Q.1) What do you mean by a data structure?

Ans) Data structure is a way of the arranging the data in computer so that the data can be used in an effective manner the data can be in a array, linked list, stack etc.

Q.2) What are some of the applications of DS?

Ans) Data structure are used to store and manage data. For example. Lists are used to store data and objects of same type. Maps are used to store key value pairs and can be used for dictionary purposes. Trees are used to represent hierarchical structures such as file trees and stack is used to manage function calls.

Q.3) What are the advantages of a linked list over an array?

Ans) The size of a linked list is dynamic whereas for an array it is static. Linked Lists can also store generic objects whereas for an array the data types of its constituents should be the same. Linked Lists are also flexible, and we can create other data structures such as circular linked lists, doubly linked lists etc.

Q.4) Write the syntax in C to create a node in the singly linked list.

Ans) typedef struct Node {

struct Node \*next.

int data.

};

Q.5) What is the use of a doubly linked list when compared to that of a singly linked list?

Ans) Doubly Linked list can be traversed bidirectionally therefore it saves the overhead of traversal in cases when we partially know the place of element.

Q.6) What is the difference between an Array and Stack?

Ans) The main difference between an array and stack is how they return the values, in an array we can access an index of an element and get the data whereas in a stack, the data is returned in a first in last out fashion, that is that the data that went in first is the last in order when we get data from the stack.

Q.7) What are the minimum number of Queues needed to implement the priority queue?

Ans) 2 Queues are required, one for storing data and one for the priorities.

Q.8) What are the different types of traversal techniques in a tree?

Ans) 1) In-order Traversal. (Left->Root->Right)

2) Pre-order Traversal. (Root->Left->Right)

3) Post-order Traversal. (Left->Right->Root)

Q.9) Why it is said that searching a node in a binary search tree is efficient than that of a simple binary tree?

Ans) Using a binary search tree, length of tree traversal is reduced by comparing the search value with the root. The traversal path is reduced using this comparison , if the search value is greater than the root then the right side is traversed and left side is traversed in case of lower value. Hence the searching complexity of binary tree O(n) is reduced to O(h) where h is the height of the tree.

Q.10) What are the applications of Graph DS?

Ans) 1) Computer Science.

2)Google maps.

3)Computer networks

4)Facebook

Q.11) Can we apply Binary search algorithm to a sorted Linked list?

Ans) We cannot apply binary search algorithm to a sorted linked list because the binary search heavily relies on indexes, and the overhead to bootstrap an index system defeats the purpose.

Q.12) When can you tell that a Memory Leak will occur?

Ans) A memory leak will occur when the unused objects are not destroyed to free up the memory held by them.

Q.13) How will you check if a given Binary Tree is a Binary Search Tree or not?

Ans) If the max of the left subtree is less than the root and minimum of right subtree is greater than the node it is a binary search tree.

Q.14) Which data structure is ideal to perform recursion operation and why?

Ans) Stacks are used to perform recursion as function on the top of the stack can executed , the function can be popped and the data can be passed to the next function, this cycle continues until the required data is passed to the original function.

Q.15) What are some of the most important applications of a Stack?

Ans) Stacks are used to implement recursion, can be used to balance parenthesis and is used to implement calculations following BODMAS rule.

1)Expression evaluation.

2) Expression Conversion.

3)Backtracking

4)Memory management.

16) Convert the below given expression to its equivalent Prefix and Postfix notations.

23) Check if a given graph is a tree or not.

Ans) To check if a given graph is a tree or not, we must check if the graph contains a cycle. A graph is a tree if it does not contain a cycle. Since it is not mentioned if it is a directed or un-directed graph, a cycle detection algorithm can’t be prescribed but techniques used to detect cycle are BFS or DFS cycle detection algorithm and Topological sorting.

25) How to find the shortest path between two vertices

Ans) Shortest path between two vertices is determined by using a shortest path algorithm called Dijkstra’s Algorithm. Dijkstra’s Algorithm is also called single source shortest path algorithm.