# Hash Tables

Data Structures
Week #4

# Practice

Go to GeeksforGeeks HashTable

https://www.geeksforgeeks.org/hashtable-in-java/

Go to GeeksforGeeks HashMap

https://www.geeksforgeeks.org/java-util-hashmap-in-java-with-examples/

Go to GeeksforGeeks HashSet

https://www.geeksforgeeks.org/hashset-in-java/

Practice HashMap design with LeetCode

https://leetcode.com/problems/design-hashmap//

# Hash Table Usage

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LRU (Least Recently Used) Cache

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In Hashtable we specify an object that is used as a key, and the value we want to associate to that key. The key is then hashed, and the resulting hash code is used as the index at which the value is stored within the table.

# HashTable


```java
Hashtable<String, Integer> topTestScores =
    new Hashtable<String, Integer>();
topTestScores.put("John", 99);
topTestScores.put("Sandra", 100);
topTestScores.put("Sammy", 85);
// Prints 100
System.out.println(topTestScores.get("Sandra"));
```


```python
topTestScores =
    {'John': 99, 'Sandra': 100, 'Sammy': 85}
# Prints 85
print topTestScores['Sammy']
```

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This class makes no guarantees as to the order of the map; in particular, it does not guarantee that the order will remain constant over time

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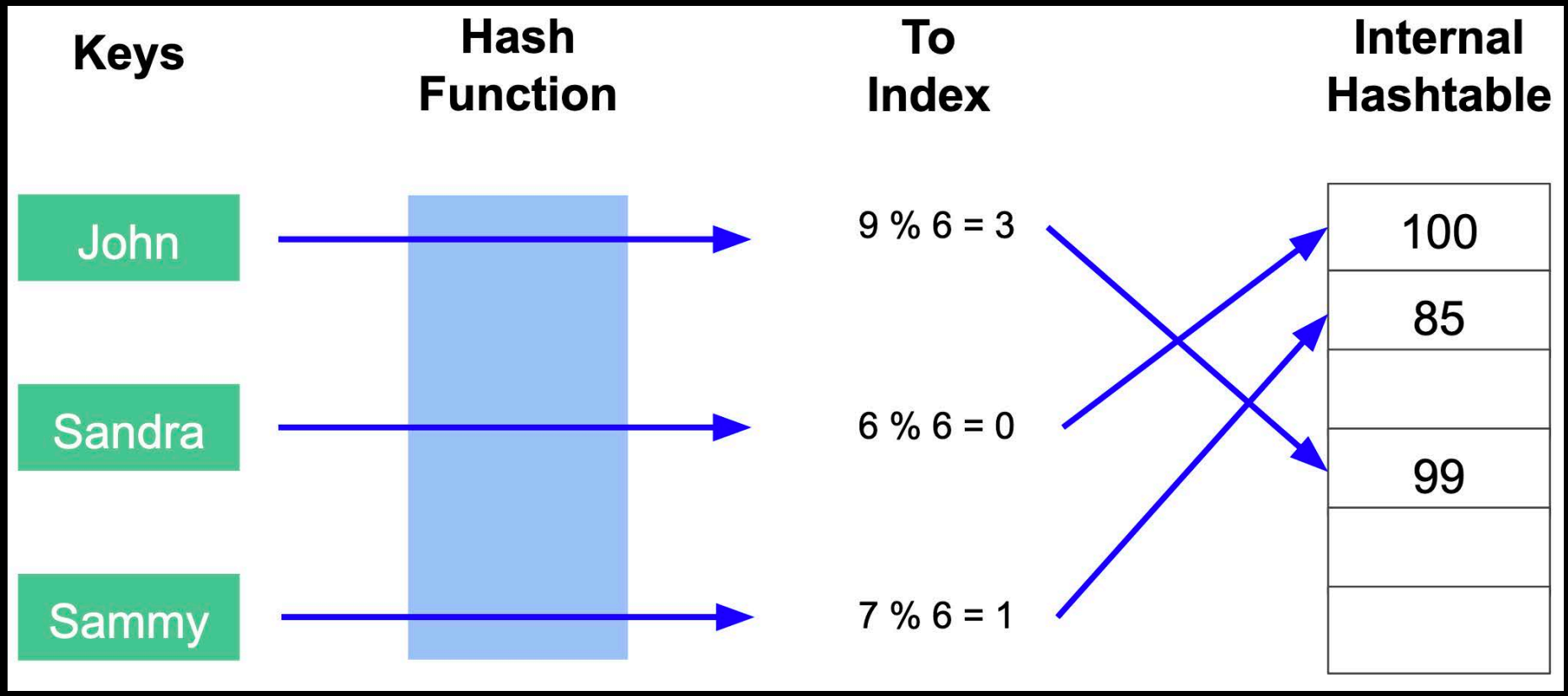
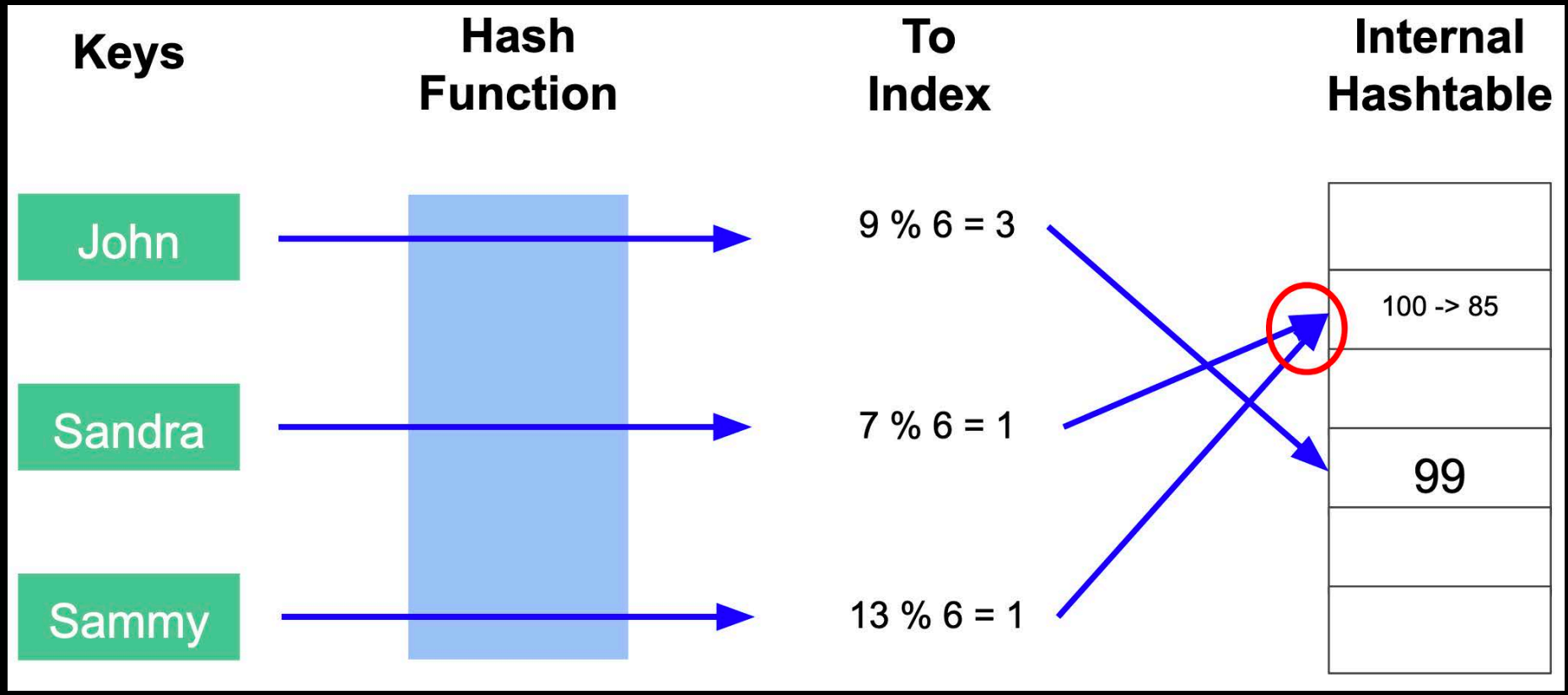
NULL elements are allowed in HashSet

# Hash Function



# Hash Function - Collisions



Understand

Matchtch

Psuedocode / Plan

Implement

Revieweview

Evaluate

# Practice Exercise #1

Given an array of integers, return indices of the two numbers such that they add up to a specific target.

You may assume that each input would have exactly one solution, and you may not use the same element twice.

**Example 1:**
Given nums = [2, 7, 11, 15], target = 9,

Because nums[0] + nums[1] = 2 + 7 = 9,
return [0, 1].

# Practice Exercise #2

You' are given strings representing the types of stones that are jewels, and s representing the stones you have.  Each character in J is a type of stone you have.  You want to know how many of the stones you have are also jewels.
The letters in J are guaranteed distinct, and all characters in J and S are letters. Letters are case sensitive, so 'a' is considered a different type of stone from 'A'.

**Example 1:**
**Input:** J =""aA", S =""aAAbbbb""
**Output:** 33

**Example 2:**
**Input:** J = "z", S = "ZZ"; "ZZ"
**Output:**  0

**Note:** S and J will consist of letters and have length at most 50.
The characters in J are distinct.

# Questions