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CS301 –DATA STRUCTURE GRAND QUIZ PREPARATION FILE

1. An efficient program executes _____ and helps _____ the usage of resources like memory, disk.
 - a. **Faster , minimize**
 - b. Slower, maximize
 - c. Faster, maximize
 - d. Minimize, faster
2. As computer applications are becoming_____, so there is need for more resources
 - a. Efficient
 - b. **Complex**
 - c. Simple
 - d. None of given
3. Within an organization data should be arranged in a way that it is easily_____.
 - a. Control
 - b. Secure
 - c. **Accessible**
 - d. Destroyed
4. The correct syntax to declare of array of 06 elements is?
 - a. **int x[6];**
 - b. int x[5];
 - c. int x{6};
 - d. int x{5};
5. An array is collection of cells of the _____ type.
 - a. Different
 - b. **Same**
 - c. Integer
 - d. String
6. Array occupies _____ memory area in the computer.
 - a. Separate
 - b. Collective
 - c. Different
 - d. **Contiguous**
7. Which of these best describes an array?
 - a) A data structure that shows a hierarchical behavior
 - b) **Container of objects of similar types**
 - c) Arrays are immutable once initialized
 - d) Array is not a data structure

8. How do you initialize an array in C?
- a) `int arr[3] = (1,2,3);`
 - b) `int arr(3) = {1,2,3};`
 - c) **`int arr[3] = {1,2,3};`**
 - d) `int arr(3) = (1,2,3);`
9. The _____ data structure is among the most generic of data structures.
- a. Array
 - b. **List**
 - c. Stacks
 - d. Queues
10. List is a set of elements in an/a _____ order.
- a. Exponential
 - b. Static
 - c. Dynamic
 - d. **Linear**
11. A List is collection of item of the _____ type.
- a. Different
 - b. **Same**
 - c. Integer
 - d. String
12. The function of `clear()`; perform what in List data structure ?
- a. Remove element at some position in the list
 - b. Set one list to be a copy of another
 - c. **Clear a list (remove all elements)**
 - d. None of the given
13. It is not necessary to always start the indexing from zero. Sometimes, it is required to start the indexing from 1.
- a. **True**
 - b. False
14. In this method, we do not add a new element to the list but simply move the pointer one element ahead.
- a. `start()`
 - b. `tail()`
 - c. **`next()`**
 - d. `back()`
15. When does the `ArrayIndexOutOfBoundsException` occur?
- a) Compile-time
 - b) **Run-time**
 - c) Not an error
 - d) Not an exception at all
16. A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as a ?
- a) **Queue**
 - b) Stack

- c) Tree
 - d) Linked list
17. Process of inserting an element in stack is called _____
- a) Create
 - b) Push**
 - c) Evaluation
 - d) Pop
18. The data structure required for Breadth First Traversal on a graph is?
- a) Stack
 - b) Array
 - c) Queue**
 - d) Tree
19. What does 'stack underflow' refer to?
- a) accessing item from an undefined stack
 - b) adding items to a full stack
 - c) removing items from an empty stack**
 - d) index out of bounds exception
20. What is the time complexity of pop() operation when the stack is implemented using an array?
- a) O(1)**
 - b) O(n)
 - c) O(logn)
 - d) O(nlogn)
21. It is impossible that one element of the array is located at a memory location while the other element is located somewhere far from it in the memory.
- a. True**
 - b. False
22. When we have declared the size of the array, it is _____ to increase or decrease it during the execution of the program.
- a. Possible
 - b. Not possible**
 - c. Depend on the programming language
 - d. Depend on the compiler
23. While calling a function, we pass values of variables to it. Such functions are known as
- a. Call by value**
 - b. Call by reference
 - c. Call by address
 - d. Call by location
24. A node comprises _____ fields.
- a. Two**
 - b. One
 - c. Three
 - d. Four
25. While calling a function, instead of passing the values of variables, we pass address of variables (location of variables) to the function known as

- a. Call by value
 - b. Call by reference**
 - c. Call by address
 - d. Call by location
26. The local variables of a function are created on _____.
- a. Heap
 - b. Array
 - c. call stack**
 - d. Linked List
27. All the variables or objects created in a function that we want to access later are created on memory heap, sometimes called?
- a. Memory bank
 - b. Heap store
 - c. Stack
 - d. free store**
28. Heap is an area in computer memory that is allocated _____.
- a. Statically
 - b. Manually
 - c. Dynamically**
 - d. Randomly
29. All the objects created using new operator have to be explicitly destroyed using the _____.
- a. delete operator**
 - b. kill operator
 - c. remove operator
 - d. clear operator
30. Nameless objects (objects accessed by pointers) are called _____.
- a. Free object
 - b. Pointer object
 - c. anonymous objects**
 - d. none of given
31. A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as a ?
- a) Queue**
 - b) Stack
 - c) Tree
 - d) Linked list
32. Which one of the following is an application of Queue Data Structure?
- (A) When a resource is shared among multiple consumers.
 - (B) When data is transferred asynchronously (data not necessarily received at same rate as sent) between two processes
 - (C) Load Balancing
 - (D) All of the above**
33. The data structure required for Breadth First Traversal on a graph is?
- a) Stack
 - b) Array
 - c) Queue**
 - d) Tree

34. A queue follows _____
a) **FIFO (First In First Out) principle**
b) LIFO (Last In First Out) principle
c) Ordered array
d) Linear tree
35. Circular Queue is also known as _____
a) **Ring Buffer**
b) Square Buffer
c) Rectangle Buffer
d) Curve Buffer
36. If the elements "A", "B", "C" and "D" are placed in a queue and are deleted one at a time, in what order will they be removed?
a) **ABCD**
b) DCBA
c) DCAB
d) ABDC
37. A data structure in which elements can be inserted or deleted at/from both the ends but not in the middle is?
a) Queue
b) Circular queue
c) **Deque**
d) Priority queue
38. A normal queue, if implemented using an array of size MAX_SIZE, gets full when
a) **Rear = MAX_SIZE - 1**
b) Front = (rear + 1) mod MAX_SIZE
c) Front = rear + 1
d) Rear = front
39. Queues serve major role in _____
a) Simulation of recursion
b) Simulation of arbitrary linked list
c) **Simulation of limited resource allocation**
d) Simulation of heap sort
40. Which of the following is not the type of queue?
a) Ordinary queue
b) **Single ended queue**
c) Circular queue
d) Priority queue
41. How many stacks are needed to implement a queue? Consider the situation where no other data structure like arrays, linked list is available to you.
(A) 1
(B) **2**
(C) 3
(D) 4
42. Choose correct output for the following sequence of operations.

```
push(5)
```

```
push(8)
```

```
pop
push(2)
push(5)
pop
pop
pop
push(1)
pop
```

- a. 85251
 - b. 85521
 - c. 82551
 - d. 81255
43. Stack can be implemented using _____ and _____?
- a. Array & Binary Tree
 - b. Linked List & Graph
 - c. **Array & Linked list**
 - d. Queue & linked list
44. Postfix form of following expression.
- a. EF^*D+
 - b. **DEF^*+**
 - c. $DEF+^*$
 - d. EFD^*+
45. When function calls another function then the details of previous function are stored in Stack?
- a. **True**
 - b. False
46. Insertion and Deletion operation in Queue is known as
- a. Push & Pop
 - b. **Enqueue & Dequeue**
 - c. Insert & Delete
 - d. None of given
47. Stack data structure cannot be used for
- a. Implementation of recursive function
 - b. **Allocation resource & scheduling**
 - c. Reversing string
 - d. Evaluations of string in postfix form
48. What is the advantage of recursive approach than an iterative approach?
- a) Consumes less memory
 - b) **Less code and easy to implement**
 - c) Consumes more memory
 - d) More code has to be written

49. In which of the cases uniform binary search fails compared to binary search?
- a) A table lookup is generally faster than an addition and a shift
 - b) Many searches will be performed on the same array
 - c) Many searches will be performed on several arrays of the same length
 - d) Complexity of code**
50. Given an input arr = {2,5,7,99,899}; key = 899; What is the level of recursion?
- a) 5
 - b) 2
 - c) 3**
 - d) 4
51. What is the worst case complexity of binary search using recursion?
- a) $O(n \log n)$
 - b) $O(\log n)$**
 - c) $O(n)$
 - d) $O(n^2)$
52. What is the average case time complexity of binary search using recursion?
- a) $O(n \log n)$
 - b) $O(\log n)$**
 - c) $O(n)$
 - d) $O(n^2)$
- 53.** Which of the following is not an application of binary search?
- a) To find the lower/upper bound in an ordered sequence
 - b) Union of intervals
 - c) Debugging
 - d) To search in unordered list**
54. Binary Search can be categorized into which of the following?
- a) Brute Force technique
 - b) Divide and conquer**
 - c) Greedy algorithm
 - d) Dynamic programming
- 55.** Given an array arr = {5,6,77,88,99} and key = 88; How many iterations are done until the element is found?
- a) 1
 - b) 3
 - c) 4
 - d) 2**
56. Each element of a binary tree is called a _____ of the tree.
- a. Node**
 - b. Leaf
 - c. Mode
 - d. Child
57. We make (draw) a tree by joining different nodes with lines. But we _____ join any nodes whichever we want to each other.
- a. Can also
 - b. Cannot**
 - c. Depend on the nodes
 - d. None of given
58. In a tree there is always _____ path to go (from root) to a node.

- a. Two
 - b. One**
 - c. No path
 - d. None of the given
59. We can use the words descendant and child interchangeably.
- a. True**
 - b. False
60. A binary tree is said to be a strictly binary tree if every non-leaf node in a binary tree has non-empty left and right sub trees.
- a. True**
 - b. False
61. Level of any other node is one more than the level its_____.
- a. Child
 - b. Leaf
 - c. Descendant
 - d. Parent**
62. A complete binary tree of depth d is the strictly binary tree all of whose leaves are at level d".
- a. True**
 - b. False
63. We can say that in a complete binary tree at a particular level k, the number of nodes is equal to _____?
- a. $2K$
 - b. $2 \cdot 2^k$
 - c. $2 \log k$
 - d. 2^k**
64. Which of the following is not an operation on binary tree?
- a. `right(p)` returns pointer to right sub tree
 - b. `parent(p)` returns the father of p
 - c. `brother(p)` returns brother of p.
 - d. all of the given
65. A complete binary tree is necessarily a strictly binary tree but not vice versa.
- a. True**
 - b. False
66. Binary tree is useful structure when two-way decisions are made at each point.
- a. True**
 - b. False
67. What is an AVL tree?
- a) a tree which is balanced and is a height balanced tree**
 - b) a tree which is unbalanced and is a height balanced tree
 - c) a tree with three children
 - d) a tree with at most 3 children
68. Why we need to a binary tree which is height balanced?
- a) to avoid formation of skew trees**
 - b) to save memory
 - c) to attain faster memory access
 - d) to simplify storing

69. In post order traversal of binary tree right sub tree is traversed before visiting root.
a) **True**
b) False
70. What is the possible number of binary trees that can be created with 3 nodes, giving the sequence N, M, L when traversed in post-order.
a) 15
b) 3
c) **5**
d) 8
71. Which of the following pair's traversals on a binary tree can build the tree uniquely?
a) post-order and pre-order
b) **post-order and in-order**
c) post-order and level order
d) level order and preorder
72. To obtain a prefix expression, which of the tree traversals is used?
a) Level-order traversal
b) **Pre-order traversal**
c) Post-order traversal
d) In-order traversal
73. Which one is a self- referential data type?
a. Stack
b. Queue
c. Link list
d. **All of these**
74. Each node in doubly link list has,
a. 1 pointer
b. **2 pointers (Page 39)**
c. 3 pointers
d. 4 pointers
75. I have implemented the queue with a linked list, keeping track of a front pointer and a rear pointer. Which of these pointers will change during an insertion into an EMPTY queue?
a. Neither changes
b. Only front pointer changes.
c. **Only rear pointer changes.**
d. Both change.
76. The nodes with no successor are called _____
a. Root Nodes
b. **Leaf Nodes**
c. Both of these
d. None of these
77. Doubly Linked List always has one NULL pointer.
a. True
b. **False (Page 43)**
78. In which of the traversal method, the recursive calls can be used to traverse a binary tree ?
a. **In preorder traversal only (Page 143)**
b. In inorder traversal only
c. In postorder traversal only
d. All of the given options

79. What is the maximum height of an AVL tree with p nodes?
- a) p
 - b) $\log(p)$**
 - c) $\log(p)/2$
 - d) $p/2$
80. A tree is an AVL tree if
- a. Any one node fulfills the AVL condition
 - b. At least half of the nodes fulfill the AVL condition
 - c. All the nodes fulfill the AVL condition (Page 213)**
 - d. None of the given options
81. Consider the following sequence of push operations in a stack:
stack.push('7');
stack.push('8');
stack.push('9');
stack.push('10');
stack.push('11');
stack.push('12');
- a. 7 8 9 10 11 12**
 - b. 9 8 11 10 7 12
 - c. 9 10 8 11 12 7
 - d. 9 10 8 12 7 11
82. Which one of the following operators has higher priority than all of others?
- a. Multiplication operator**
 - b. Minus operator
 - c. Plus operator
 - d. Exponentiation operator
83. Which of the following is "TRUE" about arrays,
- a. We can increase the size of arrays after their creation.
 - b. We can decrease the size of arrays after their creation.
 - c. We can increase but can't decrease the size of arrays after their creation.
 - d. We can neither increase nor decrease the array size after their creation.**
84. Next item in a linked list is known as
- a. Index
 - b. Item
 - c. Node**
 - d. Child
85. Each operator in a postfix expression refers to the previous _____ operand(s).
- a. One
 - b. Two**
 - c. Three
 - d. Four
86. We access elements in AVL Tree in,
- a. Linear way only
 - b. Non Linear way only**
 - c. Both linear and non linear ways
 - d. None of the given options.
87. $A + B * C$ the postfix expression is _____?
- a. $+ A * B C$

- b. $+*ABC$
 - c. **$ABC*+$**
 - d. $A+*BC$
88. Data compression plays a significant role in _____?
- a. Application software
 - b. Database
 - c. Encoding scheme
 - d. **computer networks**
89. Huffman code is method for the compression of standard text documents.
- a. **True**
 - b. False
90. _____ is a data structure that can grow easily dynamically at run time without having to copy existing elements.
- a. Array
 - b. **List**
 - c. Both of these
 - d. None of these
91. "+" is a _____ operator.
- a. Unary
 - b. **Binary**
 - c. Ternary
 - d. None of the above
92. A _____ is a FIFO structure, which can make the level-order traversal easier.
- a. Array
 - b. List
 - c. **Queue**
 - d. Linked List
93. We can make a lexicographic order of characters based on their ASCII values.
- a. **True**
 - b. False
94. A queue is a _____ data structure, whereas a stack is a _____ data structure.
- a. **FIFO, LIFO**
 - b. LIFO, FIFO
 - c. none of these
 - d. both of these
95. Searching an element in an AVL tree take maximum _____ time (where n is no. of nodes in AVL tree),
- a. $\log_2(n+1)$
 - b. $\log_2(n+1) - 1$
 - c. **$1.44 \log_2 n$**
 - d. $1.66 \log_2 n$
96. Consider the following infix expression.
 $5 + 6/2$
 If one converts the above expression into postfix, what would be the resultant expression?
- a) $56/ + 2$
 - b) **$5 6 2 / +$** not confirmed
 - c) $5 6 / 2 +$
 - d) $/62 + 5$

97. Which of the following is a nonlinear data structure?

- a. Linked List
- b. Stack
- c. Queue
- d. **Tree**

98. In an AVL tree to delete a parent with two childs in a straight line following rotations will be required:-

- a. Single
- b. **Double**
- c. Triple
- d. None.

99. Each node in a BST has _____ Pointers:-

- a. 1
- b. **2**
- c. 3
- d. 4

100. When an operator is used in between two operands this is which type of notation

- a. Prefix
- b. Postfix
- c. **Infix**
- d. None of the Above