Selection Sort

01 December 2025 21:44

Iteration 1:

[0]	[1]	[2]	[3]	[4]	[5]
30	20	60	50	10	40

Sel_pos pos

30 > 20 ? Yes
swap

Index 0 , 1
Index 0, 2
Index 0,3
Index 0, 4
Index 0 5

[0]	[1]	[2]	[3]	[4]	[5]
20	30	60	50	10	40

Sel_pos pos

20 > 60 ? no

[0]	[1]	[2]	[3]	[4]	[5]
20	30	60	50	10	40

Sel_pos pos

20 > 50 ? no

[0]	[1]	[2]	[3]	[4]	[5]
20	30	60	50	10	40

Sel_pos pos

20 > 10 ? Yes
swap

[0]	[1]	[2]	[3]	[4]	[5]
10	30	60	50	20	40

Sel_pos pos

10 > 40 ? no

[0]	[1]	[2]	[3]	[4]	[5]
10	30	60	50	20	40

Iteration/cycle/pass : 2

[0]	[1]	[2]	[3]	[4]	[5]
10	30	60	50	20	40

Sel_pos pos

30 > 60 ? no

[0]	[1]	[2]	[3]	[4]	[5]
10	30	60	50	20	40

Sel_pos pos

30 > 50 ? no

[0]	[1]	[2]	[3]	[4]	[5]

30 > 20 ? Yes

[0]	[1]	[2]	[3]	[4]	[5]
10	30	60	50	20	40

Sel_pos pos

30 > 20 ? Yes
swap

[0]	[1]	[2]	[3]	[4]	[5]
10	20	60	50	30	40

Sel_pos pos

20 > 40 ? no

[0]	[1]	[2]	[3]	[4]	[5]
10	20	60	50	30	40

Iteration 3:

[0]	[1]	[2]	[3]	[4]	[5]
10	20	60	50	30	40

Sel_pos pos

60 > 50 ? Yes
swap

[0]	[1]	[2]	[3]	[4]	[5]
10	20	50	60	30	40

Sel_pos pos

50 > 30 ? Yes
swap

[0]	[1]	[2]	[3]	[4]	[5]
10	20	30	60	50	40

Sel_pos pos

30 > 40 ? no

[0]	[1]	[2]	[3]	[4]	[5]
10	20	30	60	50	40

Cycle/pass 4:

[0]	[1]	[2]	[3]	[4]	[5]
10	20	30	60	50	40

Sel_pos pos

Arr[sel_pos] > arr[pos]
Yes
swap

[0]	[1]	[2]	[3]	[4]	[5]
10	20	30	50	60	40

Arr[sel_pos] > arr[pos]
Yes

[0]	[1]	[2]	[3]	[4]	[5]
10	20	30	50	60	40

Sel_pos pos

Arr[sel_pos] > arr[pos]
Yes
swap

[0]	[1]	[2]	[3]	[4]	[5]
10	20	30	40	60	50

Iteration : 5

[0]	[1]	[2]	[3]	[4]	[5]
10	20	30	40	60	50

Sel_pos pos

60 > 50 ? Yes
swap

[0]	[1]	[2]	[3]	[4]	[5]
10	20	30	40	50	60

No. of Iterations : n-1 : 6-1 : 5

No. of comparisons : 5 + 4+ 3+2+1 = 15
(n-1) + (n-2) + (n-3)… 1

Time complexity : O(n^2) (best,worst,avg)
Space complexity : aux space (sel_pos and pos variables) are constant irrespective of input space.
Hence space complexity = O(1)

Total space complexity : O(n) + O(1) = O(n)