

# Midterm 1-Page Study Guide

Handout 5  
CSCI 136: Fall 2019  
October 9

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You are responsible for anything we covered in class or in lab up to and including **Linked Lists**, and everything in the assigned reading from *Java Structures*, up to and including Sorting and Lab 5; that is, Chapters 1-7 and Chapter 9, as well as the handouts.

The following non-exhaustive list may be helpful in reminding you about some of the key topics we have covered:

- Java syntax, compilation, and debugging, as covered in our programming assignments.
- Classes, both concrete and abstract, and interfaces and their respective roles.
- Information hiding (abstraction as a concept) and why it's good.
- Extending classes with inheritance.
- Generic classes (e.g., `Vector<E>`, `Association<K, V>`, `SinglyLinkedList<E>`, etc) and their use
- Pre- and post-conditions, and assertions.
- The meaning of `static` (and non-static) as applied to variables and methods
- `Vector`, its implementation in the `structure5` package, and its methods.
- Complexity: Big "O" definition.
  - Determining the asymptotic behavior of mathematical functions
  - Determining the time and space complexity for a given algorithm.
  - Worst and best case analysis.
- Linear and binary search.
- Recursion and induction.
- Sorting.
  - Bubble sort, selection sort, insertion sort, merge sort, quicksort.
  - Using `Comparator/Comparable` for sorting.
- Linked lists: Singly, Doubly, and Circularly linked lists. *Note:* In the Linked List lab, we modified the standard doubly linked list implementation by adding "dummy nodes". You should be familiar with the standard implementation as described in class and in the textbook (i.e., lists without dummy nodes).