Advanced Java Questions

1. What is the Collection framework in Java?
   (The Java collections framework **provides a set of interfaces and classes to implement various data structures and algorithms**.)

2. What are the main differences between array and collection?
   (Arrays can hold the only the same type of data in its collection i.e only homogeneous data types elements are allowed in case of arrays. Collection, on the other hand, can hold both homogeneous and heterogeneous elements. Arrays can hold both object and primitive type data.)

3. Explain various interfaces used in Collection framework?
   (six interfaces
   The collection hierarchy consists of **six interfaces**, the core collection intefaces. Three of these interfaces, Set, List, and SortedSet are descendants of the Collection interface;)

4. What is Collection interface in java?
   (The Collection interface is **the root interface of the Java collections framework**. There is no direct implementation of this interface.)

5. What is Iterable interface in java?
   (An iterable interface **allows an object to be the target of enhanced for loop(for-each loop)**.)

6. What is List interface in java?
   (The List interface in Java **provides a way to store the ordered collection**.)

7. What is Set interface in java?
   (A Set is **a Collection that cannot contain duplicate elements**.)

8. What is Queue and Dequeue interface in java?
   (**Deque interface present in java. util package is a subtype of the queue interface**.)

9. What is Map interface in java?
   (**A Map is an object that maps keys to values**. A map cannot contain duplicate keys: Each key can map to at most one value. It models the mathematical function abstraction.)

10. What is the difference between ArrayList and Vector?
    (**ArrayList is non-synchronized. Vector is synchronized**. ArrayList increments 50% of its current size if element added exceeds its capacity. Vector increments 100% of its current size if element added exceeds its capacity.)

11. What is the difference between ArrayList and LinkedList?
    (**ArrayList internally uses a dynamic array to store the elements. LinkedList internally uses a doubly linked list to store the elements**. 2) Manipulation with ArrayList is slow because it internally uses an array. If any element is removed from the array, all the other elements are shifted in memory.)

12. Can you explain how does work ArrayList?
    (**Internally an ArrayList uses an Object[]** . As you add items to an ArrayList , the list checks to see if the backing array has room left. If there is room, the new item is just added at the next empty space.)

13. Can you explain how does work LinkedList?
    (In Java, the linked list class is **an ordered collection that contains many objects of the same type**. Data in a Linked List is stored in a sequence of containers.)

14. What is the difference between List and Set?
    List is a type of ordered collection that maintains the elements in insertion order while Set is a type of unordered collection so elements are not maintained any order.

15. What is the difference between HashSet and TreeSet?
Hash set and tree set both belong to the collection framework. **HashSet is the implementation of the Set interface whereas Tree set implements sorted set**. Tree set is backed by TreeMap while HashSet is backed by a hashmap.
16. What is the difference between Set and Map?
The main difference between Set and Map is that **Set contains only data elements, and the Map contains the data in the key-value pair**, so Map contains key and its value.

17. What is the difference between HashSet and HashMap?
Hashmap is the implementation of Map interface. Hashset on other hand is the implementation of set interface. Hashmap internally do not implements hashset or any set for its implementation. Hashset internally uses Hashmap for its implementation.

18. What is the difference between HashMap and TreeMap?
HashMap allows a single null key and multiple null values. TreeMap does not allow null keys but can have multiple null values. HashMap allows heterogeneous elements because it does not perform sorting on keys. TreeMap allows homogeneous values as a key because of sorting.

19. What is the difference between HashMap and Hashtable?
It is thread-safe and can be shared with many threads. **HashMap allows one null key and multiple null values whereas Hashtable doesn't allow any null key or value**. HashMap is generally preferred over HashTable if thread synchronization is not needed.

20. What is the difference between Collection and Collections?
Collection helps to store a set of objects into a single Collection object while Collections helps to perform an operation on the object of Collection. Hence, this is also a difference between Collection and Collections.

21. What is the difference between Comparable and Comparator?
While Comparable is used on objects that are naturally ordered, the Comparator interface implements sorting by taking the attributes of an object into consideration. Further, Comparator sorting takes into

account objects of two different classes and Comparable compares objects using the “this” reference.

22. What does the hashCode() method?
The hashCode method is an inbuilt method that **returns the integer hashed value of the input value**.

23. Why we override equals() method?
It needs to be overridden **if we want to check the objects based on the property**. For example, we want to check the equality of employee object by the id. Then, we need to override the equals() method.

24. What is the difference between Array and ArrayList?
An array is a fixed-length data structure. ArrayList is a variable-length data structure. It can be resized itself when needed.

25. How to convert ArrayList to Array and Array to ArrayList?
We can convert an array to arraylist using following ways.

1. Using Arrays. asList() method - Pass the required array to this method and get a List object and pass it as a parameter to the constructor of the ArrayList class.
2. Collections. ...
3. Iteration method - Create a new list.

26. How to remove duplicates from ArrayList?
Approach:

1. Get the ArrayList with duplicate values.
2. Create a LinkedHashSet from this ArrayList. This will remove the duplicates.
3. Convert this LinkedHashSet back to Arraylist.
4. The second ArrayList contains the elements with duplicates removed.
5.

27. How to reverse ArrayList?
To reverse an ArrayList in java, one can **use Collections class reverse method i.e Collections. reverse() method**.

28. How to sort ArrayList in descending order?

Approach:

An ArrayList can be Sorted by **using the sort() method of the Collections Class in Java**. This sort() method takes the collection to be sorted and Collections.

29. When to use ArrayList and LinkedList?

LinkedList is fast for adding and deleting elements, but slow to access a specific element. ArrayList is fast for accessing a specific element but can be slow to add to either end, and especially slow to delete in the middle.

30.What is the Stack class?

The Stack class **represents a last-in-first-out (LIFO) stack of objects**. It extends class Vector with five operations that allow a vector to be treated as a stack.