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Question Bank

Class: F.Y.B. Sc.CS

Semester: II

Subject: Data Structures

UNIT 1

Q1 A mathematical-model with a collection of operations defined on that model is called

- a) Data Structure
- b) Abstract Data Type
- c) Primitive Data Type
- d) Algorithm

Q2 Which of this 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 initialised
- d) Array is not a data structure

Q3 Which of the following concepts make extensive use of arrays?

- a) Binary trees
- b) Scheduling of processes
- c) Caching
- d) Spatial locality

Q4 How can we describe an array in the best possible way?

- a) The Array shows a hierarchical structure.
- b) Arrays are immutable
- c) Container that stores the elements of similar types
- d) The Array is not a data structure

Q5 Which of the following is the correct way of declaring an array?

- a) `int javatpoint [10];`
- b) `int javatpoint;`
- c) `javatpoint {20};`
- d) `array javatpoint [10];`

Q6 How can we initialize an array in C language?

- a) `int arr[2]=(10, 20)`
- b) `int arr(2)={ 10, 20}`
- c) `int arr[2] = { 10, 20}`
- d) `int arr(2) = (10, 20)`

Q7 Which of the following is the advantage of the array data structure?

- a) Elements of mixed data types can be stored.
- b) Easier to access the elements in an array
- c) Index of the first element starts from 1.
- d) Elements of an array cannot be sorted

Q8 Which of the following highly uses the concept of an array?

- a) Binary Search tree
- b) Caching
- c) Spatial locality
- d) Scheduling of Processes

Q9 Which of the following is the disadvantage of the array?

- a) Stack and Queue data structures can be implemented through an array.
- b) Index of the first element in an array can be negative
- c) Wastage of memory if the elements inserted in an array are lesser than the allocated size
- d) Elements can be accessed sequentially.

Q10 Which one of the following is the size of `int arr[9]` assuming that `int` is of 4 bytes?

- a) 9
- b) 36
- c) 35
- d) None of the above

Q11 Which one of the following is the process of inserting an element in the stack?

- a) Insert
- b) Add
- c) Push
- d) None of the above

Q12 Which data structure is required to convert the infix to prefix notation?

- a) Stack
- b) Linked list
- c) Binary tree
- d) Queue

Q13 Which of this 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

Q14 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);`

Q15 How do you instantiate an array in Java?

- a) `int arr [] = new int(3);`
- b) `int arr[];`
- c) `int arr [] = new int[3];`
- d) `int arr () = new int (3);`

Q16 Which of the following is the correct way to declare a multidimensional array in Java?

- a) `int [] arr;`
- b) `int arr [[]];`
- c) `int [] [] arr;`
- d) `int [[]] arr;`

Q17 What are the advantages of arrays?

- a) Objects of mixed data types can be stored
- b) Elements in an array cannot be sorted
- c) Index of first element of an array is 1
- d) Easier to store elements of same data type

Q18 Assuming int is of 4bytes, what is the size of `int arr [15];` ?

- a) 15
- b) 19
- c) 11
- d) 60

Q20 Elements in an array are accessed _____

- a) randomly
- b) sequentially
- c) exponentially
- d) logarithmically

Q21 Map implements collection interface?

- a) True
- b) False

Q22 Which of the below does not implement Map interface?

- a) HashMap
- b) Hashtable
- c) EnumMap
- d) Vector

Q23 What is the premise of equality for Identity HashMap?

- a) Reference equality
- b) Name equality

- c) Hashcode equality
- d) Length equality

Q24 What happens if we put a key object in a HashMap which exists?

- a) The new object replaces the older object
- b) The new object is discarded
- c) The old object is removed from the map
- d) It throws an exception as the key already exists in the map

Q25 While finding the correct location for saving key value pair, how many times the key is hashed?

- a) 1
- b) 2
- c) 3

UNIT 2

1. Process of inserting an element in stack is called _____
 - a) Create
 - b) Push
 - c) Evaluation
 - d) Pop

2. Process of removing an element from stack is called _____
 - a) Create
 - b) Push
 - c) Evaluation
 - d) Pop

3. Entries in a stack are “ordered”. What is the meaning of this statement?
 - a) A collection of stacks is sortable
 - b) Stack entries may be compared with the ‘<’ operation
 - c) The entries are stored in a linked list
 - d) There is a Sequential entry that is one by one

4. Which of the following is not the application of stack?
 - a) A parentheses balancing program
 - b) Tracking of local variables at run time
 - c) Compiler Syntax Analyzer
 - d) Data Transfer between two asynchronous process

5. Consider the usual algorithm for determining whether a sequence of parentheses is balanced. The maximum number of parentheses that appear on the stack AT ANY ONE TIME when the algorithm analyzes: $((()())())$?
 - a) 1
 - b) 2
 - c) 3
 - d) 4 or more

6. What is the value of the postfix expression $6\ 3\ 2\ 4\ +\ -\ *?$
 - a) 1
 - b) 40
 - c) 74
 - d) -18

7. 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) Queue
 - b) Stack
 - c) Tree
 - d) Linked list

8. The data structure required for Breadth First Traversal on a graph is?
 - a) Stack
 - b) Array

- c) Queue
- d) Tree

9. A queue follows _____
- a) FIFO (First In First Out) principle
 - b) LIFO (Last In First Out) principle
 - c) Ordered array
 - d) Linear tree
10. Circular Queue is also known as _____
- a) Ring Buffer
 - b) Square Buffer
 - c) Rectangle Buffer
 - d) Curve Buffer
11. 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
12. A data structure in which elements can be inserted or deleted at/from both ends but not in the middle is?
- a) Queue
 - b) Circular queue
 - c) Dequeue
 - d) Priority queue
13. Which of the following is not the type of queue?
- a) Ordinary queue
 - b) Single ended queue
 - c) Circular queue
 - d) Priority queue
14. A linear collection of data elements where the linear node is given by means of pointer is called?
- a) Linked list
 - b) Node list
 - c) Primitive list
 - d) Unordered list
15. Consider an implementation of unsorted singly linked list. Suppose it has its representation with a head pointer only. Given the representation, which of the following operation can be implemented in $O(1)$ time?
- i) Insertion at the front of the linked list
 - ii) Insertion at the end of the linked list
 - iii) Deletion of the front node of the linked list
 - iv) Deletion of the last node of the linked list

- a) I and II
- b) I and III
- c) III and III
- d) I, II and IV

16. In linked list each node contains a minimum of two fields. One field is data field to store the data second field is?

- a) Pointer to character
- b) Pointer to integer
- c) Pointer to node
- d) Node

17. What would be the asymptotic time complexity to add a node at the end of singly linked list, if the pointer is initially pointing to the head of the list?

- a) $O(1)$
- b) $O(n)$
- c) $\theta(n)$
- d) $\theta(1)$

18. What would be the asymptotic time complexity to insert an element at the front of the linked list (head is known)?

- a) $O(1)$
- b) $O(n)$
- c) $O(n^2)$
- d) $O(n^3)$

19. The concatenation of two lists can be performed in $O(1)$ time. Which of the following variation of the linked list can be used?

- a) Singly linked list
- b) Doubly linked list
- c) Circular doubly linked list
- d) Array implementation of list

20. What is the order of a matrix?

- a) number of rows X number of columns
- b) number of columns X number of rows
- c) number of rows X number of rows
- d) number of columns X number of columns

21. Which of the following property does not hold for matrix multiplication?

- a) Associative
- b) Distributive
- c) Commutative
- d) Additive Inverse

22. How do you allocate a matrix using a single pointer in C? (r and c are the number of rows and columns respectively)

- a) `int *arr = malloc(r * c * sizeof(int));`
- b) `int *arr = (int *)malloc(r * c * sizeof(int));`

- c) `int *arr = (int *)malloc(r + c * sizeof(int));`
- d) `int *arr = (int *)malloc(r * c * sizeof(arr));`

23. If row-major order is used, how is the following matrix stored in memory?

- a b c
- d e f
- g h i
- a) ihgfedcba
- b) abcdefghi
- c) cfibehadg
- d) adgbehcfi

24. If column-major order is used, how is the following matrix stored in memory?

- a b c
- d e f
- g h i
- a) ihgfedcba
- b) abcdefghi
- c) cfibehadg
- d) adgbehcfi

25. Which of the following don't use matrices?

- a) In solving linear equations
- b) Image processing
- c) Graph theory
- d) Sorting numbers

26. Which of the following is an advantage of matrices?

- a) Internal complexity
- b) Searching through a matrix is complex
- c) Not space efficient
- d) Graph Plotting

27. Matrix A when multiplied with Matrix C gives the Identity matrix I, what is C?

- a) Identity matrix
- b) Inverse of A
- c) Square of A
- d) Transpose of A

28. The data structure required to check whether an expression contains a balanced parenthesis is?

- a) Stack
- b) Queue
- c) Array
- d) Tree

29. What data structure would you mostly likely see in non recursive implementation of a recursive algorithm?

- a) Linked List
- b) Stack
- c) Queue
- d) Tree

30. The process of accessing data stored in a serial access memory is similar to manipulating data on a _____

- a) Heap
- b) Binary Tree
- c) Array
- d) Stack

31. The postfix form of $A*B+C/D$ is?

- a) $*AB/CD+$
- b) $AB*CD/+$
- c) $A*BC+/D$
- d) $ABCD+/*$

32. Which data structure is needed to convert infix notation to postfix notation?

- a) Branch
- b) Tree
- c) Queue
- d) Stack

33. Which data structure is used for implementing recursion?

- a) Queue
- b) Stack
- c) Array
- d) List

34. What differentiates a circular linked list from a normal linked list?
- a) You cannot have the 'next' pointer point to null in a circular linked list
 - b) It is faster to traverse the circular linked list
 - c) You may or may not have the 'next' pointer point to null in a circular linked list
 - d) Head node is known in circular linked list
35. What is the time complexity of searching for an element in a circular linked list?
- a) $O(n)$
 - b) $O(n \log n)$
 - c) $O(1)$
 - d) $O(n^2)$
36. Which of the following application makes use of a circular linked list?
- a) Undo operation in a text editor
 - b) Recursive function calls
 - c) Allocating CPU to resources
 - d) Implement Hash Tables
37. Which of the following is false about a circular linked list?
- a) Every node has a successor
 - b) Time complexity of inserting a new node at the head of the list is $O(1)$
 - c) Time complexity for deleting the last node is $O(n)$
 - d) We can traverse the whole circular linked list by starting from any point
38. Consider a small circular linked list. How to detect the presence of cycles in this list effectively?
- a) Keep one node as head and traverse another temp node till the end to check if its 'next' points to head
 - b) Have fast and slow pointers with the fast pointer advancing two nodes at a time and slow pointer advancing by one node at a time
 - c) Cannot determine, you have to pre-define if the list contains cycles
 - d) Circular linked list itself represents a cycle. So no new cycles cannot be generated
39. Which of the following is an external sorting?
- A. Insertion Sort
 - B. Bubble Sort
 - C. Merge Sort
 - D. Tree Sort

40. Very slow way of sorting is

- A. Insertion sort
- B. Heap sort
- C. Bubble sort
- D. Quick sort

41. The time complexity of quicksort is

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

42. Selection sort first finds the element in the list and put it in the first position.

- A. Middle element
- B. Largest element
- C. Last element
- D. Smallest element

43. Quick sort is also known as

- A. merge sort
- B. tree sort
- C. shell sort
- D. partition and exchange sort

44. The operation that combines the element is of A and B in a single sorted list C with $n = r + s$ element is called

- A. Inserting
- B. Mixing
- C. Merging
- D. Sharing

45. A tree sort is also known as sort.

- A. quick
- B. shell
- C. heap
- D. selection

46. sorting is good to use when alphabetizing a large list of names.

- A. Merge
- B. Heap

- C. Radix
- D. Bubble

47. Which of the following sorting algorithm is of divide and conquer type?

- A. Bubble sort
- B. Insertion sort
- C. Quicksort
- D. Merge sort

48. The function used to modify the way of sorting the keys of records is called

- A. Indexing function
- B. Hash function
- C. Addressing function
- D. All of the above

49. If the number of records to be sorted large and the key is short, then sorting can be efficient.

- A. Merge
- B. Heap
- C. Radix
- D. Bubble

50. The total number of comparisons in a bubble sort is

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

51. Stack works on _____principle

- a. LIFO
- b. FIFO
- c. LILO
- d. LOFI

52. LIFO stands for_____

- a. Last In First Out

- b. Latest in First Out
- c. Late In First out
- d. Last In Frequency Out

53. _____operation returns the value of the topmost position.

- a. Pop()
- b. Push()
- c. Peek()
- d. Stack()

54. The _____operation returns the number of elements currently present in the stack.

- a. add(element)
- b. Remove(element)
- c. Length()
- d. Contain(element)

55. Which of the following is incorrect matching of parentheses.

- a. {}
- b. {}[]
- c. {([])}
- d. {}{[[

56. Which of the following is infix notation

- a. $X+Y$
- b. $XY+$
- c. $+XY$
- d. $XY+^*$

57. Which of the following is postfix notation

- a. $X+Y$
- b. $XY+$
- c. $+XY$
- d. $XY+^*$

58. Which of the following is Prefix notation

- a. $X+Y$
- b. $XY+$
- c. $+XY$
- d. $XY+^*$

59. Queue is a linear data structure which has two references front and _____

- a. Rear
- b. Top
- c. Peek
- d. List

60. In queue ADT new elements are inserted from _____

- a. Peek
- b. Front

- c. Rear
- d. List

61. In queue ADT elements are deleted from_____

- a. Peek
- b. Front
- c. Rear
- d. List

62. _____creates an empty Queue.

- a. Queue()
- b. isEmpty()
- c. Length()
- d. Enqueue(value)

63. _____returns true if Queue is Empty

- a. Queue()
- b. isEmpty()
- c. Length()
- d. Enqueue(value)

64. _____retuns the number of element currently present in queue.

- a. Queue()
- b. isEmpty()
- c. Length()
- d. Enqueue(value)

65. _____insert an element at the rear of the queue

- a. Queue()
- b. isEmpty()
- c. Length()
- d. Enqueue(value)

66. _____ returns or delete the element which was at front

- a. Queue()
- b. isEmpty()
- c. Dequeue()
- d. Enqueue(value)

67. A _____ is a special type of queue in which every element is inserted in the queue along with its priority.

- a. Circular queue
- b. Linked list
- c. Priority queue
- d. Stack

68. _____ creates a new unbounded queue

- a. PriorityQueue()
- b. Queue()
- c. Enqueue()
- d. BoundedPriorityQueue(plevels)

69. _____ creates a bounded priority queue

- a. PriorityQueue()

- b. Queue()
- c. Enqueue()
- d. BoundedPriorityQueue(plevels)

70. _____ indicates the maximum integer value a priority is allowed to have.

- a. Int
- b. Array
- c. List
- d. Plevels

UNIT 3

1. Recursion is a method in which the solution of a problem depends on _____
 - a) Larger instances of different problems
 - b) Larger instances of the same problem
 - c) Smaller instances of the same problem
 - d) Smaller instances of different problems
2. Which of the following problems can't be solved using recursion?
 - a) Factorial of a number
 - b) Nth Fibonacci number
 - c) Length of a string
 - d) Problems without base case
3. Recursion is similar to which of the following?
 - a) Switch Case
 - b) Loop
 - c) If-else
 - d) if elif else
4. In recursion, the condition for which the function will stop calling itself is _____
 - a) Best case

- b) Worst case
 - c) Base case
 - d) There is no such condition
5. Which of the following statements is true?
- a) Recursion is always better than iteration
 - b) Recursion uses more memory compared to iteration
 - c) Recursion uses less memory compared to iteration
 - d) Iteration is always better and simpler than recursion
6. In general, which of the following methods isn't used to find the factorial of a number?
- a) Recursion
 - b) Iteration
 - c) Dynamic programming
 - d) Non iterative / recursive
7. Which of the following recursive formula can be used to find the factorial of a number?
- a) $\text{fact}(n) = n * \text{fact}(n)$
 - b) $\text{fact}(n) = n * \text{fact}(n+1)$
 - c) $\text{fact}(n) = n * \text{fact}(n-1)$
 - d) $\text{fact}(n) = n * \text{fact}(1)$
8. Suppose the first fibonacci number is 0 and the second is 1. What is the sixth fibonacci number?
- a) 5
 - b) 6
 - c) 7
 - d) 8
9. Which of the following is not a fibonacci number?
- a) 8
 - b) 21
 - c) 55
 - d) 14
10. Which of the following option is wrong?
- a) Fibonacci number can be calculated by using Dynamic programming
 - b) Fibonacci number can be calculated by using Recursion method
 - c) Fibonacci number can be calculated by using Iteration method
 - d) No method is defined to calculate Fibonacci number
11. Which of the following recurrence relations can be used to find the nth Fibonacci number?
- a) $F(n) = F(n) + F(n - 1)$
 - b) $F(n) = F(n) + F(n + 1)$

- c) $F(n) = F(n - 1)$
- d) $F(n) = F(n - 1) + F(n - 2)$

12. Which of the following option is wrong about natural numbers?
- a) Sum of first n natural numbers can be calculated by using Iteration method
 - b) Sum of first n natural numbers can be calculated by using Recursion method
 - c) Sum of first n natural numbers can be calculated by using Binomial coefficient method
 - d) No method is prescribed to calculate sum of first n natural number
13. Which of the following gives the sum of the first n natural numbers?
- a) $nC2$
 - b) $(n-1) C2$
 - c) $(n+1) C2$
 - d) $(n+2) C2$
14. Which of the following methods used to find the sum of first n natural numbers has the least time complexity?
- a) Recursion
 - b) Iteration
 - c) Binomial coefficient
 - d) All have equal time complexity
15. Which of the following algorithm implementations is similar to that of an insertion sort?
- a) Binary heap
 - b) Quick sort
 - c) Merge sort
 - d) Radix sort
16. Merge sort uses which of the following technique to implement sorting?
- a) backtracking
 - b) greedy algorithm
 - c) divide and conquer
 - d) dynamic programming
17. What is the average case time complexity of merge sort?
- a) $O(n \log n)$
 - b) $O(n^2)$
 - c) $O(n^2 \log n)$
 - d) $O(n \log n^2)$
18. What is the auxiliary space complexity of merge sort?
- a) $O(1)$
 - b) $O(\log n)$
 - c) $O(n)$
 - d) $O(n \log n)$

19. Which of the following method is used for sorting in merge sort?
- merging
 - partitioning
 - selection
 - exchanging
20. What will be the best-case time complexity of merge sort?
- $O(n \log n)$
 - $O(n^2)$
 - $O(n^2 \log n)$
 - $O(n \log n^2)$
21. Choose the incorrect statement about merge sort from the following?
- it is a comparison-based sort
 - it is an adaptive algorithm
 - it is not an in-place algorithm
 - it is stable algorithm
22. Which of the following is not in place sorting algorithm by default?
- merge sort
 - quick sort
 - heap sort
 - insertion sort
23. Which of the following is not a stable sorting algorithm?
- Quick sort
 - Cocktail sort
 - Bubble sort
 - Merge sort
24. Which of the following stable sorting algorithm takes the least time when applied to an almost sorted array?
- Quick sort
 - Insertion sort
 - Selection sort
 - Merge sort
25. Which of the following sorting algorithm makes use of merge sort?
- Tim's sort
 - intro sort
 - bogo sort
 - quick sort
26. Which of the following sorting algorithm does not use recursion?
- quick sort
 - merge sort

- c) heap sort
 - d) bottom-up merge sort
27. Which of the following sorting algorithms is the fastest?
- a) Merge sort
 - b) Quick sort
 - c) Insertion sort
 - d) Shell sort
28. What is the worst-case time complexity of a quick sort algorithm?
- a) $O(N)$
 - b) $O(N \log N)$
 - c) $O(N^2)$
 - d) $O(\log N)$
29. Which of the following methods is the most effective for picking the pivot element?
- a) first element
 - b) last element
 - c) median-of-three partitioning
 - d) random element
30. Find the pivot element from the given input using median-of-three partitioning method.
8, 1, 4, 9, 6, 3, 5, 2, 7, 0.
- a) 8
 - b) 7
 - c) 9
 - d) 6
31. Which of the following sorting algorithms is used along with quick sort to sort the sub arrays?
- a) Merge sort
 - b) Shell sort
 - c) Insertion sort
 - d) Bubble sort
32. How many sub arrays does the quick sort algorithm divide the entire array into?
- a) one
 - b) two
 - c) three
 - d) four
33. Quick sort is a _____
- a) greedy algorithm
 - b) divide and conquer algorithm
 - c) dynamic programming algorithm
 - d) backtracking algorithm

34. What is the worst-case time complexity of the Quick sort?
- $O(n \log n)$
 - $O(n)$
 - $O(n^3)$
 - $O(n^2)$
35. Apply Quick sort on a given sequence 7 11 14 6 9 4 3 12. What is the sequence after first phase, pivot is first element?
- 6 4 3 7 11 9 14 12
 - 6 3 4 7 9 14 11 12
 - 7 6 14 11 9 4 3 12
 - 7 6 4 3 9 14 11 12
36. Which one of the following sorting algorithms is best suited to sort an array of 1 million elements?
- Bubble sort
 - Insertion sort
 - Merge sort
 - Quick sort
37. Quick sort is a space-optimized version of _____
- Bubble sort
 - Selection sort
 - Insertion sort
 - Binary tree sort
38. What is a randomized Quicksort?
- The leftmost element is chosen as the pivot
 - The rightmost element is chosen as the pivot
 - Any element in the array is chosen as the pivot
 - A random number is generated which is used as the pivot
39. Which of the following is the most suitable definition of radix sort?
- It is a non-comparison-based integer sort
 - It is a comparison-based integer sort
 - It is a non-comparison based non integer sort
 - It is a comparison based non integer sort
40. Which of the following is an alternate name of MSD radix sort?
- bottom-up radix sort
 - top-down radix sort
 - forward radix sort
 - backward radix sort
41. What is an external sorting algorithm?
- Algorithm that uses tape or disk during the sort

- b) Algorithm that uses main memory during the sort
 - c) Algorithm that involves swapping
 - d) Algorithm that are considered 'in place'
42. What is an internal sorting algorithm?
- a) Algorithm that uses tape or disk during the sort
 - b) Algorithm that uses main memory during the sort
 - c) Algorithm that involves swapping
 - d) Algorithm that are considered 'in place'
43. What is the worst-case complexity of bubble sort?
- a) $O(n \log n)$
 - b) $O(\log n)$
 - c) $O(n)$
 - d) $O(n^2)$
44. Which of the following is not an advantage of optimized bubble sort over other sorting techniques in case of sorted elements?
- a) It is faster
 - b) Consumes less memory
 - c) Detects whether the input is already sorted
 - d) Consumes less time
45. The given array is $arr = \{1, 2, 4, 3\}$. Bubble sort is used to sort the array elements. How many iterations will be done to sort the array?
- a) 4
 - b) 2
 - c) 1
 - d) 0
46. Which of the following is false about a binary search tree?
- a) The left child is always lesser than its parent
 - b) The right child is always greater than its parent
 - c) The left and right sub-trees should also be binary search trees
 - d) In order sequence gives decreasing order of elements
47. What is the speciality about the inorder traversal of a binary search tree?
- a) It traverses in a non-increasing order
 - b) It traverses in an increasing order
 - c) It traverses in a random fashion
 - d) It traverses based on priority of the node
48. What are the worst case and average case complexities of a binary search tree?
- a) $O(n)$, $O(n)$
 - b) $O(\log n)$, $O(\log n)$
 - c) $O(\log n)$, $O(n)$
 - d) $O(n)$, $O(\log n)$

49. What are the conditions for an optimal binary search tree and what is its advantage?
- a) The tree should not be modified and you should know how often the keys are accessed, it improves the lookup cost
 - b) You should know the frequency of access of the keys, improves the lookup time
 - c) The tree can be modified and you should know the number of elements in the tree beforehand, it improves the deletion time
 - d) The tree should be just modified and improves the lookup time
50. The number of edges from the root to the node is called _____ of the tree.
- a) Height
 - b) Depth
 - c) Length
 - d) Width
51. The number of edges from the node to the deepest leaf is called _____ of the tree.
- a) Height
 - b) Depth
 - c) Length
 - d) Width
52. _____ is a function which calls itself again and again
- a) Nesting
 - b) Recursion
 - c) Hash
 - d) Clustering
53. Nesting of function requires _____ loops
- a) zero
 - b) one
 - c) two
 - d) No
54. Recursion requires _____ loop or calling a function in that function only.
- a) zero
 - b) one
 - c) two
 - d) infinity
55. A _____ class must be there in recursive solution.
- a) main
 - b) recursive
 - c) base

d) nest

56. The factorial of any number can be found using the _____ for that number

- a) permutation
- b) Addition
- c) Division
- d) subtraction

57. Fibonacci sequence is generated by adding the first _____ numbers

- a) 1
- b) 2
- c) 3
- d) 4

58. What is the objective of tower of hanoi puzzle?

- a) To move all disks to some other rod by following rules
- b) To divide the disks equally among the three rods by following rules
- c) To move all disks to some other rod in random order
- d) To divide the disks equally among three rods in random order

59. Which of the following is NOT a rule of tower of hanoi puzzle?

- a) No disk should be placed over a smaller disk
- b) Disk can only be moved if it is the uppermost disk of the stack
- c) No disk should be placed over a larger disk
- d) Only one disk can be moved at a time

60. _____ is the process of inserting a element into limited number of location using a hash key

- a) Searching
- b) Traversing

- c) Hashing
- d) probing

61. The key is stored in array, this array is known as _____

- a) Element
- b) List
- c) Data
- d) Hash Table

ANS: d.Hash table

62. _____ will give us a location where we have to store the data.

- a) Array
- b) Key

- c) Hash table
 - d) Hash function
63. Which of the following is not the factor required for efficiency of hash function?
- a) Hash function
 - b) Size of Table
 - c) Type of collision resolution technique
 - d) Chaining
64. What is best time complexity for algorithm.
- a) $O(1)$
 - b) $O(n)$
 - c) $O(n^2)$
 - d) $O(63)$
65. What is worst time complexity for algorithm
- a) $O(1)$
 - b) $O(n)$
 - c) $O(n^2)$
 - d) $O(63)$
66. Separate Chaining is also known as _____
- a) Open hashing
 - b) Close hashing
 - c) Collision
 - d) Analysis hashing
67. In separate chaining collision can be totally avoided if we allow the one table entry to share _____ keys
- a) Zero
 - b) One
 - c) Two
 - d) Multiple
68. _____ refers to arranging data elements of a list in an increasing or decreasing order.
- a) Searching
 - b) Sorting
 - c) Traversing
 - d) Implementation

69. _____ uses Divide and Conquer technique

- a) Insertion sort
- b) Selection sort
- c) Radix sort
- d) Merge sort

ANS:d.Merge sort

70. .In _____ we divide the list into nearly equal sublists,each of which then again divide into two sublists

- a) insertion sort
- b) Selection sort
- c) Merge sort
- d) Quick sort