Java Data Structures

Post-Course Assessment

1. Which of the following statements is true?

1. Removing an element from a linked list is faster than adding an element to a linked list.

2. Traversing a linked list has the same complexity as removing an element from a list.

3. Traversing a linked list has the same complexity as adding an element to a list.

4. Removing and adding an element to a linked list has the same complexity as a traversing operation.

a. 1 and 3

b. 1

c. 2 and 4

d. 4

Analysis:

1. Correct. Removing an element has a complexity of O(1), while traversing and adding an element to a list has a complexity of O(n). See Module 2: Sorting Algorithms and Fundamental Data Structures, Lesson 2.4: Getting Started with Fundamental Data Structures.
2. Incorrect. Removing an element has a complexity of O(1), while traversing and adding an element to a list has a complexity of O(n). See Module 2: Sorting Algorithms and Fundamental Data Structures, Lesson 2.4: Getting Started with Fundamental Data Structures.
3. Incorrect. Removing an element has a complexity of O(1), while traversing and adding an element to a list has a complexity of O(n). See Module 2: Sorting Algorithms and Fundamental Data Structures, Lesson 2.4: Getting Started with Fundamental Data Structures.
4. Incorrect. Removing an element has a complexity of O(1), while traversing and adding an element to a list has a complexity of O(n). See Module 2: Sorting Algorithms and Fundamental Data Structures, Lesson 2.4: Getting Started with Fundamental Data Structures.

… … …

25. What is represented by O(n) to Ω(n) to Θ(n)?

a. Asymptotically tighter bounds on algorithm performance

b. Different functions for the hash table's hash function

c. Measures of linear algorithm performance

d. Results of computing recurrence relations

Analysis:

1. Correct. Omega and theta are the asymptotic bounds. See Module 4: Algorithm Design Paradigms, Lesson 4.2: Getting Started with Divide and Conquer Algorithms.
2. Incorrect. The hash functions are not omega and theta. See Module 4: Algorithm Design Paradigms, Lesson 4.2: Getting Started with Divide and Conquer Algorithms.
3. Incorrect. A measure of linear algorithm performance is Big-O. See Module 4: Algorithm Design Paradigms, Lesson 4.2: Getting Started with Divide and Conquer Algorithms.
4. Incorrect. Omega and theta are functions of performance. See Module 4: Algorithm Design Paradigms, Lesson 4.2: Getting Started with Divide and Conquer Algorithms.