Dataset:
https://www.kaggle.com/datasets/ziya07/iot-enhanced-e-learning-dataset

📊 Exploratory Data Analysis (EDA)

1. Basic Summary Statistics

- **Objective:** Get an overview of the dataset.
- **Tools:** `pandas`
- **Tasks:**
    - Use `.info()` and `.describe()` to view data types and distributions.
    - Count null or missing values in each column.
    - Value counts of categorical columns like `learning_mode`, `student_id`, etc.

2. Daily Average Engagement and Attention

- **Objective:** Track how student attention/engagement varies daily.
- **Tools:** `pandas`, `matplotlib.pyplot`
- **Tasks:**
    - Group by `date` and calculate average `attention` and `engagement`.
    - Plot line charts for daily trends.

3. Most and Least Engaged Students

- **Objective:** Identify students who consistently perform well or poorly.
- **Tools:** `pandas`, `numpy`, `matplotlib`
- **Tasks:**

    - Group by `student_id` and average `engagement` or `attention`.
    - Sort and display top/bottom 10 students using a bar chart.

🧠 Behavioral Pattern Analysis

4. Engagement by Learning Mode

- **Objective:** Analyze which learning modes lead to higher engagement.
- **Tools:** `pandas`, `matplotlib`
- **Tasks:**
    - Group by `learning_mode` and compute average `engagement`.
    - Plot a bar chart to compare modes.