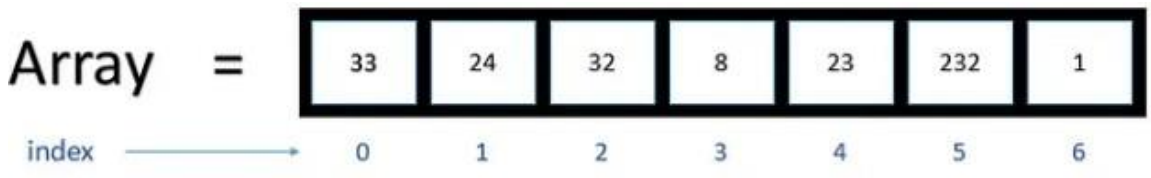
Lab Task # 3 Arrays and Unit Testing

Arrays

An Array is a data structure consisting of a homogenous set of elements stored at contiguous memory locations.

You can imagine arrays as a container where each bucket inside the container can hold a value of same data type , and each bucket inside an array could be accessed by index numbers that range from 0 to size-1.

For example, consider an array of size 7 with data type as an integer :



Here, array is a container which contains collections of multiple buckets all of type integers and each bucket consists of a single element. These buckets are stored in a continuous manner and each bucket is referenced by its index number which starts from 0 to 6 (i.e. size-1).

Lab Work

Task 1:
Make a menu of the following operations using two dimensional array of size m x n. You should use user-defined functions which accept 2-D array A, and its size m and n as arguments. The options are:
To input elements into matrix of size m x n
To display elements of matrix of size m x n
Sum of all elements of matrix of size m x n
To display row-wise sum of matrix of size m x n
To display column-wise sum of matrix of size m x n
To create transpose of matrix of size n x m

Task 2:

Write a C++ program for two dimensional arrays A and B of size m x n to calculate,
Addition of A and B
Multiplication of A and B

Task 3:

Write a C++ program for two dimensional array A of size m x n to calculate,
Left diagonal sum
Right diagonal sum

Task 4:

Write a program in C++ which accepts a 2 dimensional array of integers and its size as arguments and displays the elements of middle row and the elements of middle column.
[Assuming the 2D Array to be a square matrix with odd dimension i.e. 3x3, 5x5, 7x7 etc...]
2 Dimensional Array:
2 6 9
3 8 5
2 1 8
Output:
Middle Row: 3 8 5
Middle Column: 6 8 1