PYTHON DEVELOPER
TASK - 5

33. **Find All Permutations of a String**
    Objective: Generate all permutations of a given string.
    Input: A string.
    Output: List of all permutations.
    Hint: Use recursion to swap characters or `itertools.permutations`.

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34. **N-th Fibonacci Number (Dynamic Programming)**
    Objective: Find the nnn-th Fibonacci number using dynamic programming for efficiency.
    Input: An integer nnn.
    Output: The nnn-th Fibonacci number.
    Hint: Use a bottom-up approach with a memoization array.

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35. **Find Duplicates in a List**
    Objective: Identify all duplicate elements in a list.
    Input: A list of integers.
    Output: A list of duplicate integers.
    Hint: Use a dictionary or `collections.Counter` to count occurrences.

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36. **Longest Increasing Subsequence (LIS)**
    Objective: Find the length of the longest increasing subsequence in an array.
    Input: A list of integers.
    Output: The length of the LIS.
    Hint: Use dynamic programming with an auxiliary array to store lengths.

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37. **Find K Largest Elements**
    Objective: Find the kkk largest elements in a list.
    Input: A list of integers and an integer kkk.
    Output: A list of the kkk largest integers.
    Hint: Use a heap or sort the array and select the last kkk elements.

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38. **Rotate Matrix**
    Objective: Rotate a matrix 90 degrees clockwise.
    Input: A 2D list (matrix).
    Output: The rotated matrix.
    Hint: Transpose the matrix and then reverse rows.

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39. **Sudoku Validator**
    Objective: Validate whether a given Sudoku board configuration is valid.
    Input: A 9x9 2D list representing a Sudoku board.
    Output: `True` if valid, otherwise `False`.
    Hint: Check rows, columns, and 3×33 \times 33×3 grids for duplicates.

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5. Virtual Stock Market Simulator

- **Description**: Create a stock market simulation where users can buy, sell, and track virtual stocks based on random price fluctuations.
- **Challenges**:
    - Implement a system for price changes based on random or predefined patterns.
    - Keep track of users' portfolios and transactions.
    - Introduce advanced features like market trends or risk analysis.
- **Skills**: Data structures, random number generation, and business logic.

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5. Virtual Stock Market Simulator

- **Restriction**: **No real-time stock data access** or APIs.
- **Reason**: The goal is to **simulate stock market behavior** without depending on actual market data. Students will create algorithms to model stock price changes based on random fluctuations or predefined trends. This teaches how to **simulate systems** that behave like real-world systems (stocks in this case) and how to handle **financial modeling** without relying on external data.
- **Learning Outcome**: Students will learn how to **simulate complex systems**, work with **financial concepts**, and understand the fundamentals of **market behavior** and how to track and predict stock changes.

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Deadline Compliance

- **Restriction**: **Submit the project within 7 days** from the start date.
- **Reason**: Meeting deadlines is crucial in the real-world software development environment. This restriction helps students practice **time management** and **task prioritization**. In professional settings, tight deadlines are often the norm, and learning to meet them without compromising quality is an essential skill.
- **Learning Outcome**: Students will learn to manage their time effectively, complete projects under pressure, and **deliver results on time**, which are all important skills in the workplace.