Industry-Oriented NumPy Questions

Question 1: Sensor Data Analysis (Basic Array Operations)

Scenario:

You are working as a data analyst in an IoT company. The temperature sensors in a smart factory send readings every hour.

You received the data as:

temps = np.array([25.3, 26.1, 27.8, 29.0, 28.4, 30.2])

Task:

1. Find the average temperature using NumPy.
2. Find the maximum and minimum temperature.
3. Add 2°C to all readings to simulate calibration correction.

Question 2: Stock Price Changes (Array Indexing & Slicing)

Scenario:

You are analyzing stock price movements for a company over 7 days.

prices = np.array([101, 103, 98, 97, 105, 110, 115])

Task:

1. Extract prices for days 2 to 5.
2. Count how many days the stock price was above 100.
3. Print only those prices that are greater than the average price.

Question 3: Simple Image Pixel Manipulation (Basic Broadcasting)

Scenario:

You are building a basic AI filter for a grayscale image.

```
image = np.array([[120, 200, 30],
                  [255, 100, 75],
                  [0, 180, 220]])
```

Task:

1. Increase brightness by adding 10 to each pixel.
2. Use np.clip() to make sure no pixel value exceeds 255.
3. Print the final array.

Question 4: Student Marks Evaluation (Array Math)

Scenario:

You are developing a report system for a school.

Each student's marks in 3 subjects are stored as a NumPy array:

```
marks = np.array([[78, 82, 89],
                  [90, 76, 85],
                  [88, 80, 92]])
```

Task:

1. Find the average marks of each student.
2. Find the highest marks in each subject.
3. Calculate the overall class average.

Question 5: Sales Data Normalization (Data Scaling)
Scenario:
A startup wants to normalize its weekly sales data before visualization.
sales = np.array([5000, 7000, 8000, 6500, 7200, 9000])
Task:
1. Find the minimum and maximum sales values.
2. Apply Min-Max normalization to scale all values between 0 and 1 using:

Question 6: Random Data Simulation (AI Data Sampling)
Scenario:
You're testing an ML model and need to generate synthetic data for 100 samples, each having 3 features.
Task:
1. Use np.random.rand(100, 3) to generate the dataset.
2. Display the shape and first 5 rows.
3. Calculate the mean and standard deviation of each feature column.