

Line up in order of birthday day (1-31)

Ex: August 3rd = 3

How would I find someone with the same day as me?

Binary Search

- Begin with sorted list
- For each comparison, you'll eliminate half of the list by looking at the middle element
- Repeatedly use this logic until you find the target element

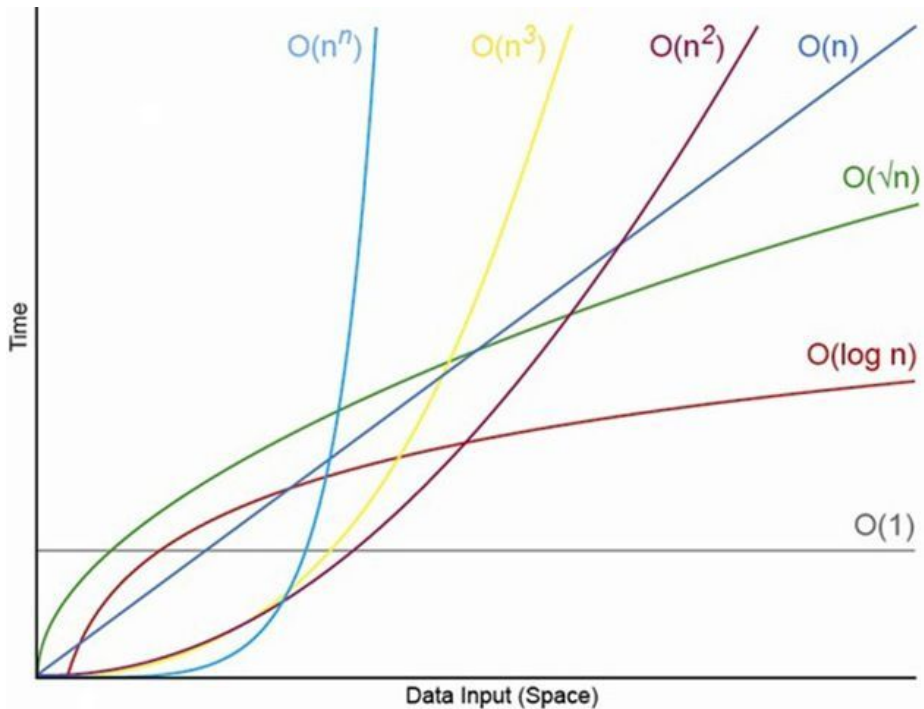
Binary Search

- What would be better, an ArrayList or LinkedList? Why?

Binary Search

Every step, we eliminate half the numbers.

Binary search average run time complexity:
 $O(\log_2 n)$



Your turn - 20 mins

<https://leetcode.com/problems/binary-search/>

Binary Search - Iterative

```
public int binarySearch(int[] nums, int target) {  
    int low = 0;  
    int high = nums.length - 1;  
    while (low <= high) {  
        // we think target >= nums[low] && target <= nums[high]  
        int mid = (low + high) / 2;  
        if (nums[mid] == target) {  
            return mid;  
        } else if (nums[mid] > target) {  
            high = mid - 1;  
        } else {  
            // nums[mid] < target  
            low = mid + 1;  
        }  
    }  
    return -1;  
}
```

Binary Search - Recursive

```
// initially called with low = 0, high = nums.length
public int binarySearch(int[] nums, int target, int low, int high) {
    // we think value > nums[low] && value < nums[high]
    if (high < low) return -1;
    int mid = (low + high) / 2;
    if (nums[mid] == target) {
        return mid;
    } else if (nums[mid] > target) {
        return binarySearch(nums, target, low, mid-1);
    } else {
        // nums[mid] < target
        return binarySearch(nums, target, mid+1, high);
    }
}
```

Check in

Any questions about how binary search works?

Ghost

Demo

Things You'll Need To Do

- Add buttons to the screen
- Read the word.text file
- Get the letter that was typed in ***onKeyUp***
- Call a method when a button is pressed
- Implement binary search to look up words
 - Looking for prefix, not exact match, so slightly different

Tips

- You'll need to read from a .txt file.
Try looking at the code for Anagrams (in onCreate) for an example.
- The documentation for [Character](#) and [KeyEvent](#) may be useful in dealing with key presses in **onKeyUp**.
- You may want to go back to the leetcode problem and finish an independent binary search implementation.