13/09/2022
Tuesday

UNIT - I

Overview of concepts

Unit 1. Definat⁰, Elementary data organization, Data structures, data structures operations, Abstract data types, algorithms complexity, time-space trade off, preliminaries: Mathematical notation and function, Algorithmic notations, control statement structures, Complexity of algorithms, asymptotic notations for complexity of algorithms.
Arrays: Definition, Linear arrys, arrays as ADT, Representat⁰ of linear arry in (Row mas) Memory, Traversing linear arrays, Insert⁰ & deleting, Multi dimensional array, matrices & sparse matrices

What is data?
Data can be facts related to ____ which have no meaning and has to be processed.

Informat⁰ : The processed form of data is called informat⁰

(Or)

If data is arranged in a systematic way then it get structure & become meaningful

(a)

ans → the meaningfull or processed data called informat⁰

Datum : A singular form of data
A single unit of value

Group Item:
A data item that can be subdivide
into Sub item. sub-item

Elementary item
A data item that can't be sub divided

Entity : An object that has certain
attribute or property

Entity Set : Entities with similar attributes
form an entity set.
• Domain refers to the range

3. What is Data Structure ?
• A data structure is a systematic way
to organize data so that it can be
used efficiently.

$$DS = Organizing + Operat^n$$

Classificat^n of Data Structure

Data Structures

Primitive DS
- → Integer
- → Real
- → Character
- → Boolean
- → float

Non-Primitive DS

Linear DS
- Array
- Linked list
- Stack

Non-linear
- Tree
- Stock

Primitive data structure

Basic data type which
* Can't be divided. [can stroe only 1 value]
* It can be directly operated by machine level instruction.
→ Binary lang

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1. Operatⁿ on Primitive Data Structure
   * Creation   SUDC
   * Deletion /Destroy
   * Selection
   * Updation.

Creatⁿ : This operatⁿ creates a data structure
   eg: int a.

Deletion : It is used to destroy the DS in c by " free( )"

Selectⁿ : It is for accesing data within a DS

Updatⁿ : It is used to change data in DS.
   Eg:- int i = 10 ;
   i = 50 ;

2. Non - Primitive data structure
   We can't multiple value within a DS
   * Refers to data type that are denived from primitive ds.
   * It cannot be directly operated by machine level instruction
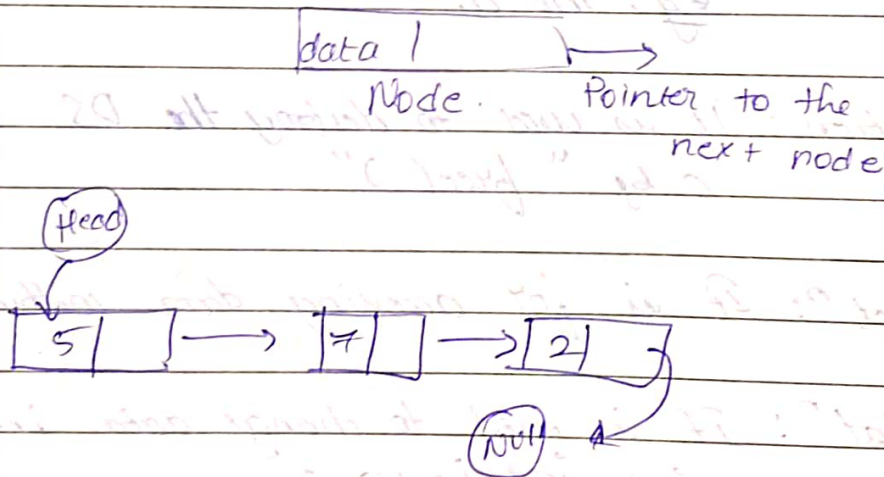
3. <u>linear DS</u>

The
data in
linear Ds
ur

- Data is organized in a sequence
- It establishes the relationship of adjacency b/w the elements, which means all the elements are stored in memory linearly or sequentially
- Arrangment of data follows a linear tred.
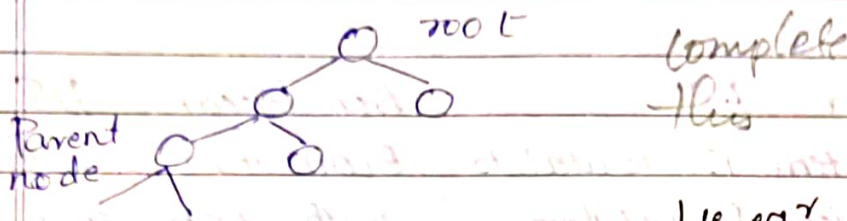
Ex: Stack, Array, Linked lists and queues.

<u>Array :</u>

| a | 1 | 3 | 6 | 23 | 6 9 | |

indexes/   a(0) a[1]   2   -3   4.
subsrepts.

<u>Linked list</u>

data | ⟶
Node.   Pointer to the
               next node

(Head)

| 5 | | ⟶ | 7 | | ⟶ | 2 | |

(Null)

Non-linear DS

- If de
- The data in Non-linear DS are
- If the dat is not arranged in sequence
- The relat^n (other than) the (adjacency) relationship.

Ex :- Tree, graph

root

Complete
this

Parent
node

primitive | linear

① Operation on DS

1. Traversing
Inserting
Deleting
Sorting
Searching
Merging

Traversing : Accessing each element exactly
only is called traversing

Inserting : Adding the new element to the
existing data structure

Deleting : Deleting an element from a DS

Searching : Searches a particular element
in the list of element in DS

Sorting : Arranging the element in ascending
& descending order.

Merging : Combining the two different lists
into single list.
↳ ↳ Same data type.