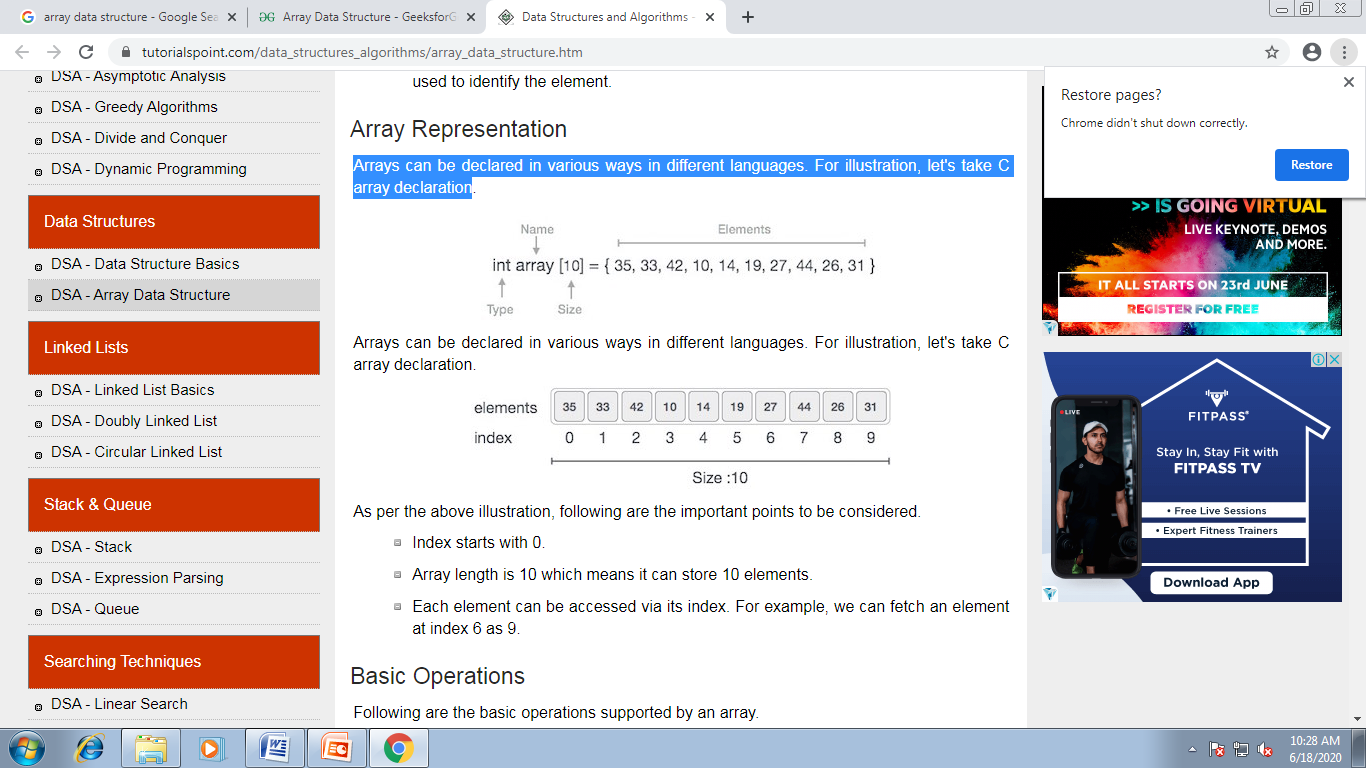
## Array Data Structures-

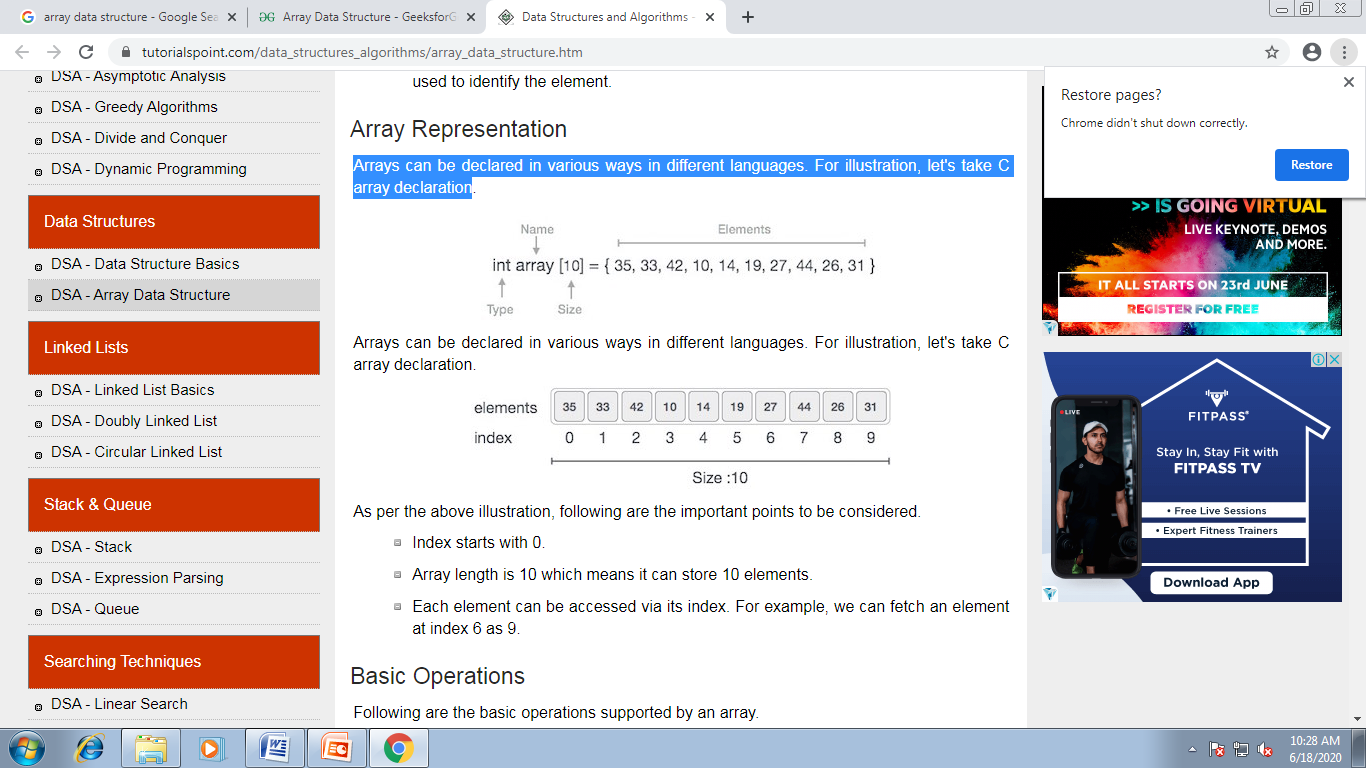
Array is a container which can hold a fix number of items and these items should be of the same type. Most of the data structures make use of arrays to implement their algorithms. Following are the important terms to understand the concept of Array.

* **Element** − Each item stored in an array is called an element.
* **Index** − Each location of an element in an array has a numerical index, which is used to identify the element.

## Array Representation ( 1- Dimension)

Arrays can be declared in various ways in different languages. For illustration, let's take C array declaration- \





As per the above illustration, following are the important points to be considered.

* Index starts with 0.
* Array length is 10 which means it can store 10 elements.
* Each element can be accessed via its index. For example, we can fetch an element at index 6 as 9.

## Array Declaration-

## DataType Array\_Name [size];

## Ex-

## int ABC [10];

## Array Initialization-

## int ABC[10] = {10,11,12,13,14,15,16,17,18,19,20};

## OR

## for(int i = 0; i<10; i++)

## scanf(“%d”, &ABC[i]);

## Array Accessing-

## To access an individual element, we can access it by index number, for ex- ABC[0] will return 1st element, ABC[1] will return 2nd element….so on.

## OR

## for(int i = 0; i<10; i++)

## printff(“%d”, &ABC[i]);

## Basic Operations on Array-

Following are the basic operations supported by an array.

* **Traverse** − print all the array elements one by one.
* **Insertion** − Adds an element at the given index.
* **Deletion** − Deletes an element at the given index.
* **Search** − Searches an element using the given index or by the value.
* **Update** − Updates an element at the given index.

## Insertion Operation

Insert operation is to insert one or more data elements into an array. Based on the requirement, a new element can be added at the beginning, end, or any given index of array.

Here, we see a practical implementation of insertion operation, where we add data at the end of the array –

#include <stdio.h>

main() {

int LA[] = {1,3,5,7,8};

int item = 10, k = 3, n = 5;

int i = 0, j = n;

printf("The original array elements are :\n");

for(i = 0; i<n; i++) {

printf("LA[%d] = %d \n", i, LA[i]);

}

n = n + 1;

while( j >= k) {

LA[j+1] = LA[j];

j = j - 1;

}

LA[k] = item;

printf("The array elements after insertion :\n");

for(i = 0; i<n; i++) {

printf("LA[%d] = %d \n", i, LA[i]);

}

}

## Deletion Operation

Deletion refers to removing an existing element from the array and re-organizing all elements of an array.

### Algorithm

Consider **LA** is a linear array with **N** elements and **K** is a positive integer such that **K<=N**. Following is the algorithm to delete an element available at the Kth position of LA.

1. Start

2. Set J = K

3. Repeat steps 4 and 5 while J < N

4. Set LA[J] = LA[J + 1]

5. Set J = J+1

6. Set N = N-1

7. Stop

Program-

#include <stdio.h>

void main() {

int LA[] = {1,3,5,7,8};

int k = 3, n = 5;

int i, j;

printf("The original array elements are :\n");

for(i = 0; i<n; i++) {

printf("LA[%d] = %d \n", i, LA[i]);

}

j = k;

while( j < n) {

LA[j-1] = LA[j];

j = j + 1;

}

n = n -1;

printf("The array elements after deletion :\n");

for(i = 0; i<n; i++) {

printf("LA[%d] = %d \n", i, LA[i]);

}

}