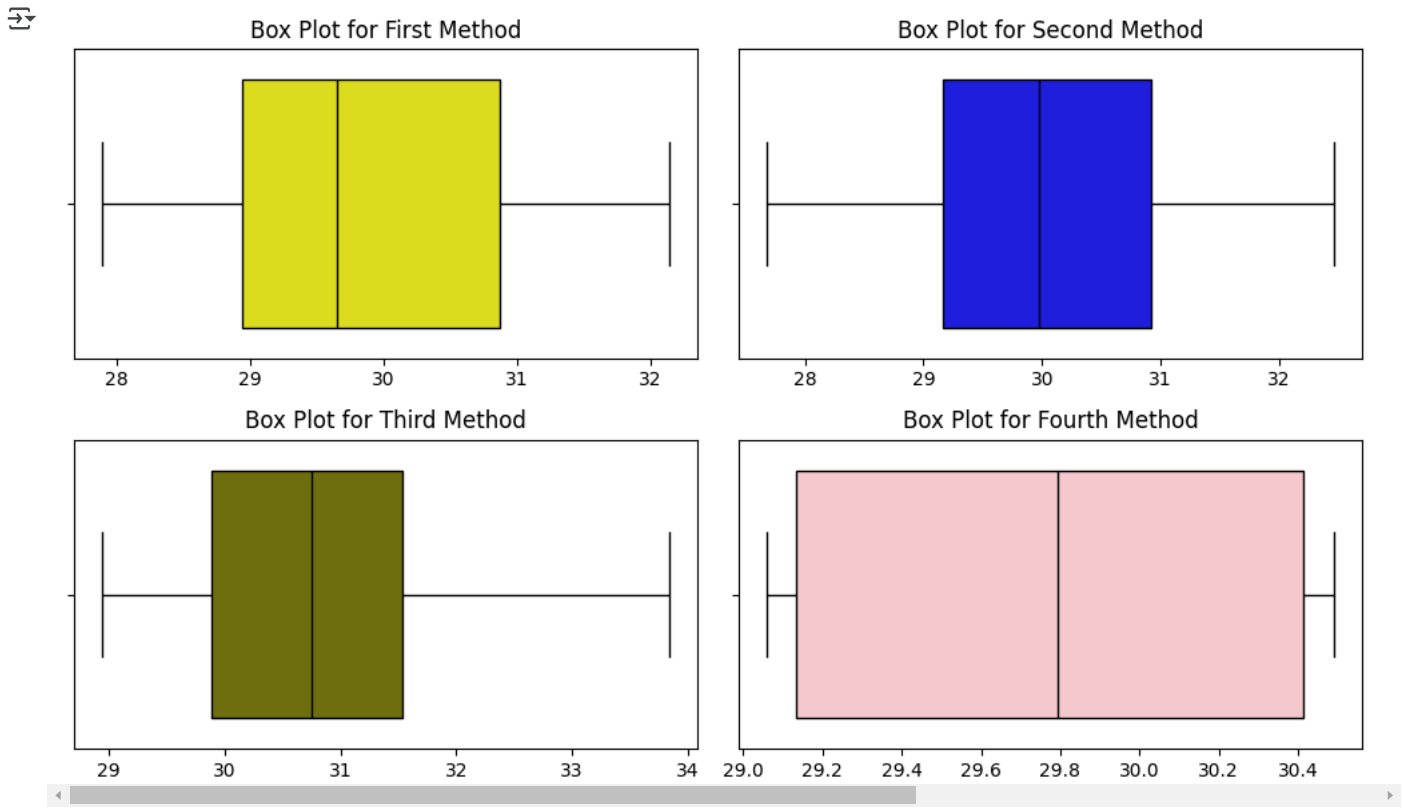
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import scipy.stats as stats


# Example 1
# 6 samples were taken from each of 6 different methods
# Creating data lists for each method
m1 =[28.91, 32.14, 29.04, 30.27, 27.89, 31.07]
m2 = [27.68, 29.47, 30.47, 32.46, 31.07, 29.06]
m3 = [33.84, 31.24, 30.27, 29.75, 28.94, 31.63]
m4 = [29.06, 30.47, 29.06, 30.24, 30.49, 29.35]


# Creating Box Plot

plt.figure(figsize=(10,6))
plt.subplot(2,2,1)
sns.boxplot(m1, orient = 'h', fill = True, color = 'yellow', linecolor = 'black')
plt.title('Box Plot for First Method')
plt.subplot(2,2,2)
sns.boxplot(m2, orient = 'h', fill = True, color = 'blue', linecolor = 'black')
plt.title('Box Plot for Second Method')
plt.subplot(2,2,3)
sns.boxplot(m3, orient = 'h', fill = True, color = 'olive', linecolor = 'black')
plt.title('Box Plot for Third Method')
plt.subplot(2,2,4)
sns.boxplot(m4, orient = 'h', fill = True, color = 'pink', linecolor = 'black')
plt.title('Box Plot for Fourth Method')
plt.tight_layout()
plt.show()
```




```
# Formulation of Hypothesis
# Ha: Alternate Hypothesis = The mean values of excipients for the methods are not equal or they are different
# Ho: Null Hypothesis = The mean values of excipients for the methods are equal or they are same
# Confidence Level = 95% , Hence Alpha = 5% - ANOVA is One Tailed Test


# Using One Way ANOVA (Analysis of Variance )
stats.f_oneway(m1,m2,m3,m4)
```

```
F_onewayResult(statistic=0.7837713488076711, pvalue=0.5169433688688806)
```

```
# We note that pvalue = 0.5169 > Alpha = 0.05
# As p is high, NULL must fly
```

```
# Therefore we cannot reject NULL Hypothesis
# Therefore we conclude that the mean value of excipients for these four methods are same or they are not different


# Example 2
# 5 Samples of batteries taken for 4 different Brands
# Creating data lists for each Brand
b1 =[42, 30, 39, 28, 29]
b2 = [28, 36, 31, 32, 27]
b3 = [24, 36, 28, 28, 33]
b4 = [20, 32, 38, 28, 25]


# Formulation of Hypothesis
# Ha: Alternate Hypothesis = The mean lifetime of batteries for all these Brands are not equal or they are different
# Ho: Null Hypothesis = The mean lifetime of batteries for all these Brands are equal or they are same
# Confidence Level = 95% , Hence Alpha = 5% - ANOVA is One Tailed Test


# Using One Way ANOVA (Analysis of Variance )
stats.f_oneway(b1,b2,b3,b4)
```

```
F_onewayResult(statistic=0.7392953929539297, pvalue=0.5439408823819896)
```

```
# We note that pvalue = 0.5439 > Alpha = 0.05
# As p is high, NULL must fly
# Therefore we cannot reject NULL Hypothesis
# Therefore we conclude that the mean lifetime of batteries for all these Brands are not equal or they are different
```