# Week 3 Tasks

1. What is Array List and why do we need Array List when we have Arrays in Java?

   Array List is part of Collection framework hence can be used to store data inside it as we do in Arrays. Array List is found in Java.util package.

   <u>Difference between ArrayList and Arrays</u>

   - ArrayList is a Dynamic storage whereas in Arrays we have to define the amount of space required before hand and it cannot be changed after initialization.
   - ArrayList is slower than Standard Arrays when it comes to searching/ sorting
   - In ArrayList we cannot pass primitives (int, float etc), we can only use Wrapper Classes (String, Integer) and object types
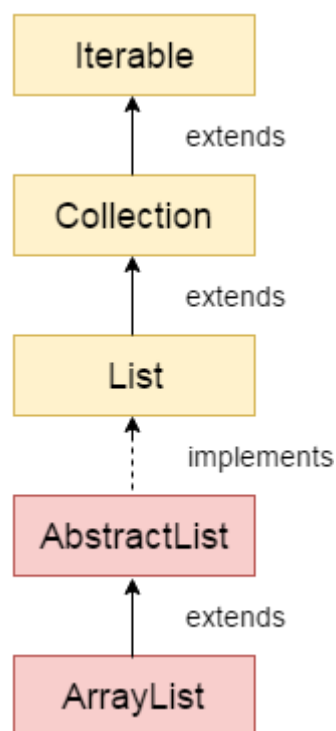
2. What are some Key Features of Array List?

   - ArrayList can have duplicate elements if the generics are not specified.
   - ArrayList retains insertion order.
   - It is non-Synchronized

- It Allows random access of elements just like arrays
- The size of Array List changes with size. i.e. It is dynamic in nature and the size of list changes depending on the removal and adding of element.

3. What is the complexity of adding and removing the elements in Array List?

- Adding – The best-case scenario is O (1) and the worst-case scenario is O(N). When the Array List exceeds its default storage then it the Time complexity becomes O(N)

- Removing – The worst case while removing the elements is O (N) as all the elements needed to be shifted to the right after one element is deleted in the middle. The best case is if the element to be deleted is at the last index so the complexity will be O (1).

4. What is the impact of Resizing the size of an Array List?

- When we add more and more elements into the Array List, if the size crosses the default, then the data is to be moved to another Array under the hood hence, we this increases the time taken hence negatively impacting the performance of Array List.
- This can usually be avoided by keeping default size more then the estimated required space

5. What is the role of iterator Interface in Array List Implementations?

- Collections extends Iterator interface. Iterator is generally used in Array List implementations because we can iterator over the elements in the list. ArrayList provides with an iterator method then can be used to iterate over the elements and remove the elements that are not required