287. Find the Duplicate Number

link

solution explain

用linkedList寻找环的方法. 这里得初始化两个都是0, 然后用do while的循环

```
    public int findDuplicate(int[] nums) {
        int slow = 0;
        int fast = 0;
        do{
            slow = nums[slow];
            fast = nums[nums[fast]];
        }while(fast != slow);
        slow = 0;
        do {
            slow = nums[slow];
            fast = nums[fast];
            if(slow == fast) return fast;
        } while(slow != fast);
        return -1;
    }
```

错误的写法这个从第一个开始判断如果`nums[0]`相等, 就无限循环了

`[3,1,3,4,2]`

3 -> 4 -> 2 -> 3

slo: 3, 4, 2, // 1, 4, 2, 3, //4, 2, 3

fas: 4, 3, 2, // 2, 3, 4, 2, //3, 4, 2

```
    public int findDuplicate(int[] nums) {
        int slow = nums[0];
        int fast = nums[nums[0]];
        while(fast != slow){
            slow = nums[slow];
            fast = nums[nums[fast]];
        }
        slow = nums[0];
        while(slow != fast){
            slow = nums[slow];
            fast = nums[fast];
            if(slow == fast) return fast;
        }
        return -1;
    }
```

这样也可以

```
    public int findDuplicate(int[] nums) {
        int slow = nums[nums[0]];
        int fast = nums[slow];
        while(fast != slow){
            slow = nums[slow];
            fast = nums[nums[fast]];
        }
        slow = nums[0];
        if(slow == fast) return slow;
        while(slow != fast){
            slow = nums[slow];
            fast = nums[fast];
            if(slow == fast) return fast;
        }
        return -1;
    }
```