Data Structures & its applications

UNIT – 1

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1	Data Structures	1.	Classifications Primitive and Non Primitive	----------
		2.	Data structure Operations	----------
2	Review of	1.	Arrays	----------
		2.	Structures	----------
		3.	Self- Referential Structure	----------
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3	Pointers	1.	Dynamic Memory Allocation Functions	----------
		2.	Dynamically allocated arrays	----------
4	Algorithm	1.	Specification	----------
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5	Stack	1.	Definition.	----------
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		3.	Array Representation of Stacks.	----------
		4.	Stacks using Dynamic Arrays.	1.Program in “C”
6	Stack Applications	1.	Infix to postfix conversion	2.Program in “C”
		2.	Evaluation of postfix expression	3.Program in “C”
		Recursion		----------
		1.	Factorial	4.Program in “C”
		2.	Greatest Common Divisor	5.Program in “C”
		3.	Fibonacci Sequence	6.Program in “C”
		4.	Tower of Hanoi	7.Program in “C”

I. Data Structures

1. **Classifications Primitive and Non Primitive.**
2. **Data structure Operations**

Data structures are normally divided into two broad categories.
(i) Primitive Data Structures (built-in)
(ii) Non-Primitive Data Structures (user defined)

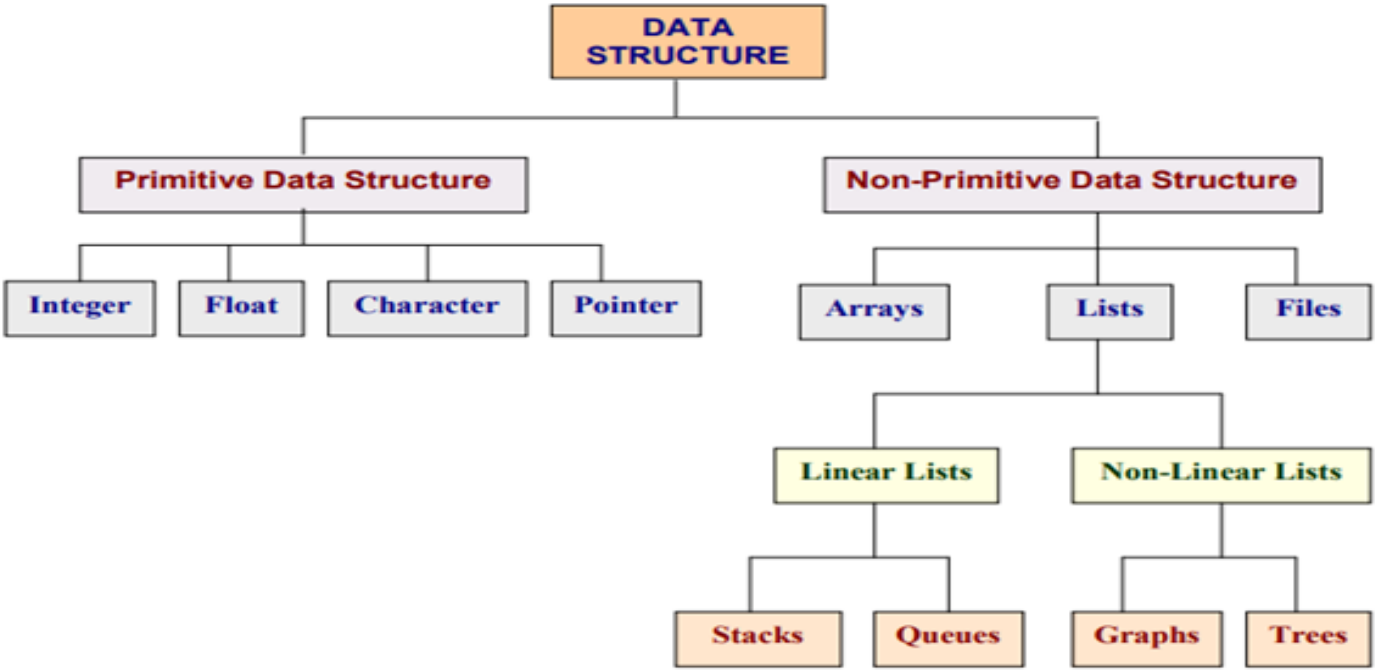

Fig.(1) : Classification of Data structure.

Primitive Data Structures (Built-In)

These are basic structures and are directly operated upon by the machine instructions. Integers, floating-point numbers, character constants, string constants, pointers etc. fall in this category.

Non-Primitive Data Structures (User-Defined)

These are more complicated data structures. These are derived from the primitive data structures. The non-primitive data structures stress on structuring of a group of homogeneous (same type) or heterogeneous (different) data items. Arrays, structures, lists are examples.

Operations of Data Structures

The data appearing in data structures are processed by means of certain operations. Data structure that chooses for a given situation depends largely on the frequency with which specific operations are performed.

The basic operations that are performed on data structures are as follows:

1. **Traversing:** Accessing each data so that certain items in the data may be processed.
2. **Searching:** Searching operation finds the presence of the desired data item in the list of data.
3. **Inserting:** Inserting means addition of a new data element in a data structure.
4. **Deleting:** Deleting means removal of a data element from a data structure.

The following two operations, which are used in special situations, will also be considered:
(1) Sorting: Sorting is the process of arranging all data items in a data structure in an order.
(2) Merging: Combining the records of two different sorted files into a single sorted file.