1. 179, 721,639, 549, 292, 427, 335, 435, 62

|  |  |  |
| --- | --- | --- |
| **Key % 9** | **(Key /9) % 9** | **Key / 9 /9** |
| 0: 639; 549 | 335; 179 | 62 |
| 1: 721 |  |  |
| 2: 335 | 427 | 179 |
| 3: 435 | 435 | 292 |
| 4: 292; 427 |  | 335 |
| 5: | 292 | 427; 435 |
| 6: | 62 | 549 |
| 7: | 549 | 639 |
| 8: 179; 62 | 639; 721 | 721 |

1. Number of comparisons: >= log(n!)

We have n = 4, so number of comparisons have to be at least log(4!). New algorithm doesn’t violate the lower bound.

1. **Exploring new ideas**: Forward and backward sorted array (FBS array)

* Step 1: Sort the array ascendingly: abcdefgh
* Step 2: put the right half elements in descending order in odd locations: a**h**b**g**c**f**d**e**

Time complexity: quicksort **O(nlogn)** to sort if we use extra n array

Fastest possible asymptotic running time: **O(nlogn)**