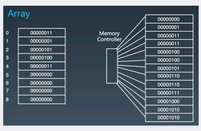
数据结构与算法总览

数据结构

一维

基础

数组array



实现：在内存中开辟一段连续的地址

特性：O(1) 查询很快

O(n) 插入、删除

java源码实现

```
public void add(int index, E e)
{
 checkBoundInclusive(index);
 modCount++;
 if (size == data.length)
  ensureCapacity(size + 1);
 if (index != size)
  System.arraycopy(data, index, data, index + 1, size - index);
 data[index] = e;
 size++;
}
```

链表linked list

双向链表：previous/next

循环链表：tail.next –> head

特性：O(1) 插入、删除很快

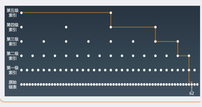
O(n) 查找

应用：LRU Cache

跳表skip list

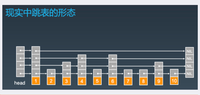
当链表元素有序的时候，如何快速查找，这就引出了跳表

查找如何优化：有序链表–>增加维度–>跳表



时间复杂度

O(log n) 查找、插入、删除



空间复杂度

O(n) 跳表的空间复杂度要比原始链表高，但由于是收敛的，所以数量级还是在O(n)

应用：Redis

https://redisbook.readthedocs.io/en/latest/internal– datastruct/skiplist.html

https://www.zhihu.com/question/20202931

高级

栈stack

后进先出

O(1) 添加、删除

O(n) 查询

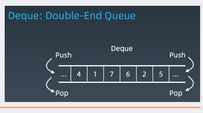
队列queue

先进先出

O(1) 添加、删除

O(n) 查询

双端队列deque



O(1) 添加、删除

O(n) 查询

优先队列priority queue

O(1) 添加

O(log n) 取出–按元素的优先级取出（特性）

算法

复杂度分析

时间复杂度

复杂的情况：递归

主定理
–用来解决所有递归函数如何计算时间负责度问题

空间复杂度

数组长度

递归深度