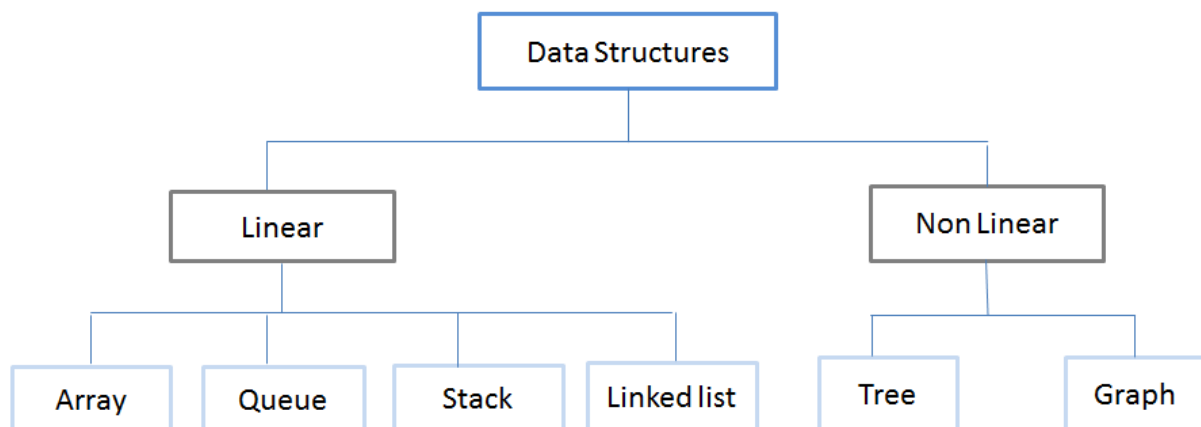


Linear & Non-Linear Data Structures

Ch. Anil Kumar, Lecturer in Computer Science
V.S.R. Govt. Degree & P.G. College, Movva, Krishna District

Data structure is a way to organize a data in computer so that it can be used efficiently. In computer science, data structure is classified into two types: Linear Data structure and Non Linear data structure.



Linear Data Structures:

The data structure where data items are organized sequentially or linearly where data elements attached one after another is called linear data structure. Examples of linear data structures are Arrays, Stack, Queue and Linked List.

- An array is a collection of data items having the same data types.
- A Stack is a LIFO (Last in First Out) data structure where element that added last will be deleted first. All operations on stack are performed from one end called TOP.
- A Queue is a FIFO (First in First Out) data structure where element that added first will be deleted first. In queue, insertion is performed from one end called REAR and deletion is performed from another end called FRONT.

- A Linked list is a collection of nodes, where each node is made up of a data element and a reference to the next node in the sequence.

Non Linear Data Structures:

The data structure where data items are not organized sequentially is called non linear data structure. In other words, data elements of the non linear data structure could be connected to more than one element to reflect a special relationship among them. All the data elements in non linear data structure cannot be traversed in single run. Examples of non linear data structures are Trees and Graphs.

- A tree is collection of nodes where these nodes are arranged hierarchically and form parent child relationships.
- A Graph is a collection of a finite number of vertices and edges that connect these vertices. Edges represent relationships among vertices that stores data elements.

Difference between Linear and Non Linear Data structures:

Linear Data Structure	Non-Linear Data Structure
Every item is related to its previous and next item	Every item is attached with many other items
Data is arranged in linear sequence	Data is not arranged in sequence
Data items can be traversed in single run	Data cannot be traversed in single run
Implementation is easy	Implementation is difficulty
Examples: stack, queue, linked list	Example: trees, graphs