**COLLECTION FRAMEWORK ASSIGNMENT**

**Q1. What is the Collection framework in Java?  
Ans.** A collection framework is like a structure in which we can develop our codes by using the several inbuilt methods , classes , interface which are presents in framework, we don’t required to start from scratch.

**Q2. What is the difference between ArrayList and LinkedList?  
Ans.** The difference between both of them are:-

* ArrayList class implements the List interface Where as LinkedList Implements List as well as Deque interface.
* In ArrayList If we want to add data it will happen only on rear end where as in LinkedList it can add on front , middle and rear end.
* ArrayList uses the Dynamic array to store the values whereas LinkedList used Doubly LinkedList to store the value.
* In both Duplicates value is allowed.
* ArrayList provides random access whereas LinkedList Provides no random access.
* ArrayList takes less space because it stores only object on other hand LinkedList takes more space because it stores object as well as address of that object.

**Q3. What is the difference between iterator and List iterator?  
Ans.** The difference between both of them are:-

* Iterator can only traverse in forward direction where as List iterator can traverse in both directions.
* Iterator is used in Set , list and Queue but List iterator only can used in List.
* The iterator can perform only the remove operation while traversing the collection whereas the List iterator can perform add? Remove? Set ? while traversing the array.

**Q4. What is the difference between iterator and enumeration?  
Ans.** The difference between iterator and enumeration:-

* The iterator can traverse legacy and non legacy element but enumeration can traverse only legacy element.
* The iterator is fail fast whereas enumeration is not .
* The iterator is slower than enumeration.
* The iterator can perform only the remove operation while traversing the collection.
* The enumeration can perform only traverse operation while traversing the collection.

**Q5. What is the difference between List and Set?  
Ans.** The List and Set both extend the collection interface A However, there are some differences between the two which are listed below:-

* In List interface Index base insertion is allowed whereas in Set interface it is not allowed.
* In list Interface Duplicates value is allowed but in Set it is not allowed.
* In List interface Order of value is preserve but in Set it is not.
* The List interface allow numbers of null values in a collection whereas Set interface is allowed only one null value.

**Q6. What is the difference between Hash Set and Tree Set?  
Ans.** They both are the classes of Set interface , the major difference between both of them are:

* **Ordering:** HashSet is an unproper 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 duplicates as well.
* **Implementation:** HashSet is implemented using a hash table, while TreeSet is implemented using a self-balancing binary search tree (Rep-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 operations due to the self-balancing property.
* **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 iterator in sorted order.
* **Usage:** HashSet is suitable when ordering is not important, and fast access and membership tests are needed A TreeSet is suitable when elements need to be sorted or accessed in a specific order.

**Q7. What is the difference between Array an ArrayList?  
Ans.** Both arrays and ArrayLists are used to store collections of elements in java, but they have some differences in terms of their properties and usage:-

* **Type:** Arrays can store elements of primitive data types as well as objects, while ArrayList can only store objects.
* **Size:** The size of an array is fixed once it is created, while the size of an ArrayList can be dynamically increased or decreased by adding or removing elements.
* **Mutability:** Arrays are mutable, meaning 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 ArrayLists for certain operations, such as accessing elements by index, because they are implemented as a continuous block of memory. ArrayLists, 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 manipulating the collection, such as adding, removing, and sorting elements.
* **Initialization:** Arrays can be initialized with values at the time of creation, while ArrayList requires the use of methods to add elements to the collection.
* **Compatibility**: Arrays are compatible with traditional for-loops and can be easily passed to other methods, while ArrayList requires the use of a special for-each loop and may require more code to be passed to other methods.