemployment_2019[desired_column])
plt.xlabel('Claims in Millions ($)')
plt.ylabel('Frequency')
plt.title('Histogram of Unemployment Claims in all stats in 2019');
plt.show()
```



Create Histogram for 2020

In [18]:
```
# bin_size = 5
# maximum = max(unemployment_2020[desired_column])
# minimum = min(unemployment_2020[desired_column])
# bins = math.ceil((maximum - minimum) / bin_size)

plt.hist(unemployment_2020[desired_column])
plt.xlabel('Claims in Millions ($)')
plt.ylabel('Frequency')
plt.title('Histogram of Unemployment Claims in all stats in 2020');
plt.show()
```



Ed Anderson's Python

Descriptive Statistics

In [12]:
```
df = pd.read_csv(r'./data/Years_Cleaned.csv')
```

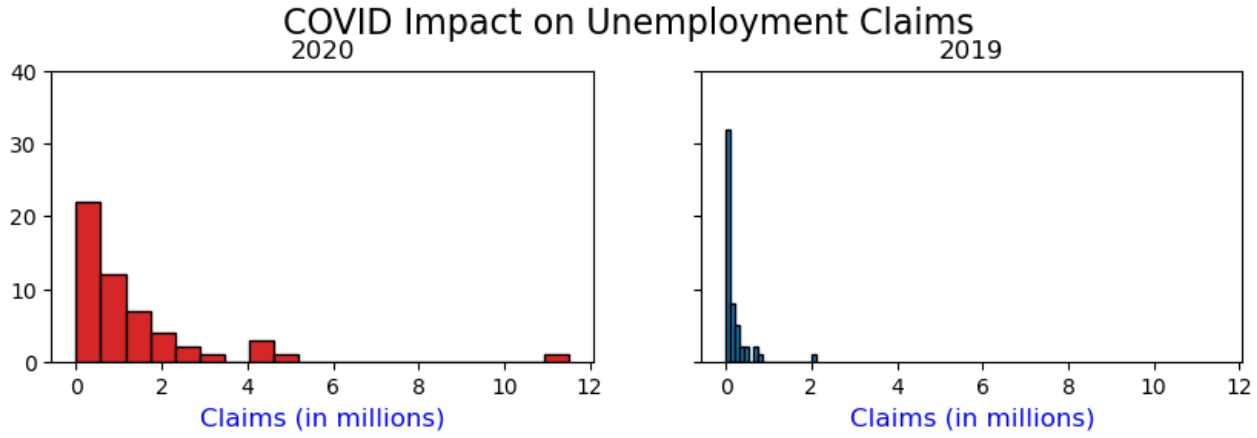
```
display(df[["2019_Claims","2020_Claims"]].describe())
```

	2019_Claims	2020_Claims
count	53.000000	53.000000
mean	0.211321	1.332075
std	0.323835	1.841381
min	0.000000	0.000000
25%	0.100000	0.300000
50%	0.100000	0.800000
75%	0.200000	1.400000
max	2.100000	11.500000

Histogram Side-by-Side

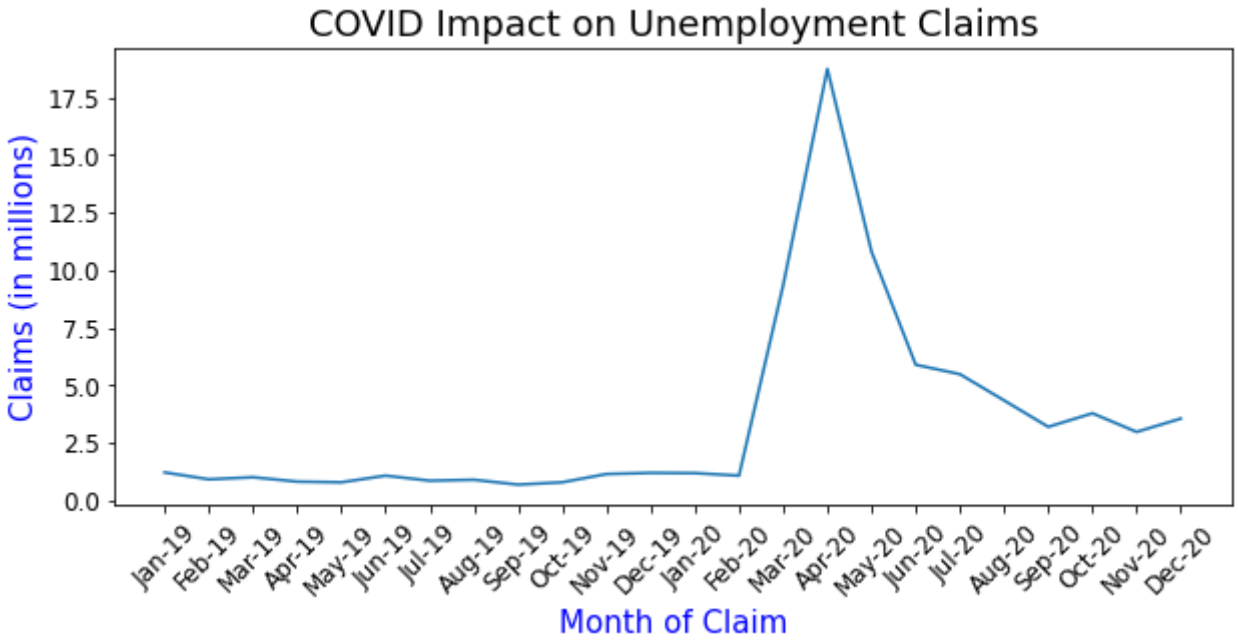
In [13]:
```
# import pandas as pd
# from matplotlib import pyplot as plt

df = pd.read_csv(r'./data/State_by_Year.csv')

fig, axes = plt.subplots(1, 2, figsize=(10,2.5), dpi=100, sharex=True, sharey=Tr
colors = ['tab:red', 'tab:blue']

for i, (ax, Year) in enumerate(zip(axes.flatten(), df.Year.unique())):
    x = df.loc[df.Year==Year, 'Claims_in_millions']
    ax.hist(x, bins=20, label=str(Year), color=colors[i], edgecolor = 'black')
    ax.set_title(Year)
    ax.set_xlabel('Claims (in millions)', fontsize = 12, color = 'b')

plt.ylim(0, 40)

plt.suptitle('COVID Impact on Unemployment Claims', y=1.05, size=16)
#plt.tight_layout();
```

Out[13]:
```
Text(0.5, 1.05, 'COVID Impact on Unemployment Claims')
```



Monthly Line Chart

In [14]:
```
# import matplotlib.pyplot as plt
# import pandas as pd

df = pd.read_csv(r'./data/Claims_by_Month.csv')

plt.figure(figsize=(10, 4.2))
x = range(len(df['Claims']))
plt.plot(x, df['Claims'])
plt.xticks(x, df['Month'])
plt.xticks(rotation = 45) # Rotates X-Axis Ticks by 45-degrees

plt.title('COVID Impact on Unemployment Claims', fontsize = 18)
plt.ylabel('Claims (in millions)', fontsize = 15, color = 'b')
plt.xlabel('Month of Claim', fontsize = 15, color = 'b')

plt.xticks(fontsize = 12)
plt.yticks(fontsize = 12)
plt.show()
```

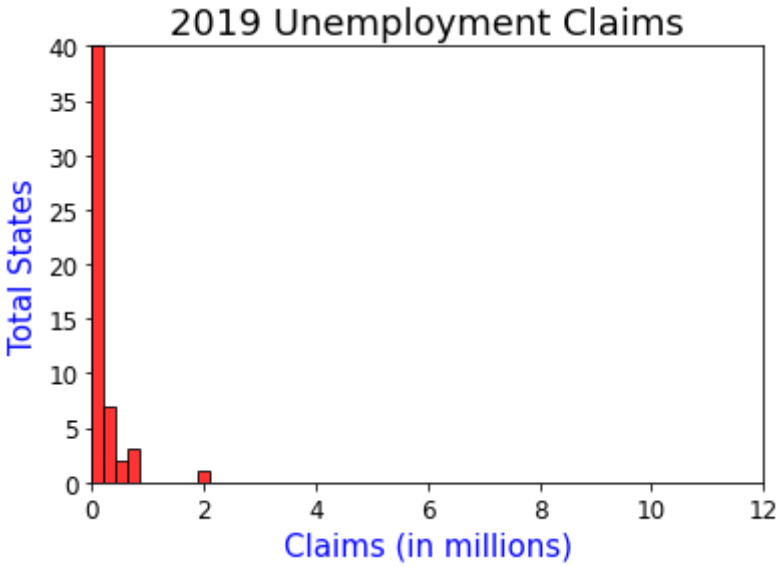


Unemployment Claims

Unemployment Claims 2019

In [15]:
```
import pandas as pd
from matplotlib import pyplot as plt

df = pd.read_csv (r'./data/Years_Cleaned.csv')

data = df['2019_Claims']
bins=10

plt.hist(df['2019_Claims'], bins, color = 'red', alpha = 0.8, edgecolor = 'black

plt.title('2019 Unemployment Claims', fontsize = 18)
plt.xlabel('Claims (in millions)', fontsize = 15, color = 'b')
```

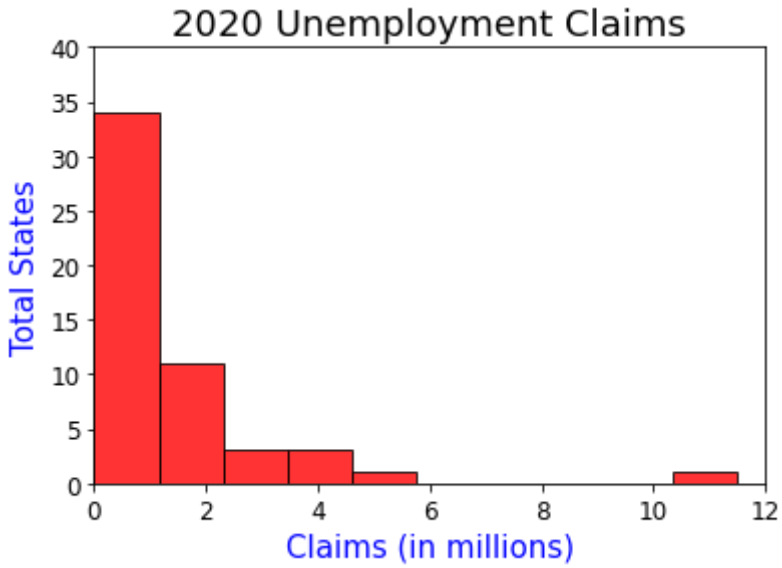
```
plt.xlim(0, 12)
plt.ylim(0, 40)
plt.ylabel('Total States', fontsize = 15, color = 'b')

plt.xticks(fontsize = 12)
plt.yticks(fontsize = 12)

plt.show()
```



Unemployment Claims 2020

In [16]:

```
# import pandas as pd
# from matplotlib import pyplot as plt

df = pd.read_csv(r'./data/Years_Cleaned.csv')

data = df['2020_Claims']
bins=10

plt.hist(df['2020_Claims'], bins, color = 'red', alpha = 0.8, edgecolor = 'black

plt.title('2020 Unemployment Claims', fontsize = 18)
plt.xlabel('Claims (in millions)', fontsize = 15, color = 'b')
plt.xlim(0, 12)
plt.ylim(0, 40)
plt.ylabel('Total States', fontsize = 15, color = 'b')

plt.xticks(fontsize = 12)
plt.yticks(fontsize = 12)

plt.show()
```


2020 Unemployment Claims
Total States
Claims (in millions)
0
5
10
15
20
25
30
35
40
0
2
4
6
8
10
12

In [ ]: