What is data structure?

A data structure is a way of organizing and storing data to perform operations efficiently. It defines the relationship between the data and the operations that can be performed on the data.

What is Arrays?

An array is a data structure that stores elements of the same type in contiguous memory locations. Elements can be accessed using their index or position in the array.

What is a linked list?

A linked list is a linear data structure where elements are stored in nodes, and each node points to the next node in the sequence. It allows dynamic memory allocation and efficient insertion and deletion operations.

What is Stack?

A stack is a data structure that follows the Last In, First Out (LIFO) principle. Elements are added and removed from the same end, typically referred to as the "top" of the stack.

What is LIFO?

LIFO stands for Last In, First Out. It is a principle followed by data structures like stacks, where the last element added is the first one to be removed.

What is Queue?

A queue is a data structure that follows the First In, First Out (FIFO) principle. Elements are added at the rear (enqueue) and removed from the front (dequeue).

What is FIFO?

FIFO stands for First In, First Out. It is a principle followed by data structures like queues, where the first element added is the first one to be removed.

What are binary trees?

Binary trees are hierarchical data structures composed of nodes, each having at most two children: a left child and a right child. The structure provides efficient searching, insertion, and deletion operations.

What is recursion?

Recursion is a programming concept where a function calls itself directly or indirectly to solve a smaller instance of a problem. It involves breaking a problem into smaller subproblems and solving them.

What is the OOPs concept?

Object-Oriented Programming (OOP) is a programming paradigm based on the concept of "objects," which can encapsulate data and behavior. OOP principles include encapsulation, inheritance, polymorphism, and abstraction.

What are the concepts introduced in OOPs? Explain.

Encapsulation: Bundling data and methods that operate on that data into a single unit (class).

Inheritance: Acquiring the properties and behaviors of an existing class into a new class.

Polymorphism: The ability of objects to take on multiple forms or the ability to use a single interface for different data types.

Abstraction: Simplifying complex systems by modeling classes based on the essential properties.

Explain binary search tree?

A binary search tree (BST) is a binary tree where each node has at most two children, and the left child contains values less than the parent, while the right child contains values greater than the parent. This property enables efficient searching.

Explain doubly linked list?

A doubly linked list is a linked list in which each node contains a data element and two pointers, one pointing to the next node (next pointer) and another pointing to the previous node (previous pointer). This allows traversal in both directions.

What is Graph?

A graph is a collection of nodes (vertices) and edges that connect pairs of nodes. Graphs can be directed or undirected and may have weighted or unweighted edges.

Differentiate between linear and non-linear data structure?

Linear data structures store elements in a sequential manner, such as arrays and linked lists. Non-linear data structures, like trees and graphs, allow elements to be connected in a non-sequential manner.

What is deque?

A deque (double-ended queue) is a data structure that allows insertion and deletion of elements from both ends, front and rear.

Differentiate between stack and array?

An array is a static data structure with a fixed size, while a stack is a dynamic data structure that can grow or shrink as needed. Stacks are often implemented using arrays.

Which sorting algorithm is best?

There is no one-size-fits-all answer. The choice of a sorting algorithm depends on the specific requirements of the task and the characteristics of the data. Different sorting algorithms perform better in different scenarios.

How does variable declaration affect memory?

Variable declaration informs the compiler about the data type and size of the variable. It reserves memory space for the variable based on its data type, allowing the program to allocate and manage memory efficiently.

What are dynamic data structures?

Dynamic data structures are those whose size can change during program execution. Examples include linked lists, trees, and dynamic arrays. They allow efficient memory utilization and accommodate varying amounts of data.