

## 1. Sales Performance Analysis (Highest and Lowest Sales)

📌 A company records monthly sales in an array: `[5000, 7000, 8000, 6500, 7200, 9000, 8500]`. Find and print the highest and lowest sales values.

## 2. Reshape a 1D Array into a 2D Matrix

📌 A company's quarterly sales data is stored in a 1D NumPy array: `[1000, 1200, 1500, 1800, 2000, 2100, 2500, 2700]`. Convert it into a 2D array with 4 rows and 2 columns representing sales per quarter.

## 3. Calculate Total Revenue from Products Sold

📌 A store sells 4 types of products. The quantity sold and the price per unit are stored as NumPy arrays:

```
quantities = np.array([10, 15, 7, 20]) # Number of units sold
prices = np.array([50, 40, 100, 30])    # Price per unit
```

## 4. Find Students Who Passed (Marks $\geq 40$ )

📌 A class has students' marks stored in an array: `[35, 60, 42, 75, 29, 90, 55]`. Find and print the marks of students who passed ( $\geq 40$ ).

## 5. Find the Most Frequent Element in an Array

📌 Given a NumPy array `[1, 2, 2, 3, 3, 3, 4, 4, 4, 4]`, determine which element appears the most times.

## 6. Normalize an Array (Scaling Values Between 0 and 1)

📌 You have an array of exam scores: `[50, 80, 90, 60, 75, 85]`. Normalize them between 0 and 1 using Min-Max Scaling.

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Dataset => [Social\\_Network\\_Ads.csv](https://mitu.co.in)  
<https://mitu.co.in>

## 7. Load the Dataset and Display Basic Info

📌 You are given the `Social_Network_Ads.csv` dataset. Load it into a Pandas DataFrame and display the first 5 rows along with dataset summary information.

## 8. Find the Number of Users by Gender

📌 How many male and female users are present in the dataset?

## 9. Find the Average Age of Users Who Purchased the Product

📌 Calculate the average age of users who have purchased the product (`Purchased == 1`).

## 10. Identify High Earners (Above ₹100,000) Who Didn't Purchase

📌 Find all users who have an `EstimatedSalary` greater than ₹100,000 but didn't purchase the product (`Purchased == 0`).

## 11. Find the Gender of Users Who Made Purchases

📌 What is the count of male and female users who purchased the product?

## 12. Find the Age Group with the Highest Purchase Rate

📌 Group users into age brackets (18-25, 26-35, 36-45, 46+) and find which age group has the highest purchase rate.

## 13. Calculate the Percentage of Users Who Purchased (Overall and By Gender)

📌 What percentage of total users purchased the product? Also, break it down by gender.

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Dataset => iris.csv  
<https://mitu.co.in>

## 14. Load the Dataset and Display Basic Information

📌 Load the dataset and display the first five rows, along with dataset summary statistics.

## 15. Find the Average Sepal Length for Each Species

📌 Compute the average sepal length for each species of iris flower.

## 16. Identify the Species with the Largest Petal Width

📌 Find the species that has the largest average petal width.

## 17. Find the Most Common Petal Length

📌 Find the most frequently occurring petal length value in the dataset.

## 18. Count How Many Samples Have Sepal Width Between 2.5 cm and 3.5 cm

📌 Count how many iris samples have a *sepal width* between 2.5 cm and 3.5 cm.

## 19. Add a Column Indicating Large or Small Petals

📌 Create a new column *Petal\_Size* which labels samples as "*Large*" if the petal length is greater than 4 cm, otherwise "*Small*"

## 20. Save the Updated Dataset

📌 Save the updated dataset with the *Petal\_Size* column to a CSV file named *Updated\_Iris\_Dataset.csv*.

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Dataset => iris.csv

<https://mitu.co.in>

## 21. Create a Scatter Plot of Sepal Length vs Sepal Width

📌 You are analyzing the relationship between sepal length and sepal width. Create a scatter plot with species as different colors.

## 22. Create a Histogram of Petal Length

📌 You want to understand the distribution of petal length values. Plot a histogram.

## 23. Create a Box Plot for Sepal Length for Each Species

📌 You need to compare the spread and distribution of *sepal length* among different species using a box plot.

## 24. Create a Pair Plot of the Iris Dataset

📌 You want to explore pairwise relationships between all features for different species using a pair plot.

## 25. Create a Count Plot of Different Species

📌 You need to visualize how many samples belong to each species.

## 26. Create a KDE Plot for Petal Width

📌 You want to visualize the probability distribution of petal width for each species using a KDE (Kernel Density Estimation) plot.

## 27. Create a Heatmap of Correlation Between Features

📌 You want to analyze how strongly the features are correlated with each other using a heatmap.

## 28. Create a Violin Plot for Petal Length

📌 You want to analyze the distribution and density of `petal length` for each species using a violin plot.

## 29. Create a Subplot Grid Showing the Distribution of All Features with Different Plot Types

📌 You want to analyze the distribution of each numerical feature in the Iris dataset. Create a 2x2 subplot grid, using:

- Histogram for `sepal length`
- Box plot for `sepal width`
- KDE plot for `petal length`
- Violin plot for `petal width`

## 30. Create a Custom Dual-Axis Line and Bar Chart Comparing Average Feature Values Across Species

📌 You need to compare the **average feature values** of each species using a combination of bar plots and line plots on the same graph. Implement:

- **Bars** to show average `sepal length` and `petal length`
- **A line plot** to show `sepal width` and `petal width` on a secondary y-axis
- **Custom colors, labels, and dual-axis formatting**