File Handling and Modules Questions

1. Write a program that reads a file **from the end** and prints its lines in reverse order (last line first, first line last) **without using `readlines()` or `[::-1]` slicing**.

2. Given a large text file, write a program that:

- Reads it in chunks of **100 characters each**.
- Creates multiple smaller files (part1.txt, part2.txt, ...) containing those chunks. Ensure the file pointer positions are managed correctly.

3. Write a program that replaces all occurrences of the word "error" with "warning" inside a large log file **without reading the entire file into memory at once**.

4. Create a program that:

- Opens any binary file (e.g., an image) in rb mode.
- Reads the first **64 bytes** and prints them in **hexadecimal format** along with their file pointer positions (tell()).
- Then jumps (seek()) to the last 32 bytes of the file and prints them too.

5. Two Python programs (writer1.py and writer2.py) are writing to the same file at the same time in "a" mode.

- Write a simulation script that runs both and shows how their outputs might get interleaved.
- Then modify it using **file locking** (fcntl or with open) to ensure no corruption happens.

6. Create a NumPy array of size 20 with values starting from 10 to 29. - Extract all even numbers from it. - Reverse the array using slicing. - Reshape it into a 5x2x2 array

7. Simulating a Chessboard (Slicing & Indexing): Create an 8x8 array with alternating 0 and 1 values like a chessboard.

8. Create a 6x6 array using np.arange. - Find its shape, size, ndim, and dtype. - Reshape it into a 3x2x6 array and verify the attributes again

9. Create two arrays: A = np.arange(1, 10).reshape(3,3) B = np.ones((3,3), dtype=int) * 5 - Perform element-wise addition, subtraction, multiplication, and division. - Compare A and B to return a Boolean mask of where elements of A are greater than B

10. Create an array of angles from 0 to 2π (in 10 steps using linspace). - Compute sin, cos, and tan values for each angle. - Verify the identity: $\sin^2\theta + \cos^2\theta \approx 1$ for all values in the array

11. Create a 7x7 matrix filled with ones. - Change the border elements to 0. - Change the center element to 9.

12. A text file contains 100 integers separated by spaces.

- Read the numbers into a NumPy array.
- Reshape the array into 10x10.
- Find the row with the maximum sum and print it.