**Week 4 summary:**

From the content of the lectures, the topics covered and key learnings include:

**Lecture 4-1: Arrays, Part I**

1. **Introduction to Arrays**:

• Purpose and examples of arrays.

• Array construction, queries, and processing.

2. **Array Processing Examples**:

• DNA sequence analysis.

• Sales data analysis (average, max/min sales, indices).

3. **Mutability**:

• Mutable vs. immutable objects.

• Understanding call-by-value and call-by-reference in Java.

4. **Advanced Processing**:

• Letter frequency counting in DNA sequences.

• Monte Carlo simulations and random number generation.

• Reversing arrays (in-place and with new arrays).

5. **Best Practices**:

• Avoid functions with unintended side effects unless documented.

**Lecture 4-2: Arrays, Part II**

1. **Java and Arrays**:

• How Java handles arrays and their references.

• Low-level memory representation.

2. **Strings in Java**:

• Immutable nature of strings and how changes result in new memory allocations.

• Use of garbage collection to manage memory.

3. **Applications of Arrays**:

• The coupon collector problem: A simulation-based probability problem.

• Prime number generation using the Sieve of Eratosthenes.

4. **Practical Implementations**:

• Creating and shuffling a deck of cards.

• Random value generation and distribution testing.

5. **Key Concepts**:

• High-level abstraction vs. low-level implementation in memory handling.

Both lectures emphasize core programming concepts, practical problem-solving, and efficient use of Java data structures. If you have specific aspects you’d like clarified or explored further, let me know!