

COP 3330 – Object Oriented Programming in Java
Quiz 4 Review

Quiz Date: 4/17/2026

Time: 12:30 pm (come early)

Location: CB2-106 our classroom

Outline of Quiz 4 Material

1. ArrayList class
 - a. Allows you to manage a dynamically sized list.
 - b. add() is $O(1)$
 - c. Any method requiring shifting of elements (add to index, remove) is $O(n)$

2. ArrayDeque class
 - a. Allows you to simulate Stack, Queue, Double Ended Queue
 - b. Run times of these methods (add/remove first/last) is $O(1)$

3. StringTokenizer class
 - a. Used to help parse a String with delimiters
 - b. Often paired with a Scanner that only calls the nextLine() method to read.
 - c. Can use with default delimiters (white space) or your own.

4. HashSet class
 - a. Allows for $O(1)$ expected time insert, delete and search.
 - b. Unordered

5. TreeSet class
 - a. Allows for $O(\lg n)$ expected time insert, delete and search.
 - b. Stored as a balanced binary search tree, so ordered.
 - c. Allows $O(\lg n)$ access to first item, last item, floor, ceiling, lower, higher items.

6. HashMap
 - a. Similar to HashSet, except each item (called a key) is mapped to a value.
 - b. Use keySet() to loop through all keys.
 - c. Run-times are similar to HashSet run-times.

7. TreeMap class
 - a. Similar to TreeSet, except each item (called a key) is mapped to a value.
 - b. Use keySet() to loop through all keys.
 - c. Run-times are similar to TreeSet run-times.

8. PriorityQueue class
 - a. Allows inserting items and deleting the minimum item in $O(\lg n)$ time.
 - b. Allows repeated items.

9. Exceptions

- a. Some exceptions must be reported (thrown) or handled (try-catch).
- b. A method with a call to a method which might cause a reported exception must either handle it or throw the Exception to the method which called it. This can cause a chain of throws all the way back to main or to a method which handles the Exception.
- c. try-catch sets up two blocks, or more, if you want to catch different types of Exceptions.
- d. All Exceptions inherit from the class Exception.
- e. You can make your own Exception class, which you can then throw from a user defined method.

10. Input/Output Files

- a. For Input, we can just instantiate a Scanner object passing it a File object.
- b. For Output, we use a PrintWriter object instantiated by passing it a FileWriter object.
- c. Remember to close both input and output files after you are done with them.
- d. Similar to standard input, standard output since we've already used a Scanner and a PrintWriter supports both print and println.

Quiz Format

Coding Questions – write code segments, fill in solutions to full programs, won't have to write boring template code (public static void main...)

Tracing questions

75 points

Use of the Java API – 60 to 65 points

Files, Exceptions – 10 to 15 points

Quiz Aids

None

Necessary Java documentation that is posted online will be provided.