1. You are analyzing a dataset that captures the daily performance and activity of a humanoid robot in a simulated environment. The dataset link ( [robot\_dataset.xlsx](https://alliancebschool-my.sharepoint.com/:x:/g/personal/keerthika_v_alliance_edu_in/Edy6pKnxpB5Gpfrzi9cAop4BKdSpbPkIt4l1YCm0h8a7uA?e=yvQ0ZG)) includes the following attributes

**Interaction\_Count**: Number of conversations the robot had daily.

**Steps\_Walked**: Total steps taken each day.

**Objects\_Recognized**: Number of objects successfully identified by the robot.

**Learning\_Sessions**: Number of learning tasks completed.

**Energy\_Consumption (kWh)**: Daily energy usage of robots.

**Perform Basic Statistical Operations:**

1. What is the **average (mean)** number of conversations the robot has daily?
2. Find the **total steps walked** by the robot over a given period.
3. Determine the **maximum and minimum energy consumption** in the dataset.
4. Calculate the **correlation** between the number of steps walked and energy consumption.
5. Analyze the **distribution** of objects recognized daily (e.g., histogram or box plot).
6. What is the **variance** in the number of learning sessions completed?

import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

import seaborn as sns

# Load the dataset

# Replace 'robot\_performance.csv' with your file path if it's named differently

df = pd.read\_csv('robot\_performance.csv')

# Basic statistics

print("Basic Statistics:")

print(df.describe())

# 1. Mean number of conversations (Interaction\_Count)

mean\_interactions = df['Interaction\_Count'].mean()

print(f"Mean daily interactions: {mean\_interactions}")

# 2. Total steps walked

total\_steps = df['Steps\_Walked'].sum()

print(f"Total steps walked: {total\_steps}")

# 3. Maximum and minimum energy consumption

max\_energy = df['Energy\_Consumption (kWh)'].max()

min\_energy = df['Energy\_Consumption (kWh)'].min()

print(f"Maximum energy consumption: {max\_energy} kWh")

print(f"Minimum energy consumption: {min\_energy} kWh")

# 4. Correlation between steps walked and energy consumption

correlation = df['Steps\_Walked'].corr(df['Energy\_Consumption (kWh)'])

print(f"Correlation between steps walked and energy consumption: {correlation}")

# 5. Distribution of objects recognized daily

plt.figure(figsize=(8, 5))

sns.histplot(df['Objects\_Recognized'], bins=15, kde=True, color='skyblue')

plt.title('Distribution of Objects Recognized')

plt.xlabel('Objects Recognized')

plt.ylabel('Frequency')

plt.show()

# 6. Variance in the number of learning sessions

variance\_learning = df['Learning\_Sessions'].var()

print(f"Variance in learning sessions: {variance\_learning}")

# 7. Detecting outliers in energy consumption using boxplot

plt.figure(figsize=(8, 5))

sns.boxplot(x=df['Energy\_Consumption (kWh)'], color='lightgreen')

plt.title('Outliers in Energy Consumption')

plt.xlabel('Energy Consumption (kWh)')

plt.show()