

Unit 2

* Data type.

Data type is a term, which is used to refer the kind of data that variables may hold in programming language. The general form of class of data items is known as data types.

Data types such as :

1. Unsigned char, Signed char, &
- 2) int, long int, Unsigned int
- 3) double, long double, float.

These are two types of data types

1. Primary data types \rightarrow The Data types that are not composed of other data types known as primary data types. Such as Integers, float and characters.
2. Secondary data types \rightarrow The Data types which are composed of primary data types called secondary data types. They are defined by the programmer that's why it is sometimes called User-defined data type. Such as array, structure, pointers, Unions etc.

* Data object:-

Data object is term used to represent a set of Elements. Data object may be finite or infinite.

* Data structures:-

Data structure is defined as the specific way of arranging the data in specific an efficient manner.

\rightarrow Types of Data structure:-

1. Built-in-data structure.

The Data structure which are initially provided by the higher level language called Built-in-data structure.

Ex \rightarrow arrays, structures etc.

2. User-defined data structure.

The Data structure which are formed by the user with the help of user Built-in-data structure called User defined DS

Ex \rightarrow stack, queue, linkedlist, ~~array~~ graph, tree.

3. Linear data structure.

The data structure whose elements are processed sequentially one by one called Linear data structure.

Ex → Stack, queue, linked list.

4. Non-linear data structure.

The data structure whose elements are not processed sequentially called Non-linear data structure.

Ex → Tree, graph.

* Data structure operations

There are six basic operations in data structure :-

1. Traversing.
2. Inserting.
3. Sorting.
4. Searching.
5. Deleting.
6. Merging.

1. Traversing ⇒ By Traversing, we mean processing of each data item in the data structure, exactly once, from first element to last element.

2. Inserting ⇒ By Inserting, we mean addition of data item in the data structure at any position, last position or first position.

3. Sorting ⇒ By Sorting, we mean sort the data item into ascending order, descending order or according to the requirement of programmer.

4. Searching \Rightarrow By searching, we mean finding an data item from a set of numbers.

5. Deleting \Rightarrow By deleting, we mean delete an data item in a data structure from any position.

6. Merging \Rightarrow By merging, we mean combining of two data structure into one data structure.

* Data structure at Abstract (logical) level.

At this level, the programmer has to decide ~~for~~ how the elements are related to each other and ~~the~~^{what} operations are needed. At this level, the programmer has no concern about the representation of data in the memory. Therefore at this level, it is necessary to understand your problem very carefully.

* Data structure at Implementation level.

At Implementation level, we do a specific way for representation of data structure and its various operations in memory. It means that, at Implementation level, we convert our algorithm into computer program after deciding which one is better way to implement it.

* Data structure at Application level.

On Application level, we use data structure which is implemented at earlier stages. At this level, we avail the facility provided by various data structure.

Ex \rightarrow Stack is used to convert postfix expression to prefix expression.