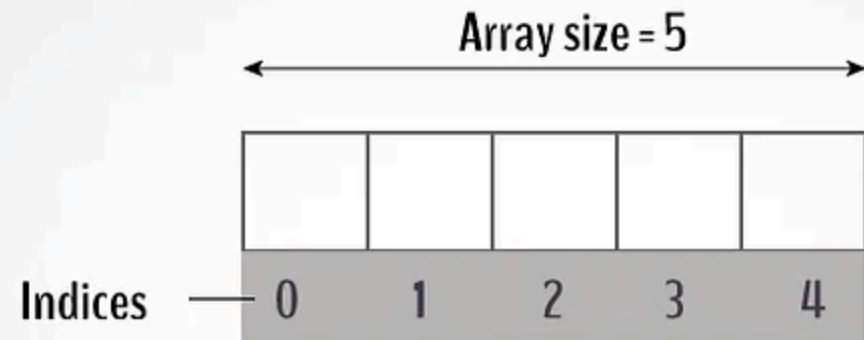


L-10 Arrays, 1D 2D problems



C Arrays



Insertion Sort

```
#include<stdio.h>
int main(){
    int arr[] = { 9, 6, 7, 2, 5, 8};
    int size = sizeof(arr) / sizeof(arr[0]);
    int i,j;
    for (i = 1; i < size; i++) { // Start from 1 as arr[0] is always sorted
        int currentElement = arr[i];
        j = i - 1;
        // Move elements of arr[0..i-1], that are greater than key,
        // to one position ahead of their current position
        while (j >= 0 && arr[j] > currentElement) {
            arr[j + 1] = arr[j];
            j = j - 1;}
        // Finally place the Current element at its correct position.
        arr[j + 1] = currentElement;
    }
    printf("Sorted Array: ");
    for (i = 0; i < size; i++){
        printf("%d ", arr[i]);}
    printf("\n");
    return 0;
}
```



Bubble Sort

```
#include<stdio.h>
int main()
{
    int arr[] = {3,2,6,5,4,7,8,9,10,1};
    int size = sizeof(arr)/sizeof(arr[0]);
    // loop over array elements
    for (int i = 0; i < size - 1; ++i) {
        // swapped variable initially set to 0
        int swapped = 0;
        // loop to compare array elements
        for (int j = 0; j < size - i - 1; ++j) {
            // compare adjacent elements
            if (arr[j] > arr[j + 1]) {
                // swap if out-of-order
                int temp = arr[j];
                arr[j] = arr[j + 1];
                arr[j + 1] = temp;
                swapped = 1;
            }
        }
        if(swapped == 0) { break;}
    }
    printf("Sorted Array: ");
    for(int i = 0; i < size; i++) {
        printf(" %d", arr[i]);
    }
    printf("\n");
    return 0;
}
```



Selection Sort

```
#include <stdio.h>
int main()
{ int n = 10;
  int a[] = {3,2,6,5,4,7,8,9,10,1};
  int min_index;
  for(int i = 0; i < n - 1; i++) {
    min_index = i;
    for(int j = i + 1; j < n; j++)
    { if(a[min_index] > a[j]) {
      min_index = j;
    }
  }
  if(min_index != i)
  { int temp = a[i];
    a[i] = a[min_index];
    a[min_index] = temp;
  }
}
printf("Sorted Array: ");
for(int i = 0; i < n; i++) {
  printf(" %d", a[i]);}
printf("\n");
return 0;
}
```



Leader in array

```
#include<stdio.h>
int main()
{
    int arr[] = {21, 16, 17, 4, 6, 3, 5, 2};
    int n = sizeof(arr)/sizeof(arr[0]); // get the array length
    int max_from_right = arr[n-1];
    printf("%d ", max_from_right);
    for (int i = n-2; i >= 0; i--)
    {
        if (max_from_right < arr[i])
        {
            max_from_right = arr[i]; //
            printf("%d ", max_from_right);
        }
    }
    printf("\n");
    return 0;
}
```



Insertion Sort: <https://courses.iiit.ac.in/mod/resource/view.php?id=55407>

Bubble Sort: <https://courses.iiit.ac.in/mod/resource/view.php?id=55408>

Selection Sort: <https://courses.iiit.ac.in/mod/resource/view.php?id=55409>

Leader in Array: <https://courses.iiit.ac.in/mod/resource/view.php?id=55410>

Reading Material:

- <https://www.youtube.com/watch?v=kPRA0W1kECg>
- Knuth, Donald Ervin, 1938 - The art of computer programming / Donald Ervin Knuth. xiv,782 p. 24 cm.
- The Advantages & Disadvantages of Sorting Algorithms - Joe Andy - <https://sciencing.com/the-advantages-disadvantages-of-sorting-algorithms-12749529.html>

Practice problems 1

- Write a C program to read and print elements of array.
- Write a C program to find sum of all array elements.
- Write a C program to find maximum and minimum element in an array.
- Write a C program to print all negative elements in an array.
- Write a C program to count total number of even and odd elements in an array.
- Write a C program to count total number of negative elements in an array.



Practice problems 2

- Write a C program to copy all elements from an array to another array
- Write a C program to insert an element in an array.
- Write a C program to find reverse of an array.
- Write a C program to merge two array to third array.
- Write a C program to count total number of duplicate elements in an array.
- Write a C program to print all unique elements in the array.
- Write a C program to count frequency of each element in an array.
- Write a C program to put even and odd elements of array in two separate array.



Practive Problem 3

1000 simple problems topic wise

- <https://www.sanfoundry.com/c-programming-examples/>

L-10, Slides

- https://github.com/cpro-iiit/cpro-iiit.github.io/blob/main/web/content/docs/course_material/lectures/10/10.pdf