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import pandas as pd
import numpy as np

df = pd.read_excel("FEV-data-Excel.xlsx", sheet_name="Auta
elektryczne")

energy_consumption = df["mean - Energy consumption [kWh/100
km]"].dropna()

Q1 = energy_consumption.quantile(0.25)
Q3 = energy_consumption.quantile(0.75)
IQR = Q3 - Q1

lower_bound = Q1 - 1.5 * IQR
upper_bound = Q3 + 1.5 * IQR

outliers = df[
    (df["mean - Energy consumption [kWh/100 km]"] < lower_bound) |
    (df["mean - Energy consumption [kWh/100 km]"] > upper_bound)
]
print("--- Outliers in Energy Consumption (kWh/100 km) ---")
print(outliers[["Car full name", "mean - Energy consumption [kWh/100
km]"]])

print("\n--- Summary Statistics ---")
print(f"Q1 (25th percentile): {Q1:.2f} kWh/100 km")
print(f"Q3 (75th percentile): {Q3:.2f} kWh/100 km")
print(f"IQR: {IQR:.2f} kWh/100 km")
print(f"Lower bound (Q1 - 1.5*IQR): {lower_bound:.2f} kWh/100 km")
print(f"Upper bound (Q3 + 1.5*IQR): {upper_bound:.2f} kWh/100 km")

--- Outliers in Energy Consumption (kWh/100 km) ---
Empty DataFrame
Columns: [Car full name, mean - Energy consumption [kWh/100 km]]
Index: []

--- Summary Statistics ---
Q1 (25th percentile): 15.60 kWh/100 km
Q3 (75th percentile): 23.50 kWh/100 km
IQR: 7.90 kWh/100 km
Lower bound (Q1 - 1.5*IQR): 3.75 kWh/100 km
Upper bound (Q3 + 1.5*IQR): 35.35 kWh/100 km

```