Theoretical Questions on Array

1. When should you use an Array over a List?

Arrays are preferred over lists when:

- Multidimensional structures are needed for data storage, as lists are limited to one dimension.
- Fixed length and static allocation are necessary.
- Faster data processing is a priority.
- Storing primitive data types directly is required, as lists cannot accommodate them.

2. Why is the complexity of fetching a value from an array be O(1)?

   As Arrays are allocated contiguously in memory, fetching a value via an index of the array is an arithmetic operation. All arithmetic operations are done in constant time i.e., O(1).

3. Can we declare array size as a negative number?

   As per the convention of array declaration, it is mandatory that each time an array is evaluated it shall have a size greater than 0. Declaring array size negative breaks this “shall” condition. That’s why this action gives an error.

4. What is meant by Sparse Array?

- Sparse matrices are those array that has the majority of their elements equal to zero.
- A sparse array is an array in which elements do not have contiguous indexes starting at zero.
- Sparse arrays are used over arrays when there are lesser non-zero elements. Sparse arrays require lesser memory to store the elements and the computation time can be saved.

5. How to create an array/list inside another array/list?

   Using insert() + loop: In this method, we insert one element by 1 at a time using the insert function. This way we add all the list elements at the specified index in other list.
   Or
   Using list slicing

6. What is a circularly sorted array?
   Circularly sorted arrays are arrays that are sorted in ascending or descending order and then rotated by a number of steps.