Finding the kth Smallest Element of an Array a of Size n in Expected Linear Time: Example

a = (26,51,40,14,77,59,32,82,63,45,37,89,78,57,22,60,99,74,34,19,53,48,39,95,87,11,92,73,68,86,65),
n = 31, k = 21.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |

26 51 40 14 77 59 32 82 63 45 37 89 78 57 22 60 99 74 34 19 53 48 39 95 87 11 92 73 68 86 65

$left$ = 1, $right$ = 31, $partition$(a, 1, 31) chooses 60 as pivot and returns final pivot position 17.

34 51 40 14 11 59 32 39 48 45 37 53 19 57 22 26 60 **74 99 78 89 63 82 95 87 77 92 73 68 86 65**

$left$ = 18, $right$ = 31, $partition$(a, 18, 31) chooses 95 as pivot and returns final pivot position 30.

34 51 40 14 11 59 32 39 48 45 37 53 19 57 22 26 60 **86 65 78 89 63 82 74 87 77 92 73 68** 95 99

$left$ = 18, $right$ = 29, $partition$(a, 18, 29) chooses 82 as pivot and returns final pivot position 25.

34 51 40 14 11 59 32 39 48 45 37 53 19 57 22 26 60 **77 65 78 68 63 73 74** 82 87 92 86 89 95 99

$left$ = 18, $right$ = 24, $partition$(a, 18, 24) chooses 68 as pivot and returns final pivot position 20.

34 51 40 14 11 59 32 39 48 45 37 53 19 57 22 26 60 63 65 68 **77 78 73 74** 82 87 92 86 89 95 99

$left$ = 21, $right$ = 24, $partition$(a, 21, 24) chooses 78 as pivot and returns final pivot position 24.

34 51 40 14 11 59 32 39 48 45 37 53 19 57 22 26 60 63 65 68 **74 77 73** 78 82 87 92 86 89 95 99

$left$ = 21, $right$ = 23, $partition$(a, 21, 23) chooses 77 as pivot and returns final pivot position 23.

34 51 40 14 11 59 32 39 48 45 37 53 19 57 22 26 60 63 65 68 **73 74** 77 78 82 87 92 86 89 95 99

$left$ = 21, $right$ = 22, $partition$(a, 21, 22) chooses 73 as pivot and returns final pivot position 21.

34 51 40 14 11 59 32 39 48 45 37 53 19 57 22 26 60 63 65 68 **73** 74 77 78 82 87 92 86 89 95 99

The 21st smallest element is 73.