DATA STRUCTURE VIVA QUESTIONS.

1. What is Data Structure?

➤ The logical and mathematical model of a particular organisation of data is called data structure.
There are 2 types of data structure.
1. Linear 2. Non-Linear

2. What are the goals of Data structure?

➤ It should be rich enough in structure to reflect the actual relationship of data in real world. The structure should be simple enough for efficient processing of data.

3. What does Abstract Data type mean?

➤ Data type is a collection of values and set of operation on these values. Abstract data type refer to the mathematical concept that define the data type. It is a useful tool for specifiying the logical properties of a data type. ADT is of 2 parts.
i). Values Defination.
ii). Operation Defination.

4. What is sequential search?

➤ In sequential search each item in an array is compared with the item being searched until a match occurs. It is applicable to a table organised either as an array or as a linked list.

5. What is the difference between a stack and an array?

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STACK	ARRAY.
• Stack is an ordered collection of items.	• Array is an ordered collection of values.
• Stack is a dynamic object whose size is constantly changing as items are pushed and popped.	• Array is a static object i.e; number of items is fixed and is assigned by the declaration of the array.
• Stack may contain different data type.	• Array contains same data types.
• Stack is declared as a structure containing an array to hold the element of the stack, and an integer to indicate the current stack within the array.	• Array can be home of the stack, i.e, array can be declared large enough for maximum size of the stack.

6. What do you mean by recursive defination?

> The defination which defines an object in items of simpler cases of itself is called recursive defination.

7. What actions are performed a function returns?

> i). Return address is retrieved.
ii). Function data area of freed.
iii). Branch is taken to the return address.

8. What is a linked list?

> A Linked list is a Linear collection of data element called nodes, where the linear order is given by pointers. Each node has two parts

- First part contains the information of the element.
- Second part contains the address of the next node in the list.

9. What actions are performed when a function is called?

> i). arguments are passed
> ii). local variable are allocated and initialized.
> iii). Transferring control to the function.

10. What are advantages of linked list over array?

> In linked list each element contains a field, called a link or pointer which contains the address of the next element. It is easy to insert and delete elements in linked list. All this is not available in array and one can't double or triple the size of array as it occupies memory space.

11. Can we apply binary search algorithm to a sort linked list, why?

> No we can not apply binary search algorithm to a sorted linked list since there is no way of indexing the middle element in the list. This is the drawback of linked list in data structure.

12. What do you mean by free pool?

> Pool is a list of unused memory cells which has its own pointer.

13. What do you meanby garbage collection?

> It is a technique in which operating system periodically collects all the deleted space onto the free storage list. It tables place when there is minimum amount of space left in storage list or CPU is 'ideal'.

14. What do you mean by overflow and underflow?

> • When new data is inserted into data structure but there is no available space, this is called overflow.
> • When we want to delete data from a data structure that is empty it is called underflow.

15. What are disadvantages array implementation of linked list?

➤ • The number of nodes needed cant be predicted when the program is written.
• The number of nodes declared must remain allocated throughout its extension.

16. What is a queue?

➤ A queue is an ordered collection of items from which items may be deleted at one end (front end) and items inserted at the other end (rear end).
There is no limit to the number of element a queue contains. (FIFO Rule).

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17. What is a Priority queue?

➤ It is a data structure in which the intrinsic ordering of the elements (numeric / alphabetic) determines the result of its basic operation. It is of 2 types.

i). Ascending: Here smallest item can be removed.
ii). Descending: Here largest item can be removed.

18. What are the disadvantages of sequential storage?

➤ i). Fixed amount of storage remains allocated to data structure even if it contains less element.
ii). No more than fixed amount of storage is allocated causing overflow.

19. Disadvantages of stack or queue by linked list?

➤ i). A node in linked list (info and next field) occupies more storage than a corresponding element in an array.
ii). Additional time spent in managing the available list.

20. What are dangling pointer and how to avoid it?

> After a call free(p) makes reference to *p illegal, i.e, though the storage to p is free but the value of p (address) remain unchanged, so the object at that address may be used as the value of *p (no way to detect illegality). So p is dangling pointer.

→ To avoid this, it is better to set p to NULL after executing free(p).

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21. What are disadvantages of linear list?

> i). We cannot reach any of the nodes that precede node(p).
ii). If a list is traversed, the external pointer to the list must be preserved in order to reference the list again.

22. Define circular list? What are its advantages?

> In linear list the next field of the last node contain a null pointer, when next field is in the last node contain a back pointer to the first node, it is called circular list.
Advantage – From any point in the list it is possible to reach at any other point.

23. What are the disadvantages of circular list?

> i). We cant traverse the list backwards.
ii). If a pointer to a node is given, we cant delete the node.

24. Define double linked list?

> Collection of data elements called nodes, where each node is divided into 3 parts :-

i). An info field that contains the info stored in node.
ii). Left field that contain pointer to node on left side.
iii). Right field that contain pointer to node on right side.

25. It is necessary to sort a file before searching particular item?

➤ If less work is involved in searching a element than to sort, and then extract then we don't go for sort.
If frequent use of file is required for purpose of retrieving specific element, it is more efficient to sort the file.

26. What are the issues that hamper the efficiency in sorting a file?

➤ i). Length of time required by programmer in coding a particular sorting program.
ii). Amount of machine time necessary for running the program.
iii). Amount of space necessary for the particular program.

27. Calculate the efficiency of sequential search?

➤ Number of comparisons depend on the record of the argument by appears in the table.
1). It appears in the first position then one comparison.
2). If appears at last position then n comparison.
3). Average = (n+1)/2 comparisons.
4). Unsuccesful search in n comparison.
5). Number of comparison in any case is O(n).

28. Is any implicit argument passed to a function when its called?

➤ Yes, there is a set of implicit arguments that contain information necessary for the function to execute and return correctly. One of them is return address which is stored within the function's data area.

29. Parenthesis is never required in Postfix/Prefix expressions, Why?

➤ Parenthesis is not required because of the operators in the Postfix/Prefix expression determines the actual order of operations in the evaluating of the expression.

30. List out the areas in which data structures are applied?

> • Database Management System. • Compiler Design.
> • Operating System • Numerical Analysis • Graph.
> • Statistical analysis package • Artificial Intelligence • Simulation.

31. What are the major data structures used in the following area: network data model and Hierarchical data model?

> RDBMS – Array (i.e, Array of structure).
> Network data model – Graph
> Hierarchical data model – Trees.

32. If you are using C language to implement the heterogenous linked list, what pointer type will you see? and use?

> The heterogeneous linked list contains different data types in its nodes and we need a link, pointer to connect them Not possible with ordinary pointers so we use void pointer. Void pointer is capable of storing pointer to any type as it is a generic pointer type.

33. Minimum number of queue needs to implement priority queue?

> Minimum number is 2. One is used for actual storing of data and another for storing priorities.

34. What is the data structure used to perform recursion ?

> Stack is used to perform recursion, because of its LIFO (Last in First Out) property it remembers its 'caller' so knows whom to return when the function has to return. Recursion makes use of system stack for storing the return address to the function calls.

35. What are notations used in Evaluation of Arithmetic Expressions using prefix and postfix forms?

➤ Polish and Reverse Polish Notations.

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36. Convert the expression ((A+B)* C -(D-E)^(F+G) to equivalent prefix and postfix notations?

➤ Prefix Notation = ^ - * + ABC - DE + FG

Postfix Notation = AB +C * DE - - FG +^

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37. Sorting is not possible by using which of following method?
(a). Insertion (b). Selection (c). Exchange (d). Deletion.

➤ Insertion, selection and Exchange can perform sorting methods. No sorting method can't be done just using deletion.

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38. List out few applications of tree data structure?

➤ • Manipwation of arithmetic expression.
• Symbol tree construction.
• Syntax analysis.

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39. List out few applications that use of multilinked structures?

➤ Sparse Matrix, Index Generation.

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40. In tree construction which is suitable efficient data structures?
(a). Array (b). Linked List (c). Stack (d). Queue.

➤ (b). Linked List.

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41. In an AVL tree, at what condition the balancing is to be done?

➤ If the 'Pivotal value' (or the 'Height factor') is greater than 1 or less than 1.

42. What type of tree algorithm used in solving the 8 queen problem?

> Backtracking.

43. In RDBMS, what is efficient data structure used in the internal storage representation?

> B+ tree, because in B+ tree all the data is stored only in leaf nodes. that makes searching easier. Also corresponel to the records that shall be stored in leaf nodes.

44: One of the following tree structures, which is, efficient considering space and time complexities?
(a). Incomplete Binary tree (b). Complete binary tree c). full binary tree.

> Full Binary tree loses its nature when operation of insertion and deletion are done. For incomplete binary tree, extra property of complete binary tree is maintained even after operations like additions and deletions are done.

45. What is a Spanning tree?

> A Spanning tree is a tree associated with a network. All the nodes of the graph appear the tree once. A minimum spanning tree is a spanning tree organised so that the total edge weight b/w nodes is minimized.

46. Does the minimum spanning tree of a graph give the shortest distance between any 2 specified nodes?

> NO, Minimal spanning tree assures that the total weight of the tree is kept at minimum. But it doesn't mean that that the distance between any 2 nodes involved in the minimum spanning tree is minimum.

47. Whether Linked list is linear or non-linear data structure?

> According to storage Linked list is a non-linear one.