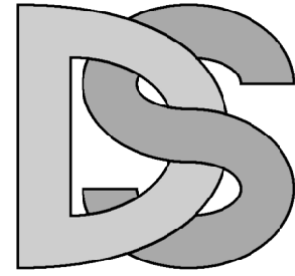


Ch 2.2- INTRODUCTION TO DATA STRUCTURE

- Introduction
- Primitive and simple structures
- Linear and nonlinear structures file organization



➡ **Some Important Terms**

➡ **DATA**

Information which is input to a computer system and is then processed by mathematical and logical operation. So that it can ultimately be output in a sensible form. It usually has numbers facts letter or system that refer to or describe an object idea, condition, situation relationship or other type of information

➡ **DATA-TYPE**

Data type is the set of permitted data values and certain operation on data.

DATA TYPE = PERMITTED DATA VALUES + OPERATION

➡ **DATA-STRUCTURE**

Data structure is the possible ways of organizing data items that defines how the data items are stored in memory and relationship with each other. Data structure is the possible ways that defines the relationship between data items.

DATA STRUCTURE = ORGANIZED DATA + ALLOWED OPE

➡ **CELLS**

Cells is the memory area that used to store elementary data items, it can be referred as a single bit, byte, group of bytes.

➡ **FIELDS**

Field is a smallest piece of information that can be reference by a programming language

TYPES OF DATA STRUCTURE

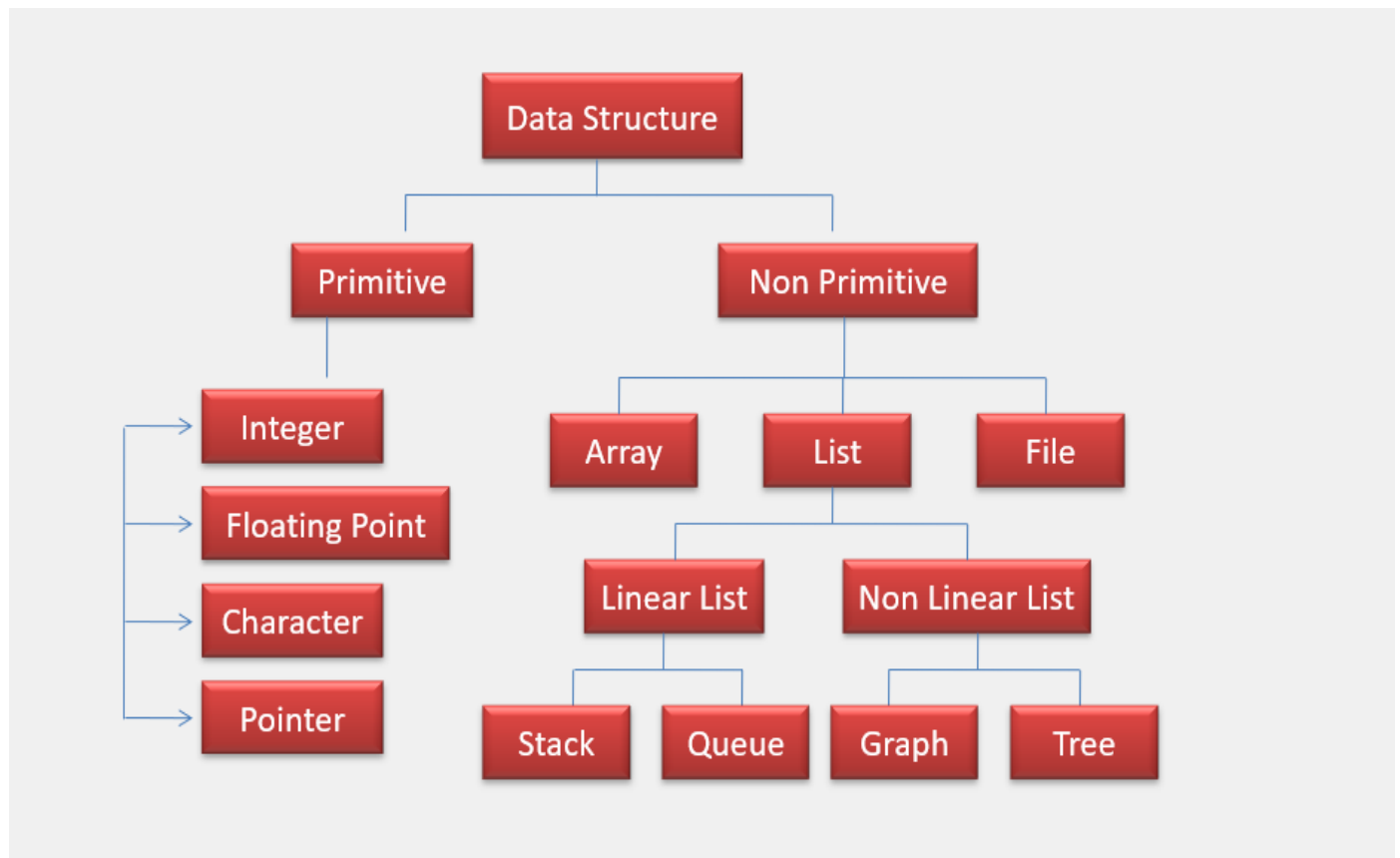
- ◆ The collection of organized data is known as data structure.

Data structure=Organized Data + Allowed operation

There are main two types of data structure:

- 1) Primitive data structure

2) Non-primitive data structure



Non-Primitive data structure:-

- ◆ Non-primitive data structure means the data structure constructed by using primitive data structure.
- ◆ Non-primitive data structure is also known as composite types.
- ◆ Non-primitive data structure is classified into two parts as shown above:

a) Linear data structure:-

- ◆ In this type of data structure, the elements are arranged in sequence like an array.
- ◆ i) Array:
 - ◆ An array is the collection of structured set that holds fix number of data elements.

◆ An array is set of homogeneous elements (having same data type).

◆ There are mainly 2 types of array:

- One-dimensional
- Two-dimensional

ii) Stack:

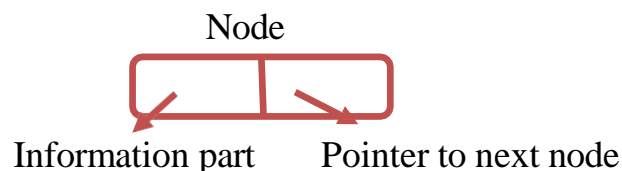
- ◆ Stack is one type of data structure where information is based on LIFO (Last In First Out).
- ◆ All the insertions and deletions take place at only one end which is known as Top Of Stack(TOS).
- ◆ There are two types of stack:
 - Static stack (using array)
 - Dynamic stack (using structure or linked list).

iii) Queue:

- ◆ Queue is one type of data structure where information is based on FIFO(First In First Out).
- ◆ All the insertions and deletion takes place at only end known as front end.
- ◆ There are two types of queue:
 - Static Queue (using array)
 - Dynamic Queue (using structure or linked list).

iv) Linked List:-

- ◆ Linked list is defined as the collection of nodes and each node contain two parts:
 - Information part
 - Pointer to next node.
- ◆ Information part contains the data and it may consists of one or more fields.
- ◆ Pointer to next node contains the location where next information is stored.



- ◆ There are two types of linked list:
 - Singly linked list
 - Doubly linked list

v) File and structure:-

- ◆ File is the collection of data that is available to program whenever needed.
- ◆ There are various operations that can be performed on file.
 - Read
 - Write
 - Append
 - Copy
- ◆ Structure is the collection of data elements that may or may not have same data type (non-homogeneous data type).

b) Non-linear data structure

- ◆ In this type of data structure, data elements are not arranged in the sequence.
- i) Tree:
 - ◆ It is the most important non-linear data structure which stores data as branches.
 - ◆ There are different types of trees like binary tree etc.
- ii) Graph:
 - ◆ It is also non-linear data structure which contains two main pair:- Vertices and edges.
 - ◆ Depending on nature of representation, there are different types of graph.

