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Class ID: 4
CS 5542, Problem Set 1
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1.
```java
public int findUnique(int[] arr) throws Exception {
    HashMap<Integer, Integer> intMap = new HashMap<Integer, Integer>();
    for(int i : arr) {
        Integer count = intMap.get(i);
        if (count == null) {
            intMap.put(i, 1);
        } else {
            intMap.put(i, ++count);
        }
    }
    for (Map.Entry<Integer, Integer> entry : intMap.entrySet()) {
        if (entry.getValue() == 1) {
            return entry.getKey();
        }
    }
    throw new Exception("Unique value not found");
}
```

time complexity: O(n), space complexity: O(n)
I saw later that there is an algorithm that uses O(1) space, using XOR, but I would not have come up with that on my own.

2.
- I would collect data that includes how to identify each chimp, the location of each chimp on the island, and the different types of activities they are involved in: eating, sleeping, grooming, fighting, mating, etc.
- I would set up cameras around the island that can record each area of the island 24/7. The cameras would act as if the researchers were watching the chimps day and night, but would instead automate the observations that would be made by the researches. First I would ask the researchers how to identify the different chimps, i.e. different distinguishing characteristics for each one. I then would ask them what different activities look like (e.g. what does the chimp look like when it's eating vs. grooming). Then I would develop some big data algorithms that would interpret the video feed and record each chimp's location and activity for every second of the day into a large database. I don't know how this would work yet because I haven't taken the class.
- I think big data analytics can use statistical techniques to uncover new patterns in the data. For example, it could be observed that one chimp spends a lot of time with another chimp, but only when a certain other chimp isn't around.
- I am not sure what this question is asking. I think learning big data analytics would improve this system.
- See hard copy PS1