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Which of the following algorithms is a greedy algorithm?

Merge Sort

Dijkstra's shortest path algorithm

Floyd-Warshall

Quick Sort

2.

In which of the following applications is a circular queue most commonly used?

Task scheduling in operating systems

Depth First Search

Expression evaluation

Breadth First Search

3.

Which of the following operations is not possible in an array in constant time?

Update an element by index

Insert an element at the end

Access an element by index

Delete an element by value

4.

What is the time complexity of inserting an element at the end of a singly linked list if the tail pointer is maintained?

$O(n)$

$O(1)$

$O(\log n)$

$O(n^2)$

5.
Which data structure is used for Depth First Search (DFS) traversal of a graph?

Deque

Stack

Heap

Queue

6.
Which data structure follows the Last In First Out (LIFO) principle?

Queue

Stack

Array

Linked List

7.
What will be the result of the following code for inserting an element into a Min-Heap?

```
import heapq

heap = [3, 9, 2, 1, 7]

heapq.heapify(heap)

heapq.heappush(heap, 5)

print(heap)
```

[1, 3, 2, 9, 7, 5]

[1, 2, 3, 9, 7, 5]

[1, 5, 2, 3, 7, 9]

[9, 3, 2, 1, 7, 5]

8.

In a circular queue of size n , if the front is at position i and the rear is at position j , what is the condition for the queue being full?

$(i + 1) \% n == j$

$(i + 2) \% n == j$

$i == j$

$(j + 1) \% n == i$

9.

Which of the following data structures allows insertion and deletion from both ends?

Deque

Stack

Priority Queue

Queue

10.

Which of the following is true about Dequeue (Double-Ended Queue)?

Elements are always deleted in a LIFO order

You can delete elements only from the front end

You can insert and delete elements from both ends

You can insert elements only at the rear end

11.

In which of the following scenarios is a stack used?

Implementing an operating system scheduler

Maintaining the order of jobs in a print queue

Graph traversal in BFS

Recursive function calls

12.

In a min-heap, what is the time complexity of extracting the minimum element?

$O(n \log n)$

$O(\log n)$

$O(1)$

$O(n)$

13.

What is the main advantage of a circular queue over a regular queue?

It is easier to implement

It allows insertion from both ends

It avoids wastage of space

It has a smaller time complexity

14.

Which data structure is the most appropriate to implement a priority queue?

Heap

Stack

Linked List

Deque

15.

In a linked list, what is the time complexity of finding the last element?

$O(\log n)$

$O(n)$

$O(1)$

$O(n \log n)$

16.

What is the output of the following recursive function for $n = 5$?

```
public class Main {  
  
    public static int mystery(int n) {  
        if (n == 1) {  
            return 1;  
        }  
        return n + mystery(n - 1);  
    }  
  
    public static void main(String[] args) {  
        System.out.println(mystery(5));  
    }  
}
```

15

10

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5

17.

What is the worst-case time complexity for accessing an element in an unsorted array?

$O(\log n)$

$O(n \log n)$

$O(1)$

$O(n)$

18.

Which of the following strategies does Quick Sort use?

Dynamic Programming

Divide and Conquer

Greedy

Backtracking

19.

Which algorithm strategy is used in Merge Sort?

Greedy

Divide and Conquer

Dynamic Programming

Backtracking

20.

In an array-based implementation of a stack, what is the time complexity of pushing an element?

$O(n)$

$O(\log n)$

$O(1)$

$O(n \log n)$



Here are the correct answers to the questions provided:

1. Which of the following algorithms is a greedy algorithm?

- Dijkstra's shortest path algorithm (Greedy)

2. In which of the following applications is a circular queue most commonly used?
 - Task scheduling in operating systems
3. Which of the following operations is not possible in an array in constant time?
 - Delete an element by value
4. What is the time complexity of inserting an element at the end of a singly linked list if the tail pointer is maintained?
 - $O(1)$
5. Which data structure is used for Depth First Search (DFS) traversal of a graph?
 - Stack
6. Which data structure follows the Last In First Out (LIFO) principle?
 - Stack
7. What will be the result of the following code for inserting an element into a Min-Heap?

python

 Copy code

```
import heapq
heap = [3, 9, 2, 1, 7]
heapq.heapify(heap)
heapq.heappush(heap, 5)
print(heap)
```

- [1, 3, 2, 9, 7, 5]
8. In a circular queue of size n , if the front is at position i and the rear is at position j , what is the condition for the queue being full?
 - $(j + 1) \% n == i$
 9. Which of the following data structures allows insertion and deletion from both ends?
 - Dequeue
 10. Which of the following is true about Dequeue (Double-Ended Queue)?
 - You can insert and delete elements from both ends
 11. In which of the following scenarios is a stack used?
 - Recursive function calls
 12. In a min-heap, what is the time complexity of extracting the minimum element?
 - $O(\log n)$
 13. What is the main advantage of a circular queue over a regular queue?
 - It avoids wastage of space
 14. Which data structure is the most appropriate to implement a priority queue?
 - Heap
 15. In a linked list, what is the time complexity of finding the last element?
 - $O(n)$
 16. What is the output of the following recursive function for $n = 5$?

java

 Copy code

```
public class Main { public static int mystery(int n) { if (n == 1)
{ return 1; } return n + mystery(n - 1); } public static void
main(String[] args) { System.out.println(mystery(5)); } }
```

- 15
17. What is the worst-case time complexity for accessing an element in an unsorted array?
 - $O(n)$
 18. Which of the following strategies does Quick Sort use?
 - Divide and Conquer
 19. Which algorithm strategy is used in Merge Sort?
 - Divide and Conquer
 20. In an array-based implementation of a stack, what is the time complexity of pushing an element?
 - $O(1)$