

```
from google.colab import drive
drive.mount('/content/gdrive', force_remount=True)
```

Mounted at /content/gdrive

```
import pandas as pd
df = pd.read_csv("/content/gdrive/MyDrive/Colab Notebooks/AirPassengers.csv");
print(df.head())
```

```

      Month  #Passengers
0  1949-01         112
1  1949-02         118
2  1949-03         132
3  1949-04         129
4  1949-05         121

```

```
print(df.tail())
```

```

      Month  #Passengers
139 1960-08         606
140 1960-09         508
141 1960-10         461
142 1960-11         390
143 1960-12         432

```

```
df['Month'] = pd.to_datetime(df['Month'], format='%Y-%m')
print(df.head())
```

```

      Month  #Passengers
0 1949-01-01         112
1 1949-02-01         118
2 1949-03-01         132
3 1949-04-01         129
4 1949-05-01         121

```

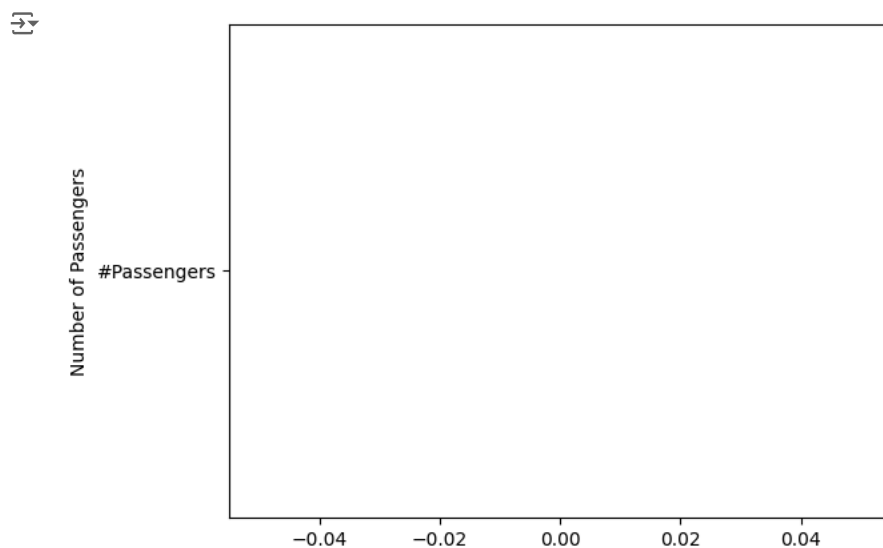
```
df.index = df['Month']
del df['Month']
print(df.head())
```

```

      #Passengers
Month
1949-01-01         112
1949-02-01         118
1949-03-01         132
1949-04-01         129
1949-05-01         121

```

```
import matplotlib.pyplot as plt
import seaborn as sns
sns.lineplot(df)
plt.ylabel('Number of Passengers');
```



```

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

# Read the dataset
df = pd.read_csv("/content/gdrive/MyDrive/Colab Notebooks/AirPassengers.csv")

# Convert 'Month' column to datetime
df['Month'] = pd.to_datetime(df['Month'])

# Extract year and month
df['year'] = df['Month'].dt.year
df['month'] = df['Month'].dt.strftime('%b')

# Unique years
years = df['year'].unique()

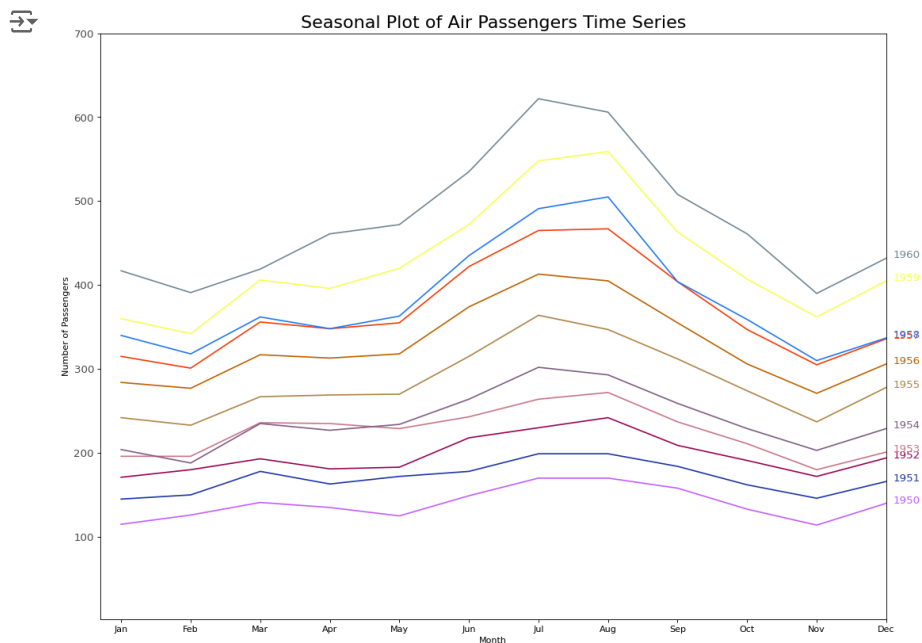
# Set random seed for reproducibility
np.random.seed(100)

# Choose random colors
mycolors = np.random.choice(list(mpl.colors.XKCD_COLORS.keys()), len(years), replace=False)

# Plotting
plt.figure(figsize=(16,12), dpi= 80)
for i, y in enumerate(years):
    if i > 0:
        plt.plot('month', '#Passengers', data=df.loc[df.year==y, :], color=mycolors[i], label=y)
        plt.text(df.loc[df.year==y, :].shape[0]-.9, df.loc[df.year==y, '#Passengers'][-1:].values[0], y, fontsize=12, color=mycolors[i])

plt.gca().set(xlim=(-0.3, 11), ylim=(2, 700), ylabel='Number of Passengers', xlabel='Month')
plt.yticks(fontsize=12, alpha=.7)
plt.title("Seasonal Plot of Air Passengers Time Series", fontsize=20)
plt.show()

```



```

import pandas as pd
import numpy as np

```

```

import seaborn as sns
import matplotlib.pyplot as plt

# Read the dataset
df = pd.read_csv("/content/gdrive/MyDrive/Colab Notebooks/AirPassengers.csv")

# Convert 'Month' column to datetime
df['Month'] = pd.to_datetime(df['Month'])

# Reset index
df.reset_index(inplace=True)

# Extract year and month
df['year'] = [d.year for d in df['Month']]
df['month'] = [d.strftime('%b') for d in df['Month']]

# Unique years
years = df['year'].unique()

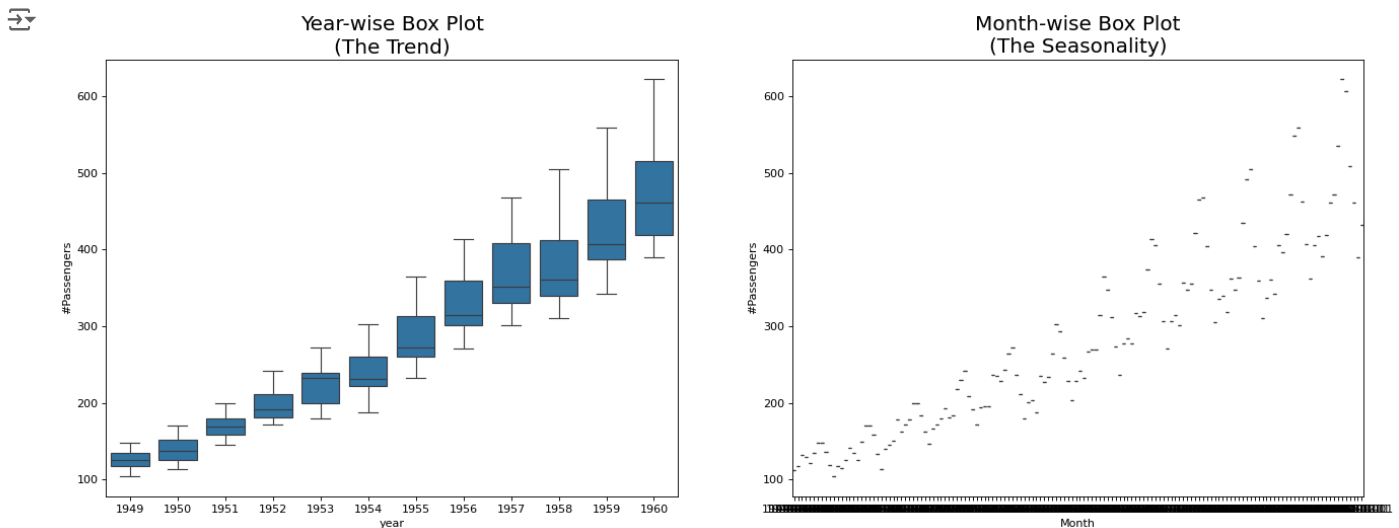
# Create subplots
fig, axes = plt.subplots(1, 2, figsize=(20,7), dpi= 80)

# Box plot for year-wise trend
sns.boxplot(x='year', y='#Passengers', data=df, ax=axes[0])
axes[0].set_title('Year-wise Box Plot\n(The Trend)', fontsize=18)

# Box plot for month-wise seasonality (excluding 1991 and 2008)
sns.boxplot(x='Month', y='#Passengers', data=df.loc[~df.year.isin([1991, 2008]), :], ax=axes[1])
axes[1].set_title('Month-wise Box Plot\n(The Seasonality)', fontsize=18)

plt.show()

```



```

import pandas as pd
import matplotlib.pyplot as plt

# Read the dataset
df = pd.read_csv("/content/gdrive/MyDrive/Colab Notebooks/AirPassengers.csv", index_col='Month')

# Create subplots
fig, axes = plt.subplots(1, 3, figsize=(20, 4), dpi=80)

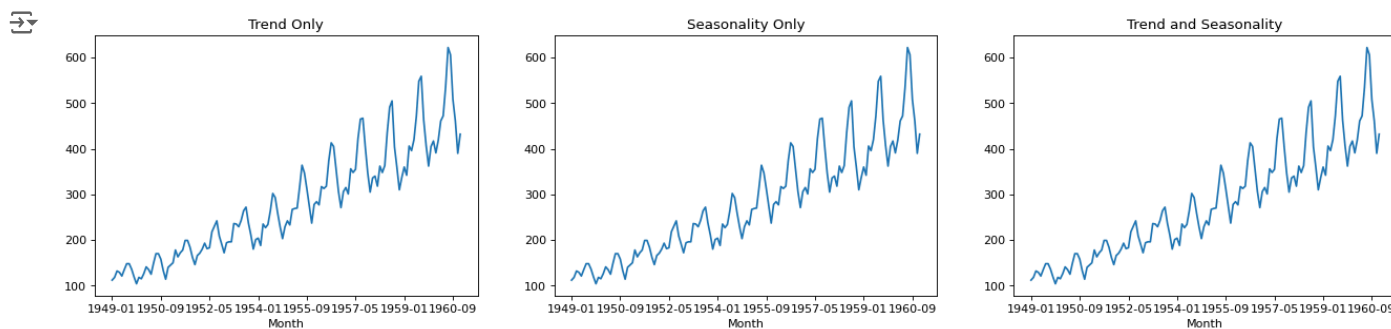
# Plot trend only
df.plot(title='Trend Only', legend=False, ax=axes[0])

# Plot seasonality only
df.plot(title='Seasonality Only', legend=False, ax=axes[1])

# Plot both trend and seasonality
df.plot(title='Trend and Seasonality', legend=False, ax=axes[2])

plt.show()

```



```
from statsmodels.tsa.seasonal import seasonal_decompose
import pandas as pd
import matplotlib.pyplot as plt

# Read the dataset skipping the header row
df = pd.read_csv("/content/gdrive/MyDrive/Colab Notebooks/AirPassengers.csv", skiprows=1, header=None)

# Set the index to a DatetimeIndex with frequency 'MS' (Month Start)
df.index = pd.date_range(start='1949-01-01', periods=len(df), freq='MS')

# Perform seasonal decomposition
result_mul = seasonal_decompose(df[1], model='multiplicative', extrapolate_trend='freq')
result_add = seasonal_decompose(df[1], model='additive', extrapolate_trend='freq')

# Plot the results
plt.rcParams.update({'figure.figsize': (10,10)})

# Plot multiplicative decomposition
result_mul.plot().suptitle('Multiplicative Decompose', fontsize=22)

# Plot additive decomposition
result_add.plot().suptitle('Additive Decompose', fontsize=22)

plt.show()
```

