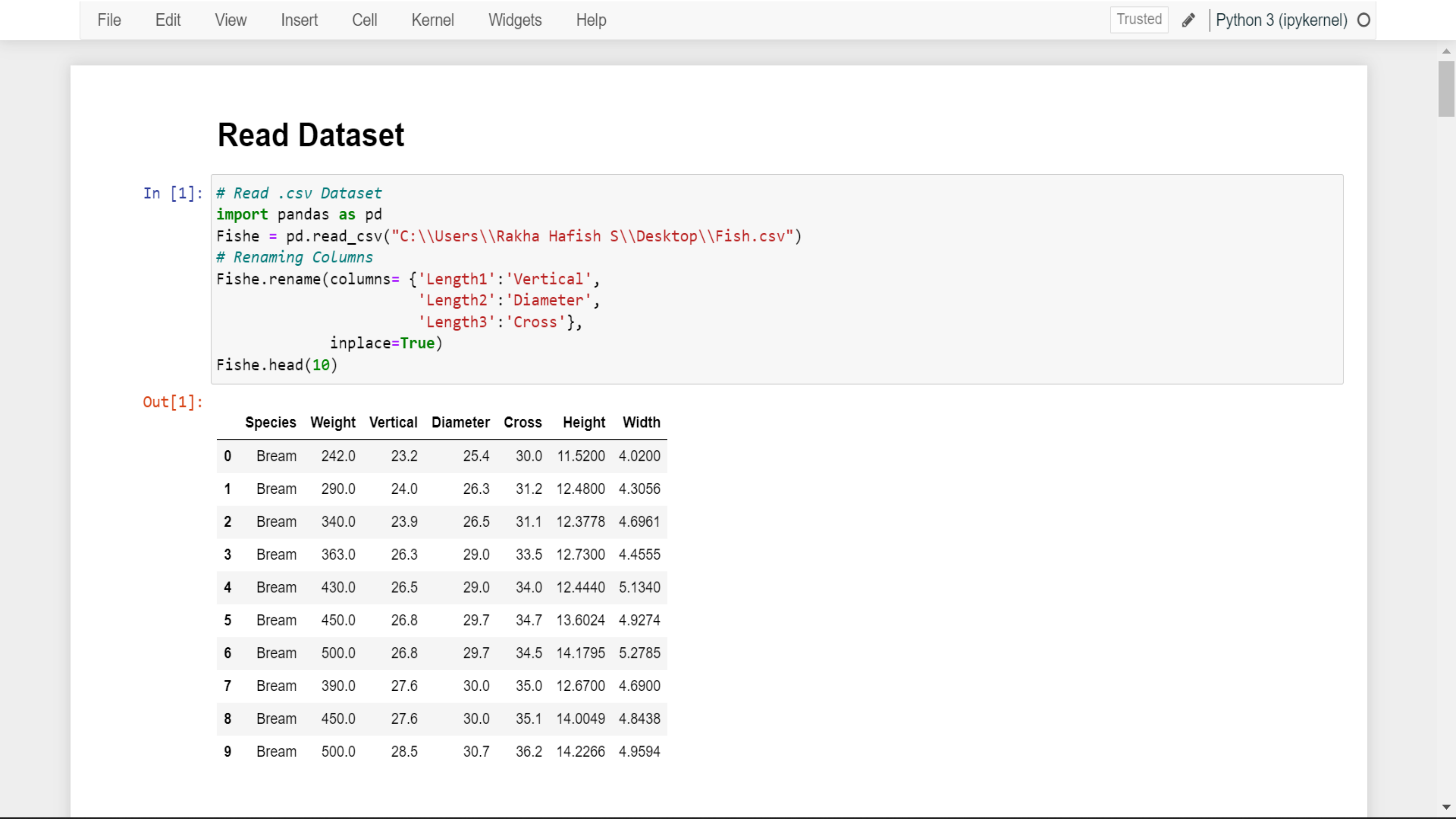


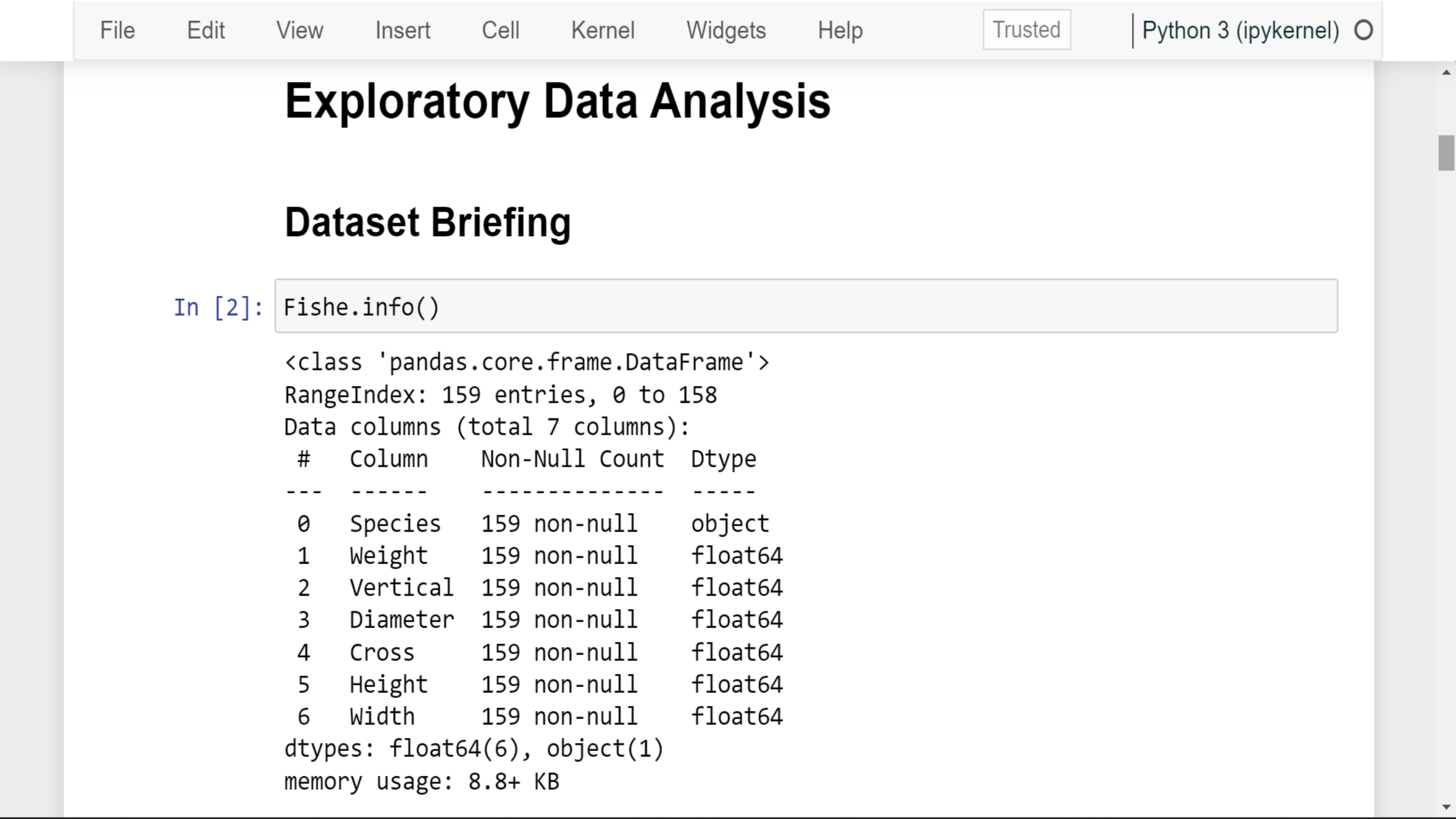
Read Dataset

In [1]:

```
# Read .csv Dataset
import pandas as pd
Fishe = pd.read_csv("C:\\Users\\Rakha Hafish S\\Desktop\\Fish.csv")
# Renaming Columns
Fishe.rename(columns= {'Length1':'Vertical',
                      'Length2':'Diameter',
                      'Length3':'Cross'},
             inplace=True)
Fishe.head(10)
```

Out[1]:

	Species	Weight	Vertical	Diameter	Cross	Height	Width
0	Bream	242.0	23.2	25.4	30.0	11.5200	4.0200
1	Bream	290.0	24.0	26.3	31.2	12.4800	4.3056
2	Bream	340.0	23.9	26.5	31.1	12.3778	4.6961
3	Bream	363.0	26.3	29.0	33.5	12.7300	4.4555
4	Bream	430.0	26.5	29.0	34.0	12.4440	5.1340
5	Bream	450.0	26.8	29.7	34.7	13.6024	4.9274
6	Bream	500.0	26.8	29.7	34.5	14.1795	5.2785
7	Bream	390.0	27.6	30.0	35.0	12.6700	4.6900
8	Bream	450.0	27.6	30.0	35.1	14.0049	4.8438
9	Bream	500.0	28.5	30.7	36.2	14.2266	4.9594

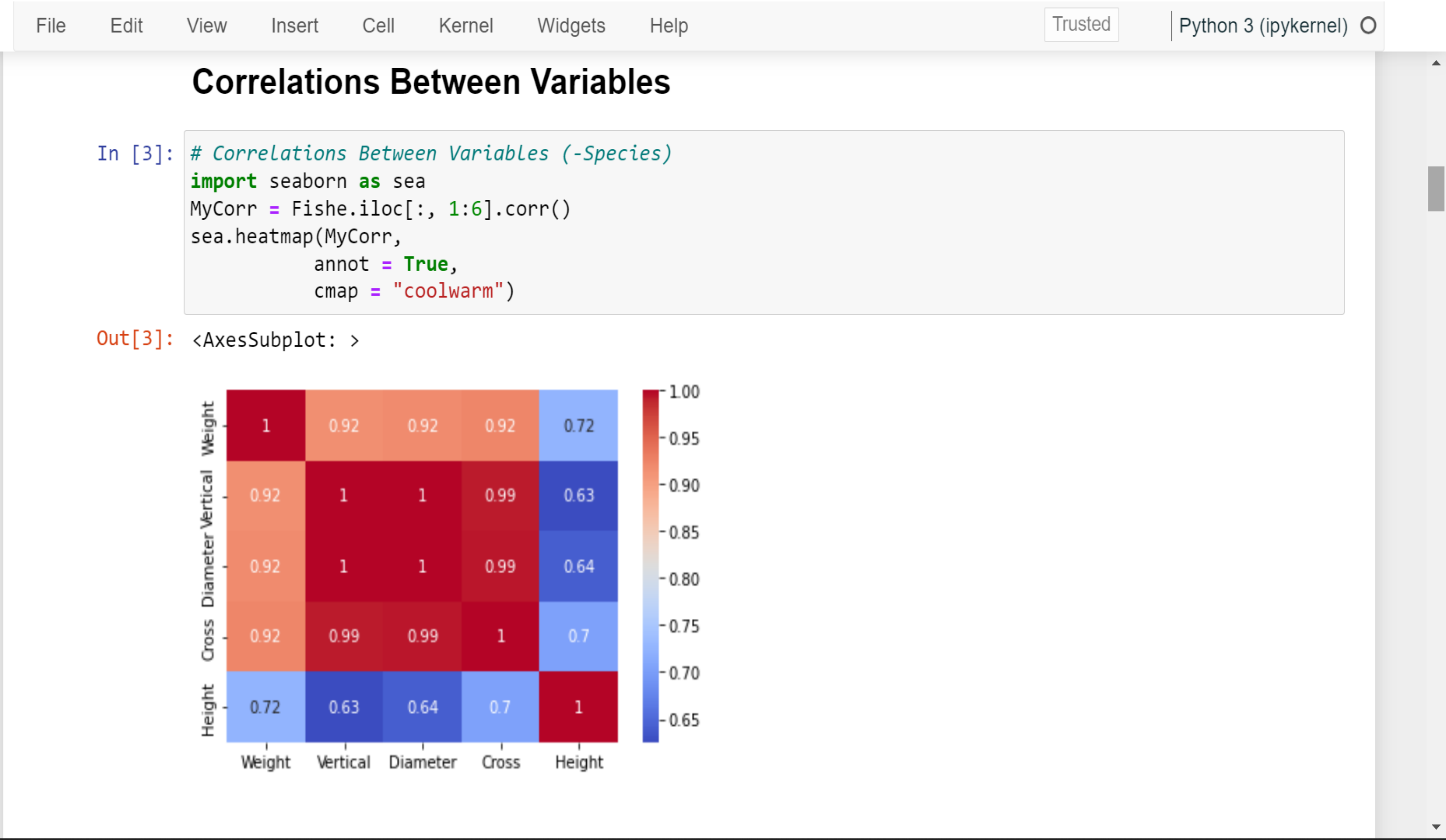


Exploratory Data Analysis

Dataset Briefing

```
In [2]: Fishe.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 159 entries, 0 to 158
Data columns (total 7 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   Species   159 non-null    object 
 1   Weight    159 non-null    float64
 2   Vertical  159 non-null    float64
 3   Diameter  159 non-null    float64
 4   Cross     159 non-null    float64
 5   Height    159 non-null    float64
 6   Width     159 non-null    float64
dtypes: float64(6), object(1)
memory usage: 8.8+ KB
```



Correlations Between Variables

In [3]:
```
# Correlations Between Variables (-Species)
import seaborn as sea
MyCorr = Fishe.iloc[:, 1:6].corr()
sea.heatmap(MyCorr,
            annot = True,
            cmap = "coolwarm")
```

Out[3]:
```
<AxesSubplot: >
```

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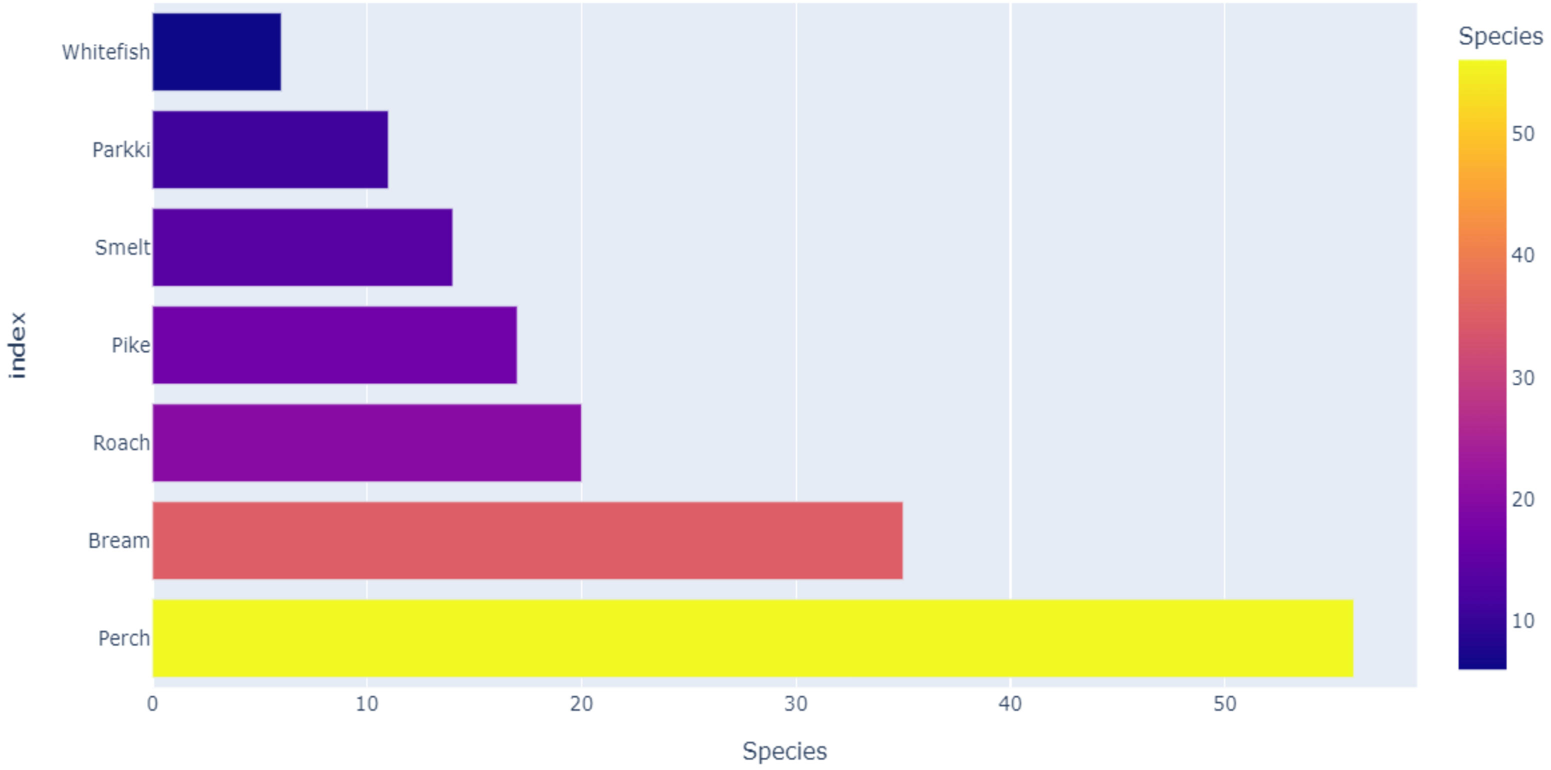
Specimen Count of Each Species

In [4]:
```
# Species Grouping
Count = Fishe["Species"].value_counts()
Count = pd.DataFrame(Count)

# Species Count Plot
import plotly.express as xplot
MyBar = xplot.bar(Count,
         x = "Species",
         color = "Species")
MyBar.show()
```



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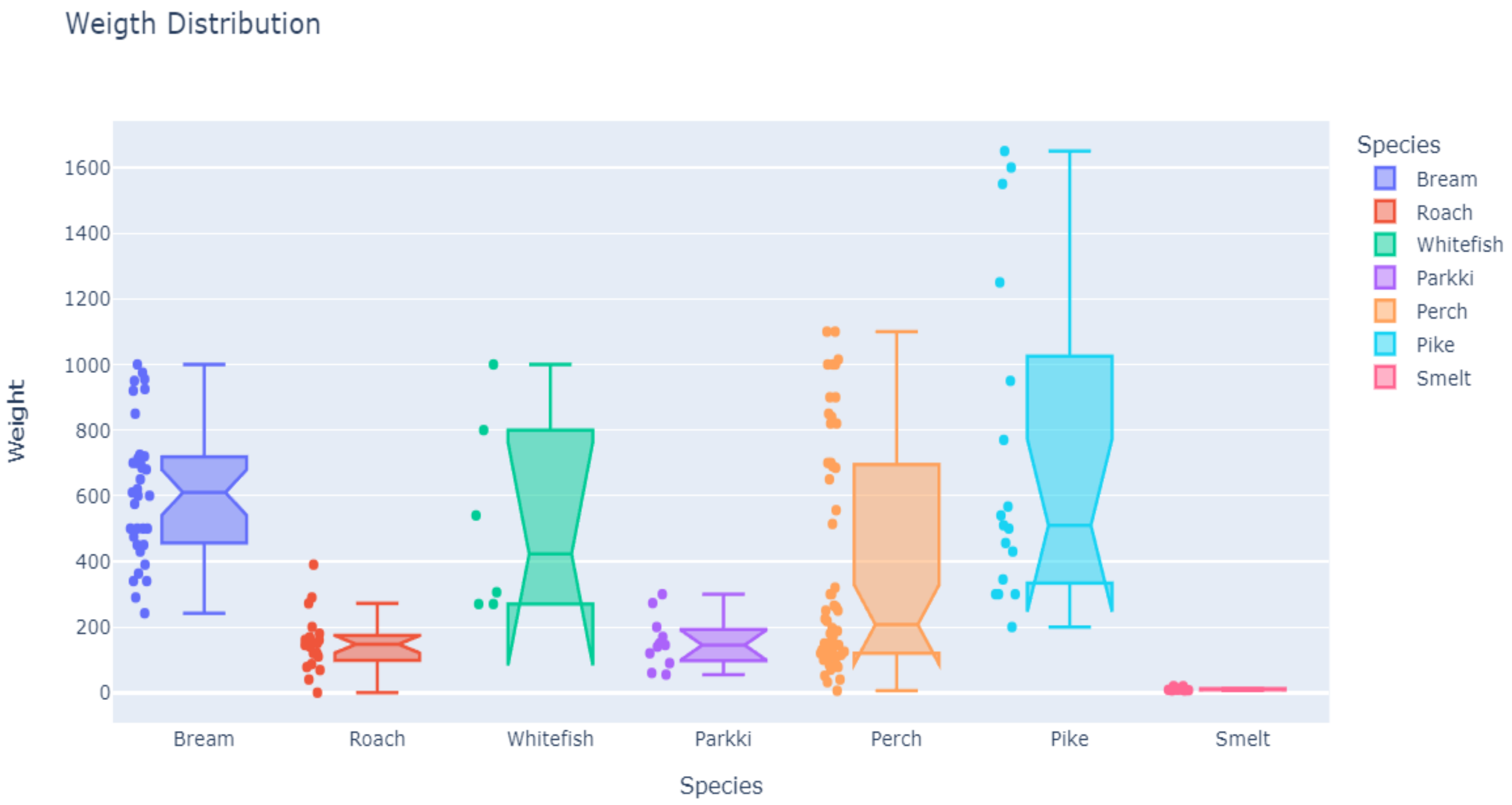
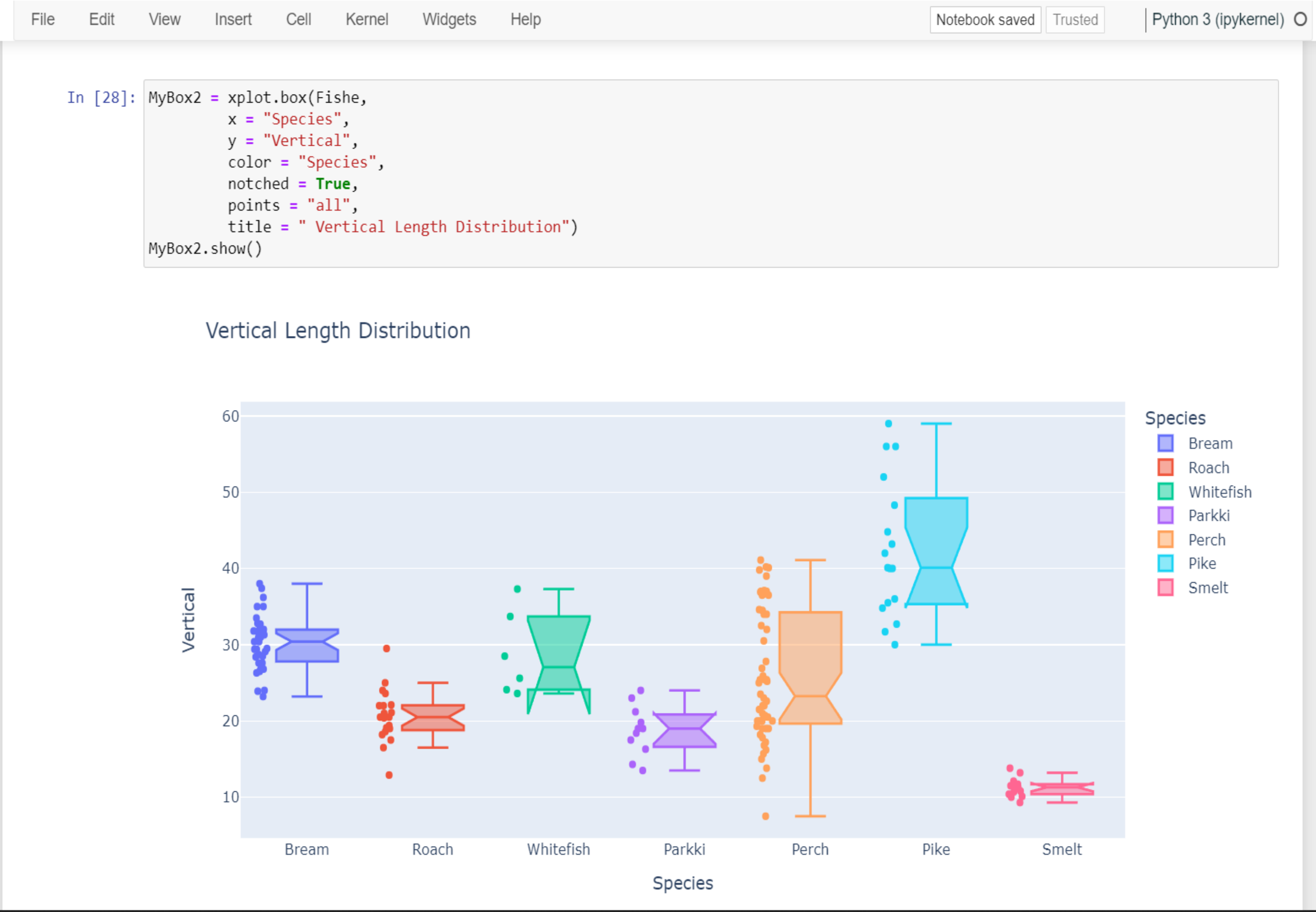
Values Distribution

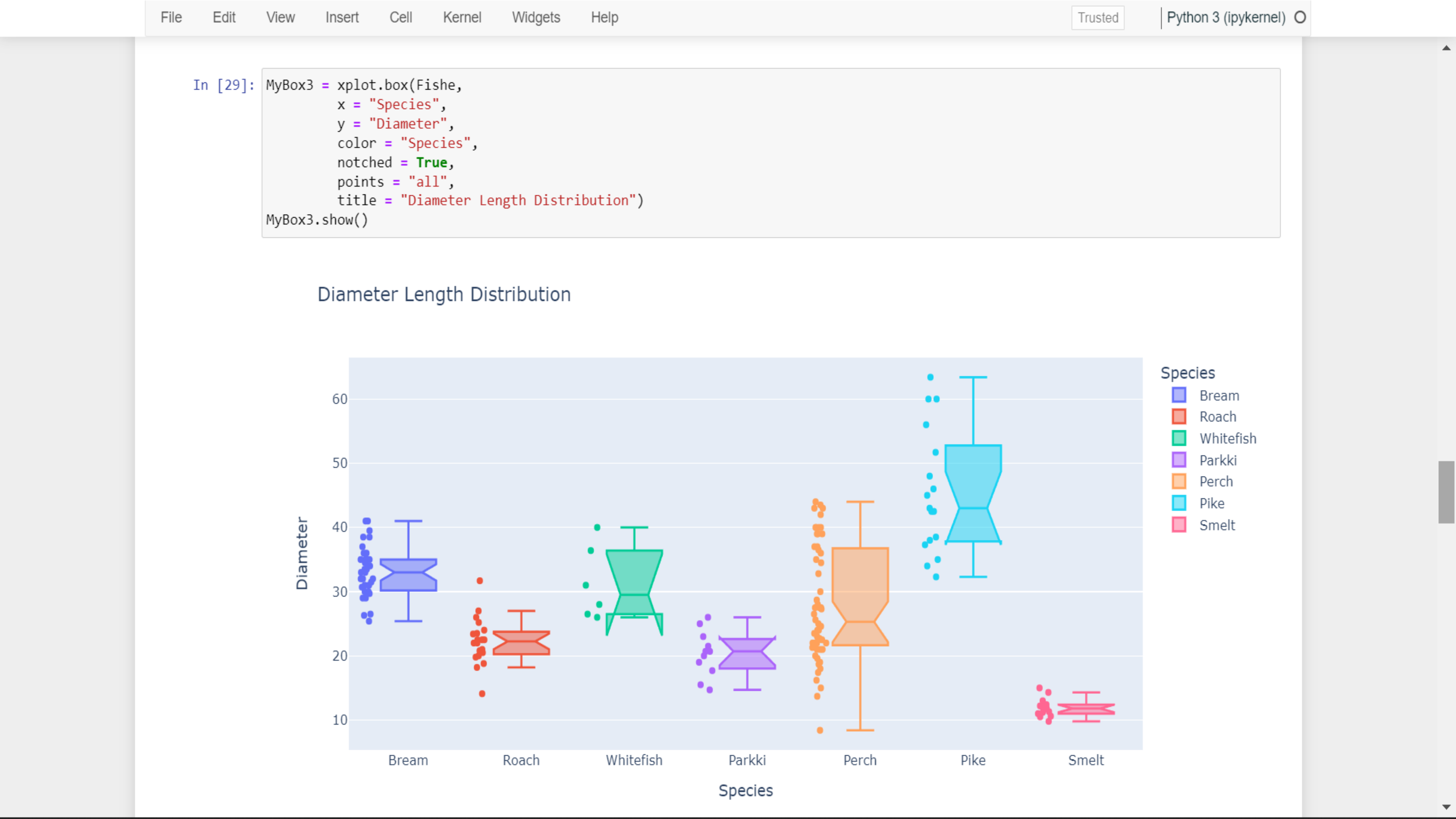
```
In [26]: MyBox1 = xplot.box(Fishe,
                  x = "Species",
                  y = "Weight",
                  color = "Species",
                  notched = True,
                  points = "all",
                  title = "Weight Distribution")
         MyBox1.show()
```





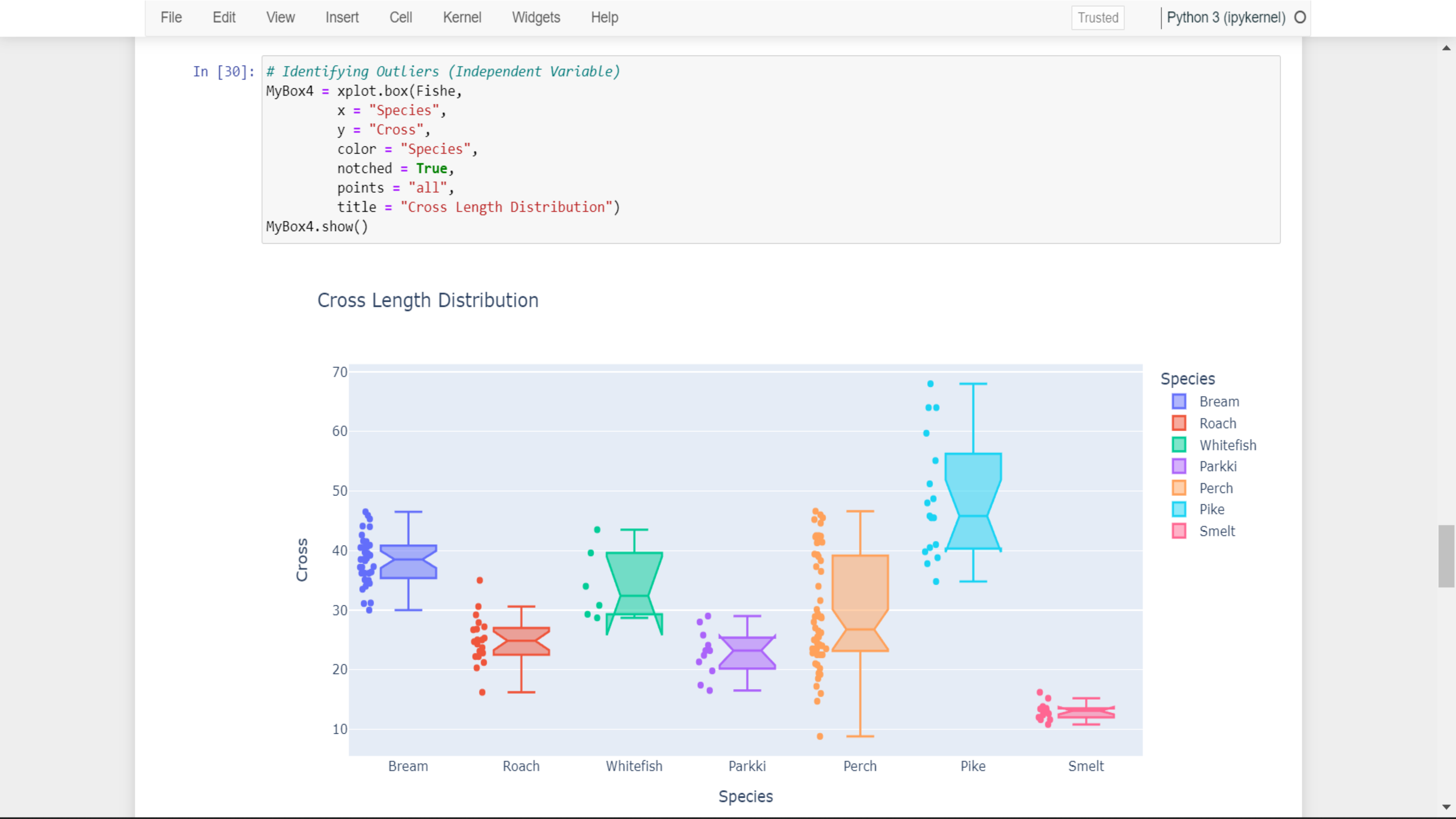
```
MyBox2 = xplot.box(Fishe,
         x = "Species",
         y = "Vertical",
         color = "Species",
         notched = True,
         points = "all",
         title = " Vertical Length Distribution")
MyBox2.show()
```

Vertical Length Distribution

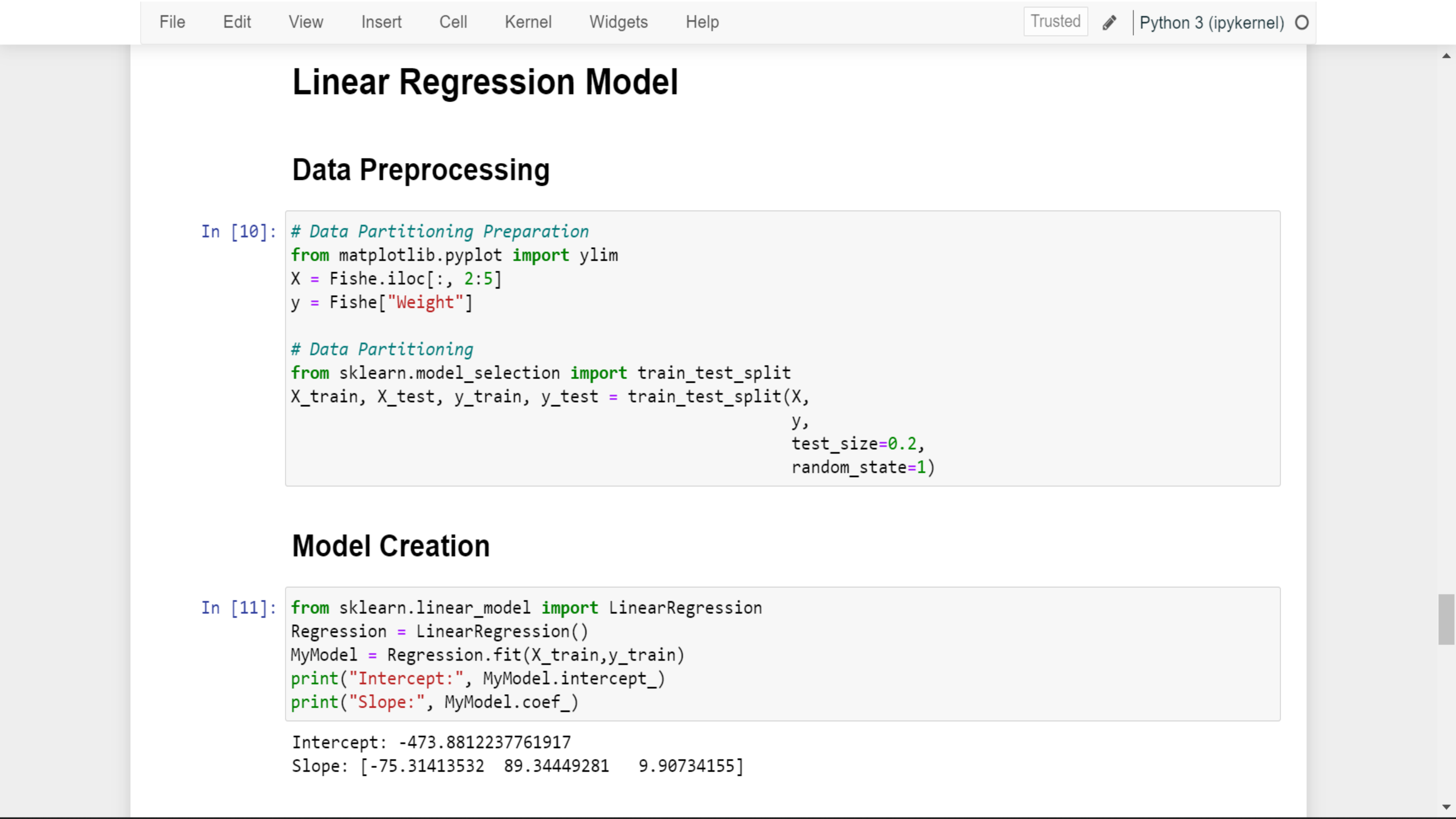


```
In [29]: MyBox3 = xplot.box(Fishe,
                  x = "Species",
                  y = "Diameter",
                  color = "Species",
                  notched = True,
                  points = "all",
                  title = "Diameter Length Distribution")
         MyBox3.show()
```

Diameter Length Distribution



```
# Identifying Outliers (Independent Variable)
MyBox4 = xplot.box(Fishe,
         x = "Species",
         y = "Cross",
         color = "Species",
         notched = True,
         points = "all",
         title = "Cross Length Distribution")
MyBox4.show()
```



Linear Regression Model

Data Preprocessing

In [10]:

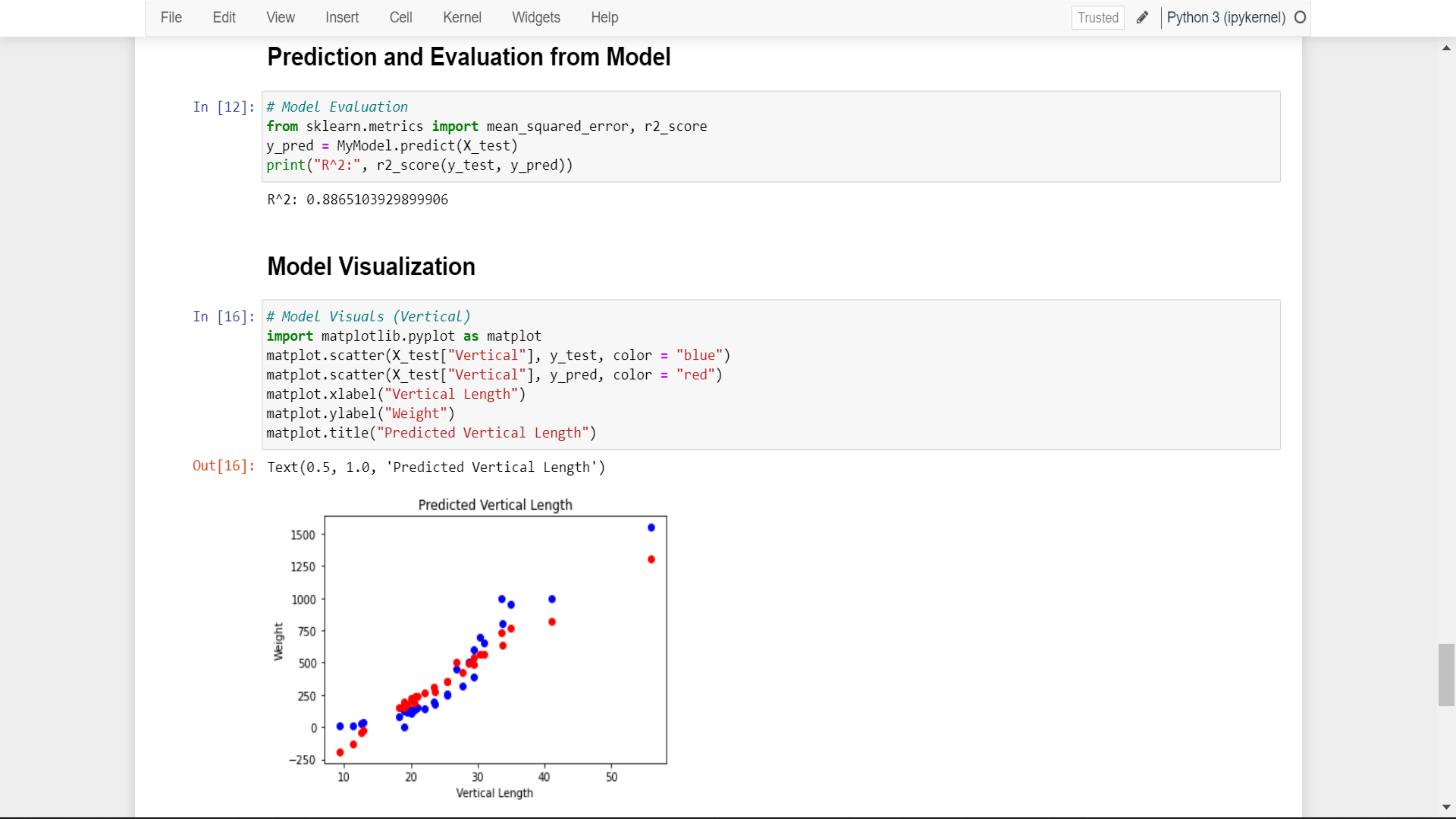
```
# Data Partitioning Preparation
from matplotlib.pyplot import ylim
X = Fishe.iloc[:, 2:5]
y = Fishe["Weight"]

# Data Partitioning
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X,
                                                    y,
                                                    test_size=0.2,
                                                    random_state=1)
```

Model Creation

In [11]:

```
from sklearn.linear_model import LinearRegression
Regression = LinearRegression()
MyModel = Regression.fit(X_train,y_train)
print("Intercept:", MyModel.intercept_)
print("Slope:", MyModel.coef_)
```

```
Intercept: -473.8812237761917
Slope: [-75.31413532  89.34449281   9.90734155]
```



Prediction and Evaluation from Model

In [12]:
```
# Model Evaluation
from sklearn.metrics import mean_squared_error, r2_score
y_pred = MyModel.predict(X_test)
print("R^2:", r2_score(y_test, y_pred))
```

```
R^2: 0.8865103929899906
```

Model Visualization

In [16]:
```
# Model Visuals (Vertical)
import matplotlib.pyplot as matplot
matplot.scatter(X_test["Vertical"], y_test, color = "blue")
matplot.scatter(X_test["Vertical"], y_pred, color = "red")
matplot.xlabel("Vertical Length")
matplot.ylabel("Weight")
matplot.title("Predicted Vertical Length")
```

Out[16]:
```
Text(0.5, 1.0, 'Predicted Vertical Length')
```

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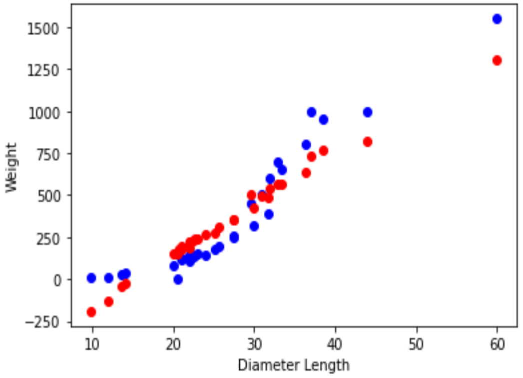
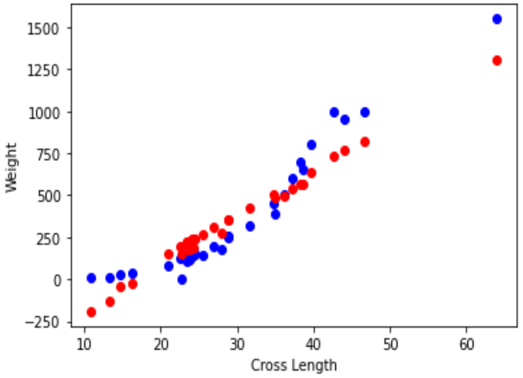
In [14]:
```
# Model Visuals (Diameter)
matplot.scatter(X_test["Diameter"], y_test, color = "blue")
matplot.scatter(X_test["Diameter"], y_pred, color = "red")
matplot.xlabel("Diameter Length")
matplot.ylabel("Weight")
matplot.title("Predicted Diameter Length")
```

Out[14]:
```
Text(0, 0.5, 'Weight')
```



In [15]:
```
# Model Visuals (Vertical)
matplot.scatter(X_test["Cross"], y_test, color = "blue")
matplot.scatter(X_test["Cross"], y_pred, color = "red")
matplot.xlabel("Cross Length")
matplot.ylabel("Weight")
matplot.title("Predicted Cross Length")
```

Out[15]:
```
Text(0, 0.5, 'Weight')
```


Weight
Cross Length