```
!pip install kaggle
```

```
Requirement already satisfied: kaggle in /usr/local/lib/python3.10/dist-packages (1.6.14)
Requirement already satisfied: six>=1.10 in /usr/local/lib/python3.10/dist-packages (from kaggle) (1.16.0)
Requirement already satisfied: certifi>=2023.7.22 in /usr/local/lib/python3.10/dist-packages (from kaggle) (2024.6.2)
Requirement already satisfied: python-dateutil in /usr/local/lib/python3.10/dist-packages (from kaggle) (2.8.2)
Requirement already satisfied: requests in /usr/local/lib/python3.10/dist-packages (from kaggle) (2.31.0)
Requirement already satisfied: tqdm in /usr/local/lib/python3.10/dist-packages (from kaggle) (4.66.4)
Requirement already satisfied: python-slugify in /usr/local/lib/python3.10/dist-packages (from kaggle) (8.0.4)
Requirement already satisfied: urllib3 in /usr/local/lib/python3.10/dist-packages (from kaggle) (2.0.7)
Requirement already satisfied: bleach in /usr/local/lib/python3.10/dist-packages (from kaggle) (6.1.0)
Requirement already satisfied: webencodings in /usr/local/lib/python3.10/dist-packages (from bleach->kaggle) (0.5.1)
Requirement already satisfied: text-unidecode>=1.3 in /usr/local/lib/python3.10/dist-packages (from python-slugify->kaggle) (1.3)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests->kaggle) (3.3.2)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests->kaggle) (3.7)
```

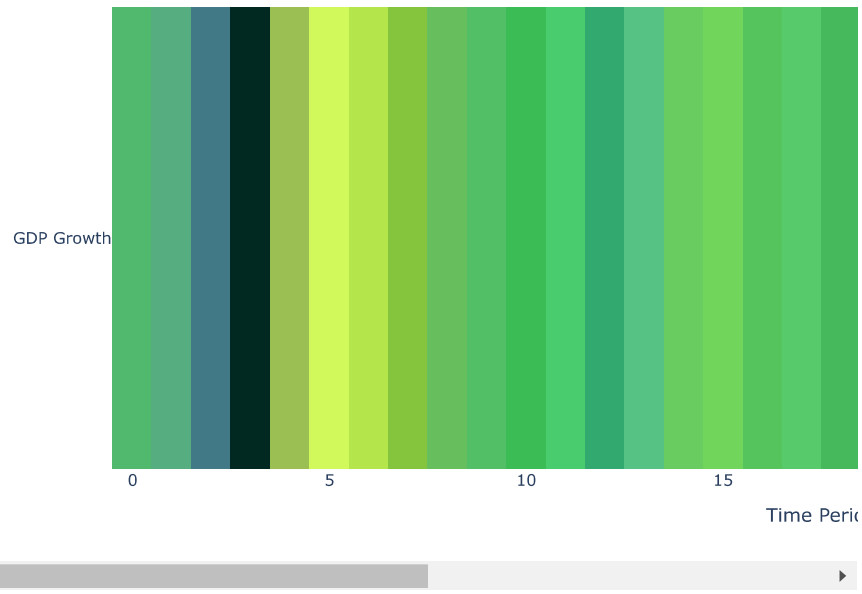
```
from google.colab import drive
drive.mount('/content/drive')
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
import pandas as pd
import plotly.graph_objs as go
import plotly.express as px
import plotly.io as pio
pio.templates.default = "plotly_white"

data = pd.read_csv('/content/drive/MyDrive/UK_monthly_gdp.csv')
print(data.head())
```

```
  Time Period  GDP Growth
0    /01/2020         0.3
1    /02/2020        -0.5
2    /03/2020        -7.0
3    /04/2020       -20.9
4    /05/2020         3.2
```

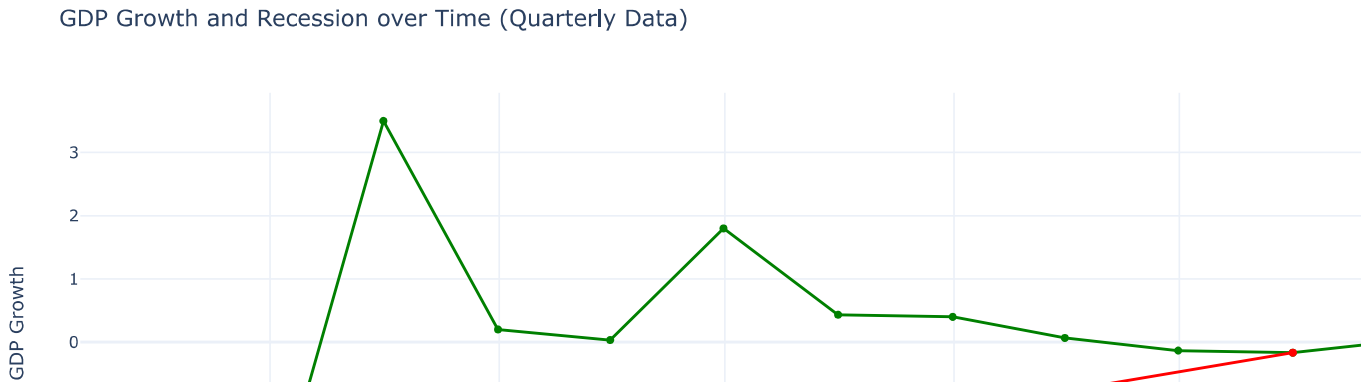
```
fig = go.Figure(data=go.Heatmap(
                   z=[data['GDP Growth']],
                   x=data.index,
                   y=['GDP Growth'],
                   colorscale='Viridis'))

fig.update_layout(title='GDP Growth over Time',
                  xaxis_title='Time Period',
                  yaxis_title='')

fig.show()
```



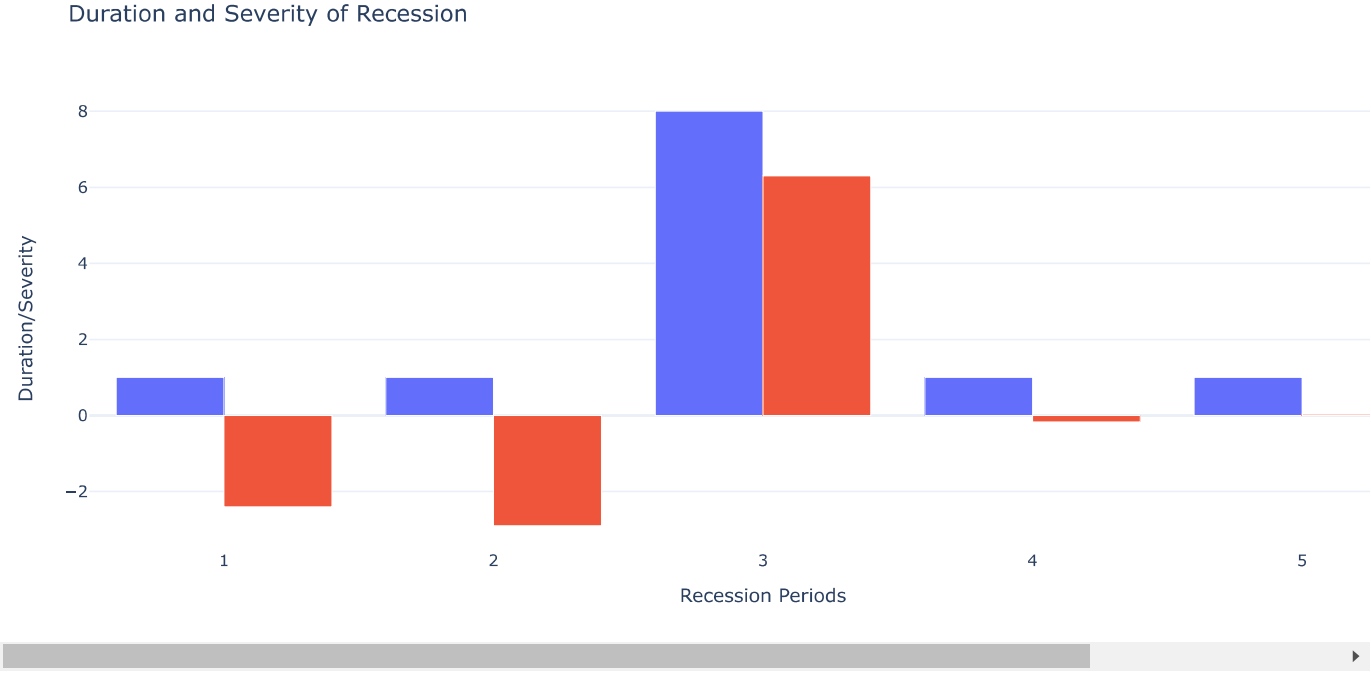

```
# Convert monthly data to quarterly data using resample method
data['Time Period'] = pd.to_datetime(data['Time Period'], format='/%m/%Y')
data.set_index('Time Period', inplace=True)
quarterly_data = data.resample('Q').mean()
print(quarterly_data.head())
```

```
              GDP Growth
Time Period
2020-03-31    -2.400000
2020-06-30    -2.900000
2020-09-30     3.500000
2020-12-31     0.200000
2021-03-31     0.033333
```

```
# Calculate recession based on quarterly GDP growth
quarterly_data['Recession'] = ((quarterly_data['GDP Growth'] < 0) & (quarterly_data['GDP Growth'].shift(1) < 0))

# Fill missing values with False (since the first quarter cannot be in a recession)
quarterly_data['Recession'].fillna(False, inplace=True)

# Plot the GDP growth and recession data
fig = go.Figure()
fig.add_trace(go.Scatter(x=quarterly_data.index,
                         y=quarterly_data['GDP Growth'],
                         name='GDP Growth',
                         line=dict(color='green', width=2)))
fig.add_trace(go.Scatter(x=quarterly_data[quarterly_data['Recession']].index,
                         y=quarterly_data[quarterly_data['Recession']]['GDP Growth'],
                         name='Recession', line=dict(color='red', width=2)))

fig.update_layout(title='GDP Growth and Recession over Time (Quarterly Data)',
                  xaxis_title='Time Period',
                  yaxis_title='GDP Growth')

fig.show()
```




```
quarterly_data['Recession Start'] = quarterly_data['Recession'].ne(quarterly_data['Recession'].shift()).cumsum()
recession_periods = quarterly_data.groupby('Recession Start')
recession_duration = recession_periods.size()
recession_severity = recession_periods['GDP Growth'].sum()

fig = go.Figure()
fig.add_trace(go.Bar(x=recession_duration.index, y=recession_duration,
                     name='Recession Duration'))
fig.add_trace(go.Bar(x=recession_severity.index, y=recession_severity,
                     name='Recession Severity'))

fig.update_layout(title='Duration and Severity of Recession',
                  xaxis_title='Recession Periods',
                  yaxis_title='Duration/Severity')

fig.show()
```



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