

## Week 4: Research

What are the differences between Lists, Sets, and Maps in Java?

- Lists can have duplicate values and is always ordered. It can also have null values and the most common way to use them is by using ArrayList, LinkedList and Vector.
- Sets is like the opposite in which they can't have any duplicates and is unordered, but still allows a null value. It is implemented by HashSet, LinkedHashSet, and TreeSet.
- Maps are a bit different and from what I have seen from the videos, it is best to think of it like you're making a dictionary. It will have key value pairs like (1, object). Only the values can have duplicates, keys can't be the same. Maps are implemented with HashMap, LinkedHashMap, TreeMap, Hashtable.

List at least two different implementations for each collection (List, Set, and Map). When would you use one of the implementations over the other?

- The two different implementations for List are ArrayList and LinkedList. ArrayList is the most common implementation we will use, but sometimes it is more convenient to use the other. In an ArrayList adding or removing anything from the list will make the list shift, whereas in a LinkedList that won't happen.
- The two implementations for Set are HashSet and TreeSet. They are pretty much complete opposites and they do completely different things. HashSet is not ordered, but a TreeSet will be ordered. Same with accepting null values, HashSet will accept null, but TreeSet will not.
- The two implementations for Maps are HashMap and Hashtable. The two are very similar, but HashTables can access multiple threads while Maps can't.

Write a line of code that shows how you would instantiate an ArrayList of String.

- `List<String> listName = new ArrayList<String>();`

Write a line of code that shows how you would instantiate a HashSet of String.

- `Set<String> setName = new HashSet<String>();`

Write a line of code that shows how you would instantiate a HashMap of String, String.

- `Map<String, String> mapName = new HashMap<String, String>();`

What is your favorite thing you learned this week?

- The most interesting thing I learned this week are Maps. It is interesting to make something like a dictionary and using it in the code.

## Citing

Promineo Tech. Loops. 7 July. 2018. Loops. <https://www.youtube.com/watch?v=c7KGTBeT5go>. Accessed 1 Oct. 2022.

“When to Use LinkedList over ArrayList in Java?” *Stack Overflow*, Accessed 1 Oct. 2022, <https://stackoverflow.com/questions/322715/when-to-use-linkedlist-over-arraylist-in-java>.

“Difference between Hashset and TreeSet in Java.” *BYJUS*, BYJU'S, Accessed 1 Oct. 2022, <https://byjus.com/gate/difference-between-hashset-and-treeset-in-java/>.

“Hashtable in Java.” *geeksforgeeks*, 1 Oct. 2022, <https://www.geeksforgeeks.org/hashtable-in-java/>.