SNS COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE AND TECHNOLOGY

DATA STRUCTURES

Lesson 1
Types of Data Structures

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PUZZLE

Imagine you have a box filled with various types of candies, including chocolates, gummy bears, and lollipops. However, the candies are all jumbled up together, making it hard to find a specific type of candy quickly.

To solve this candy chaos, you decide to organize the candies using a special method. You create separate compartments within the box for each type of candy. Now, chocolates are in one section, gummy bears in another, and lollipops in a third section.

Question:
What does this puzzle with the box and compartments represent in the context of computing?

ANSWER

The box with compartments for each type of candy represents a data structure. In computing, a data structure is a way of organizing and storing data in a structured and efficient manner, allowing quick access and manipulation of information. Just like the organized compartments in the box make it easy to find specific candies, data structures help computers manage and process data effectively in various software programs and applications.

Types of Data Structures

- **Primitive Data Structures** are the basic data structures that directly operate upon the machine instructions. They have different representations on different computers.

- **Non-primitive data structures** are more complicated data structures and are derived from primitive data structures. They emphasize on grouping same or different data items with relationship between each data item.
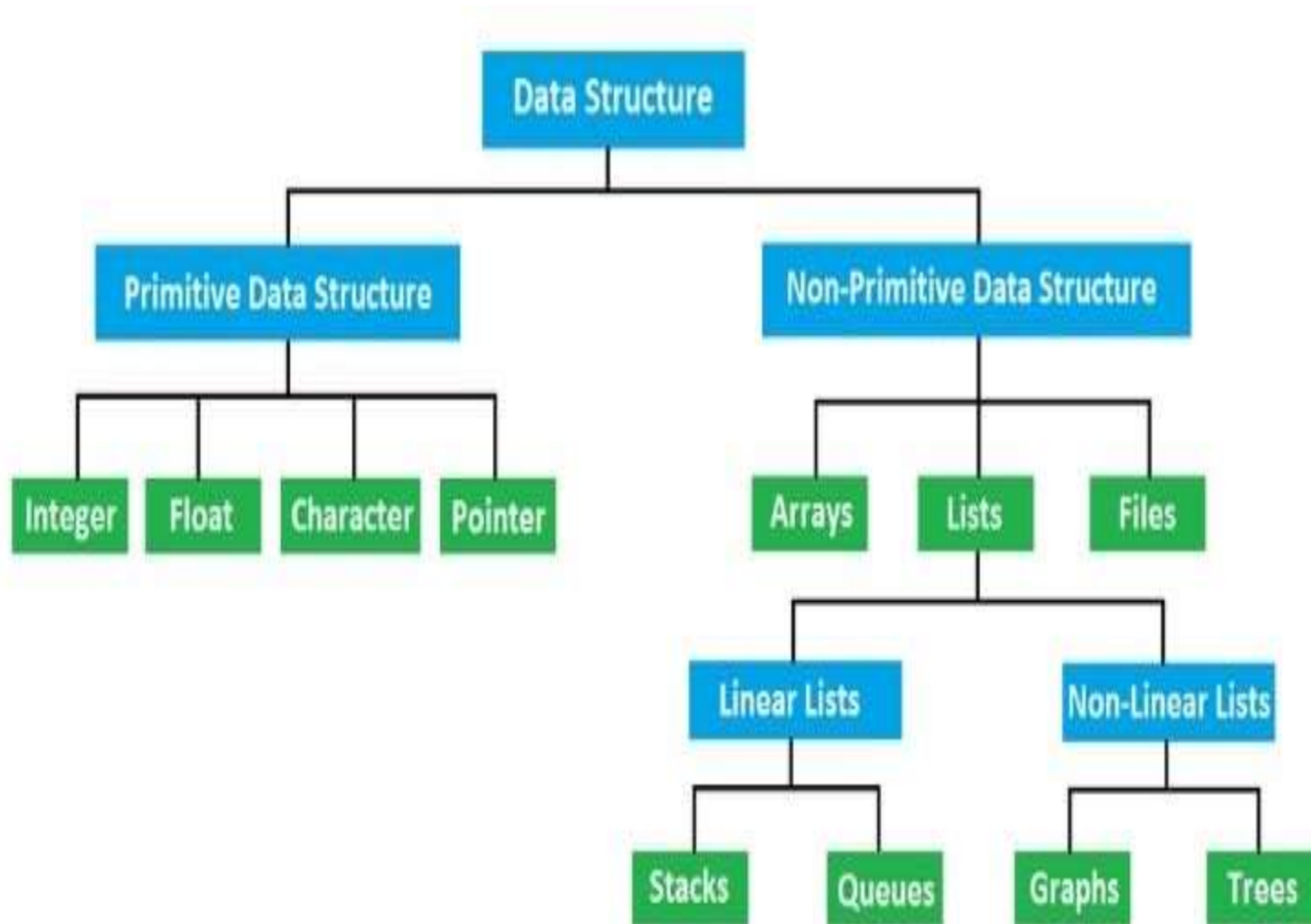
Arrays

Arrays are a linear data structure in which elements are stored in contiguous memory locations. They are useful for tasks such as searching and sorting, and can be accessed using an index.

Linked List

Linked lists are a linear data structure in which elements are stored in nodes that contain a reference to the next node in the list. They are useful for tasks such as implementing stacks and queues, and can be easily modified by adding or removing nodes.

Stack

Stacks are a linear data structure in which elements are added and removed from the top of the stack. They are useful for tasks such as implementing undo functionality or evaluating expression

QUEUE

Queues are a linear data structure in which elements are added to the back of the queue and removed from the front. They are useful for tasks such as implementing a print spooler or handling requests in a web server
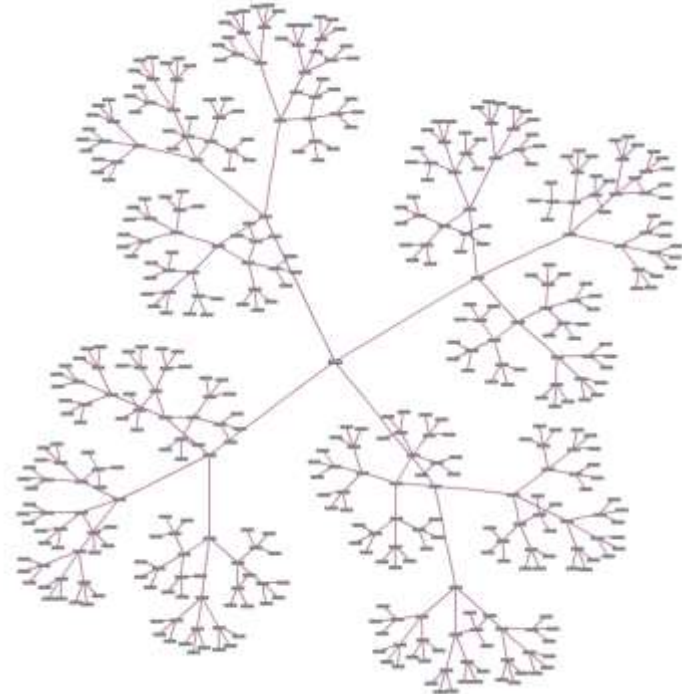
Non Linear list

Non-linear data structures are those in which the data elements are not arranged in a linear sequence, such as a tree or graph. These structures are useful for tasks such as representing hierarchical relationships or modeling complex systems.

Tree

Trees are a non-linear data structure in which elements are arranged in a hierarchical structure. They are useful for tasks such as representing file systems or organizing data in a database.
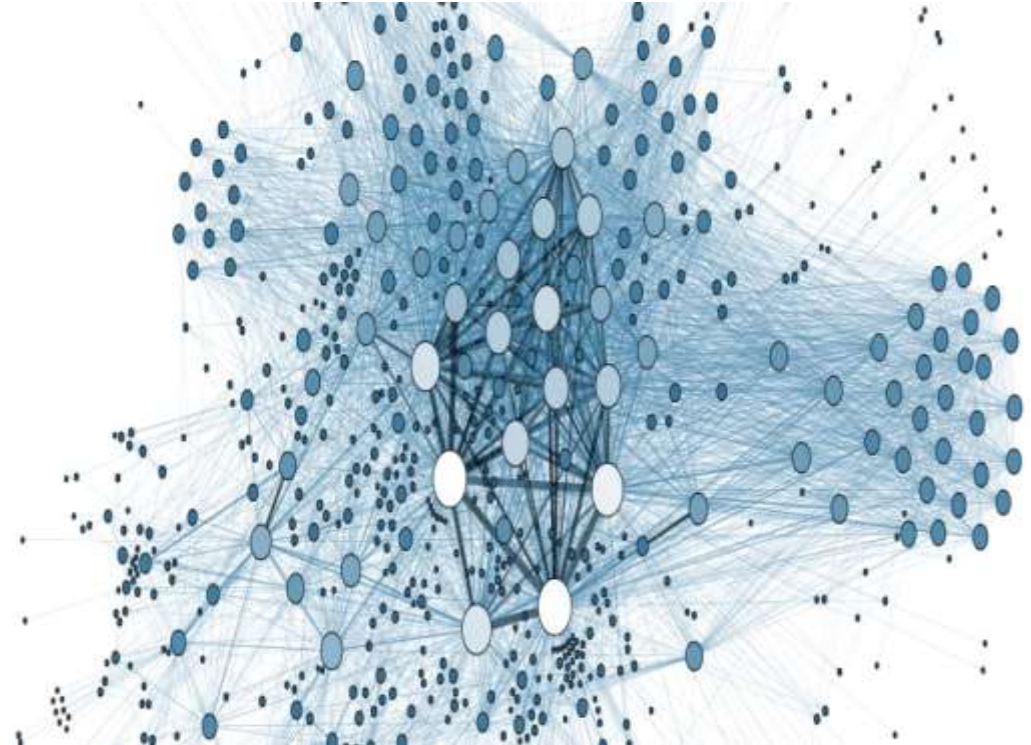
Graph

Graphs are a non-linear data structure in which elements are represented as nodes connected by edges. They are useful for tasks such as modeling relationships between people or representing the flow of data in a network.

Which data structure operates on a "Last In, First Out" (LIFO) principle?

THANK YOU