Assignment 1: Simulate a search algorithm where 4 threads process different segments of a text file, searching for a specific search term. If any threads succeed in finding the search term, then we should cancel the other threads and stop the current thread.

Assignment 2: Simulate a search algorithm where 4 threads process different segments of a text file, searching for a specific search term. It should count the total number of occurrences of the search term.

Assignment 3: Simulate a search algorithm where 4 **threads** process different segments of data. Use a **Barrier class** to ensure all threads finish their current "pass" before any thread starts the next pass.

Assignment 4: Create a program that processes 100 tasks but limits active concurrent database connections to exactly 5. Correctly implement await semaphore.WaitAsync() and ensure the semaphore is released in a finally block to prevent resource leaks.

Assignment 5: What is the difference between Task and ValueTask? Provide a scenario where using ValueTask significantly reduces GC pressure.