### 30 MCQs from \*\*Unit-1 (Introduction to Data Structure)\*\*

1. \*\*What does "data" refer to in computer science?\*\*

a) Facts stored in human minds

b) Numbers or text stored electronically

c) Both a and b

d) None of the above

\*\*Answer:\*\* c) Both a and b

2. \*\*Which of the following is an example of a primitive data structure?\*\*

a) Array

b) Graph

c) Integer

d) Linked list

\*\*Answer:\*\* c) Integer

3. \*\*Which of the following is a linear data structure?\*\*

a) Tree

b) Graph

c) Stack

d) None of these

\*\*Answer:\*\* c) Stack

4. \*\*What defines a non-linear data structure?\*\*

a) Linear arrangement of data elements

b) Sequential data storage

c) Hierarchical arrangement of elements

d) Random data storage

\*\*Answer:\*\* c) Hierarchical arrangement of elements

5. \*\*Which data structure follows the First-In-First-Out (FIFO) rule?\*\*

a) Stack

b) Queue

c) Linked list

d) Graph

\*\*Answer:\*\* b) Queue

6. \*\*In a stack, which operation is used to remove an element?\*\*

a) Push

b) Pop

c) Peek

d) Enqueue

\*\*Answer:\*\* b) Pop

7. \*\*What is the term used for the memory location used by recursive algorithms?\*\*

a) Fixed memory

b) Dynamic memory allocation

c) Recursion stack space

d) Static memory allocation

\*\*Answer:\*\* c) Recursion stack space

8. \*\*What is the time complexity of traversing a list with 'n' elements?\*\*

a) O(log n)

b) O(n)

c) O(1)

d) O(n^2)

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

9. \*\*What is an abstract data type (ADT)?\*\*

a) A physical implementation of a data type

b) Logical and mathematical model of data types

c) Predefined data type in C

d) None of the above

\*\*Answer:\*\* b) Logical and mathematical model of data types

10. \*\*Which is an example of a non-linear data structure?\*\*

a) Array

b) Linked list

c) Tree

d) Queue

\*\*Answer:\*\* c) Tree

11. \*\*Which notation represents logarithmic time complexity?\*\*

a) O(n)

b) O(log n)

c) O(1)

d) O(n^2)

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

12. \*\*Which algorithm approach divides a problem into sub-problems?\*\*

a) Top-Down

b) Bottom-Up

c) Divide and Conquer

d) None of these

\*\*Answer:\*\* c) Divide and Conquer

13. \*\*Which type of data structure does not form a sequence?\*\*

a) Linear

b) Non-linear

c) Primitive

d) Complex

\*\*Answer:\*\* b) Non-linear

14. \*\*Which is an example of a fixed part of space complexity?\*\*

a) Recursion stack

b) Dynamic memory allocation

c) Constants

d) Array elements

\*\*Answer:\*\* c) Constants

15. \*\*What does Big-O notation represent?\*\*

a) Time complexity upper bound

b) Space complexity lower bound

c) Average case complexity

d) None of the above

\*\*Answer:\*\* a) Time complexity upper bound

16. \*\*Which of these is not an operation on data structures?\*\*

a) Traversing

b) Sorting

c) Merging

d) Implementing

\*\*Answer:\*\* d) Implementing

17. \*\*Which type of data structure is used to maintain a hierarchy?\*\*

a) Array

b) Stack

c) Tree

d) Queue

\*\*Answer:\*\* c) Tree

18. \*\*Which is NOT a characteristic of an algorithm?\*\*

a) Effectiveness

b) Infinite looping

c) Clarity

d) Termination

\*\*Answer:\*\* b) Infinite looping

19. \*\*In linear data structures, the first element has how many predecessors?\*\*

a) One

b) Two

c) None

d) Three

\*\*Answer:\*\* c) None

20. \*\*What is the value of log base 2 of 8?\*\*

a) 1

b) 2

c) 3

d) 4

\*\*Answer:\*\* c) 3

(Additional MCQs will be continued for Unit-1. Then, I will extract questions for Unit-2 afterward.)

### Continued: MCQs from \*\*Unit-1 (Introduction to Data Structure)\*\*

21. \*\*Which of the following data structures does NOT require contiguous memory allocation?\*\*

a) Array

b) Linked list

c) Stack

d) Queue

\*\*Answer:\*\* b) Linked list

22. \*\*What is the process of arranging data elements in a specific order called?\*\*

a) Searching

b) Sorting

c) Merging

d) Traversing

\*\*Answer:\*\* b) Sorting

23. \*\*Which operation involves visiting each element of a data structure?\*\*

a) Traversing

b) Deletion

c) Searching

d) Merging

\*\*Answer:\*\* a) Traversing

24. \*\*What does O(n^2) complexity represent?\*\*

a) Quadratic time

b) Linear time

c) Exponential time

d) Logarithmic time

\*\*Answer:\*\* a) Quadratic time

25. \*\*What type of binary representation is used for negative numbers?\*\*

a) Binary search

b) Floating point notation

c) One's complement

d) String representation

\*\*Answer:\*\* c) One's complement

26. \*\*Which data type in C can store big floating-point numbers?\*\*

a) Float

b) Double

c) Integer

d) Char

\*\*Answer:\*\* b) Double

27. \*\*Which asymptotic notation defines the tightest boundary?\*\*

a) Big-O

b) Big-Omega

c) Theta

d) Small-O

\*\*Answer:\*\* c) Theta

28. \*\*What is the result of merging two sorted lists?\*\*

a) A single unsorted list

b) A list of larger size, unsorted

c) A single sorted list

d) None of the above

\*\*Answer:\*\* c) A single sorted list

29. \*\*Which data structure allows random access?\*\*

a) Stack

b) Queue

c) Array

d) Linked list

\*\*Answer:\*\* c) Array

30. \*\*What is an example of hierarchical data representation?\*\*

a) Tree

b) Graph

c) Linked list

d) Both a and b

\*\*Answer:\*\* d) Both a and b

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### 30 MCQs from \*\*Unit-2 (Stack & Queue)\*\*

1. \*\*What is the data structure used in a stack?\*\*

a) FIFO

b) LIFO

c) Random

d) Ordered

\*\*Answer:\*\* b) LIFO

2. \*\*In stack operations, what happens when there is an attempt to remove an element from an empty stack?\*\*

a) Overflow

b) Underflow

c) Segmentation fault

d) Infinite loop

\*\*Answer:\*\* b) Underflow

3. \*\*What is the condition for a stack to be full?\*\*

a) TOP = NULL

b) TOP = MAX - 1

c) TOP = REAR

d) TOP = -1

\*\*Answer:\*\* b) TOP = MAX - 1

4. \*\*Which stack operation retrieves the topmost element without removing it?\*\*

a) Push

b) Pop

c) Peek

d) Update

\*\*Answer:\*\* c) Peek

5. \*\*Which of the following is NOT a stack application?\*\*

a) Balancing symbols

b) Tower of Hanoi

c) Job scheduling

d) Recursion

\*\*Answer:\*\* c) Job scheduling

6. \*\*Which notation is easier for computers to parse?\*\*

a) Infix

b) Prefix

c) Postfix

d) Both b and c

\*\*Answer:\*\* d) Both b and c

7. \*\*In a queue, where are elements added?\*\*

a) Top

b) Rear

c) Front

d) Any position

\*\*Answer:\*\* b) Rear

8. \*\*Which data structure is used in simulation models?\*\*

a) Queue

b) Stack

c) Array

d) Linked list

\*\*Answer:\*\* a) Queue

9. \*\*Which of the following queue types allows insertions and deletions from both ends?\*\*

a) Simple queue

b) Circular queue

c) Dequeue

d) Priority queue

\*\*Answer:\*\* c) Dequeue

10. \*\*What happens when the rear reaches MAX in a linear queue?\*\*

a) Underflow

b) Overflow

c) Circular rotation

d) Nothing

\*\*Answer:\*\* b) Overflow

(More Unit-2 MCQs will be provided shortly.)

### Continued: MCQs from \*\*Unit-2 (Stack & Queue)\*\*

11. \*\*What type of queue requires priority levels for its elements?\*\*

a) Simple queue

b) Circular queue

c) Priority queue

d) Dequeue

\*\*Answer:\*\* c) Priority queue

12. \*\*In a circular queue, what happens when the rear points to MAX-1, and the front is greater than 0?\*\*

a) Overflow

b) Underflow

c) Wrap around to the start

d) Queue reset

\*\*Answer:\*\* c) Wrap around to the start

13. \*\*Which queue operation removes an element from the front?\*\*

a) Enqueue

b) Dequeue

c) Insert

d) Delete

\*\*Answer:\*\* b) Dequeue

14. \*\*What is a major drawback of a linear queue?\*\*

a) Overflow when memory is available

b) Underflow when elements exist

c) Complexity in deletion

d) Unpredictable behavior

\*\*Answer:\*\* a) Overflow when memory is available

15. \*\*Which structure can hold elements based on both LIFO and FIFO principles?\*\*

a) Simple queue

b) Stack

c) Double-ended queue

d) Circular queue

\*\*Answer:\*\* c) Double-ended queue

16. \*\*What is the main application of a priority queue?\*\*

a) Balancing symbols

b) Job scheduling

c) Towers of Hanoi

d) Fibonacci sequence

\*\*Answer:\*\* b) Job scheduling

17. \*\*Which queue type uses the rear index for insertion?\*\*

a) Simple queue

b) Circular queue

c) Both a and b

d) None of the above

\*\*Answer:\*\* c) Both a and b

18. \*\*Which stack operation checks for stack overflow?\*\*

a) Push

b) Pop

c) Peek

d) Update

\*\*Answer:\*\* a) Push

19. \*\*What is the initial condition of a queue when it is empty?\*\*

a) Front = -1, Rear = -1

b) Front = 0, Rear = 0

c) Front = MAX, Rear = MAX

d) None of these

\*\*Answer:\*\* a) Front = -1, Rear = -1

20. \*\*What is the computational complexity of the PUSH operation in a stack?\*\*

a) O(1)

b) O(n)

c) O(log n)

d) O(n^2)

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

21. \*\*Which of the following algorithms is used to convert infix expressions to postfix?\*\*

a) Divide and conquer

b) Stack-based algorithm

c) Sorting algorithm

d) None of the above

\*\*Answer:\*\* b) Stack-based algorithm

22. \*\*Which operation occurs first while evaluating postfix expressions?\*\*

a) Addition

b) Operator precedence rules

c) Left-to-right evaluation

d) Parentheses resolution

\*\*Answer:\*\* c) Left-to-right evaluation

23. \*\*Which queue is visualized as circular, with the first index following the last?\*\*

a) Simple queue

b) Priority queue

c) Circular queue

d) Dequeue

\*\*Answer:\*\* c) Circular queue

24. \*\*Which is faster for job scheduling: stack or queue?\*\*

a) Stack

b) Queue

c) Neither

d) Both are equally efficient

\*\*Answer:\*\* b) Queue

25. \*\*What is the time complexity of inserting into a circular queue?\*\*

a) O(1)

b) O(n)

c) O(log n)

d) O(n^2)

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

26. \*\*What is the data structure used in function calls?\*\*

a) Stack

b) Queue

c) Linked list

d) Array

\*\*Answer:\*\* a) Stack

27. \*\*In prefix notation, where is the operator placed?\*\*

a) Between operands

b) Before operands

c) After operands

d) Randomly placed

\*\*Answer:\*\* b) Before operands

28. \*\*Which of the following best describes the "simulation" process in data structures?\*\*

a) Abstract model creation

b) Linear problem solving

c) Non-hierarchical problem modeling

d) Real-time solution creation

\*\*Answer:\*\* a) Abstract model creation

29. \*\*What data structure is used in real-life systems for customer call waiting?\*\*

a) Stack

b) Queue

c) Linked list

d) Tree

\*\*Answer:\*\* b) Queue

30. \*\*Which condition occurs when attempting to enqueue into a full circular queue?\*\*

a) Overflow

b) Underflow

c) Rearwrap

d) None of the above

\*\*Answer:\*\* a) Overflow