

Quick Sort

At first this method appears to be very slow. This is only because of the length of time it takes to explain the method. In fact, for long lists, it is a very efficient method of sorting.

Consider the same list as we used earlier:

20 47 12 53 32 84 85 96 45 18

We use two pointers. One pointer points left and the other points right. Let the number we are trying to place in its correct position be marked in red in the following description.

Start with the left pointer in the first position and the right pointer in the last position. Let the number in the first position be the one we are trying to place in its correct position. We have:

20 47 12 53 32 84 85 96 45 18

→ ←

Compare the two numbers that are being pointed to. If they are in the wrong order, swap them. We have

18 47 12 53 32 84 85 96 45 20

→ ←

Now keep moving the pointer that is not attached to the red number towards the red number until either the two pointers meet or the two numbers being pointed to are in the wrong order. In this case the left pointer moves to 47 and 47 and 20 are in the wrong order, so swap them:

18 47 12 53 32 84 85 96 45 20

→ ←

18 20 12 53 32 84 85 96 45 47

→ ←

Now again move the pointer not at the red number towards the red number until either the two pointers meet or two numbers need to be swapped:

18 20 12 53 32 84 85 96 45 47

→ ←

18 20 12 53 32 84 85 96 45 47

→ ←

18 20 12 53 32 84 85 96 45 47

→ ←

18 20 12 53 32 84 85 96 45 47

→ ←

18 20 12 53 32 84 85 96 45 47

→ ←

18 20 12 53 32 84 85 96 45 47

→ ←

Swap 18 20 12 53 32 84 85 96 45 47

→ ←

18 12 20 53 32 84 85 96 45 47

→ ←

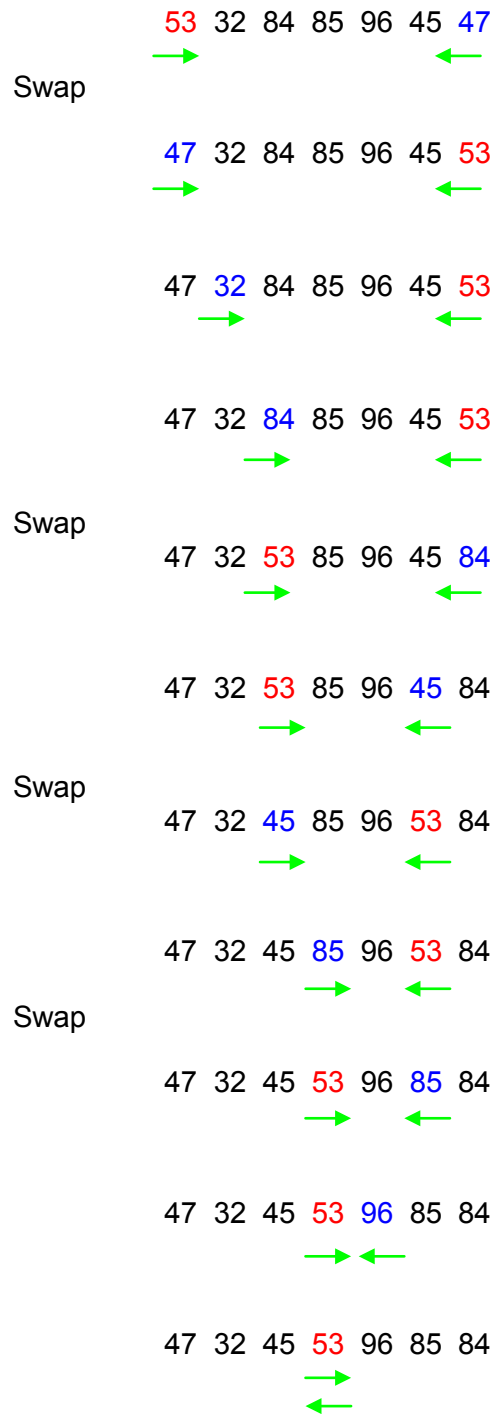
18 12 20 53 32 84 85 96 45 47

←

→

Pointers coincide. Now you will find that the number 20 is in its correct position. That is, all the numbers to the left of 20 are less than 20 and all the numbers to the right of 20 are greater than 20.

We now split the list into two; the one to the left of the 20 and the one to the right of the 20. We then quick sort each of these lists. The following shows the steps for the right hand list:



The number 53 is now in the correct position for this list. Split this list in two, as before, to give the two lists:

47 32 45 and 96 85 84

and sort these two lists using the quick sort method. When all the sublists have a single number, they can be put back together to form a sorted list.