Data Structure & Classifications

DATA STRUCTURE

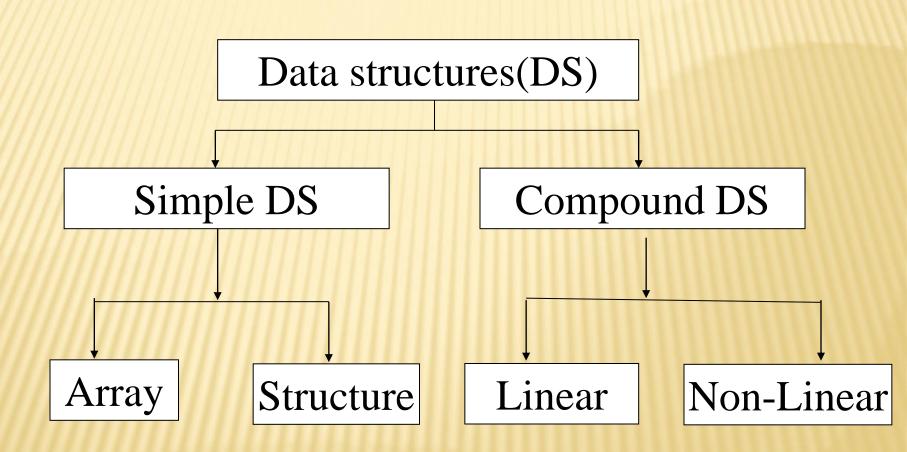
- It is a named group of data of different data types which can be processed as single unit.
- a representation of the logical relationship existing between individual elements of data.
- a way of organizing all data items that considers not only the elements stored but also their relationship to each other.

Classification of data structures

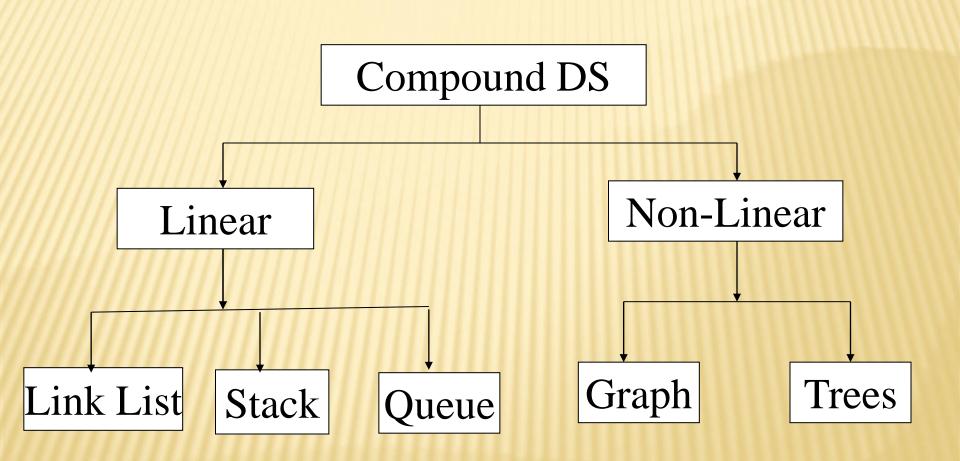
Data structure are normally divided into two broad categories:

- Simple Data Structure
- Compound Data Structure

Classification of data structures



Classification of Data Structures



Simple Data Structures

• Are normally built from primitive data types like integers, real, characters, Boolean.

- I. Array
- II. Structure

Compound Data Structures

- Simple data structures can be combined in various ways to form more complex structures are called compound data structures.
 - I. Linear data structures :- are single level data structures. Its elements form a sequence.
 - Stack
 - Queue
 - Linked list
 - Non-linear data structures:- are multilevel data structures.
 - Tree
 - Graph

Arrays

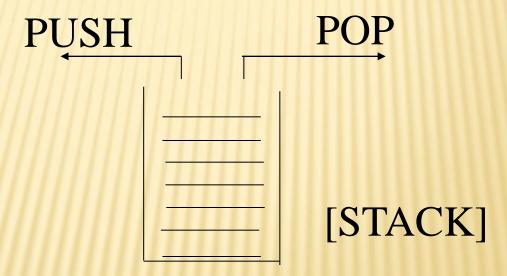
- is a named list of a finite number of similar data elements.
- is a continuous memory location shared by a common name, each element identified by its index value.
- Arrays can be one dimensional, two dimensional or multidimensional.

Structure

- Refers to a named collection of variable of different data types.
- It gathers together different types of information that form a given entity.
- Elements of a structure are referenced using dot operator.

Stacks

It refer to the lists stored and accessed in a special way, where LIFO technique is followed. Insertions and deletions take place only at one end called the top.



Queues

- Queue are first in first out type of data structure (i.e. FIFO)
- In a queue new elements are added to the queue from one end called REAR end and the element are always removed from other end called the FRONT end.
- The people standing in a railway reservation row are an example of queue.

Linked Lists

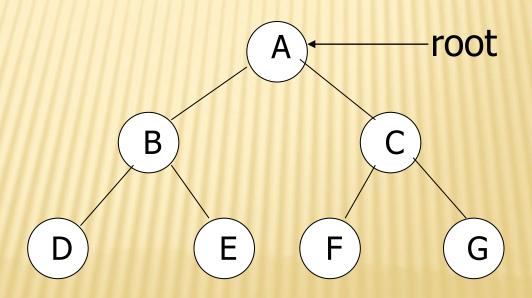
- It can be defined as a collection of variable number of data items.
- Lists are the most commonly used non-primitive data structures.
- An element of list must contain at least two fields, one for storing data or information and other for storing address of next element.

Trees

- A tree can be defined as finite set of data items (nodes).
- Tree is non-linear data structure in which data items are arranged or stored in a sorted sequence.
- Tree represent the hierarchical relationship between various elements.
- Topmost node is called root of the tree and bottommost node are called leaves.

Trees

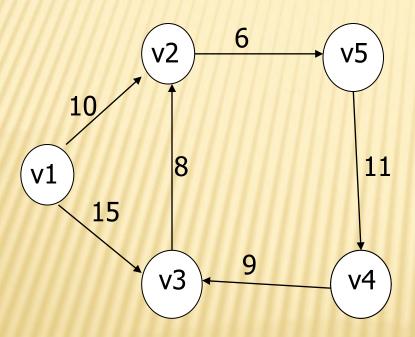
* The tree structure organizes the data into branches, which related the information.



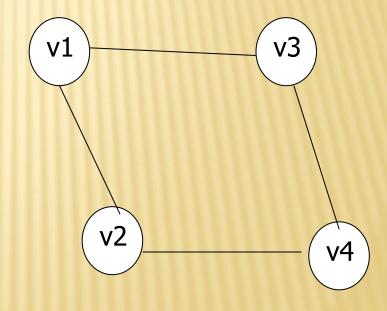
- Graph is a mathematical non-linear data structure capable of representing many kind of physical structures.
- It has found application in Geography, Chemistry and Engineering sciences.
- Definition: A graph G(V,E) is a set of vertices V and a set of edges E.

- An edge connects a pair of vertices and many have weight such as length, cost and another measuring instrument for according the graph.
- Vertices on the graph are shown as point or circles and edges are drawn as arcs or line segment.

× Example of graph:



[a] Directed & Weighted Graph



[b] Undirected Graph

Types of Graphs:

- Directed graph
- Undirected graph
- Simple graph
- Weighted graph
- Connected graph
- Non-connected graph

Thanks

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