MBA em Inteligência Artificial

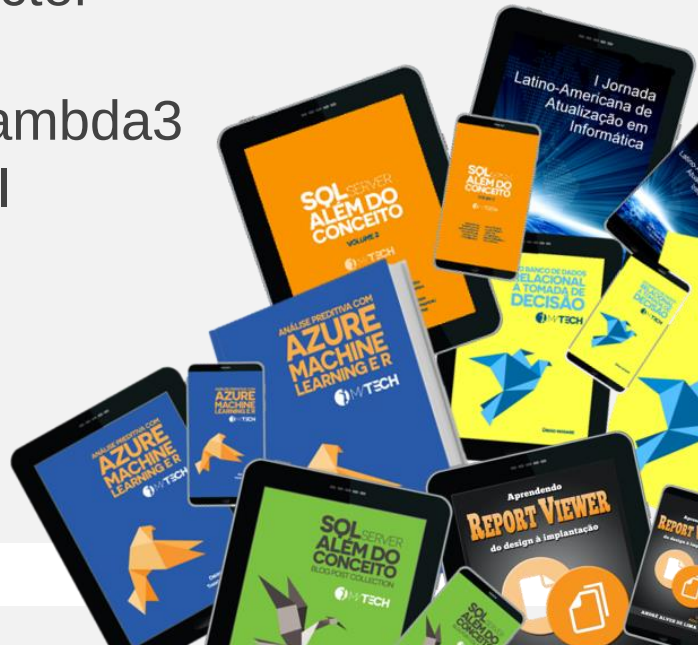
Big Data e Visualização de Dados

Prof. Diego Nogare

Diego Nogare

Former MVP Artificial Intelligence
Microsoft Regional Director
Diretor no PASS.org
Chief Data Officer @ Lambda3
Membro notável na I2AI
Mestre em IA

www.diegonogare.net
www.livrosdonogare.com.br



Pacote MatPlotLib

Uso das funções do Python para gerar gráficos

Gráficos no MatPlotLib – Criação e Edição

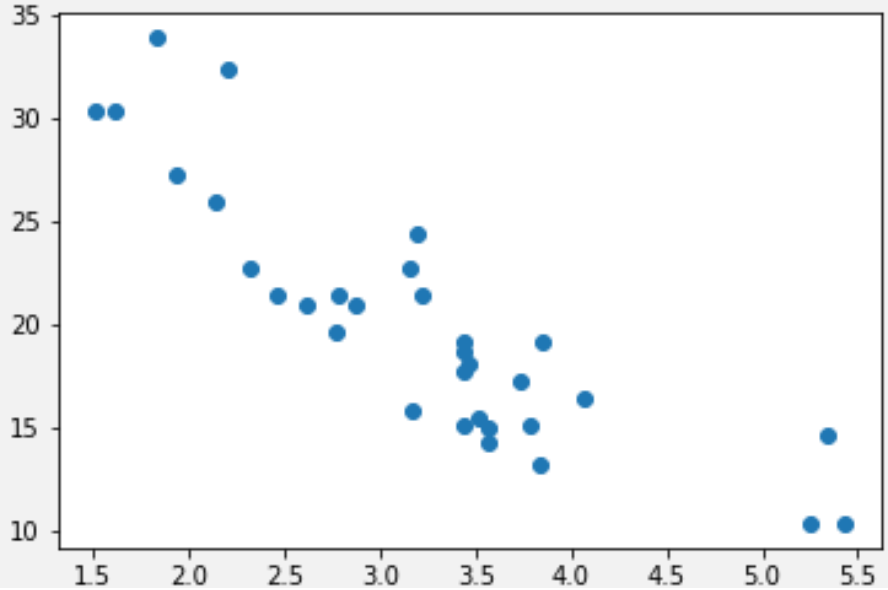
Além da versatilidade de criar aplicações de ponta a ponta, muitos cientistas de dados usam Python pelas suas capacidades gráficas simples.

```
import pandas as pd

import matplotlib.pyplot as plt
%matplotlib inline

plt.scatter(df['wt'],df['mpg']);
```

Gráficos no MatPlotLib – Criação e Edição

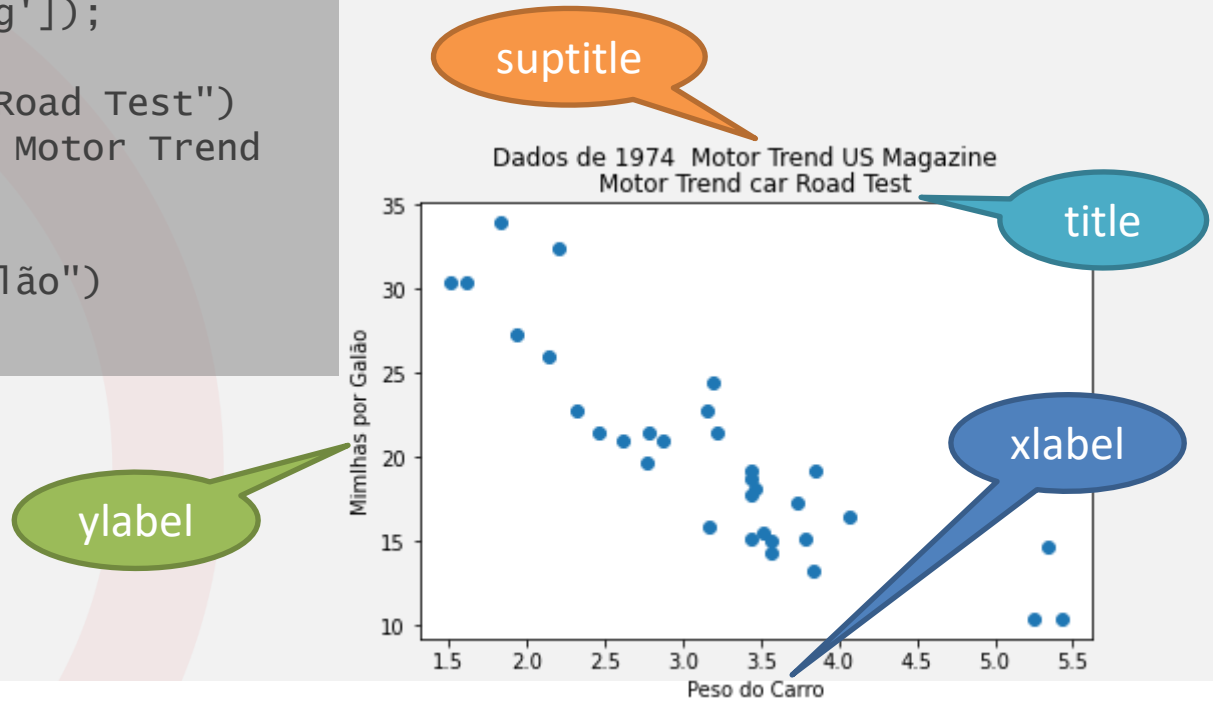
Além da versatilidade de criar aplicações de ponta a ponta, muitos cientistas de dados usam Python pelas suas capacidades gráficas simples.

```
plt.scatter(df['wt'],df['mpg']);
```

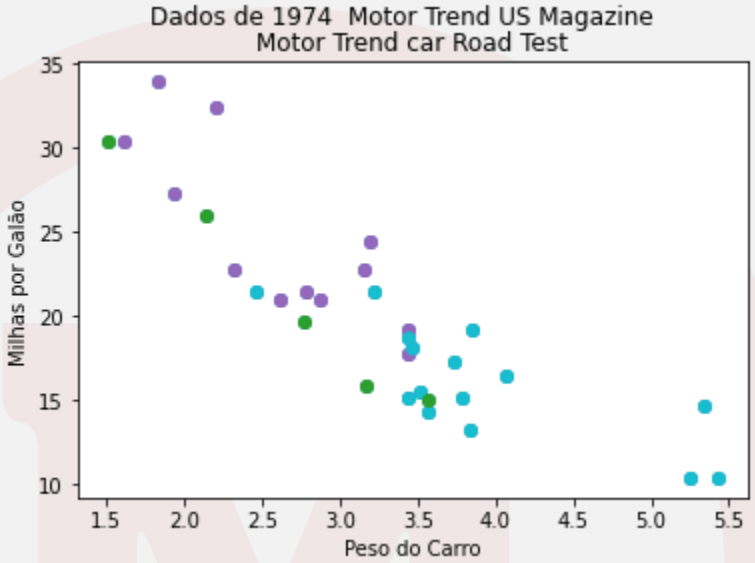


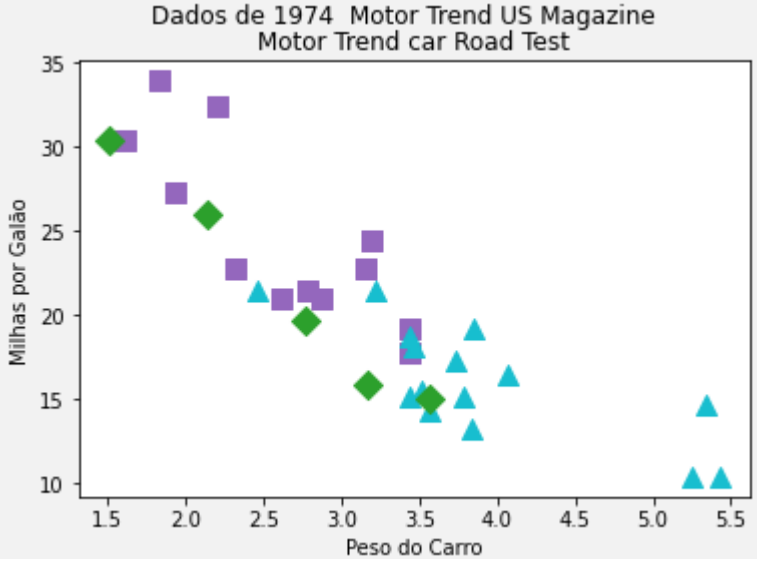
Gráficos no Python

```
plt.figure(figsize=(15,8))
plt.scatter(df['wt'],df['mpg']);

plt.title("Motor Trend car Road Test")
plt.suptitle("Dados de 1974 Motor Trend
US Magazine")
plt.xlabel("Peso do Carro")
plt.ylabel( "Mimlhas por Galão")
```



Gráficos no Python





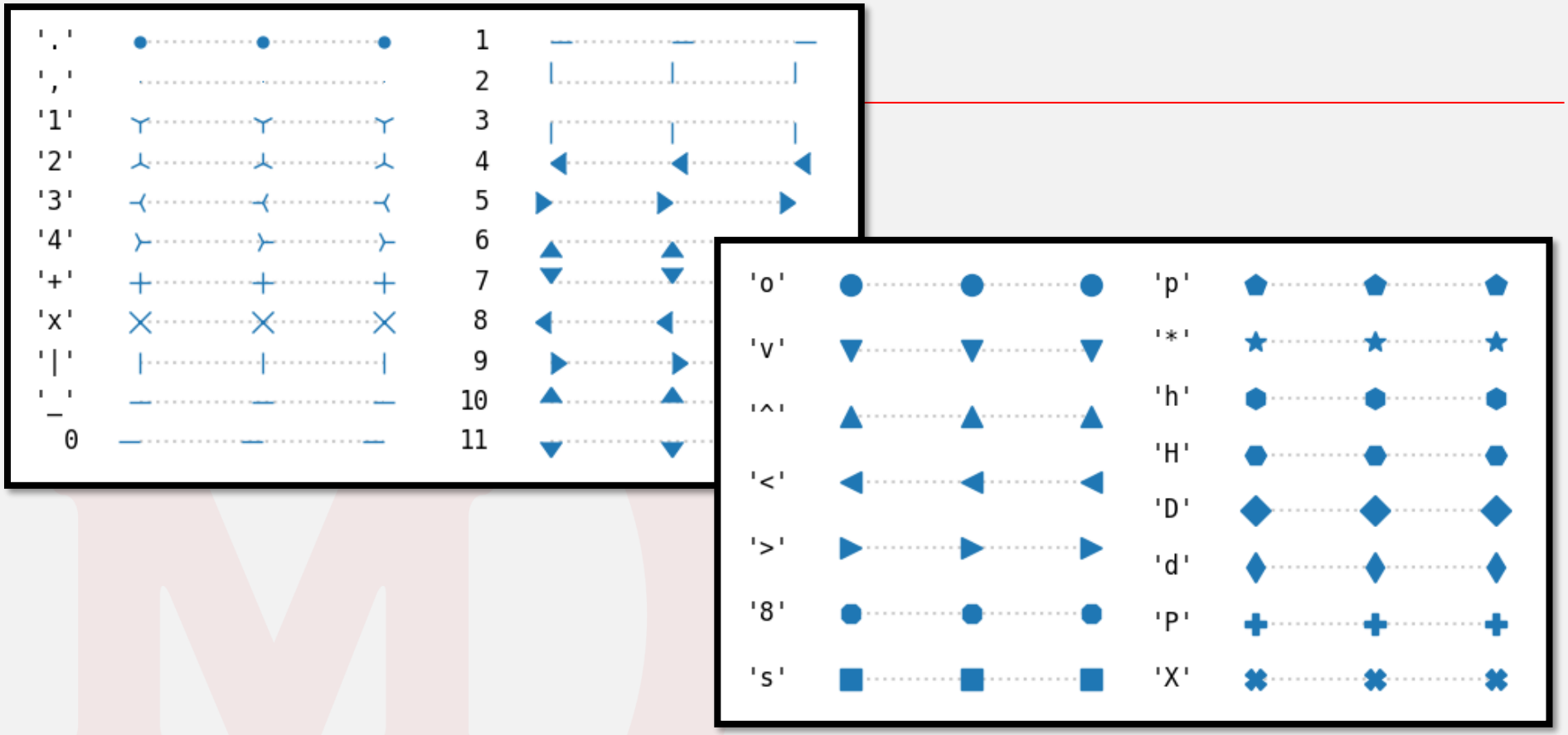
```
cores = {3:'tab:cyan',4:'tab:purple',5:'tab:green'}
marcadores = {3:'^',4:'s',5:'D'}


for cambio in df['gear'].unique():
    tmp = df[df['gear'] == cambio]
    plt.scatter(tmp['wt'], tmp['mpg'], color=cores[cambio],
                marker=marcadores[cambio], s=100)


plt.title("Motor Trend car Road Test")
plt.suptitle("Dados de 1974  Motor Trend US Mag ine")
plt.xlabel("Peso do Carro")
plt.ylabel( "Milhas por Galão")
```

Tupla de cores

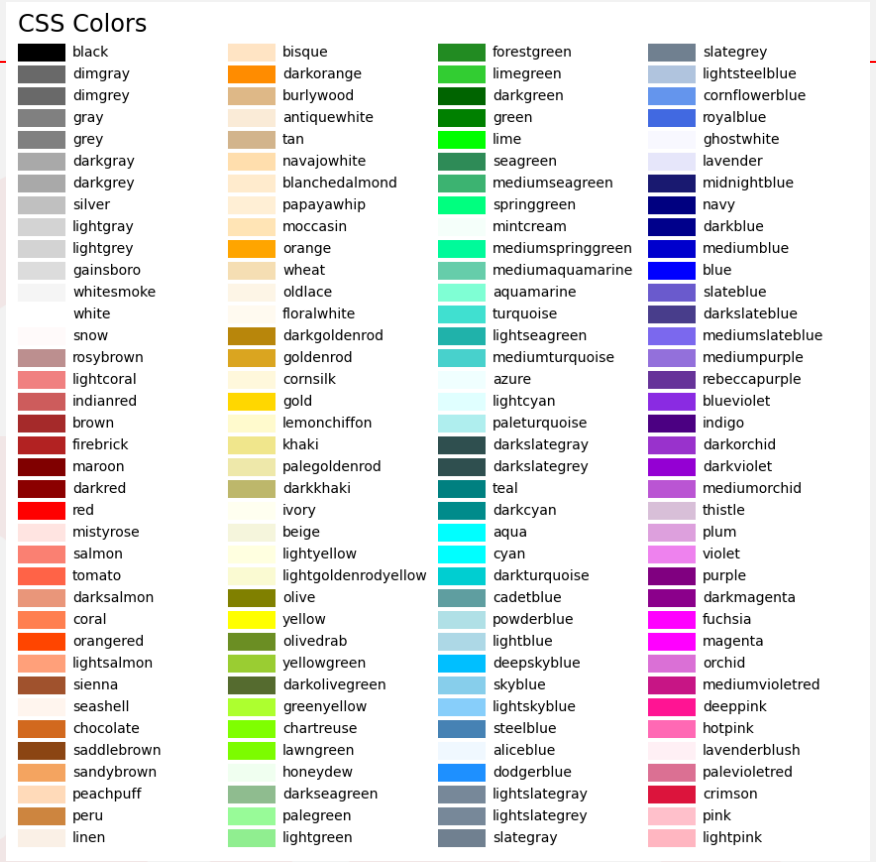
Tupla de marcadores

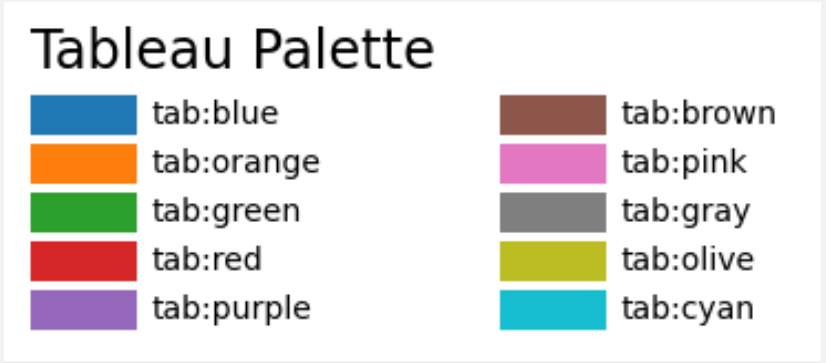
uso de cores

uso de marcadores



https://matplotlib.org/api/markers_api.html?highlight=marker



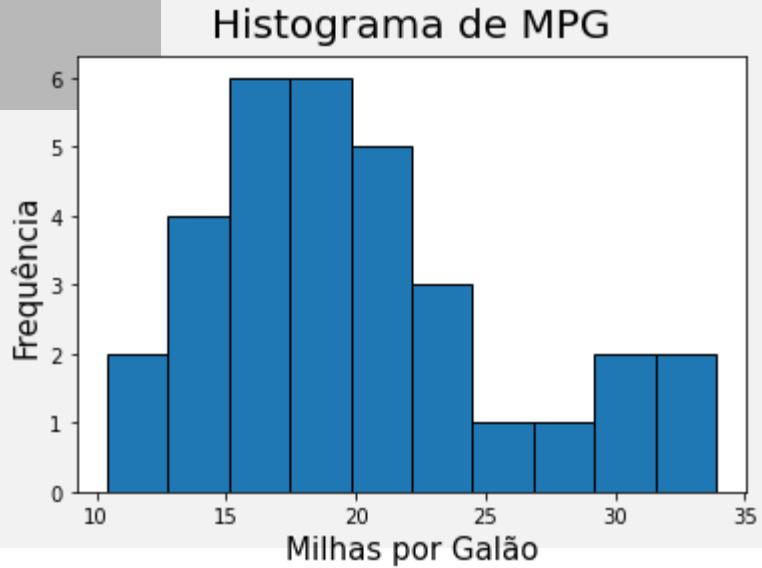


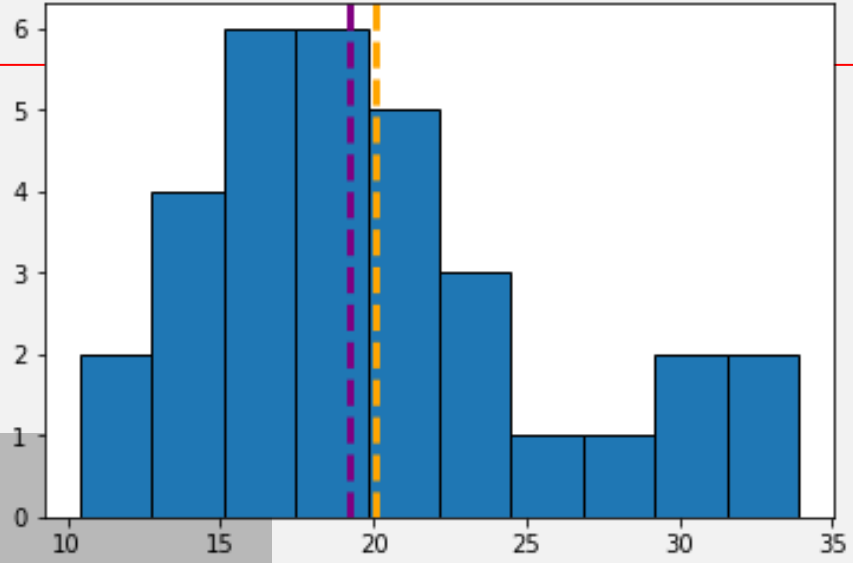
https://matplotlib.org/gallery/color/named_colors.html

```
plt.hist(df['mpg'], edgecolor="black");

plt.title("Histograma de MPG", fontsize=20, pad=10)
plt.xlabel("Milhas por Galão", fontsize=15)
plt.ylabel("Frequência", fontsize=15)
```

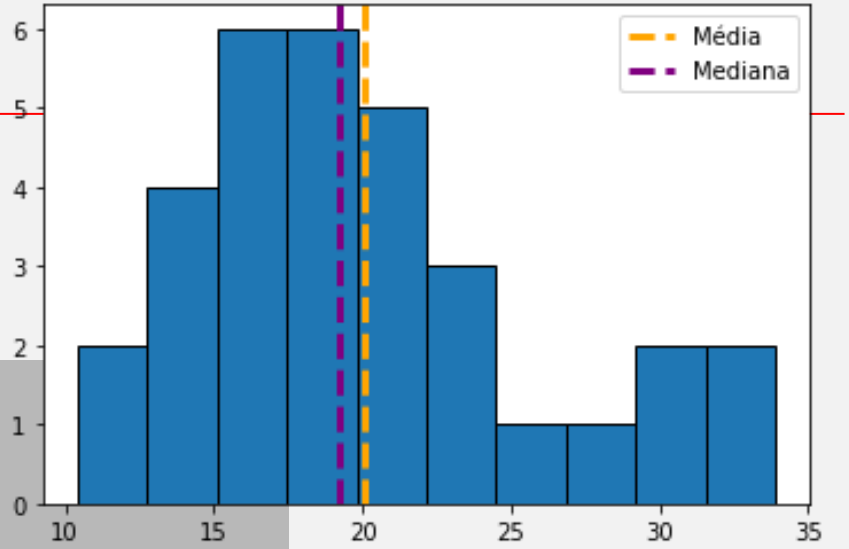
Tamanho da fonte

afastamento

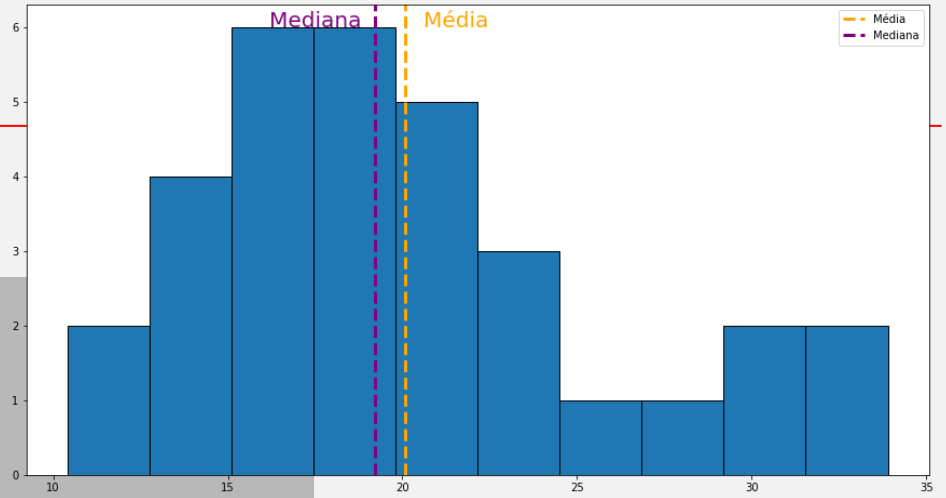





```
cores = ["orange","purple"]

plt.hist(df['mpg'], edgecolor="black");
media, mediana = df['mpg'].mean(), df['mpg'].median()

plt.axvline(media, color=cores[0], lw=3, ls="--")
plt.axvline(mediana, color=cores[1], lw=3, ls="--")
```

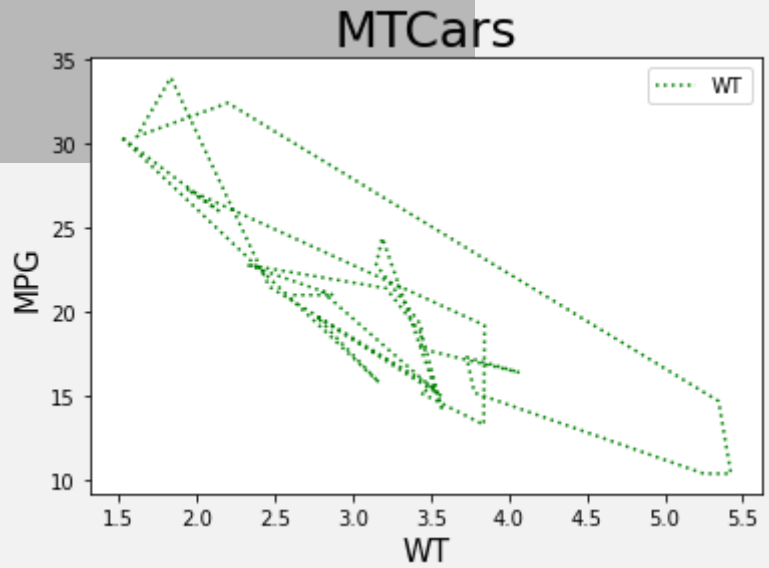



```
cores = ["orange","purple"]
legenda = ["Média","Mediana"]

plt.hist(df['mpg'], edgecolor="black");
media, mediana = df['mpg'].mean(), df['mpg'].median()

plt.axvline(media, color=cores[0], lw=3, ls="--")
plt.axvline(mediana, color=cores[1], lw=3, ls="--")

plt.legend(legenda, loc="upper right")
```



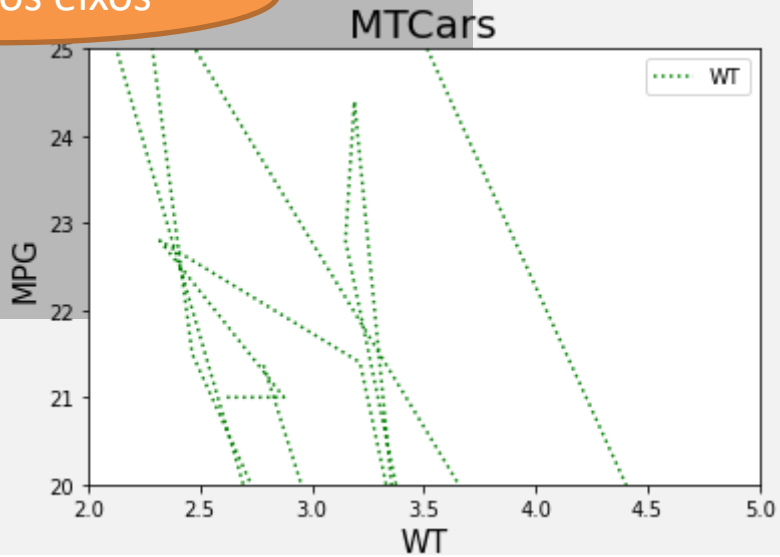

```
cores = ["orange","purple"]
legenda = ["Média","Mediana"]

plt.hist(df['mpg'], edgecolor="black");
media, mediana = df['mpg'].mean(), df['mpg'].median()
plt.axvline(media, color=cores[0], lw=3, ls="--")
plt.axvline(mediana, color=cores[1], lw=3, ls="--")

plt.legend(legenda, loc="upper right")

plt.annotate(legenda[0], xy=(media + 0.5, 6),
             color=cores[0], fontsize=20)
plt.annotate(legenda[1], xy=(mediana - 3,6),
             color=cores[1], fontsize=20)
```

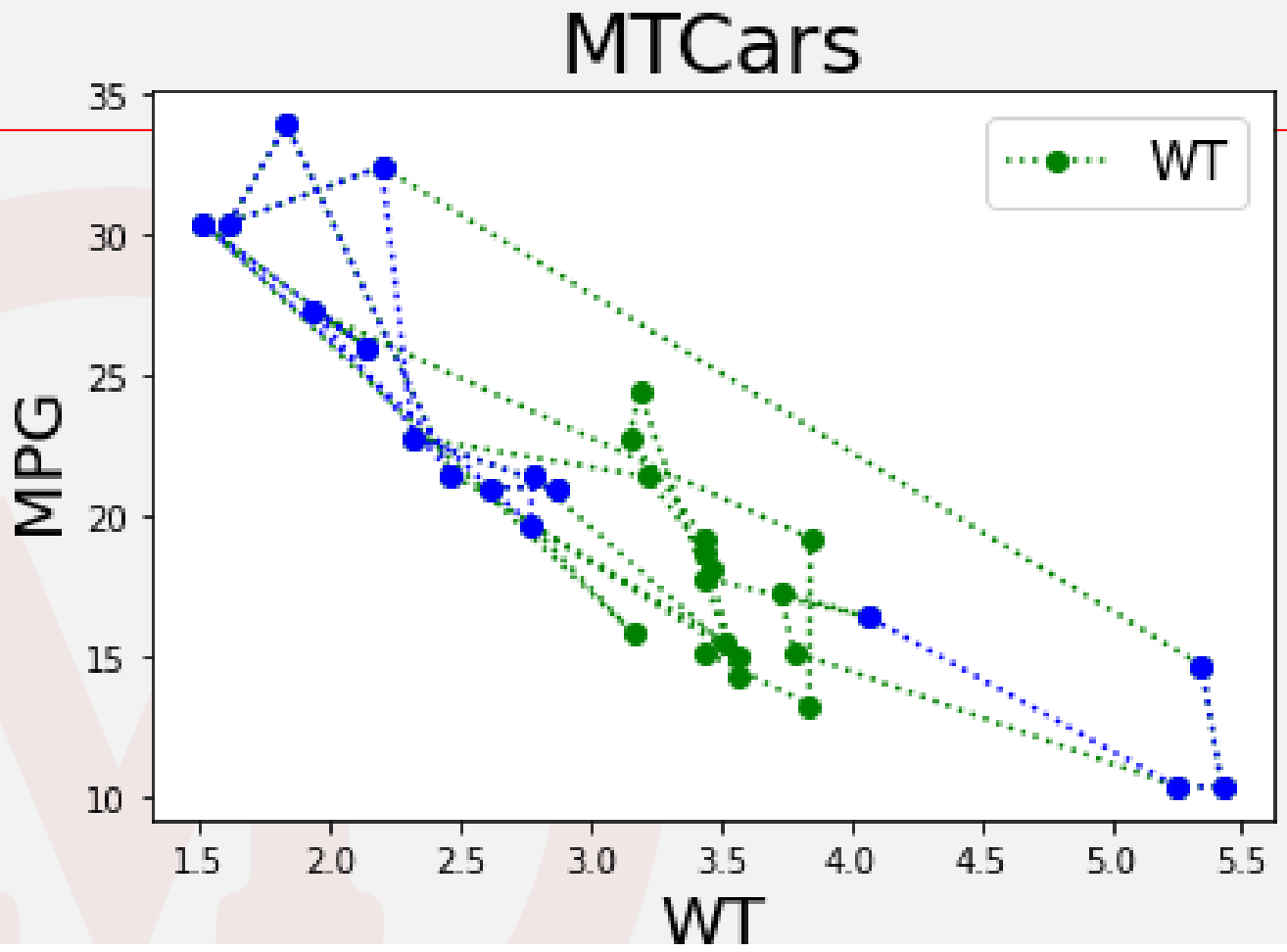
```
plt.plot(df['wt'], df['mpg'], color="green", ls = "dotted")
plt.title("MTCars", fontsize=25)
plt.xlabel("WT", fontsize=15)
plt.ylabel("MPG", fontsize=15)
plt.legend(["WT"], loc="upper right")
```



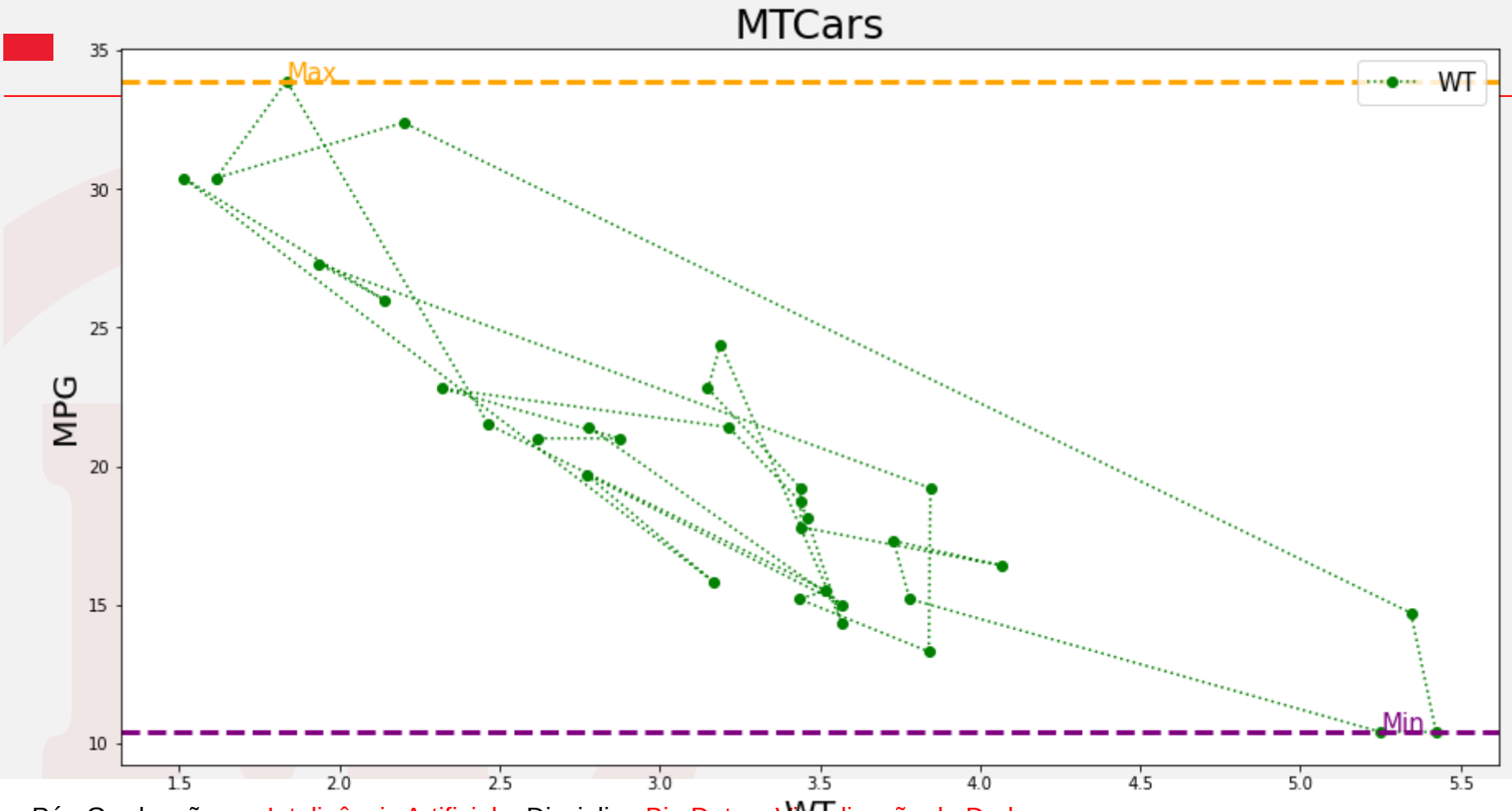
```
plt.plot(df['wt'], df['mpg'], color="green", ls = "dotted")

plt.xlim(2,5)
plt.ylim(20,25)

plt.title("MTCars", fontsize=20)
plt.xlabel("WT", fontsize=15)
plt.ylabel("MPG", fontsize=15)
plt.legend(["WT"], loc="upper right")
```

Limite dos eixos

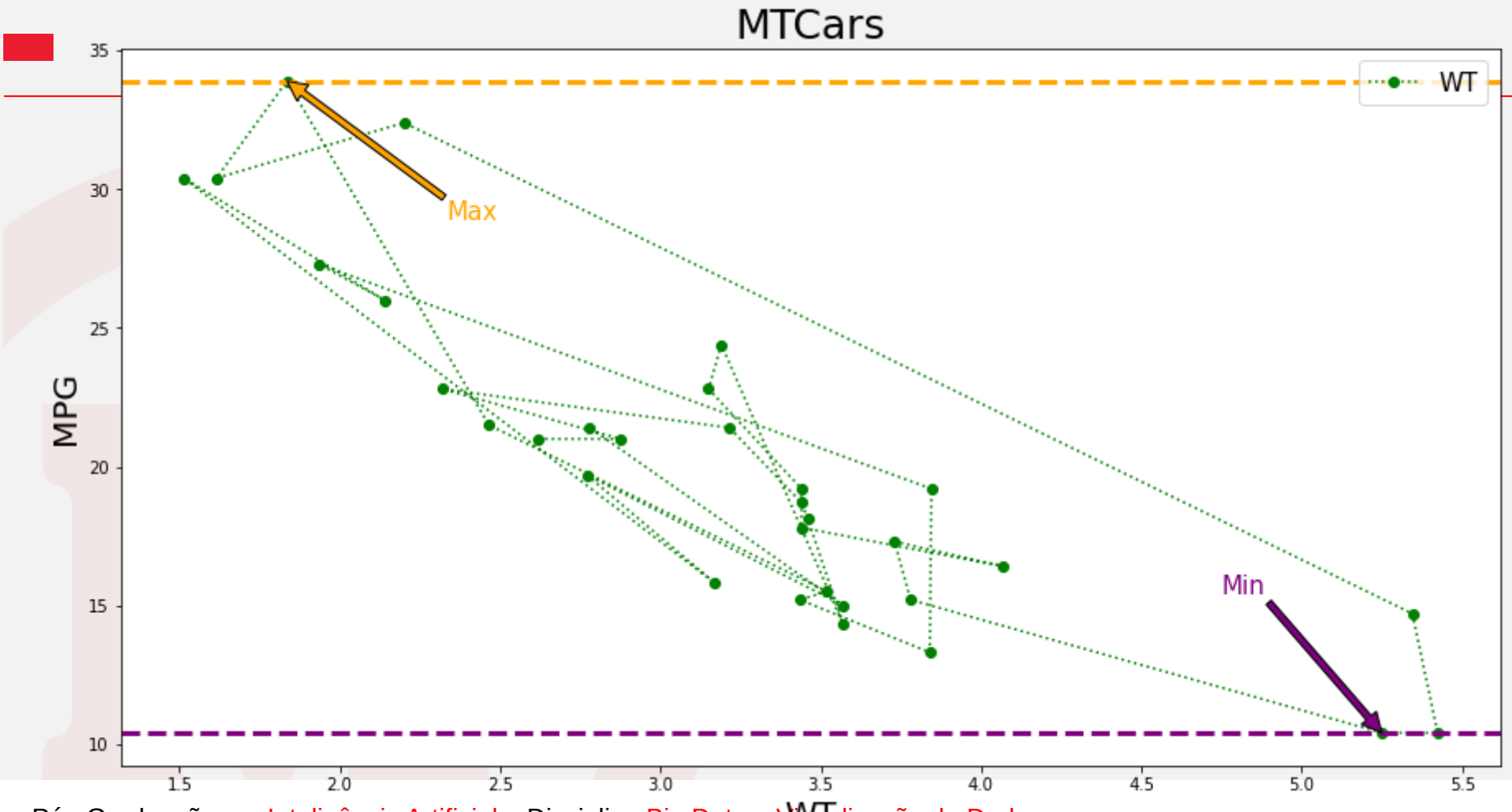



MTCars
WT
MPG
WT
35
30
25
20
15
10
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5

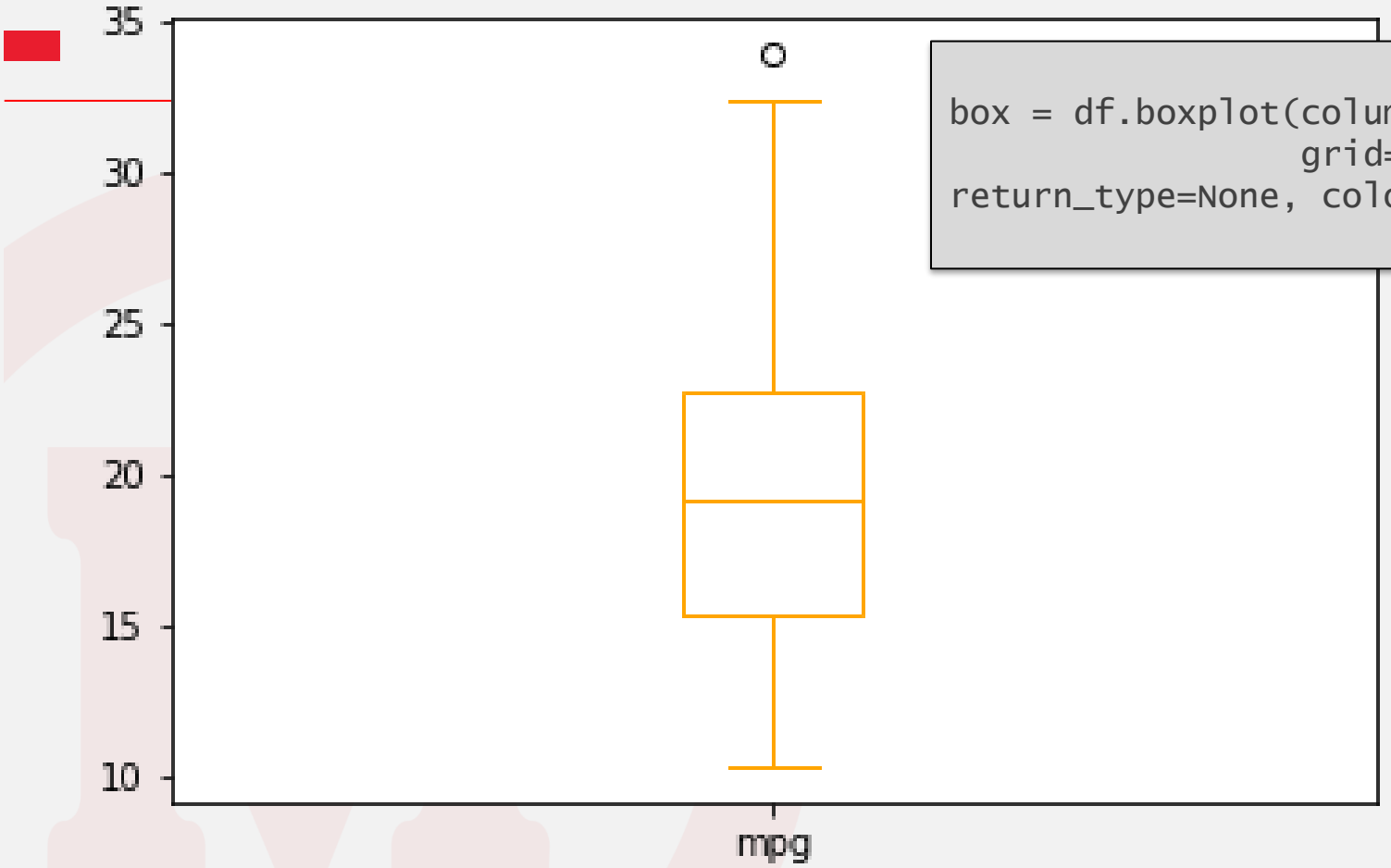
```
menor_3 = df["wt"] < 3
maior_4 = df["wt"] > 4

plt.plot(df['wt'], df['mpg'], color="green", ls = "dotted"
         , marker = "o")
plt.plot(df[menor_3]['wt'],df[menor_3]['mpg'],color="blue"
         , ls = "dotted", marker = "o")
plt.plot(df[maior_4]['wt'],df[maior_4]['mpg'],color="blue"
         , ls = "dotted", marker = "o")
plt.title("MTCars", fontsize=25)
plt.xlabel("WT", fontsize=20)
plt.ylabel("MPG", fontsize=20)
plt.legend(["WT"], loc="upper right", fontsize=15)
```


MTCars
Max
Min
WT
MPG
WT
35
30
25
20
15
10
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5

```
plt.plot(df['wt'], df['mpg'], color="green", ls = "dotted", marker = "o")
plt.title("MTCars", fontsize=25)
plt.xlabel("WT", fontsize=20)
plt.ylabel("MPG", fontsize=20)
plt.legend(["WT"], loc="upper right", fontsize=15)

plt.axhline(max(df['mpg']), color="orange", lw=3, ls="--")
plt.axhline(min(df['mpg']), color="purple", lw=3, ls='--')

x_max = df['wt'][df['mpg'].idxmax()]
y_max = max(df['mpg'])
plt.annotate("Max", xy=(x_max,y_max), color="orange", fontsize=15)

x_min = df['wt'][df['mpg'].idxmin()]
y_min = min(df['mpg'])
plt.annotate("Min", xy=(x_min,y_min), color="purple", fontsize=15)
```

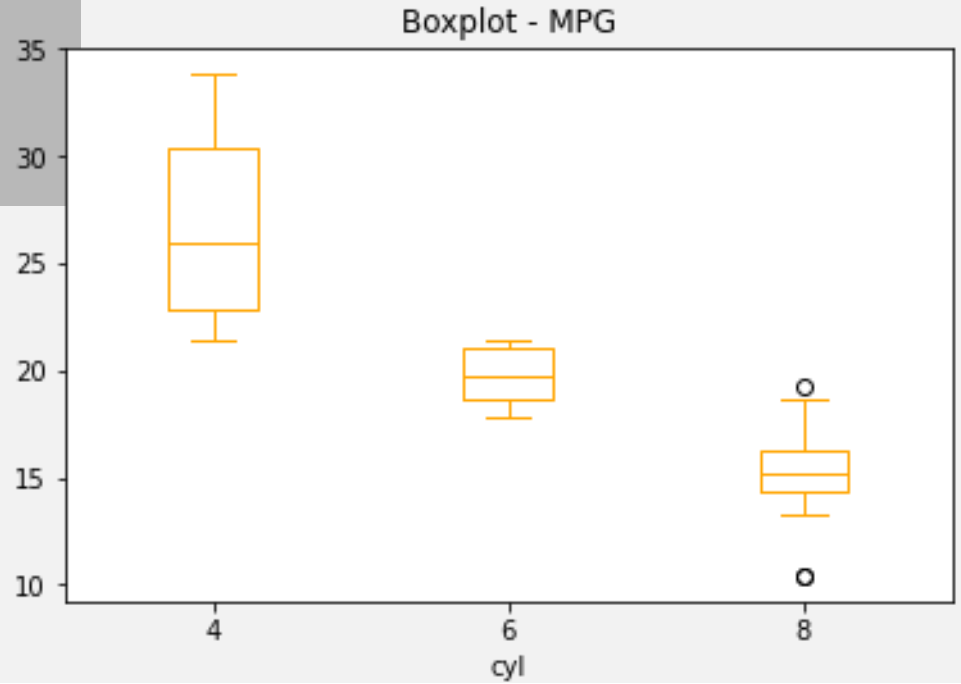

MTCars
WT
Max
Min
MPG
WT
35
30
25
20
15
10
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5

```
plt.plot(df['wt'], df['mpg'], color="green", ls = "dotted", marker = "o")
plt.title("MTCars", fontsize=25)
plt.xlabel("WT", fontsize=20)
plt.ylabel("MPG", fontsize=20)
plt.legend(["WT"], loc="upper right", fontsize=15)

plt.axhline(max(df['mpg']), color="orange", lw=3, ls="--")
plt.axhline(min(df['mpg']), color="purple", lw=3, ls='--')

x_max = df['wt'][df['mpg'].idxmax()]
y_max = max(df['mpg'])

xt_max = df['wt'][df['mpg'].idxmax()] + 0.5
yt_max = max(df['mpg']) - 5

plt.annotate("Max", xy=(x_max,y_max), color="orange",
             fontsize=15,xytext=(xt_max,yt_max), arrowprops=dict(facecolor="orange") )



x_min = df['wt'][df['mpg'].idxmin()]
y_min = min(df['mpg'])

xt_min = df['wt'][df['mpg'].idxmin()] - 0.5
yt_min = min(df['mpg']) + 5

plt.annotate("Min", xy=(x_min,y_min), color="purple", fontsize=15,
            xytext=(xt_min,yt_min), arrowprops=dict(facecolor="purple"))
```




```
box = df.boxplot(column="mpg",
                 grid=False,
return_type=None, color='orange')
```

```
box = df.boxplot(column="mpg", by="cyl",
                 grid=False,
return_type=None, color='orange')
plt.suptitle("")
plt.title("Boxplot - MPG")
```



Aprendendo a usar graficos

Referências - Materiais

Estilo de linha: https://matplotlib.org/3.2.1/api/_as_gen/matplotlib.lines.Line2D.html

BoxPlot no MatPlotLib: https://matplotlib.org/api/_as_gen/matplotlib.pyplot.boxplot.html

Cores no MatPlotLib: https://matplotlib.org/gallery/color/named_colors.html

Marcador no MatPlotLib: https://matplotlib.org/api/markers_api.html?highlight=marker

BoxPlot no Pandas:
https://pandas.pydata.org/pandas-docs/version/0.23.4/generated/pandas.DataFrame.boxplot.html

Faculdade de Computação e Informática

Mackenzie