Algorithmic Question Strtegies

Solving Strategies

How to solve difficult problems?

1. Think of common strategies
2. Don’t be afraid to use brute force solutions.
3. Simplify the problem

Common Strategies

1. Sort
2. Nested loops. Iterate all the items
3. Memory allocation. Remember appearances, or calculate sums as you go along
4. Use known algorithms: DFS, BFS, Dynamic Programming…
5. Counter - count number of appearances.

What is a **brute force** solution?

- Check all the options.
- Don’t consider time and space efficiency!

Example 1

Find the common elements between 2 arrays.

Q1 Find the common elements between 2 arrays

Don’t be afraid to use brute force solutions.

```
function findCommonNumbersBruteForce(arr1, arr2){
    let commonNumbers = []
    for (let i = 0; i < arr1.length; i++){
        for (let j = 0; j < arr2.length; j++){
            if (arr1[i] === arr2[j]){
                commonNumbers.push(arr1[i])
            }
        }
    }
    return commonNumbers
}
```

Q1 Find the common elements between 2 arrays

Think of common strategies: Allocating Data structures

```
function findCommonNumbers(arr1, arr2) {
    let commonNumbers = new Set()
    let appearances = new Set(arr2)

    for (let num of arr1) {
        if (appearances.has(num)) {
            commonNumbers.add(num)
        }
    }
    return commonNumbers
}
```

Example 2

Find the common elements between 3 arrays.

Q2 Find the common elements between 3 arrays

Simplify the problem

```
function findCommonNumbersOf3Arrs(arr1, arr2, arr3) {
    let twoArrCommons = findCommonNumbersOf2Arrs(arr1, arr2)
    let threeArrCommons = findCommonNumbersOf2Arrs(twoArrCommons, arr3)
    return threeArrCommons
}
```

Break!

Example 3

Find the common elements between 3 sorted arrays.

Q3 Find the common elements between 3 sorted arrays

```
function findCommon(arr1, arr2, arr3) {
    let arrIndices = [0, 0, 0];
    let commonNums = [];

    while (arrIndices[0] < arr1.length && arrIndices[1] < arr2.length && arrIndices[2] < arr3.length) {
        let curr = arr1[arrIndices[0]]
        if (curr === arr2[arrIndices[1]] && curr === arr3[arrIndices[2]]) {
            commonNums.push(curr)
            arrIndices = arrIndices.map(x => x + 1);
        } else {
            increaseMinIndex(arr1, arr2, arr3, arrIndices)
        }
    }

    return commonNums
}
```