

ArrayList

Java Reference

ArrayList basics

An `ArrayList` is a resizable 可变大小 list —it grows and shrinks as you add or remove items. It stores objects, so use a wrapper 包装类 type like `Integer` (not `int`). The `<Integer>` part is a generic 泛型 type. Key methods: `.add(x)`, `.get(i)`, `.set(i, x)`, `.size()`, `.remove(i)`.

```
import java.util.ArrayList;

public class Main {
    public static void main(String[] args) {
        ArrayList<Integer> nums = new ArrayList<Integer>();
        nums.add(10);
        nums.add(20);
        nums.add(30);
        System.out.println(nums.size());    // 3
        System.out.println(nums.get(1));    // 20
        nums.set(0, 99);
        System.out.println(nums);           // [99, 20, 30]
    }
}
```

ArrayList algorithms & the remove bug

`.remove(i)` shifts 移动 every later element one place left. If you remove while counting `i` **up**, you skip the next element. Fix: loop **backwards**, or don't increment `i` after a remove.

```
import java.util.ArrayList;

public class Main {
    public static void main(String[] args) {
        ArrayList<Integer> nums = new ArrayList<Integer>();
        for (int n : new int[]{4, 7, 4, 9, 4}) nums.add(n);
        // Remove every 4 — loop backwards so removals don't skip items.
        for (int i = nums.size() - 1; i >= 0; i--) {
            if (nums.get(i) == 4) nums.remove(i);
        }
        System.out.println(nums);    // [7, 9]
    }
}
```