Collection

What is the Collection framework?

The collection framework provides an architecture for storing and manipulating a collection of objects. Collections are capable of doing any data operations such as searching, sorting, insertion, manipulation, and deletion.

What are the main interfaces of the Collection Framework?

- **Collection**: The collection interface builds the foundation on which the collection framework depends. This is implemented by all the classes in the collection framework.
- **List**: The list interface provides a way to store the ordered collection. It is a child interface of Collection and It allows duplicate values.
- **Set**: This allows creating an unordered collection or list, where duplicate values are not allowed.
- **Queue**: Queue used to hold the elements about to be processed in FIFO(First In First Out) order.
- **Stack**: Stack used to hold the elements about to be processed in LIFO(Last In First Out) order.
- **Map**: Map represents a mapping between a key and a value. it always contains unique keys.
- **SortedSet**: The SortedSet interface is used to store elements with some order in a set. this extends the set interface.
- **SortedMap**: The SortedMap interface provides sorting of keys stored in a map. This extends the map interface.
- **Deque**: As we know queue support (first-in-first-out/FIFO) and stack support last-in-first-out/LIFO but Deque allows elements to be added and removed from both ends.

What is ArrayList?

It provides us with dynamic arrays. if we declare an array then it’s needed to mention the size but in ArrayList it is optional.

What is LinkedList?

This is a linear data structure used to store the elements in contiguous locations. It has addresses and pointers that are used to link the elements.

What is HashMap?

HashMap stores key-value pairs. we can access them by an index.

What is a PriorityQueue?

PriorityQueue is a queue where elements are ordered based on their natural ordering or by a provided Comparator, ensuring the highest priority element is always at the front.

What is a ConcurrentHashMap?

ConcurrentHashMap is a thread-safe variant of HashMap that allows concurrent read and write operations without locking the entire map.

What is the load factor in HashMap?

The load factor is a measure of how full the HashMap can get before it needs to resize.

What is the difference between Collection and Collections?

Collection is an interface, whereas Collections is a utility class that provides static methods for manipulating collections.

What is the difference between List and Set?

List allows duplicate elements and maintains insertion order. Set does not allow duplicates and does not guarantee any specific order.

What is the difference between ArrayList and LinkedList?

ArrayList is based on a dynamic array, allowing fast random access but slow insertions and deletions. LinkedList is based on a doubly-linked list, allowing fast insertions and deletions but slow random access.

What is the difference between HashSet and TreeSet?

HashSet is backed by a hash table and does not maintain any order. TreeSet is backed by a TreeMap and maintains elements in sorted order.

What is the difference between HashMap and Hashtable?

HashMap is non-synchronized and allows null keys and values. Hashtable is synchronised and does not allow null keys or values.

What is the difference between Array and ArrayList?

An array has a fixed size, whereas an ArrayList can dynamically resize.

What is the difference between fail-fast and fail-safe iterators?

Fail-fast iterators throw ConcurrentModificationException if the collection is modified while iterating. Fail-safe iterators operate on a cloned copy, thus allowing modifications without exceptions.