**ARRAYS**

An array is a linear data structure that stores a collection of elements of the same type in contiguous memory locations

* Arrays allow fast and direct access to any element using an index.
* Arrays allocate a fixed amount of memory when declared.
* Elements are stored sequentially, simplifying traversal.
* Sorting and searching algorithms (e.g., bubble sort, binary search) rely on arrays.
* Multiple traversals can be done using loops efficiently.
* Signal processing, multimedia, robotics, financial analysis, and more use arrays.

**TIME COMPLEXITIES**

* Adding an element to the end of an array (appending) takes O(1) time.
* Accessing an element by index (e.g., arr[i]) takes O(1) time.
* Iterating through all elements (e.g., using a loop) takes O(n) time
* Deleting an element from the end (e.g., using pop()) takes O(1) time

**LIMITATIONS OF ARRAY**

* + Arrays have a fixed size determined during creation.
  + You cannot dynamically resize an array without creating a new one.
  + Dynamic resizing involves copying elements, which can be costly.
  + Elements must be stored in contiguous memory locations.
  + Insertions and deletions in the middle of an array require shifting elements.
  + If an array is larger than needed, memory is wasted.