ARRAYS VS SETS

Arrays and Sets are both data structures used to store collections of values, but they differ significantly in their characteristics and typical use cases.

Arrays:

Ordered Collection:
Elements in an array maintain a specific order, and their position is determined by an index (e.g., 0, 1, 2...).
Allows Duplicates:
Arrays can store multiple instances of the same value.
Indexed Access:
Elements can be accessed directly using their numerical index (e.g., `array[0]`).
Methods:
Arrays offer a wide range of methods for manipulation, including:

- `push()`: Adds an element to the end.
- `pop()`: Removes the last element.
- `shift()`: Removes the first element.
- `unshift()`: Adds an element to the beginning.
- `splice()`: Adds/removes elements at a specific index.
- `includes()`: Checks for element existence (O(n) complexity).
- `map()`, `filter()`, `reduce()`: Higher-order functions for transformation and aggregation.

Sets:

Unordered Collection (generally): While insertion order might be maintained in some implementations (like JavaScript's `Set`), sets fundamentally do not guarantee a specific order of elements.

nique Values Only: Sets only store unique values; duplicate additions are ignored.
No Indexed Access: Elements cannot be accessed by index.
Methods: Sets provide methods primarily focused on managing unique elements:

- `add()`: Adds an element.
- `delete()`: Removes an element.
- `has()`: Checks for element existence (typically O(1) average complexity, making it very efficient for membership checks).
- `clear()`: Removes all elements.
- `size`: Property to get the number of elements.

Choosing Between Arrays and Sets:

Use Arrays when:

- The order of elements is important.
- Duplicate values are allowed or necessary.
- You need to access elements by their numerical index.

Use Sets when:

- You need to store a collection of unique values.
- Efficient membership checking (`has()`) is a priority.
- The order of elements is not a concern.
- You need to perform set operations like union or intersection (often requiring manual implementation or conversion to arrays).