---MCQs from Unit-5 serching and shorting

### 1. What is the purpose of searching in an array?

a) To sort the elements

b) To locate a value in the array

c) To delete an element from the array

d) To reverse the array

\*\*Answer:\*\* b) To locate a value in the array

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### 2. Which type of array is best suited for linear search?

a) Sorted

b) Unsorted

c) Single-element

d) Multi-dimensional

\*\*Answer:\*\* b) Unsorted

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### 3. In linear search, what happens if the value is not found?

a) Returns the index of the closest value

b) Stops searching

c) Displays an unsuccessful search message

d) Continues indefinitely

\*\*Answer:\*\* c) Displays an unsuccessful search message

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### 4. Which data structure is required for binary search?

a) Unsorted array

b) Sorted array

c) Queue

d) Stack

\*\*Answer:\*\* b) Sorted array

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### 5. What is the time complexity of linear search in the worst case?

a) O(log n)

b) O(n)

c) O(n^2)

d) O(1)

\*\*Answer:\*\* b) O(n)

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### 6. What is the main advantage of binary search over linear search?

a) Simplicity

b) Speed on sorted arrays

c) Ability to search unsorted arrays

d) No prerequisite

\*\*Answer:\*\* b) Speed on sorted arrays

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### 7. In binary search, if the middle element is greater than the target, where do you search next?

a) Entire array

b) Right half

c) Left half

d) None

\*\*Answer:\*\* c) Left half

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### 8. What is the best-case time complexity of binary search?

a) O(log n)

b) O(n)

c) O(1)

d) O(n log n)

\*\*Answer:\*\* c) O(1)

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### 9. Which sorting algorithm repeatedly swaps adjacent elements if they are in the wrong order?

a) Bubble Sort

b) Selection Sort

c) Quick Sort

d) Merge Sort

\*\*Answer:\*\* a) Bubble Sort

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### 10. What is the primary concept behind insertion sort?

a) Splitting arrays

b) Selecting the smallest value

c) Shifting elements to insert in sorted order

d) Dividing into halves

\*\*Answer:\*\* c) Shifting elements to insert in sorted order

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### 11. Which sorting algorithm divides an array into smaller sub-arrays, sorts them, and merges them back?

a) Quick Sort

b) Merge Sort

c) Selection Sort

d) Bubble Sort

\*\*Answer:\*\* b) Merge Sort

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### 12. What is the pivot element in Quick Sort?

a) The middle element

b) Any chosen element

c) The largest element

d) The smallest element

\*\*Answer:\*\* b) Any chosen element

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### 13. In selection sort, what happens in each iteration?

a) Largest element is placed at the end

b) Smallest element is placed at the beginning

c) Elements are swapped randomly

d) Sub-array is reversed

\*\*Answer:\*\* b) Smallest element is placed at the beginning

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### 14. Which sorting algorithm is best for nearly sorted arrays?

a) Bubble Sort

b) Selection Sort

c) Insertion Sort

d) Quick Sort

\*\*Answer:\*\* c) Insertion Sort

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### 15. What is the time complexity of Quick Sort in the average case?

a) O(n log n)

b) O(n^2)

c) O(n)

d) O(log n)

\*\*Answer:\*\* a) O(n log n)

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### 16. Which algorithm works best when memory space is limited?

a) Merge Sort

b) Heap Sort

c) Selection Sort

d) Bubble Sort

\*\*Answer:\*\* c) Selection Sort

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### 17. What is the auxiliary space complexity of Merge Sort?

a) O(1)

b) O(n)

c) O(n log n)

d) O(n^2)

\*\*Answer:\*\* b) O(n)

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### 18. Which sorting algorithm is based on a binary heap structure?

a) Heap Sort

b) Quick Sort

c) Merge Sort

d) Selection Sort

\*\*Answer:\*\* a) Heap Sort

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### 19. What is the worst-case time complexity of Quick Sort?

a) O(log n)

b) O(n)

c) O(n log n)

d) O(n^2)

\*\*Answer:\*\* d) O(n^2)

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### 20. Which sorting algorithm is considered stable?

a) Merge Sort

b) Quick Sort

c) Selection Sort

d) Heap Sort

\*\*Answer:\*\* a) Merge Sort

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### 21. Which sorting algorithm is also known as a sinking sort?

a) Insertion Sort

b) Bubble Sort

c) Selection Sort

d) Quick Sort

\*\*Answer:\*\* b) Bubble Sort

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### 22. What does the “divide” step in Merge Sort do?

a) Rearranges elements

b) Splits array into two halves

c) Compares each element

d) Removes duplicates

\*\*Answer:\*\* b) Splits array into two halves

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### 23. Which sorting algorithm uses fewer swaps in general?

a) Bubble Sort

b) Selection Sort

c) Quick Sort

d) Heap Sort

\*\*Answer:\*\* b) Selection Sort

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### 24. What is the space complexity of Insertion Sort?

a) O(1)

b) O(n)

c) O(log n)

d) O(n^2)

\*\*Answer:\*\* a) O(1)

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### 25. Which step in Quick Sort involves dividing the array?

a) Sorting

b) Partitioning

c) Merging

d) None of these

\*\*Answer:\*\* b) Partitioning

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### 26. What is the primary benefit of Heap Sort over Quick Sort?

a) Stability

b) In-place sorting

c) Less time complexity

d) Predictable worst-case performance

\*\*Answer:\*\* d) Predictable worst-case performance

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### 27. What is the key disadvantage of Selection Sort?

a) High space complexity

b) High time complexity

c) Unstable

d) Difficult implementation

\*\*Answer:\*\* b) High time complexity

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### 28. Which algorithm performs better with larger datasets: Quick Sort or Bubble Sort?

a) Quick Sort

b) Bubble Sort

c) Both are equally efficient

d) None of these

\*\*Answer:\*\* a) Quick Sort

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### 29. What is the maximum number of comparisons required in Binary Search for an array of size 16?

a) 2

b) 3

c) 4

d) 5

\*\*Answer:\*\* c) 4

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### 30. What makes Merge Sort suitable for large datasets?

a) In-place sorting

b) Low auxiliary space

c) Efficiency with external memory

d) Simplicity

\*\*Answer:\*\* c) Efficiency with external memory

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