Iris Dataset Visualization Assignment

1. Relationship Between Petal Length and Petal Width Across Species

- Plot the relationship between petal_length and petal_width for different species.

- Use axis-level (sns.scatterplot) and figure-level (sns.relplot) versions.

- Highlight species differences using hue='species'.

2. Trend of Sepal Length by Species

- Show how average sepal_length varies across species.

- Use line plots with sns.lineplot and sns.relplot.

- Add error bars (standard deviation) to represent variability.

3. Comparison of Sepal Width Across Species

- Create a bar plot to compare mean sepal_width for each species.

- Use both sns.barplot (axis-level) and sns.catplot (figure-level).

4. Distribution of Petal Length by Species

- Create a box plot and a violin plot to compare petal_length across species.

- Use sns.boxplot, sns.violinplot, and sns.catplot.

5. Count of Samples by Species

- Show the count of samples for each species.

- Use sns.countplot and sns.catplot.

6. Pairwise Relationship Between Features

- Use sns.pairplot to visualize pairwise relationships between all numerical features.

- Add hue='species' and include histograms or KDE plots on the diagonal.

7. Sepal Length Distribution Across Species

- Plot the distribution of sepal_length for each species using:

  - sns.histplot (with hue)

- sns.displot (with col or row set to species)

8. Joint Distribution of Sepal Width and Petal Width

- Create a joint plot showing the relationship between sepal_width and petal_width.

- Use sns.jointplot with different kind values (scatter, kde, hex).

9. Study the Relationship Between Sepal Length and Species

- Even though species is categorical, analyze the joint distribution of sepal_length and species.

- Use a joint plot with hue='species' to observe class-specific trends.

- Question: How does sepal length vary across species? Are there overlaps or distinct groups?

10. Explore the Relationship Between Petal Length and Sepal Width

- Analyze the relationship between a flower's petal_length and its sepal_width.

- Use both scatter joint plot and KDE joint plot (sns.jointplot).

- Question: Do flowers with longer petals tend to have narrower or wider sepals?

11. Petal Length to Width Ratio Across Species

- Create a new column: petal_ratio = petal_length / petal_width.

- Plot its distribution using sns.boxplot, sns.violinplot, or sns.histplot with hue='species'.

- Purpose: Clearly separates Setosa from the other species.

12. Correlation Heatmap for Each Species

- Filter data by species and compute correlation matrices.

- Plot using sns.heatmap.

- Goal: Identify how feature correlations differ across species.

13. KDE Plot Comparison Across Species

- Use sns.kdeplot to compare the distributions of features (especially petal_length, petal_width).

- Plot multiple KDE curves with hue='species'.

14. Histogram Facet by Species and Feature

- Use sns.displot() with col='species' and kind='hist' for one or more features.

- Plot separately for visual comparison.

15. Violin Plot of Sepal Width by Species

- Use sns.violinplot() to visualize how sepal_width varies across species.

- This feature overlaps more and is useful to spot subtler distinctions.

16. Boxplot of Petal Length by Species

- Use sns.boxplot(x='species', y='petal_length', data=iris)

- Helps reinforce the clear margin between setosa and the rest.

17. Scatter Plot of Sepal Length vs. Petal Length

- Use sns.scatterplot(x='sepal_length', y='petal_length', hue='species')

- Observation: See how petal and sepal length together can help classify species.