



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-IoT Including CS & BCT**

**COURSE NAME :23ITB201-DATA STRUCTURES & ALGORITHMS**

**II YEAR / III SEMESTER**

**Unit I- LIST ADT**

**Topic :Abstract Data Types (ADTs)**



# What is data structure?

A data structure is a technique of organizing the data so that the data can be utilized efficiently.

There are two ways of viewing the data structure:

- 1. Mathematical/ Logical/ Abstract models/ Views**
- 2. Implementation**



## Mathematical/ Logical/ Abstract models/ Views:

The data structure is the way of organizing the data that requires some **protocols or rules**.

These rules need to be modeled that come under the logical/abstract model.

## Implementation:

The second part is the implementation part.

The rules must be implemented using some programming language.



## Need of data structure

The following are the advantages of using the data structure:

These are the essential ingredients used for **creating fast and powerful algorithms.**

They help us to **manage and organize the data.**

Data structures make the **code cleaner and easier to understand.**

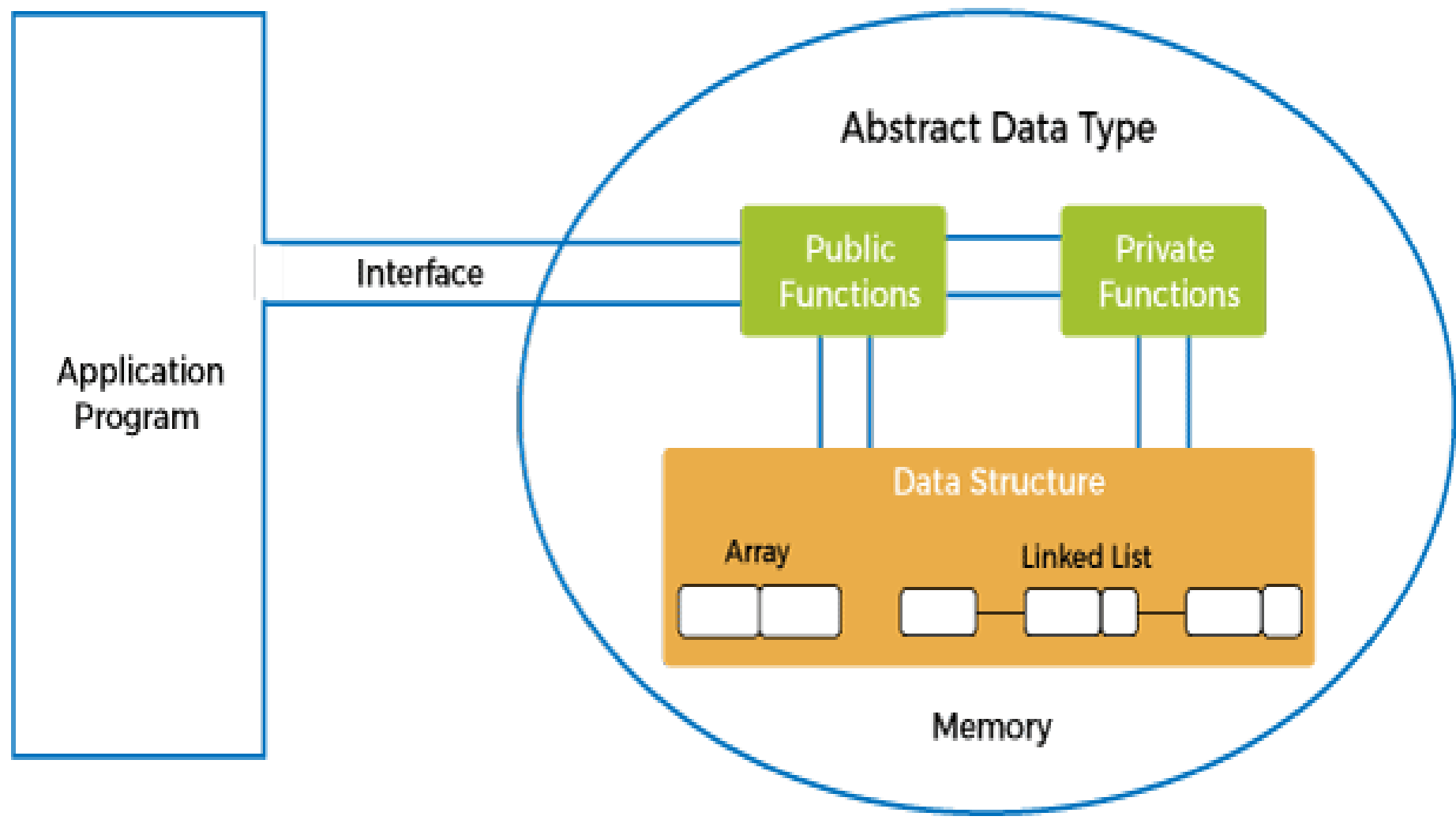


## Abstract Data Type

An abstract data type is an **abstraction of a data structure** that provides only the **interface to which the data structure must adhere**.

The interface does not give any specific details about something should be implemented or in what programming language.

**Abstract data types are the entities that are definitions of data and operations but do not have implementation details.**





# Abstract data type with a real-world example.



If we consider the **smartphone**. We look at the high specifications of the smartphone, such as:

4 GB RAM

Snapdragon 2.2ghz processor

5 inch LCD screen

Dual camera

Android 8.0



The above specifications of the smartphone are the data, and we can also perform the following operations on the smartphone:

call(): We can call through the smartphone.

text(): We can text a message.

photo(): We can click a photo.

video(): We can also make a video.

The smartphone is an entity whose data or specifications and operations are given above.

The abstract/logical view and operations are the abstract or logical views of a smartphone.





Implementation view of the above abstract/logical view is given below:

```
class Smartphone
{
    private:
    int ramSize;
    string processorName;
    float screenSize;
    int cameraCount;
    string androidVersion;
    public:
    void call();
    void text();
    void photo();
    void video();
}
```



## Key points to be Note:

We know the operations that can be performed on the predefined data types such as int, float, char, etc., but we don't know the implementation details of the data types.

Therefore, we can say that the abstract data type is considered as the hidden box that hides all the internal details of the data type.



Any Query?????

Thank you.....