DSA SERIES

- Learn Coding

Topic to be Covered today

Bubble sorting

LETS START TODAY’S LECTURE

Sorting

Why Sorting is Important?

- **Faster Searching** (like Binary Search)
- **Better Organization** (for real-life tasks, like contact lists or leaderboards)
- **Foundation** for many algorithms (e.g., solving duplicate problems, range queries)

Bubble sorting

- Simple sorting algorithm
- Compares the adjacent elements and swaps them if they are in wrong order.

Repeat the process until the array is sorted.

Key point of this sorting :

The largest element “bubble up” at the end of the array with each pass.

Procedure :

Example :

[2 5 3 1 7 9 6]

Pass 1:

[2 5 3 1 7 9 6]

[2 5 3 1 7 9 6]

[2 5 3 1 7 9 6]

[2 3 5 1 7 9 6]

[2 3 5 1 7 9 6]

[2 3 1 5 7 9 6]

[2 3 1 5 7 9 6]

[2 3 1 5 7 9 6]

[2 3 1 5 7 9 6]

[2 3 1 5 7 9 6]

[2 3 1 5 7 9 6]

[2 3 1 5 7 6 9]

[2 3 1 5 7 6 9]

Pass 2:

[2 3 1 5 7 6 9]
[2 3 1 5 7 6 9]

[2 3 1 5 7 6 9]
[2 1 3 5 7 6 9]

[2 1 3 5 7 6 9]
[2 1 3 5 7 6 9]

[2 1 3 5 7 6 9]
[2 1 3 5 7 6 9]

[2 1 3 5 7 6 9]
[2 1 3 5 6 7 9]

[2 1 3 5 6 7 9]

Pass 3:

[2 1 3 5 6 7 9]
[1 2 3 5 6 7 9]

[1 2 3 5 6 7 9]
[1 2 3 5 6 7 9]

[1 2 3 5 6 7 9]
[1 2 3 5 6 7 9]

[1 2 3 5 6 7 9]
[1 2 3 5 6 7 9]

[1 2 3 5 6 7 9]
[1 2 3 5 6 7 9]

Code :

```
#include <iostream>
using namespace std;

int main()
{

    int arr[] = {1, 2 ,3,4,5};

    int size = sizeof(arr) / sizeof(arr[0]);

    cout << "Printing the original array :" << endl;
    for (int i = 0; i < size; i++)
    {
        cout << arr[i] << " ";
    }
    cout << endl;
for (int pass = 1; pass < size; pass++)
    {
        cout << pass << "  --> ";
        for (int i = 0; i < size - pass; i++)
        {
            cout<< i <<" ";
            if (arr[i] > arr[i + 1])
            {
                swap(arr[i], arr[i + 1]);
            }
        }
        cout<<endl;
    }
     cout << "Printing the  array after sorting:" << endl;
    for (int i = 0; i < size; i++)
     {
         cout << arr[i] << " ";
    }
     cout << endl;

    return 0;
}
```

Optimised code :

```
for (int pass = 1; pass < size; pass++)
 {

   bool flag = false;
   for (int i = 0; i < size - pass; i++)
   {
     if (arr[i] > arr[i + 1])
     {
       swap(arr[i], arr[i + 1]);
       flag = true;
     }
   }
   cout<<endl;

   if (flag == false)
   {
     cout << "Array is already sorted" << endl;
     break;
   }
 }
```

Learn coding

THANK YOU