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Java Collections Framework - Comparison Table an classe

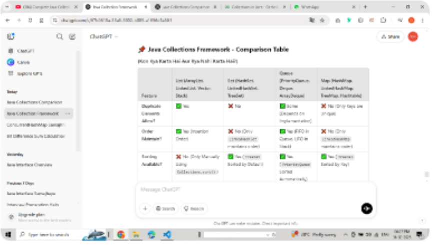
Java Collections Framework mein commonly used classes aur interfaces ka ek comparison table yahan diya gaya hai:

Collection Type	Interface/Class	Implementation Classes	Key Features
List	`List` (I)	`ArrayList`, `LinkedList`, `Vector`, `Stack`	Ordered collection, allows duplicates
Set	`Set` (I)	`HashSet`, `LinkedHashSet`, `TreeSet`	Unique elements, no duplicates
Queue	`Queue` (I)	`PriorityQueue`, `LinkedList`, `ArrayDeque`	FIFO behavior (except PriorityQueue)
Deque	`Deque` (I)	`ArrayDeque`, `LinkedList`	Double-ended queue, supports stack and queue operations
Map	`Map` (I)	`HashMap`, `LinkedHashMap`, `TreeMap`, `Hashtable`, `ConcurrentHashMap`	Key-value pairs, unique keys
SortedSet	`SortedSet` (I)	`TreeSet`	Sorted unique elements
SortedMap	`SortedMap` (I)	`TreeMap`	Sorted key-value pairs

Brief Explanation

1. **List**: Indexed collection, duplicates allowed. `ArrayList` (fast read), `LinkedList` (fast insert/delete).
2. **Set**: Unique elements, no duplicates. `HashSet` (unordered), `TreeSet` (sorted).
3. **Queue**: Elements processed in FIFO order, except `PriorityQueue` which orders elements based on priority.
4. **Deque**: Supports both stack (LIFO) and queue (FIFO) operations.
5. **Map**: Key-value pairs, keys are unique. `HashMap` (unordered), `TreeMap` (sorted keys).
6. **SortedSet & SortedMap**: Special versions of `Set` and `Map` with sorting.

Agar aapko kisi specific class ya interface ke baare mein detail chahiye to batao! 🚀



asi table me batao shi full explain

Yahan ek structured comparison table hai jo Java Collections Framework ke different data structures ko features ke basis par explain karta hai:

Java Collections Framework - Comparison Table

(Kon Kya Karta Hai Aur Kya Nahi Karta Hai?)

Feature	List *(ArrayList, LinkedList, Vector, Stack)*	Set *(HashSet, LinkedHashSet, TreeSet)*	Queue *(PriorityQueue, Deque, ArrayDeque)*	Map *(HashMap, LinkedHashMap, TreeMap, Hashtable)*
Duplicate Elements Allowed?	✅ Yes	❌ No	🔄 Some (Depends on Implementation)	❌ No *(Only Keys are Unique)*
Order Maintained?	✅ Yes *(Insertion Order)*	❌ No *(Only `LinkedHashSet` maintains order)*	✅ Yes *(FIFO in Queue, LIFO in Stack)*	❌ No *(Only `LinkedHashMap` maintains order)*
Sorting Available?	❌ No *(Only manually using `Collections.sort()`)*	✅ Yes *(TreeSet sorted by default)*	✅ Yes *(PriorityQueue Sorted Automatically)*	✅ Yes *(TreeMap Sorted by Key)*

Allows Null Values?	✅ Yes *(Except in `Vector`)*	✅ Yes *(Except `TreeSet`)*	✅ Yes *(Depends on Implementation)*	✅ Yes *(Except in `Hashtable`)*
Thread Safe?	❌ No *(Except `Vector` & `Stack`)*	❌ No	❌ No *(Use `ConcurrentLinkedQueue` for thread safety)*	❌ No *(Except `Hashtable` and `ConcurrentHashMap`)*
Best Use Case	Dynamic arrays, Fast lookup	Unique elements, No duplicates required	FIFO processing (Queue), LIFO (Stack)	Key-Value mappings

Explanation

1. **List:** Indexed collection where elements can be duplicated and order is maintained. Example: `ArrayList` (fast access) & `LinkedList` (fast insert/remove).
2. **Set:** Only unique elements allowed. `HashSet` is fast, `TreeSet` keeps sorted order.
3. **Queue:** Used for FIFO operations (except `PriorityQueue`, which sorts based on priority).
4. **Map:** Key-value pairs with unique keys. `HashMap` is fast, `TreeMap` is sorted, and `LinkedHashMap` maintains insertion order.

Agar kisi specific collection class ka deep dive chahiye to batao! 🚀

Arraylist class he ya iterface

`ArrayList` ek class hai, interface nahi.

Details:

- `ArrayList` **class** hai jo `java.util` package mein available hai.
- Ye `List` **interface** ko implement karta hai, jo ki ek ordered collection ka structure define karta hai.
- `ArrayList` **dynamically resizable array** hai, jo elements ko sequentially store karta hai aur internally ek array ka use karta hai.

Hierarchy:

```php-template
java.lang.Object
   ↳ java.util.AbstractCollection<E>
       ↳ java.util.AbstractList<E>
           ↳ java.util.ArrayList<E>
```

Interfaces Implemented by ArrayList:

✅ `List<E>`
✅ `RandomAccess`
✅ `Cloneable`
✅ `Serializable`

Example:

```java
import java.util.ArrayList;
import java.util.List;

public class Main {
    public static void main(String[] args) {
        List<String> list = new ArrayList<>();
        list.add("Apple");
        list.add("Banana");
        list.add("Cherry");

        System.out.println(list); // Output: [Apple, Banana, Cherry]
    }
}
```

Agar aur detail chahiye ya internal working samajhna ho to batao! 🚀

‹ 2/2 ›

kya set me duplicate value or null value insert kar skathe he

Set me Duplicate aur Null Values Insert karna Allowed hai ya Nahi?

1. Duplicate Values in Set:

❌ Set me duplicate values allow nahi hoti.

- Agar aap ek `Set` me duplicate value insert karne ki koshish karenge, to wo ignore ho jayegi.
- Example:

java Copy Edit

```java
import java.util.HashSet;

public class Main {
    public static void main(String[] args) {
        HashSet<Integer> set = new HashSet<>();
        set.add(10);
        set.add(20);
        set.add(10);  // Duplicate value

        System.out.println(set);  // Output: [10, 20] (Duplicate ignore ho gaya)
    }
}
```

2. Null Values in Set:

✅ Null value ka behavior Set ki implementation par depend karta hai:

Set Type	Null Allowed?	Notes
`HashSet`	✅ Yes	Ek baar null add kar sakte hain
`LinkedHashSet`	✅ Yes	Ek baar null allow hoti hai
`TreeSet`	❌ No	Null allow nahi hota (Comparator ke wajah se `NullPointerException` aayega)

- **Example: `HashSet` me null allow hoti hai**

java Copy Edit

```java
import java.util.HashSet;

public class Main {
    public static void main(String[] args) {
        HashSet<String> set = new HashSet<>();
        set.add(null);
        set.add("Apple");
        set.add(null); // Duplicate null ignore ho jayega

        System.out.println(set);  // Output: [null, Apple]
    }
}
```

- **Example: `TreeSet` me null allow nahi hota**

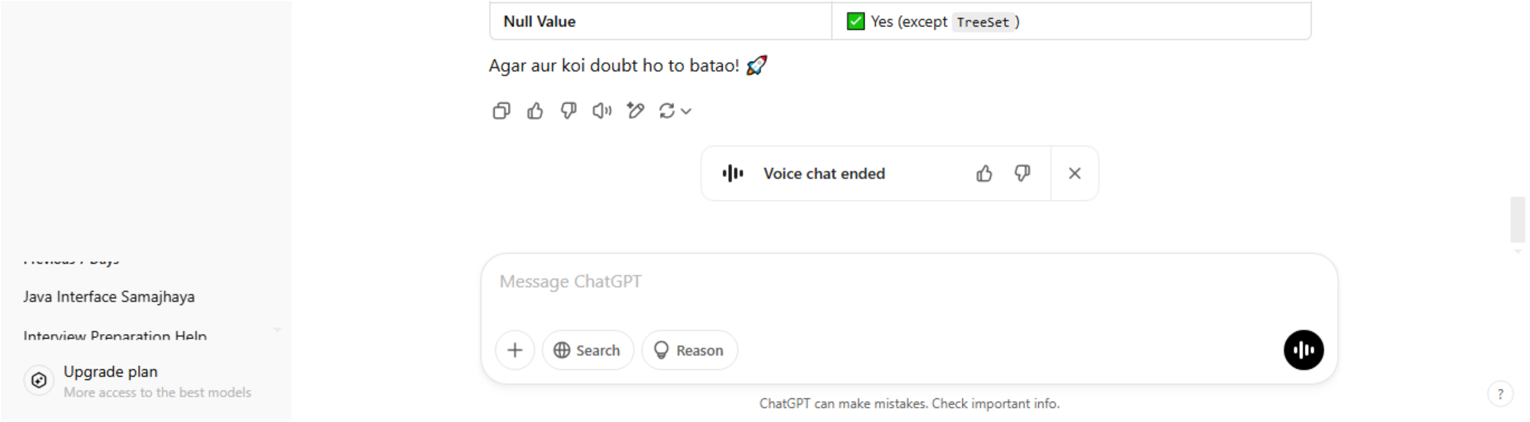
java Copy Edit

```java
import java.util.TreeSet;

public class Main {
    public static void main(String[] args) {
        TreeSet<String> set = new TreeSet<>();
        set.add(null); // NullPointerException
    }
}
```

Summary

Feature	Allowed in Set?
Duplicate Values	❌ No



Null Value	✅ Yes (except `TreeSet`)

Agar aur koi doubt ho to batao! 🚀

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