(11) Manually arrange the sequence [30 13 22 90] in ascending order using merge sort, bubble sort and selection sort, showing at each step the new configuration of the sequence.

How many comparisons and how many element moves were used by each method? Which is the best performing method for sorting this array of integers? Which would be the worst arrangement of this sequence?

|  |  |  |  |
| --- | --- | --- | --- |
|  | Merge sort | Bubble sort | Selection sort |
| Step 1 | {30 13 22 90} | 30 13 22 90 | 30 13 22 90 |
| Step 2 | {30 13} {22 90} | [13 22 30 ] 90 | 13 [30 22 90] |
| Step 3 | {30} {13} {22} {90} | 13 22 30 90 | 13 22 [30 90] |
| Step 4 | {13 30} {22 90} |  | 13 22 30 [90] |
| Step 5 | {13 22 30 90} |  |  |
| Comparisons | O (n log n) =8 | O(n) = 4 | O(n2) = 8 |

The best performing method for sorting this array of integers is Bubble sort. The worst arrangement of this sequence is Merge sort.