

Data Structure: A way to organize Data.

A **Data Structure** is a particular way of organizing data in a computer so that it can be used

Basic Terminology:Elementary Data Organization

- Data are simply values or sets of values.
- Data Item –Single unit of Values and those data items divided into subitems called group itemsEg: Name-Group item ,SSN –Single Item
- Collection of data are frequently organized into a hierarchy of fields, records and files.
- This organization of data may not complex enough to maintain and efficiently process certain collections of data.
- For this reason, data are organized into more complex type of structures called Data Structures.

Data Structures

❑ Data Structures

The logical or mathematical model of a particular organization of data is called a data structure.

❑ Types of Data Structure

1. Linear Data Structure

Example: Arrays, Linked Lists, Stacks, Queues

2. Nonlinear Data Structure

Example: Trees, Graphs

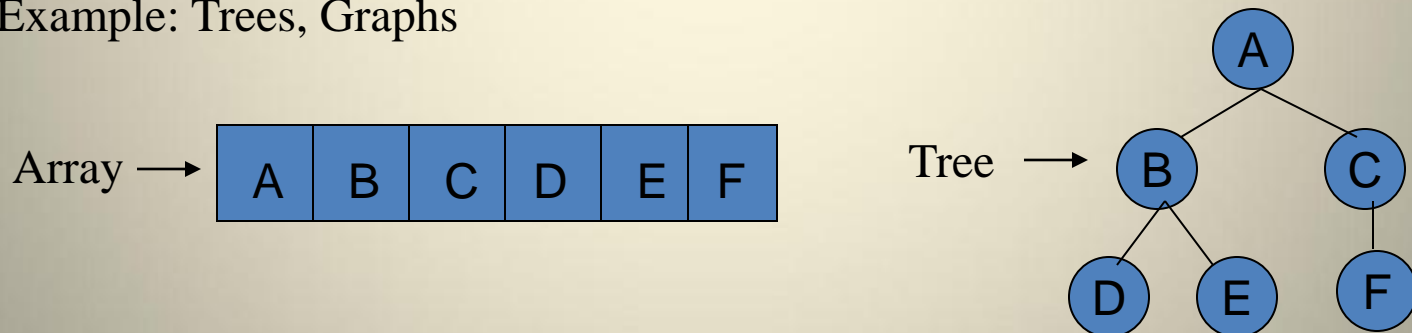


Figure: Linear and nonlinear structures

Choice of Data Structures

The choice of data structures depends on two considerations:

1. It must be rich enough in structure to mirror the actual relationships of data in the real world.
2. The structure should be simple enough that one can effectively process data when necessary.

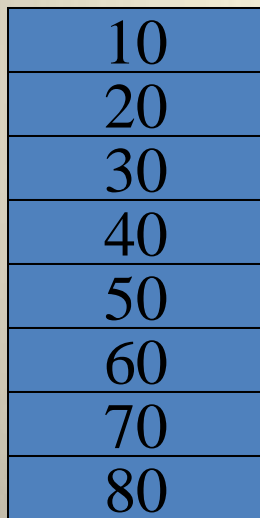


Figure 2: Array with 8 items

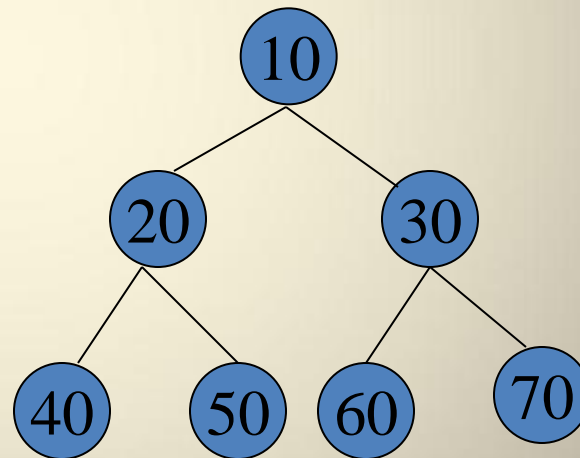


Figure 3: Tree with 8 nodes

Data Structure Operations

1. **Traversing:** Accessing each record exactly once so that certain items in the record may be processed.
2. **Searching:** Finding the location of the record with a given key value.
3. **Inserting:** Adding a new record to the structure.
4. **Deleting:** Removing a record from the structure.
5. **Sorting:** Arranging the records in some logical order.
6. **Merging:** Combining the records in two different sorted files into a single sorted file.