# Collection in java is a framework that provide an architecture to store and manipulate the group of objects.

Search sorting insertion manipulation deletion

# Java collection means a single unit of objects.

java collection framework provides many interfaces

-Set

-List

-Queue

-Deque

Classes are .....

-ArrayList

-Vector

-LinkedList

-PriorityQueue

-HashSet

-LinkedHashSet

-TreeSet

Arrays

- An array is a data structure that allows you to store multiple values of the

same type into a single variable

- The default values of numeric array elements are set to zero.

- Arrays are zero indexed; an array with n elements is indexed from 0 to n-1,

for example; 10 elements index range is from 0 to 9.

- If we try to access index that is out of range, Java will give us

an ArrayIndexOutOfBoundsException, which indicates that the index is out of range,

in other words its out of bounds.

- To access array elements we use square braces [ and ], also known as

array access operator.

Example of creating a new array:

int [] array = new int[5];

- This array contains the elements from array[0] to array[4]

- It has 5 elements and the index range is 0 to 4.

- The new operator or keyword is used to create the array and initialize the

array elements to their default values.

- In this example, all the array elements are initialized to zero since this

is an int array.

- For boolean, array elements would be initialized to false.

- For String or other objects, it would be null.

int[] myNumbers = {6, 5, 4, 3, 2, 1, 0};

- We can also initialize an array inline by using array initializer block { and }.

Values we defined need to be separated by a comma.

- This way of initializing an array is also known as an anonymous array.

- It has 7 elements and index range 0 to 6.

- In this example, array elements are initialized to 6, 5, 4, 3, 2, 1 and 0.

So let's say we create an array of size 5.

int[] myArray = new int[5];

- Each element at index 0 through 4 would be set to 0.

myArray[5] = 55; // out of bounds

- Accessing index out of range will cause error in other words,

ArrayIndexOutOfBoundsException

- We have 5 elements and index range is 0 to 4.

- When looping through an array, be sure to have the index start at 0,

since datastructure.arrays are zero indexed. Do not make the mistake of starting from

index 1. Also be cautious of the termination.

# 2D Array/ Multidimensional Array: simple words as array of arrays

Data in 2D Array are stored in tabular form (in row major order)

dataType[1st Dimension][2nd Dimension] =new dataType[size1][size2]

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ARRAYLIST

The java ArrayList implements List Interface

ArrayList always maintain insertion order of the elements

ArrayList only stores value or element

ArrayList can contain duplicate elements

We can have any numbers of null elements in ArrayList

ArrayList get() method always gives an O(1) performance

ArrayList Vs Linked List

>>Manipulation with ArrayList is slow because it internally uses an array. If any element is removed from the array, all the bits are shifted in memory.

>>Manipulation with LinkedList is faster than ArrayList because it uses a doubly linked list, so no bit shifting is required in memory.

>> An ArrayList class can act as a list only because it implements List only.

>> LinkedList class can act as a list and queue both because it implements List and Deque interfaces.

>> ArrayList is better for storing and accessing data.

>> LinkedList is better for manipulating data.

#Map:

Few characteristics of the Map Interface are:

A Map cannot contain duplicate keys and each key can map to at most one value.

Some implementations allow null key and null value like the HashMap and LinkedHashMap,

but some do not like the TreeMap.

The order of a map depends on specific implementations,

e.g TreeMap and LinkedHashMap have predictable order, while HashMap does not.

There are two interfaces for implementing Map in java: Map and SortedMap,

and three classes: HashMap, TreeMap and LinkedHashMap.

HASHMAP

The java HashMap is implements Map interface

HashMap does not maintain the insertion order

HashMap stores key and value pairs

HashMap does not contain duplicate keys but contain duplicate values.

We can have only one null key and any number of null values in HashMap

HashMap get()method can be O(1) in the best case and O(n) in the worst case

#Wrapper Classes in Java

A Wrapper class is a class whose object wraps or contains a primitive data types.

When we create an object to a wrapper class, it contains a field and in this field, we can store a primitive data types.

In other words, we can wrap a primitive value into a wrapper class object.

Need of Wrapper Classes

They convert primitive data types into objects. Objects are needed if we wish to modify the arguments passed into a method (because primitive types are passed by value).

The classes in java.util package handles only objects and hence wrapper classes help in this case also.

Data structures in the Collection framework, such as ArrayList and Vector, store only objects (reference types) and not primitive types.

An object is needed to support synchronization in multithreading.