Quiz 1 Practice Questions

Quiz 1 Concepts

- **Brute Force Algorithms**: Practice solving the algorithms below using brute force. They don't need to be correct or efficient.

- Understand the basics of the three sorting algorithms:

    - Be ready to apply the algorithms to an input

    - Understand what input gives the best and worst case for each algorithm

    - Understand the procedures each algorithm uses and be ready to write pseudocode

Brute Force Problem Set

Use any of the abstract data types (sets, maps, stacks, etc.) that we have talked about.

Problem 1: Two Sum

Problem Statement: Given an array of integers `nums` and an integer `target`, return the indices of the two numbers such that they add up to `target`. You may assume that each input would have exactly one solution, and you may not use the same element twice.

Example:

```
Input: nums = [2,7,11,15], target = 9
Output: [0,1]
```

Problem 2: Best Time to Buy and Sell Stock

Problem Statement: You are given an array `prices` where `prices[i]` is the price of a stock on the `i-th` day. Find the maximum profit from a single buy and sell operation. You must buy before you sell.

Example:

```
Input: prices = [7,1,5,3,6,4]
Output: 5 (buy at 1, sell at 6)
```

Problem 3: Contains Duplicate

Problem Statement: Given an array of integers, check if any value appears at least twice.

Example:

```
Input: [1, 2, 3, 1]
Output: True
```

Problem 4: Maximum Subarray

Problem Statement: Given an integer array `nums`, find the contiguous subarray (containing at least one number) with the largest sum.

Example:

```
Input: [-2,1,-3,4,-1,2,1,-5,4]
Output: 6 ([4,-1,2,1])
```

Problem 5: Longest Common Prefix

Problem Statement: Write a function to find the longest common prefix string amongst an array of strings. If there is no common prefix, return an empty string "".

Example:

```
Input: ["flower","flow","flight"]
Output: "fl"
```

Problem 6: Valid Palindrome

Problem Statement: Given a string, determine if it is a palindrome considering only alphanumeric characters and ignoring cases.

Example:

```
Input: "A man, a plan, a canal: Panama"
Output: True
```

Problem 7: First Unique Character in a String

Problem Statement: Given a string, find the first non-repeating character and return its index. If it does not exist, return -1.

Example:

```
Input: "leetcode"
Output: 0
```

Problem 8: Intersection of Two Arrays

Problem Statement: Given two arrays, return their intersection (unique elements only).

Example:

```
Input: nums1 = [1,2,2,1], nums2 = [2,2]
Output: [2]
```