Backend and Database Development

13 classes

Day 5 : 30 Apr 2024

Java Technologies

Collection Framework with Data structure

int a=10;

a=20;

in a we can store only one single value.

Array : array is use to store more than one value of same types.

int abc[]={10,20,30,40};

int xyz[]=new int[10];

structure : it is use to store more than one value of different types. It support by C or C++ not java.

class : using class we can store more than one value of different types.

class Employee {

int id;

String name;

float salary;

}

Employee emp = new Employee();

emp.id=100;

emp.name = “Ravi”;

emp.salary = 12000;

emp.id=101;

array objects

syntax

className objectRefName[]=new ClassName[size];

int abc[]=new int[100];

Employee employees[]=new Employee[100]; zero or 1 or 100

Zero employee class object created. Array object created which help to store 100 objects of type of employee.

employees[0]=new Employee();

employees[1]=new Employee();

employees[99]=new Employee();

Java Bean class :

1. In Java bean class all variable must be private.
2. For each variable we need to provide setter and getter methods.
3. Setter method is use to set the value and getter method is use to get the value.
4. If we want we can write empty as well as parameterized constructor.
5. We can override toString methods.

class Employee {

private int id;

private String name;

public void setId(int id) {

this.id = id;

}

public int getId() {

return id;

}

}

Whenever we display any user defined class object reference. It will display the output as

[Packagename.classname@code](mailto:Packagename.classname@code)

By default when we display reference of any class it internally call toString method of object class.

By default every java program internally extends pre -defined class ie Object. this class contains lot of pre defined methods. toString method is part of object class. that toString method return object reference in the form of string as [packagename.className@code](mailto:packagename.className@code)

Limitation of array object.

Primitive array or array object is known as fixed in memory size.

Array doesn’t provide any pre defined method which help add data in between, remove data in between, search in data from array. We need to write the code from beginning.

Collection framework provided set of classes and interface which help to store any type of values ie integer, float, char, string as well as user defined objects. It provided lot of pre defined method which help to add, remove, search, iterate the data or value very easily.

All these classes and interfaces part of util package.

Collection Framework hierarchy

Collection ---🡪 interface

Set List Queue Map ---🡪 all four are interfaces

Set, List and Queue interface internally extends Collection interface. But Map doesn’t.

Set : Set doesn’t allow duplicate. Few classes which comes under the set they maintain order or unorder or sorted. Set doesn’t provide index position.

Set classes below set class directly or indirectly implements Set interface.

HashSet : unorder.

LinkedHashSet : LinkedHashSet internally extends HashSet and it doesn’t provide any extra method. it maintain the order.

TreeSet : TreeSet internally implements SortedSet interface. SortedSet interface extends Set interface. SortedSet interface provide algorithms to display the data in sorting order by default ascending. In TreeSet we can store only homogeneous elements. It provided few extra methods as subset, tailset, headset etc.

List : List allow duplicate. List maintain the order using index position.

List classes : below list classes directly or indirectly implements List interface.

ArrayList: ArraryList is a type of List class which also known as dynamic array.

Normal Array Vs ArrayList

1. In normal array we can store homogeneous elements. But in ArrayList we can store homogeneous as well as heterogeneous elements.
2. In Array is fixed in memory size. But ArrayList is dynamic in memory size.
3. Normal array doesn’t provide any pre defined method to add, remove as well as search the elements. But ArrayList provide lot of pre defined method to do different type of operations.

LinkedList: LinkedList is a type of data structure which internally use node concept to store the data.

LinkedList internally divided into 4 types.

1. Single linked list

100 ref 200 ref 300 ref

1. Double linked list

null null

Pref 100 nref pref 200 nref

1. Circular single linked list
2. Circular double linked list

LinkedList ll = new LinkedList() by default it consider as double linked list.

Vector : Vector class is known as legacy class. by default all methods in Vector class are synchronized. (performance wise slow when we compare with Arraylist and linkedlist but work safe in multi threading environment).

Stack :

Queue : Queue is a type data structure which provide features as first in first out.

Queue classes : below queue classes directly or indirectly implements Queue interfaces.

ArrayList:

PriorityQueue :

Map : Map help use to store the data in the form of key-value pairs. Key is unique and value may be duplicate.

Map classes : below map classes directly or indirectly implements Map interface.

HashMap

LinkedHashMap

TreeMap

Hashtable