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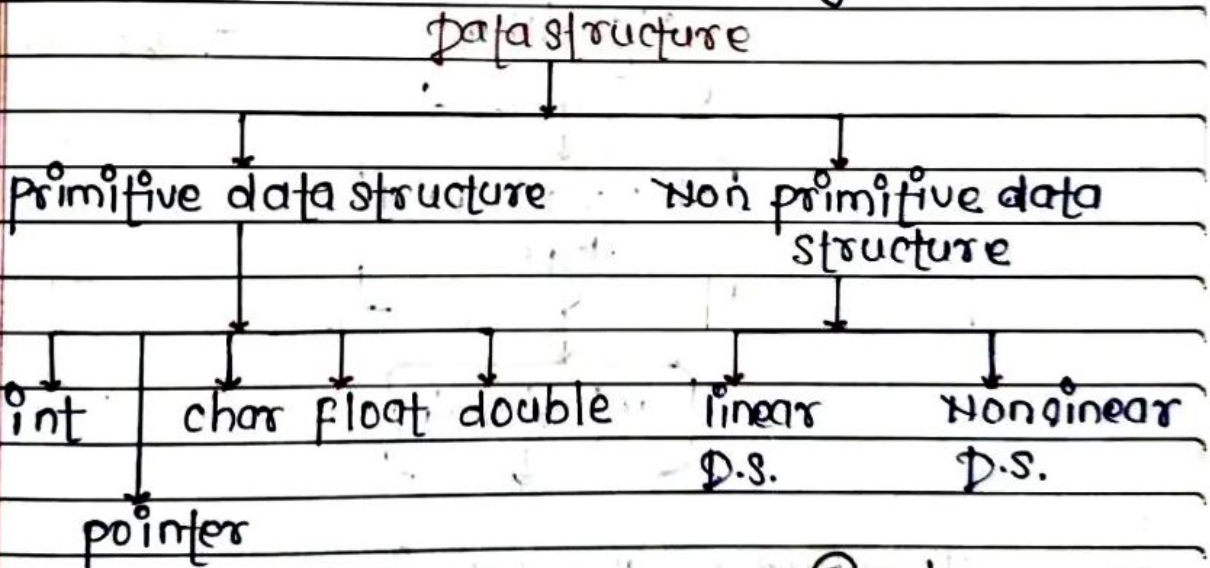
* Data Structure

What is data structure ?.

→ Data structure is a way to store and organize data so that it can be used efficiently.

As per name indicates itself that organizing the data in memory.

The data structure is not any programming language like c, c++, java, etc. It is set of algorithms that we can use in any programming language to structure data in memory.



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Linear data structure :-

The arrangement of data in the sequential manner is known as linear data structure.

The data structure used for this purpose are Arrays, linked list, stacks and queues.

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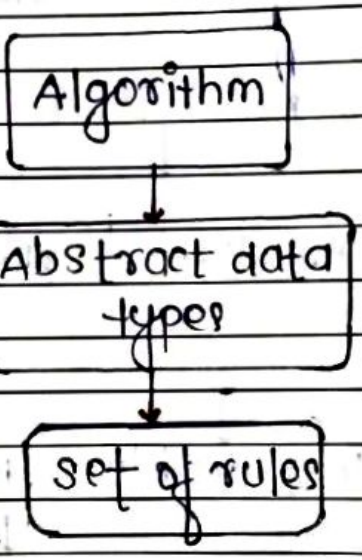
In this data structure, one element is connected to only one another element in a linear form.

Non-linear data structure :-
When one element is connected to the 'n' number of element known as non-linear data structure.

Algorithm and Abstract data types ??



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Why :-
To structure the data in memory, 'n' number of algorithm are proposed, and all these algorithms are knowns as Abstract data types.

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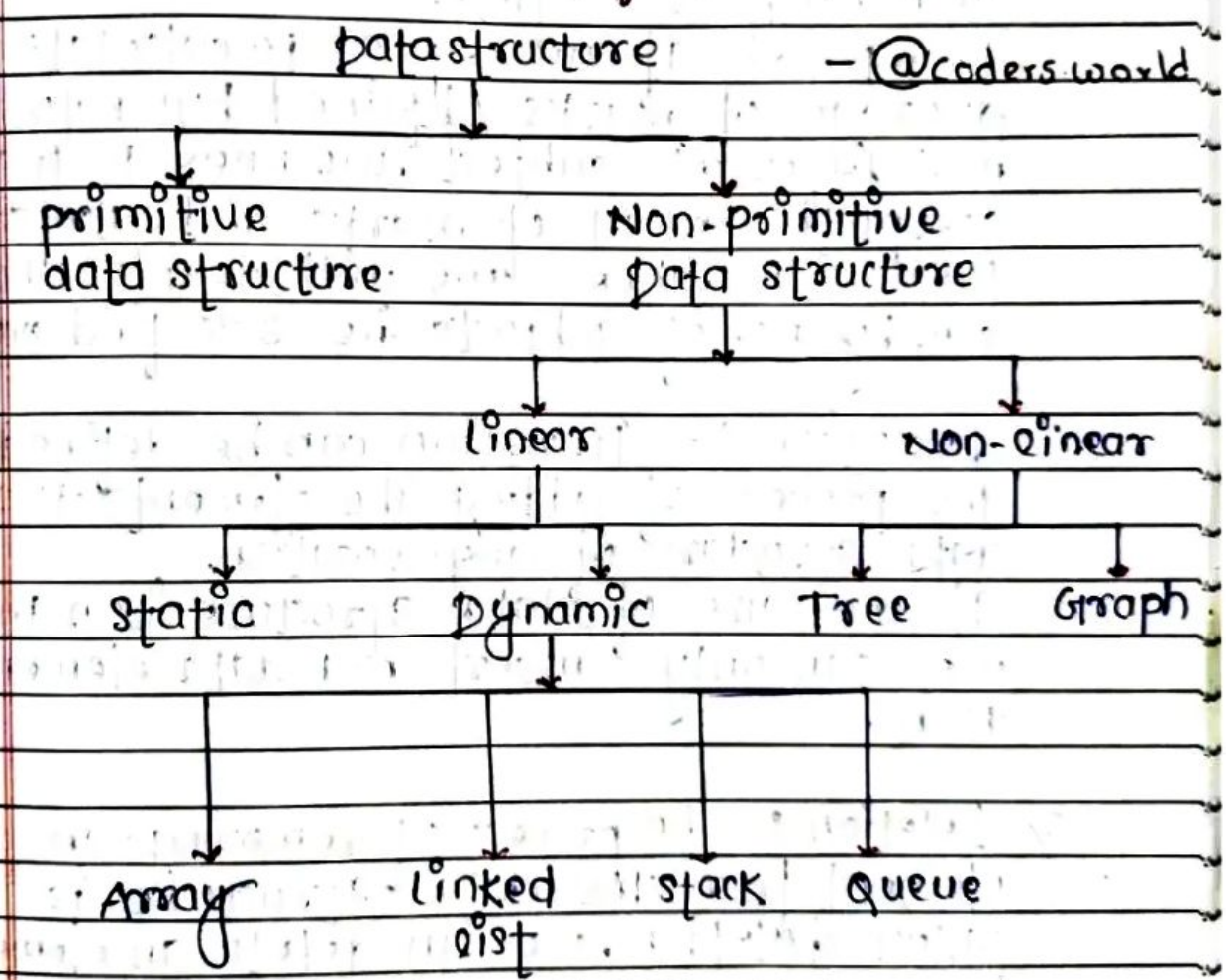
Abstraction :- The data structure specified by the ADT also provides level of abstraction. The client cannot see internal working of data structure, so it does not have to worry about implementation.

Data structure classification :-



Operations on data structure :-

1) Traversing :- Every data structure contains a set of data element. Traversing data structure means visiting each element of data structure in order to perform same specific operation like searching or sorting.
Example :- If we need to calculate average of marks obtained by a student in 6 different subject, we need to traverse complete array of marks and calculate total sum, then we will devide that sum by no. of subjects i.e 6 to find average.

2) Insertion :- Insertion can be defined as the process of adding the elements to the data structure at any location.
If the size of data structure is n then we can only insert n-1 data element to it.

3) Deletion :- The process of removing an element from the data structure is called deletion. We can delete an element from data structure at any random location.
If we try to delete an element from an empty data structure then underflow occurs.

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4) Searching :- The process of finding the location of an element within data structure is called searching. There are two algorithm to perform searching, linear search and Binary search.

5) Sorting :- The process of arranging the data structure in a specific order is called as sorting. There are many algorithms that can be used to perform sorting, for example insertion sort, selection sort, bubble sort etc.

6) Merging :- When two lists A and list B of size M and N respectively of similar type of element, clubbed or joined to produce third list, list C of size (M+N), then process is called merging.

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