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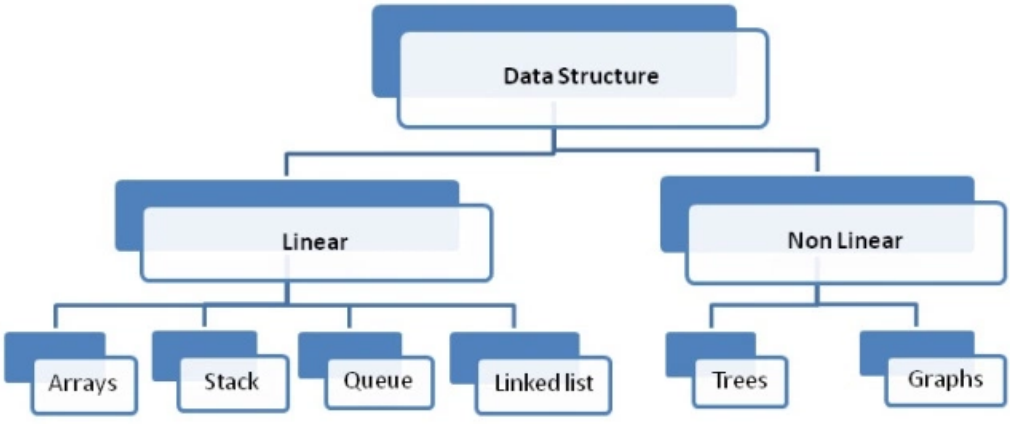
Linear vs Non Linear Data Structures

ON DECEMBER 14, 2016JANUARY 17, 2018 / BY KAUSHIK VAGHANI / IN COMPUTER SCIENCE, DATA STRUCTURE

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 categories :

1. Linear Data Structure (https://knowshares.wordpress.com/computerscience/datastructure/linear-data-structures/)
2. Non Linear Data Structure (https://knowshares.wordpress.com/computerscience/datastructure/nonlinear-data-structures/)



Classifications of 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. Data elements in a liner

data structure are traversed one after the other and only one element can be directly reached while traversing. All the data items in linear data structure can be traversed in single run.

These kind of data structures are very easy to implement because memory of computer is also organized in linear fashion.

Examples of linear data structures are Arrays (https://knowshares.wordpress.com/computerscience/datastructure/linear-data-structures/arrays/), Stack (https://knowshares.wordpress.com/computerscience/datastructure/linear-data-structures/stack/), Queue (https://knowshares.wordpress.com/computerscience/datastructure/linear-data-structures/queue/) and Linked List (https://knowshares.wordpress.com/computerscience/datastructure/linear-data-structures/linked-list/).

An arrays 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 on 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, A data elements of the non linear data structure could be connected to more than one elements to reflect a special relationship among them. All the data elements in non linear data structure can not be traversed in single run.

Examples of non linear data structures are Trees (https://knowshares.wordpress.com/computerscience/datastructure/nonlinear-data-structures/tree/) and Graphs (https://knowshares.wordpress.com/computerscience/datastructure/nonlinear-data-structures/graph/).

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

Difference Between Linear and Non Linear Data Structure

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 a single run.	Data can not be traversed in a single run.
Examples: Array, Stack, Queue, Linked List.	Examples: Tree, Graph.
Implementation is Easy.	Implementation is Difficult.

ARRAYS DATA STRUCTURE DATA STRUCTURE CLASSIFICATION GRAPH LINEAR DATA STRUCTURE LINEAR VS NONLINEAR DATA STRUCTURE LINKED LIST NON LINEAR DATA STRUCTURE QUEUE STACK TREE

13 thoughts on “Linear vs Non Linear Data Structures”

1. **RAAJ**
   VERY USEFUL

   NOVEMBER 3, 2017 AT 2:19 AM REPLY
2. **Anony**
   Great!

   NOVEMBER 17, 2017 AT 4:19 PM REPLY
3. **coolrandomthoughts**
   Nj

FEBRUARY 6, 2018 AT 12:39 PM **REPLY**

4. **vinod**
   easy to understanding

   FEBRUARY 6, 2018 AT 2:11 PM **REPLY**

5. **kirubhanandhan R**
   useful one…

   FEBRUARY 14, 2018 AT 8:13 PM **REPLY**

6. Pingback: Graphs – CasAlgorithms

7. **Shashank Shukla**
   Cooll artitcle loved itt… thankss

   APRIL 5, 2018 AT 3:41 PM **REPLY**

   Kaushik Vaghani
   Thank you Shashank.

   APRIL 27, 2018 AT 12:36 PM **REPLY**

8. **sadia**
   it provides a very easy and simple answers.i like it so much.thnku for providing us such informations.

   APRIL 27, 2018 AT 12:32 PM **REPLY**

   Kaushik Vaghani
   Thank you very much Sadia.

   APRIL 27, 2018 AT 12:36 PM **REPLY**

9. Pingback: Difference between Linear and Non Linear Data Structure – Just 4 Programmers

10. Pingback: Difference between Linear and Non Linear Data Structure | Full Software Development

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