How to synchronize ArrayList in java with example

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We have already discussed a bit about synchronization when we shared the tutorial on Vector vs ArrayList. As we are aware that ArrayList is non-synchronized and should not be used in multi-thread environment without explicit synchronization. This post is to discuss how to synchronize ArrayList in Java.

There are two ways to synchronize explicitly:

1. Using Collections.synchronizedList() method
2. Using thread-safe variant of ArrayList: CopyOnWriteArrayList

Example 1: Collections.synchronizedList() method for Synchronizing ArrayList

In this example we are using Collections.synchronizedList() method. The important point to note here is that iterator should be in synchronized block in this type of synchronization as shown in the below example.

```
package beginnersbook.com;
import java.util.ArrayList;
import java.util.Iterator;
import java.util.List;
import java.util.Collections;

public class Details {

   public static void main(String a[]){
        List<String> syncal =
          Collections.synchronizedList(new ArrayList<String>());

        //Adding elements to synchronized ArrayList
        syncal.add("Pen");
        syncal.add("NoteBook");
        syncal.add("Ink");

        System.out.println("Iterating synchronized ArrayList:");
        synchronized(syncal) {
        Iterator<String> iterator = syncal.iterator();
        while (iterator.hasNext())
           System.out.println(iterator.next());
        }
   }
}
```

Output:

```
Iterating synchronized ArrayList:
Pen
NoteBook
Ink
```

Method 2: Using CopyOnWriteArrayList

CopyOnWriteArrayList is a thread-safe variant of `ArrayList`.

```
package beginnersbook.com;
import java.util.concurrent.CopyOnWriteArrayList;
import java.util.Iterator;

public class Details {

 public static void main(String a[]){
    CopyOnWriteArrayList<String> al = new CopyOnWriteArrayList<String>();

    //Adding elements to synchronized ArrayList
    al.add("Pen");
    al.add("NoteBook");
    al.add("Ink");

    System.out.println("Displaying synchronized ArrayList Elements:");
    //Synchronized block is not required in this method
    Iterator<String> iterator = al.iterator();
    while (iterator.hasNext())
       System.out.println(iterator.next());
  }
}
```

Output:

```
Displaying synchronized ArrayList Elements:
Pen
NoteBook
Ink
```