DATA STRUCTURES & ALGORITHMS

CCIT 104

In Computer Science, one of the core fields that belongs to its foundations, with the design, analysis, and implementation of algorithms for the efficient solutions of the problem concerned.

The data structure is one of the subjects that intrinsically connected with the design and implementations of efficient algorithms.

It deals with the study of methods, techniques, and tools to organize or structure data in computer memory.

REPRESENTATION OF DATA

All high-level languages allow data to be represented in computer memory in two types:

- Numerical Data
  - Integer
  - Floating-point
- Alphanumerical Data

DATA STRUCTURE

Is the representation of the logical relationship between individual elements of data

In Computer Science, Data Structure is defined as a mathematical or logical model of organizing the data items into computer memory in such a way that they can be used efficiently

DATA STRUCTURE

refers to the study of data and representation of data objects within the program; i.e., the implementation of structured relationships among different data objects.

DATA STRUCTURE

Different sets of operations can be performed on different data structures.

DATA STRUCTURE

can be used for:

- Organizing the data
- Accessing methods
- Specifying the degree of associativity
- Processing alternatives for data

Algorithm + Data Structure = Program

CLASSIFICATION OF DATA STRUCTURE

- Primitive data structure
- Non-Primitive data structure

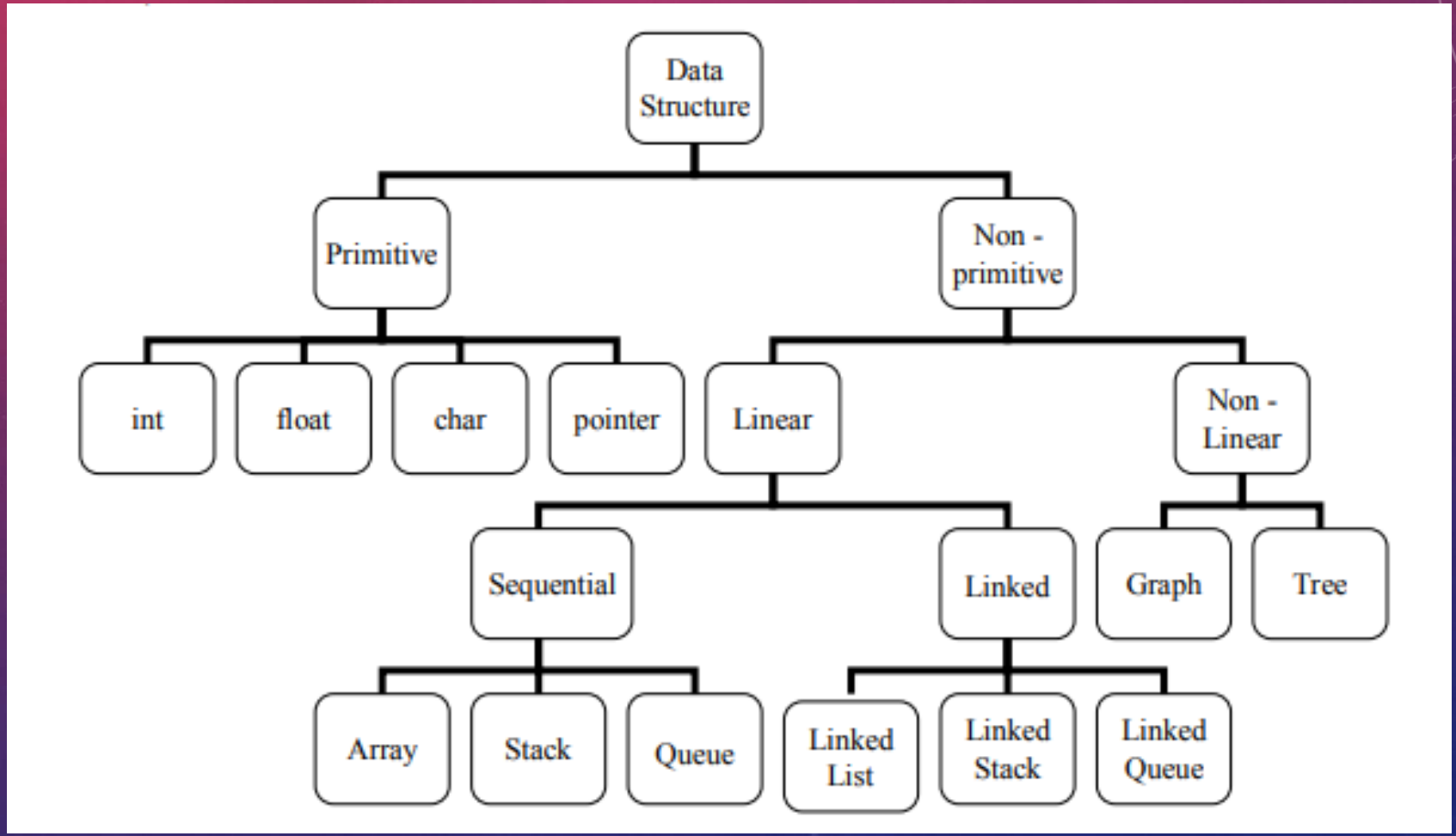
CLASSIFICATION OF DATA STRUCTURE

- Primitive data structure
  - are defined that can be manipulated or operated by the machine instruction
  - Example: Integer, floating point, characters, pointer, boolean, etc.

CLASSIFICATION OF DATA STRUCTURE

- Non-Primitive data structure
  - are a data structure that cannot be manipulated or operated directly by the machine instructions. These are more sophisticated data structures
  - Example: Arrays, stack, queues, linked lists etc.

CLASSIFICATION OF DATA STRUCTURE



LINEAR DATA STRUCTURE

- if every data item is related to its previous and next data items
- In the linear data structure, data items are arranged in memory in a linear sequence and data items are accessed linearly. The traversing of the linear data structure is exactly once.

LINEAR DATA STRUCTURE

- Sequential
  - are based on arrays where objects are stored in a sequence of consecutive memory locations
- Linked
  - a data structure, which consists of a set of nodes linked together and organized with links.

NON-LINEAR DATA STRUCTURE

- if every data item attaches to many other data items in specific ways to reflect relationships.
- the data elements are not in sequence, i.e., insertion and deletion are not possible in a linear manner. The traversing of the non-linear data structure is always more than one

THANK YOU!

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