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# Import necessary libraries
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np

# Specify the CSV file containing the dataset
csv_file = "Data-Week4.csv"

# Read the dataset into a Pandas DataFrame
df = pd.read_csv(csv_file)

# Replace infinite values with NaN for data cleanliness
df.replace([np.inf, -np.inf], np.nan, inplace=True)

# Define the columns you want to plot for density plots, histograms, and box plots
columns_to_plot = ["HP", "Attack", "Defense", "Speed"]

# Create a figure for density plots
plt.figure(figsize=(10, 6))

# Create density plots for each selected column and shade the area under the curve
for column in columns_to_plot:
    sns.kdeplot(df[column].dropna(), shade=True, label=column)

# Set plot title, x-axis label, and y-axis label, and display the legend
plt.title("Density Plot")
plt.xlabel('.'.join(columns_to_plot))
plt.ylabel("Density")
plt.legend()
plt.show()

# Create a FacetGrid for histograms
g = sns.FacetGrid(df.melt(value_vars=columns_to_plot), col="variable", col_wrap=3,
sharex=False, sharey=False)

# Map histogram plots with kernel density estimation for each column
g.map_dataframe(sns.histplot, kde=True)

# Adjust subplot layout and set the main title
plt.subplots_adjust(top=0.9)
g.fig.suptitle("Histograms")
plt.show()

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# Create a figure for box plots
plt.figure(figsize=(10, 6))

# Create a vertical box plot for the selected columns
sns.boxplot(data=df[columns_to_plot].dropna(), orient="v")

# Set the title and display the plot
plt.title("Box Plot")
plt.show()

# Select a subset of columns for correlation analysis
df = df[["HP", "Attack", "Defense", "Speed"]]

# Calculate the correlation matrix for the selected columns
correlation_matrix = df.corr()

# Create a figure for the correlation heatmap
plt.figure(figsize=(10, 6))

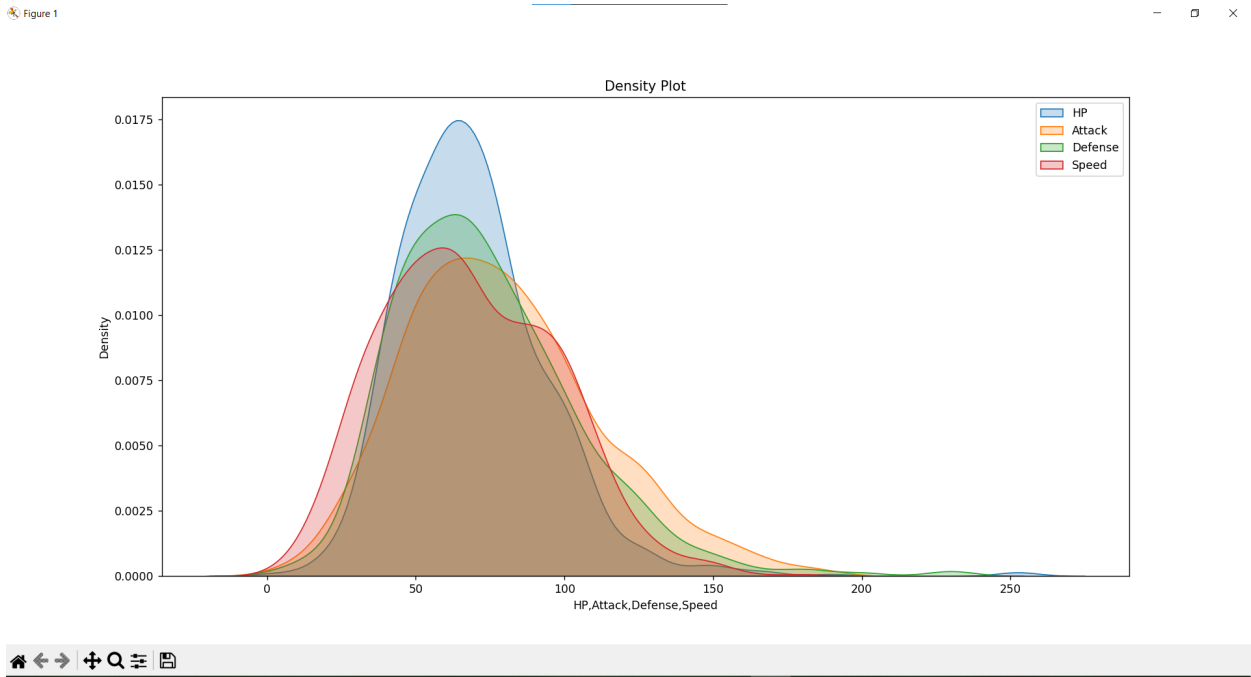
# Create a heatmap to visualize the correlation matrix with annotations
sns.heatmap(correlation_matrix, annot=True, cmap="coolwarm", linewidths=.5)

# Set the title for the heatmap and display it
plt.title("Correlation Heatmap")
plt.show()

# Create pairwise scatter plots for the selected columns
sns.pairplot(df[columns_to_plot])

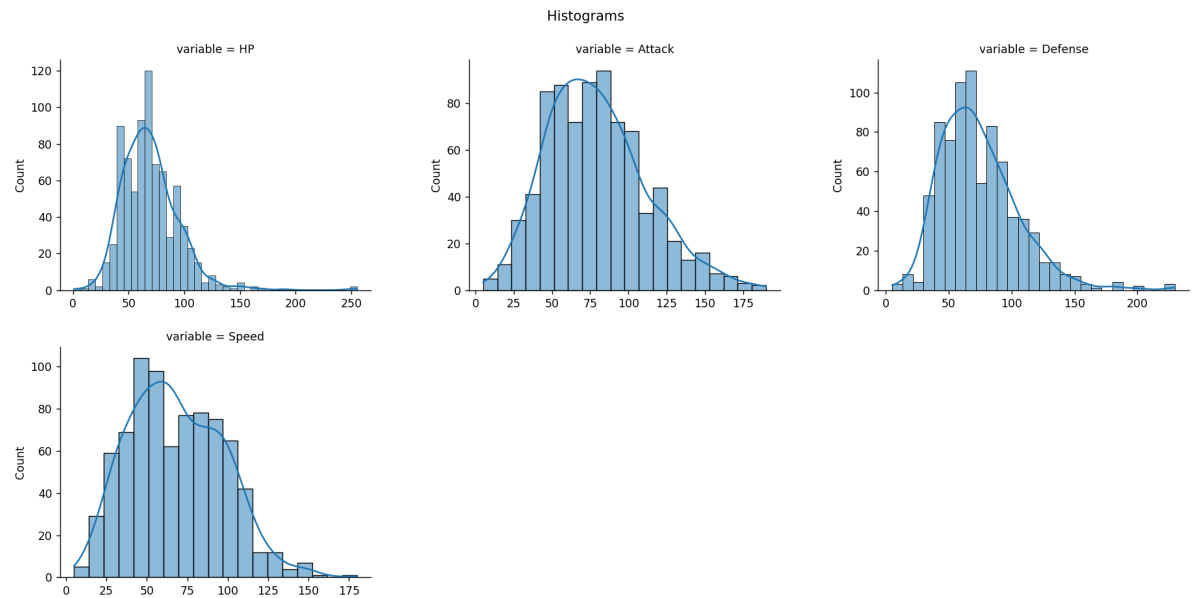
# Set the main title for the pairplot and display it
plt.suptitle("Pairwise Scatter Plots")
plt.show()
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Density plot:



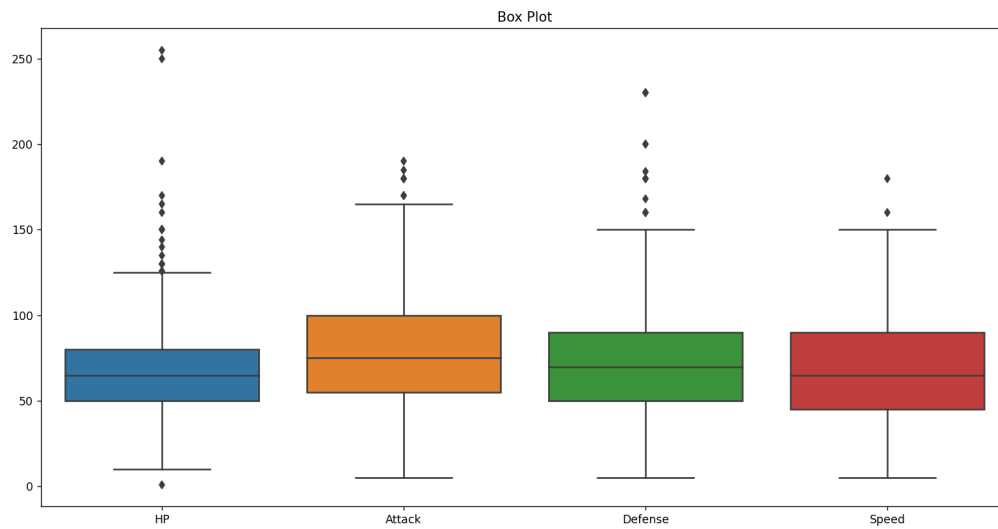
## Histogram plots:

Figure 1

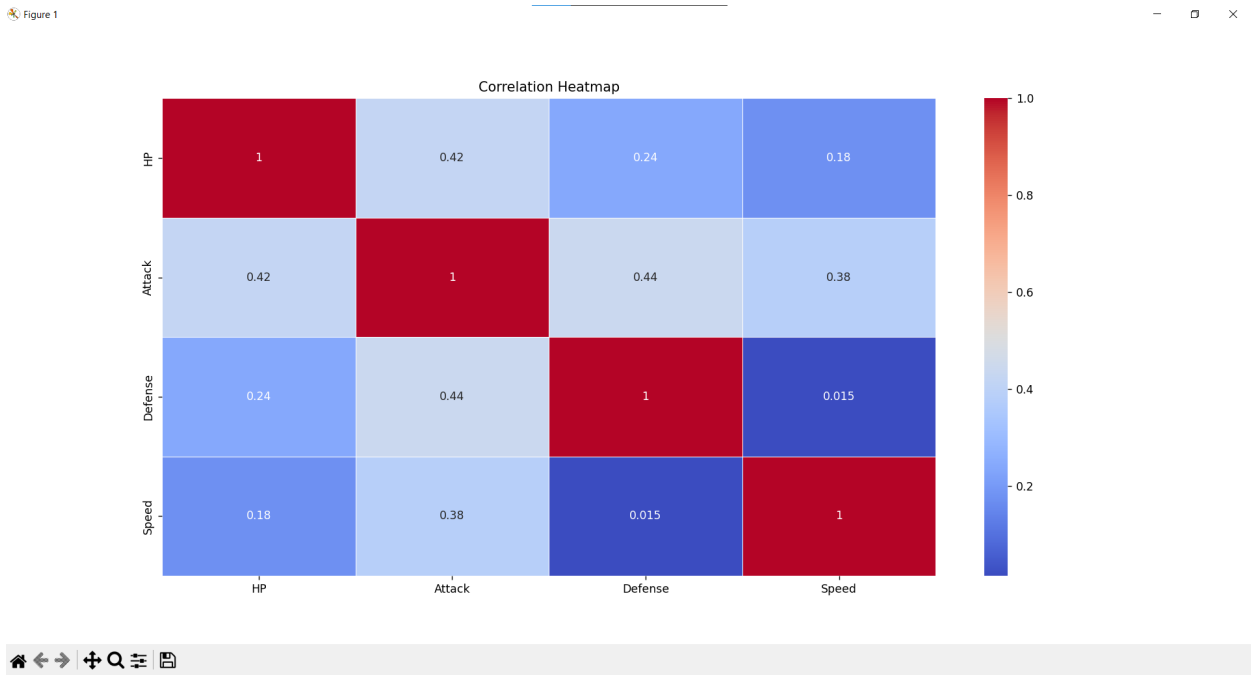


## Box plots:

Figure 1



Correlation map:



Pairwise scatter plots:

