Vector

List is a concrete sub class of List interface.

Characteristics
Introduced in 1.2v.
Insertion order is preserved.
Null objects are allowed.
Duplicate objects are allowed.
Heterogenous objects are allowed.
Datastructure is growable or shrinkable.
It has 4 constructors

Note:-
Vector came before ArrayList (c), List (I) and Collection (I), so it is referred as Legacy class.
After java 1.2 Vector became child of Collection (I) & List (I).
Therefore it has 3 methods to add element.

1. add(Object ref) from collection (I)
2. add(int index, object ref) from List (I)
3. addElement(object ref) from Vector (c)

it has 4 methods for Accessing elements,
get(int index) → from List(I)
elementAt(int index) → from Vector (c)
firstElement()→ from Vector (c)
lastElement()→ from Vector (c)

it has 5 methods for removing,
remove(object ref)→from Collection(I)
remove(int index)→from List(I)
removeElement(Object ref)→from Vector
clear()→from Collection(I)
removeAllElements()→from Vector

Its initial size is 10
formula :-
new capacity = 2*old capacity

ex:-

```
public class CollFramework {
	public static void main(String[] args) {
		Vector <Integer>l=new Vector();
		l.add(1);
		l.add(6);
```

```
                l.addElement(10);
                l.add(3, 3);
                for(int i=0;i<l.size();i++) {
                        System.out.println(l.get(i));
                }
                System.out.println(l.capacity()); //10
                l.removeAllElements();
                System.out.println(l); //[]
        }
}
```

ex :- to retrive values

```
public class Employee {
        public static void main(String[] args) {
                Vector<Integer> v=new Vector();
                v.add(1);
                v.addElement(3);
                v.add(0, null);
                v.add(98);
                v.add(11);
                v.addElement(6);
                v.add(2, 9);
                v.add(89);
                System.out.println(v);
                System.out.println(v.get(2)); //9
                System.out.println(v.elementAt(4)); //98
                System.out.println(v.firstElement()); //null
                System.out.println(v.lastElement()); //89
        }
}
```

Differences between ArrayList and Vector

ArrayList	Vector
Default capacity is 10	Default capacity is 10
Inroduced in 1.2 version of Java, so Non Legacy Class.	Introduced in 1.0 version of Java, so Legacy Class.
When it reaches its saturation point size increases by oldsize*(3/2)+1	when it reaches its saturation point size increases by its equal size ex: 10+10=20
Performance is higher in ArrayList	Performance is poor in Vector

Stack

Stack is a subclass of Vector and it is specially designed for Last in First Out.

Characteristics :-

Introduced in 1.0v.
It follows Last in First Out.
Insertion and deletion happens at one end.
Insertion order is maintained.
Duplicates are allowed.
Null values are allowed.
It has only 1 constructor.

Methods

Push(Object ref)

It is used to insert objects into the stack.

Pop()

It is used to remove and return top of the stack.

Peek()

It returns the object which is going to remove.

ex :-

```
public class Employee {
	public static void main(String[] args) {
		Stack s=new Stack();
		s.add(25);
		s.push("e");
		s.push(6);
		s.push(null);
		s.push('a');
		System.out.println(s); //[25, e, 6, null, a]
		s.pop();
		System.out.println(s); //[25, e, 6, null]
		System.out.println(s.pop()); //null
		System.out.println(s.peek()); //6
		System.out.println(s); //[25, e, 6]
	}
}
```