

- **Mutability**:- Arrays are mutable meaning ~~they~~ that you can modify the elements in an array after it has been created. ArrayList is also mutable, but the only way to modify it is by adding, removing or modifying elements.
- **Performance**:- Arrays have better performance than ArrayList for certain operations, such as accessing element by index, because they are implemented as a continuous block of memory. ArrayList, on the other hand, use dynamic memory allocation and are implemented as a dynamic array, which may result in more memory overhead and slower performance for certain operations.
- **Methods**:- Arrays have a limited set of methods compared to ArrayLists, which provides more methods for manipulation the collection, such as adding, removing and sorting elements.
- **Initialization**:- Array can be initialized with values at the time of creation, while ArrayList requires the use of methods ~~to~~ to add elements to the collection.
- **Compatibility**:- Array are compatible with traditional for-loops and can be easily passed other methods, while ArrayList requires the use of a special for-each loop and may require more code to be passed to other methods.



- **Memory usage:** Hashset uses less memory than TreeSet because it only stores the elements, while TreeSet stores additional information for maintaining the order.

- **Iteration:** Hashset provides no guarantees regarding the order of iteration, while TreeSet guarantees the elements are iterated in stored order.

- **Usage:** Hash set is suitable when ordering is not important, and fast access and membership tests are needed. Tree set is suitable when elements need to be stored or accessed in a specific order.

⑦

Ans:

What is difference between Array and ArrayList.  
Both arrays and ArrayLists are used to store collections of elements in Java, but they have some differences in terms of their properties and usages.

- **Type :-** Arrays can store elements of primitive data types as well as objects, while ArrayList can only stores objects.

- **Size:** The size of an arrays is fixed once it is created, while the size of an ArrayList can be dynamically increased or decreased by adding or removing elements.



- The List interface contains a single legacy class which is Vector class whereas the Set interface does not have any legacy class.
- The List interface can allow a number of null values whereas Set interface only allows a single null value.

Q. What is the difference between HashSet and TreeSet?  
Ans: Both HashSet and TreeSet are implementations of the Set interface in Java, but they have some difference in terms of their properties and usage.

- **Ordering** :- HashSet is an ~~an~~ unordered collection of elements, while TreeSet is a sorted set of elements based on their natural order or a custom comparator.
- **Duplication** :- HashSet does not allow duplicate elements while TreeSet does not allow duplicate as well.
- **Implementation** :- HashSet implemented using a hashtable while TreeSet implemented using a self-balancing binary search tree (Red-Black tree).
- **Performance** :- HashSet has constant-time complexity  $O(1)$  for adding, removing and testing the existence of an element, while TreeSet has a logarithmic-time complexity  $O(\log n)$  for these operation due to the self balancing property.



- ① The iterator can be used in list, set and queue. ② ListIterator can be used in list only.
- ③ The iterator can only perform a remove operation while traversing the collection. ④ ListIterator can perform add, remove, and set operations while traversing the collection.

④ what is difference between iterator and Enumeration  
Ans: Iterator Enumeration

- ① The iterator can traverse legacy and non-legacy elements. ② Enumeration can traverse only legacy elements.
- ③ The iterator is fail-fast. ④ Enumeration is not fail-fast.
- ⑤ The iterator is slower than enumeration. ⑥ Enumeration is faster than iterator.
- ⑦ The iterator can perform a remove operation while traversing the collection. ⑧ The Enumeration can perform only traverse operations on the collections.

⑤ what is difference between List and Set?  
Ans: The list and set both extends the collection interface. However there are some difference between the two which are listed below.

- List can contain duplicate elements where as set includes unique items.
- The list is an ordered collection which maintain the insertion order whereas set is an unordered collection which does not preserve the insertion order.



## Collection Framework

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Q1) what is collection framework in java?

Ans:-

Collection framework is a combination of classes and interfaces, which is used to store and manipulate the data in the form of objects. It provides various classes such as ArrayList, Vector, Stack and HashSet etc and interfaces such as List, Queue, Set etc for this purpose.

Q2) what is the difference between ArrayList and LinkedList?

Ans:-

### ArrayList

① ArrayList used a dynamic array.

② ArrayList is not efficient for manipulation because too much required.

③ ArrayList provide random access.

④ ArrayList takes less memory overhead as it stores only object.

### LinkedList

① LinkedList uses a doubly linked list.

② LinkedList is efficient for manipulation.

③ LinkedList does not provide random access.

④ Linked list takes more memory overhead, as it stores the object as well as the address of that object.

Q3)

Q3) what is difference between Iterator and ListIterator?

Ans:-

### Iterator

① The iterator traverse the elements in the forward direction only.

### ListIterator

① ~~Traverse~~ ListIterator traverse the elements in backward and forward direction both.