QUICK SORT

Quick Sort

- Explanation of Quick Sort
- Visualization of Quick Sort
- Implementation of Quick Sort

Quick Sort

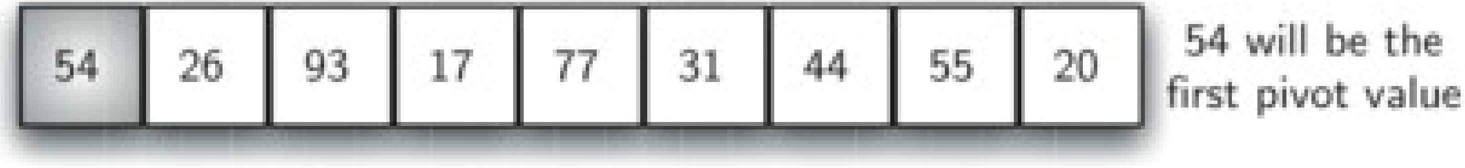
- The **quick sort** uses divide and conquer to gain the same advantages as the merge sort, while not using additional storage.
- As a trade-off, however, it is possible that the list may not be divided in half.
- When this happens, we will see that performance is diminished.

Quick Sort

- A quick sort first selects a value, which is called the **pivot value**.
- The role of the pivot value is to assist with splitting the list.
- The actual position where the pivot value belongs in the final sorted list, commonly called the **split point**, will be used to divide the list for subsequent calls to the quick sort

Quick Sort

- 54 is out first pivot value.

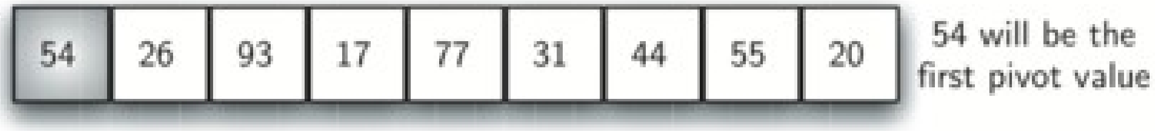


54	26	93	17	77	31	44	55	20

54 will be the first pivot value

Quick Sort

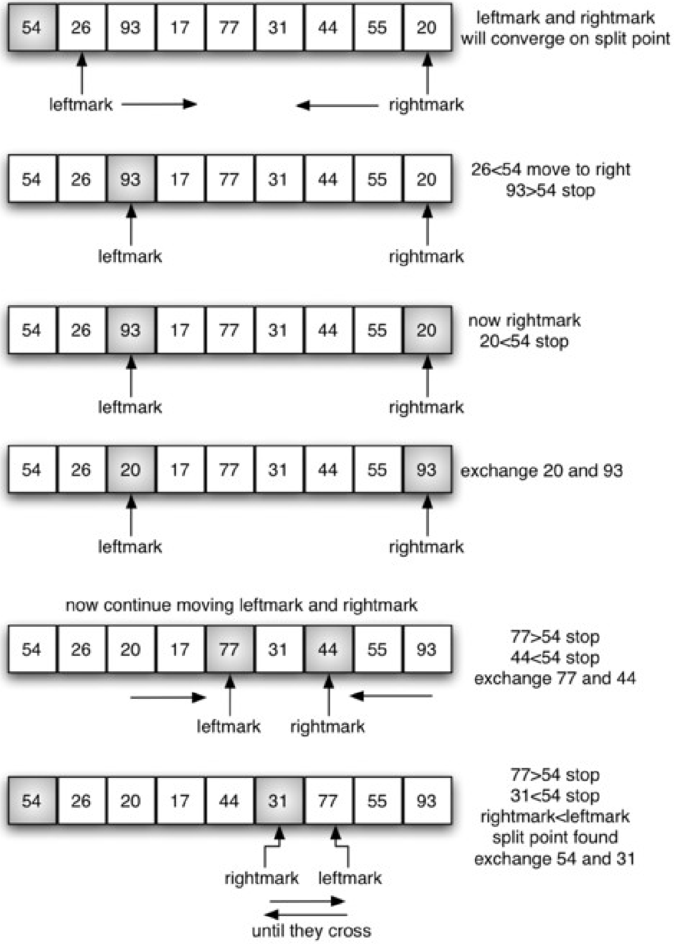
- The **partition** process will happen next.
- It will find the split point and at the same time move other items to the appropriate side of the list, either less than or greater than the pivot value.



54	26	93	17	77	31	44	55	20

54 will be the first pivot value

Quick Sort



54 26 93 17 77 31 44 55 20

leftmark and rightmark will converge on split point

leftmark → ← rightmark

54 26 93 17 77 31 44 55 20

26<54 move to right
93>54 stop

leftmark rightmark

54 26 93 17 77 31 44 55 20

now rightmark
20<54 stop

leftmark rightmark

54 26 20 17 77 31 44 55 93

exchange 20 and 93

leftmark rightmark

now continue moving leftmark and rightmark

54 26 20 17 77 31 44 55 93

77>54 stop
44<54 stop
exchange 77 and 44

leftmark rightmark

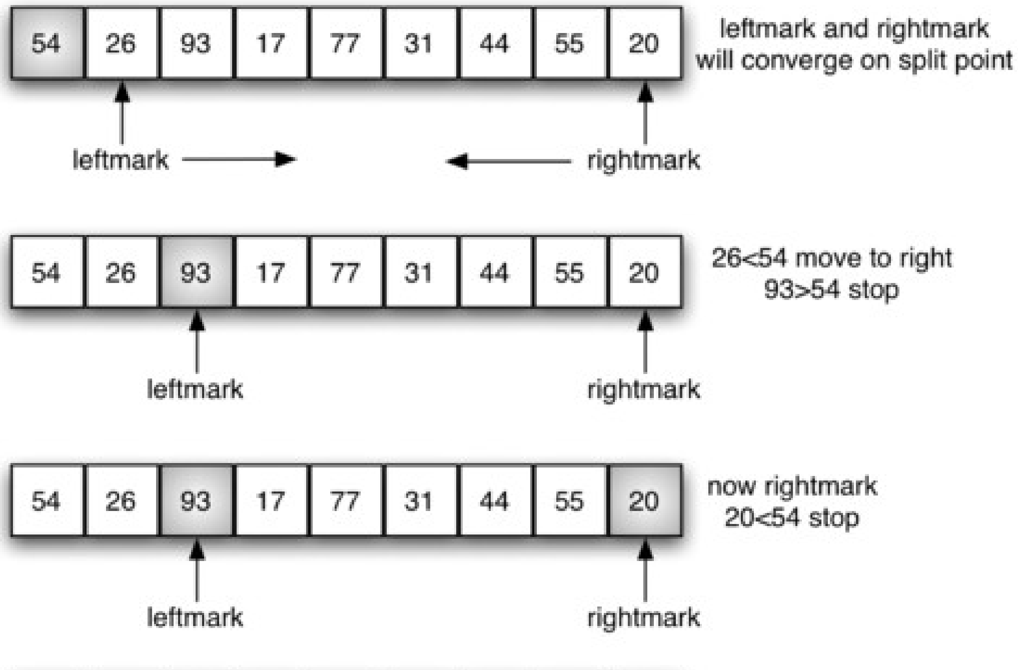
54 26 20 17 44 31 77 55 93

77>54 stop
31<54 stop
rightmark<leftmark
split point found
exchange 54 and 31

rightmark leftmark

until they cross

Quick Sort

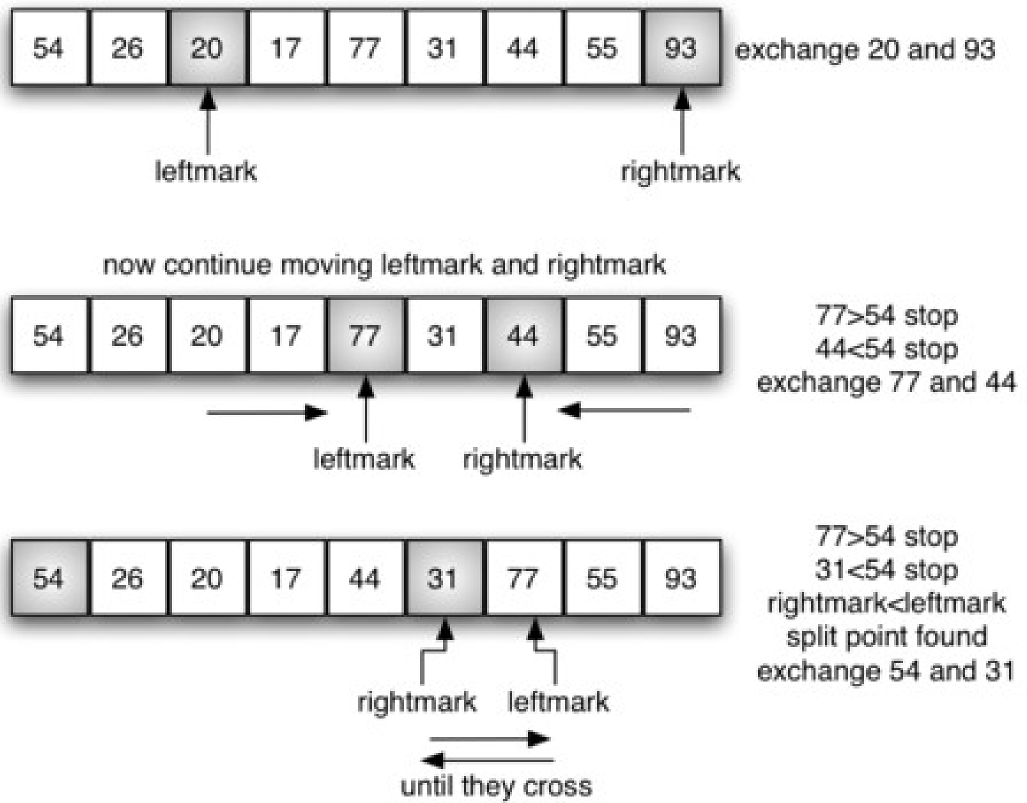


leftmark and rightmark will converge on split point

26<54 move to right
93>54 stop

now rightmark
20<54 stop

Quick Sort



54	26	20	17	77	31	44	55	93

exchange 20 and 93

now continue moving leftmark and rightmark

54	26	20	17	77	31	44	55	93

77>54 stop
44<54 stop
exchange 77 and 44

54	26	20	17	44	31	77	55	93

77>54 stop
31<54 stop
rightmark<leftmark
split point found
exchange 54 and 31

until they cross

Visualizations

- Let’s take a look at some visualizations!