**Python with Parallel Programming: “Part2 G Assignments\_08Oct2025 Assignments” ( by Trainer: K.Praveen Kumar)**

**Serialization**

1. Write a program to serialize and deserialize a **Python dictionary** containing employee details using **JSON**.
2. Convert a **nested Python list** into binary form using **pickle**, store it in a file, and reload it.

**Multiprocessing**

1. Create two processes that each print numbers 1–5 with a 1-second delay.
2. Use a **process Pool** to calculate cubes of numbers 1–10 and print the result list.

**Multithreading**

1. Write a multithreading program where one thread prints even numbers and another prints odd numbers up to 20.
2. Implement a **thread communication** example where one thread produces random numbers and another consumes them from a queue.
3. Build a **thread worker pool** that performs string reversal tasks concurrently.
4. Design a **stoppable thread** that continuously writes timestamps to console until user interrupts it.

**Processes & Threads**

1. Demonstrate the **GIL effect** by comparing single vs multi-thread increment of a shared counter.
2. Compare performance between **ThreadPoolExecutor** and **ProcessPoolExecutor** for computing factorial of multiple numbers.
3. Implement **thread-safe shared state** using locks and test race-condition avoidance.
4. Share data between processes using multiprocessing.Manager().dict() or Value objects.