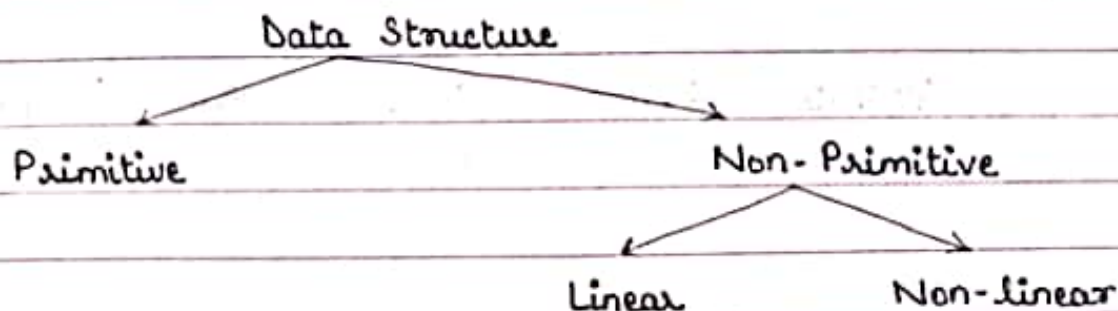


UNIT-1

Array, Linked list, Pointer, Stack, Tree



DATA

The term data simply refers to a value or set of values.

Ex → Observations from an experiment.

Marks obtained by a student.

DATA ITEM

It refers to a single unit of values.

Ex → Roll No., name, age.

Data item that can be divided into sub items are called group items and those that are not divided into sub items are called elementary items.

GROUP ITEM

An address is a group item divided into sub item such as house no., street no., pin code etc.

ELEMENTARY ITEM

Roll no., account no., pincode, city

ENTITY

An entity is something that has certain attributes or properties which may be assigned values. These values may be either numeric or non-numeric.

Attribute	Name	DOB	Age	Class
Student	Saishti	28/06/94	20	EC-II

ENTITY SET

Entities with similar attributes form an entity set or collection of similar entities.

Ex → students of a class.

products manufactured by a manufacturing unit.

RECORD

A record is a collection of related data items in fact a record represents an entity.

Ex → DOB, Roll no, of a particular student.

FILE

A file is a collection of related records in fact a file represents an entity.

Ex → Record of all employees in a company.

FIELD

A field is a single elementary unit of information representing an attribute of an entity.

Each record in a file may contain many field items.

KEY

A key is a data item in a record that takes unique value and can be used to differentiate a record. It may happen that more than one data item has unique values in that case these exist multiple keys but at a time we may be using only one data item as a key called primary key.

20/11/15

Lecture-2

DEFINITION OF DATA STRUCTURE

Data structure are used to solve real world computer program problems i.e., efficient problem solving using computers.

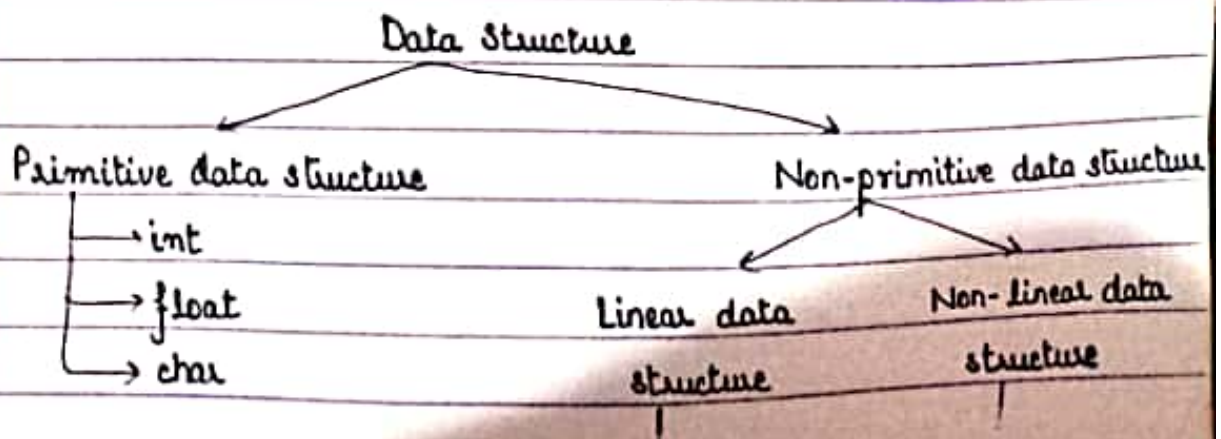
Structure means particular way of data organisation so data structure refers to the organisation of data in computer memory or the way in which the data is efficiently stored, processed and retrieved is called data structure.

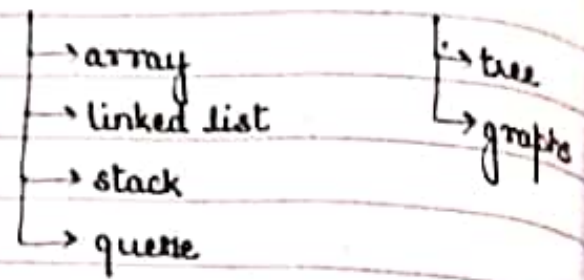
It is a mathematical or logical model of particular organisation of data.

Thus, the study of data structure includes -

- 1) Logical or mathematical description of the structure.
- 2) Implementation of the structure on a computer.
- 3) Quantitative analysis of structure which includes determining the amount of memory needed to store the structure and the time required to process the structure.

TYPES OF DATA STRUCTURE





LINEAR DATA STRUCTURE

In linear data structure in consecutive memory locations. A data structure whose elements form a sequence and every element in the structure has a unique predecessor and unique successor.

Ex - Array, linked list, stack, Queue

NON-LINEAR DATA STRUCTURE

These are the data structures in which data may be arranged in hierarchical manner or data structure whose elements do not form sequence i.e., there is no unique predecessor or unique successor.

Ex - Trees, Graphs

ALGORITHM

An algorithm is a step by step finite sequence of instruction, to solve well defined computational problem.

An algorithm is a finite set of instructions for performing a particular task.

An algorithm can be expressed in English like language called Pseudo code, in programming language or in the form of flow chart.

Every algorithm must satisfy the following criteria -

INPUT -

There are zeroes and more values which are externally supplied.

OUTPUT -

Atleast one value is produced.

DEFINITENESS -

Each step must be clear and unambiguous.

FINITENESS -

If we trace the steps of an algorithm then for all cases the algorithm must terminate after a finite number of steps.

EFFECTIVENESS -

Each step must be sufficiently basic.