Soort Kar do array

↓

inc ↑ sort karna

Sorting Algorithms

arr = { 1, 0, -1, 2, 9, 3, 7 }

↓

{ -1, 0, 1, 2, 3, 7, 9 }

Contents

Ques: Check if array is sorted

arr = { 1, 0, 2, 3, 4, 5, 6 } false

arr = { -1, 0, 1, 2 } true

arr = { 1, 1, 2, 3, 4, 4 }

Bubble Sort → ek algo hai jisse array sort hota hai

arr = { 3, 5, 1, 4, 2, 0 }

arr = { 0, 1, 2, 3, 4, 5 }

'n-1' passes honge

Bubble Sort

```
for(i=0 to n-2){
|  for(j=0 to n-2){
|  |  ——
|  }
}
```

3

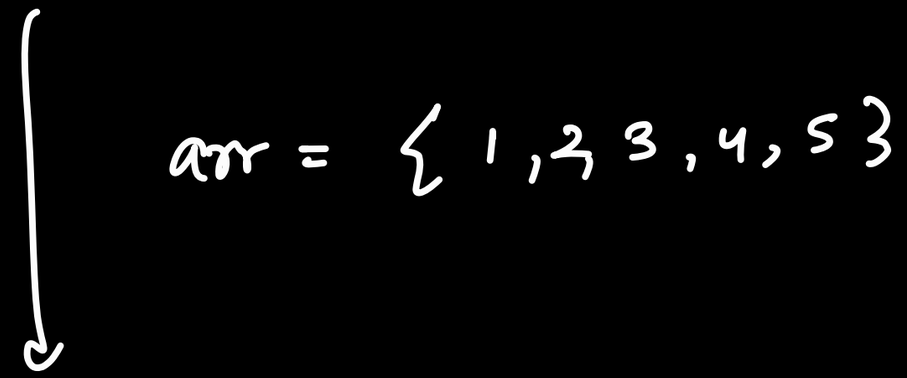
$T.C. = (n-1)^2$

```
for(i=0 to n-2){
|  for(j=0 to n-2-i){
|  |  ——
|  }
}
```

3

$n-1 + n-2 + n-3 \cdots 1 = \frac{n(n-1)}{2}$

Bubble Sort (thoda better)



before each pass, we can actually check if the array is sorted or not.

Bubble Sort (Optimised)

Time Complexity

Best Case : $O(n)$

Avg. Case : $O(n^2)$

Worst Case : $O(n^2)$

Bubble Sort (Reverse)

Q1: Sort an array in descending order using bubble sort.

↑

Homework.

Ques: Move all Zeros to end

arr = { 1, 0, -2, 3, 0, 4, 8, 6, 10, 12 }

arr = { 1, -2, 3, 4, 8, 10, 12, 0, 0, 0 }

Ques: Move all Zeros to end

$arr = \{ 1, -2, 3, 4, 8, 10, 12, 6, 0, 0, 0 \}$

i

j

Built-in Sort (Merge Sort)

↓

T.C. = $O(n \log n)$

A.S. = $O(n)$

Arrays.sort(arr)

Collections.sort(list)

Selection Sort (Select Smallest)

arr = {8, 4, 1, 9, -3, 6, 5}

arr = {-3, 4, 1, 9, 8, 6, 5}

arr = {-3, 1, 4, 9, 8, 6, 5}

arr = {-3, 1, 4, 9, 8, 6, 5}

arr = {-3, 1, 4, 5, 8, 6, 9}

arr = {-3, 1, 4, 5, 6, 8, 9}

arr = {-3, 1, 4, 5, 6, 8, 9}

T.C.

Best : $O(n^2)$

Avg : $O(n^2)$

Worst : $O(n^2)$

T.n.o.

$= n + n-1 + n-2 \cdots 1$

$= \frac{n(n+1)}{2}$

Selection Sort (find largest first)

Homework

arr = { 8, 4, 1, 9, -3, 6, 5 }

arr = { 8, 4, 1, 5, -3, 6, 9 }

Ques: 2 Sum - Find a pair with given sum

arr = { 7, 0, 4, 3, 2, 8, 10 } target = 9

sort → O(n log n)

{ 0, 2, 3, 4, 7, 8, 10 } → O(n)

i j

O(n log n + n) = O(n log n)

Ques: 2 Sum - Find a pair with given sum

arr = { 7, 12, 26, 41, 54 } target = 50

j

i

Stability of Bubble & Selection Sort

arr =

bubble Sort

Selection Sort

Stable

unstable

Ques: Common Elements

$a = \{3, 1, 2, 1, 1, 4, 5, 5\}$ $b = \{6, 1, 1, 4, 4, 2, 8\}$

↓ Sort ↓ Sort

→ $a = \{1, 1, 1, 2, 3, 4, 5, 5\}$ $b = \{1, 1, 2, 4, 4, 6, 8\}$

i j

ans = {1, 1, 2, 4}

HW: Union of 2 sorted Arrays

HW: Intersection of Arrays with Distinct

Insertion Sort

Ques: Kth smallest element

Selection Sort

THANKYOU

Cuties