

Assignment (Practice Questions)

Topic: Merge Sort, Quick Sort

Ques1. The following two lists are to be merged, which element first goes into the new merged list?

List 1: 2 4 8 9

List 2: 1 6 8 4

- A) 0
- B) 1
- C) 2
- D) 3

Ques2. Which sorting algorithm is described by: split a list into individual lists, then combine these, two lists at a time.

- A) Bubble
- B) Merge
- C) Insertion
- D) None of these

Ques3. Which of the following is not an in-place sorting algorithm?

- A) Insertion Sort
- B) Quick sort
- C) Merge sort
- D) All the above

Ques4. Quick sort uses ____ sorting method.

- A) Internal
- B) External

Ques5. Merge sort uses ____ sorting method.

- A) Internal
- B) External

Ques6. Which of the following is not a stable sorting algorithm?

- A) Merge sort
- B) Quick sort

C) Insertion sort

Ques7. Which of the following algorithm design technique is used in the quick sort algorithm?

- A) Dynamic programming
- B) Backtracking
- C) Divide-and-conquer
- D) Greedy method

Ques8. Merge sort uses which of the following algorithms to implement sorting?

- A) Backtracking
- B) greedy algorithm
- C) divide and conquer
- D) dynamic programming

Ques9. Which of the following accomplishes sorting in merge sort?

- A) merge
- B) partition
- C) selection
- D) exchange

Ques10. Which of the following is a stable sorting algorithm in its typical implementation?

- A) Insertion Sort
- B) Merge Sort
- C) Quick Sort
- D) Both A and B

Ques11. What is the recurrence relation of Merge Sort?

- A) $T(n) = T(n-2) + O(n)$
- B) $T(n) = T(n-1) + O(n)$
- C) $T(n) = 2T(n/2) + O(n)$
- D) $T(n) = T(n/10) + T(9n/10) + O(n)$

Ques12. Which of the following sorting algorithms has the minimum running time complexity in the best and average case respectively?

- A) Insertion sort, Quick sort
- B) Quick sort, Quick sort
- C) Quick sort, Insertion sort
- D) Insertion sort, Insertion sort

Ques13. Is quick sort in place.

- A) Yes
- B) No

Ques14. What is the auxiliary space complexity of merge sort?

- A) $O(1)$
- B) $O(\log n)$
- C) $O(n)$
- D) $O(n \log n)$

Ques15. Is merge sort in place.

- A) Yes
- B) No

Ques16. Is Quick Sort stable?

- A) Yes
- B) No

Ques17. Which sorting algorithm splits a list of items into individual lists?

- A) Merge Sort
- B) Bubble Sort
- C) Insertion Sort
- D) None of these

Ques18. Given the following list of numbers [14, 17, 13, 15, 19, 10, 3, 16, 9, 12]. Which option below shows the contents of the list after the first partitioning according to the quick sort algorithm (choose last element as pivot)?

- A. [9, 3, 10, 13, 12]
- B. [10, 3, 9]
- C. [9,3,10,12,13,14,17,16,15,19]
- D. [10,3,9,12,19,14,17,16,13,15]

Ques19. Given the following list A= [38,27,43,3,9,82,10]. Which among the given options shows the contents of two sub-arrays after first split of array A using merge Sort.

- A) [38, 27, 43] and [3,9,82,10]
- B) [38,27] and [43,3,9,82,10]
- C) [38,27,43,3] and [9,82,10]
- D) [38] and [27,43,3,9,82,10]

Ques20. Which of the following is not true about merge sort?

- A) Slower comparative to the other sort algorithms for smaller tasks.
- B) Merge sort algorithm requires an additional memory space of $O(n)$ for the temporary array.
- C) It goes through the whole process even if the array is sorted.
- D) Its worst case time complexity is $O(n^2)$

Ques21. In the merge sort algorithm, what is the running time of the merge operation?

- (A) $O(\log n)$
- (B) $O(n)$
- (C) $O(n \log n)$
- (D) $O(n^2)$

Ques22. The worst case occurs in quick sort when _____

- A) Pivot is the median of the array
- B) Pivot is the smallest element
- C) Pivot is the middle element
- D) None

Ques23. Is n^{100} greater than 2^n ?

- A) Yes
- B) No

Ques24. Is n^3 greater than $10n^2$?

- A) Yes
- B) No

Ques25. Among the given options, which sorting algorithm performs better in the worst case.

- A) Insertion Sort
- B) Merge Sort
- C) Quick Sort
- D) All have equivalent time complexity in the worst case