

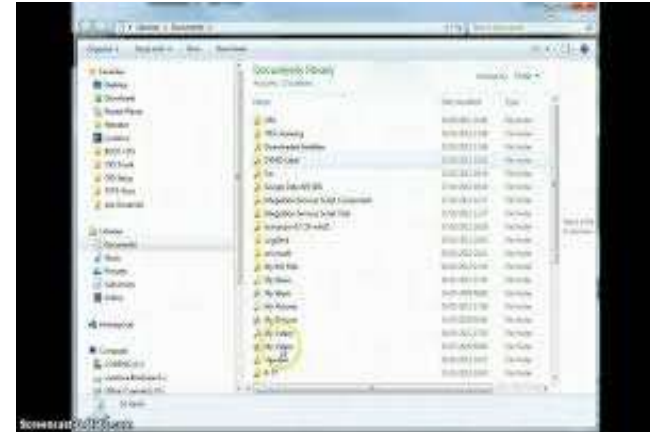


Need of Data Structure





Need of Data Structure



6/26/2023



Introduction to DS



- Data structures are generally based on the ability of a computer to fetch and store data at any place in its memory, specified by a pointer
- Thus, the array and record data structures are based on computing the addresses of data items with arithmetic operations
- What is Program?
 - A Set of Instructions

Data Structures + Algorithms

Data Structure = A Container stores Data Algorithm = Logic + Control



- **Data Structure**

- **Data:** are simply a value are set of values of different type which is called data types like string, integer, char etc.
- **Structure:** Way of organizing information, so that it is easier to use

In simple words we can define data structures as

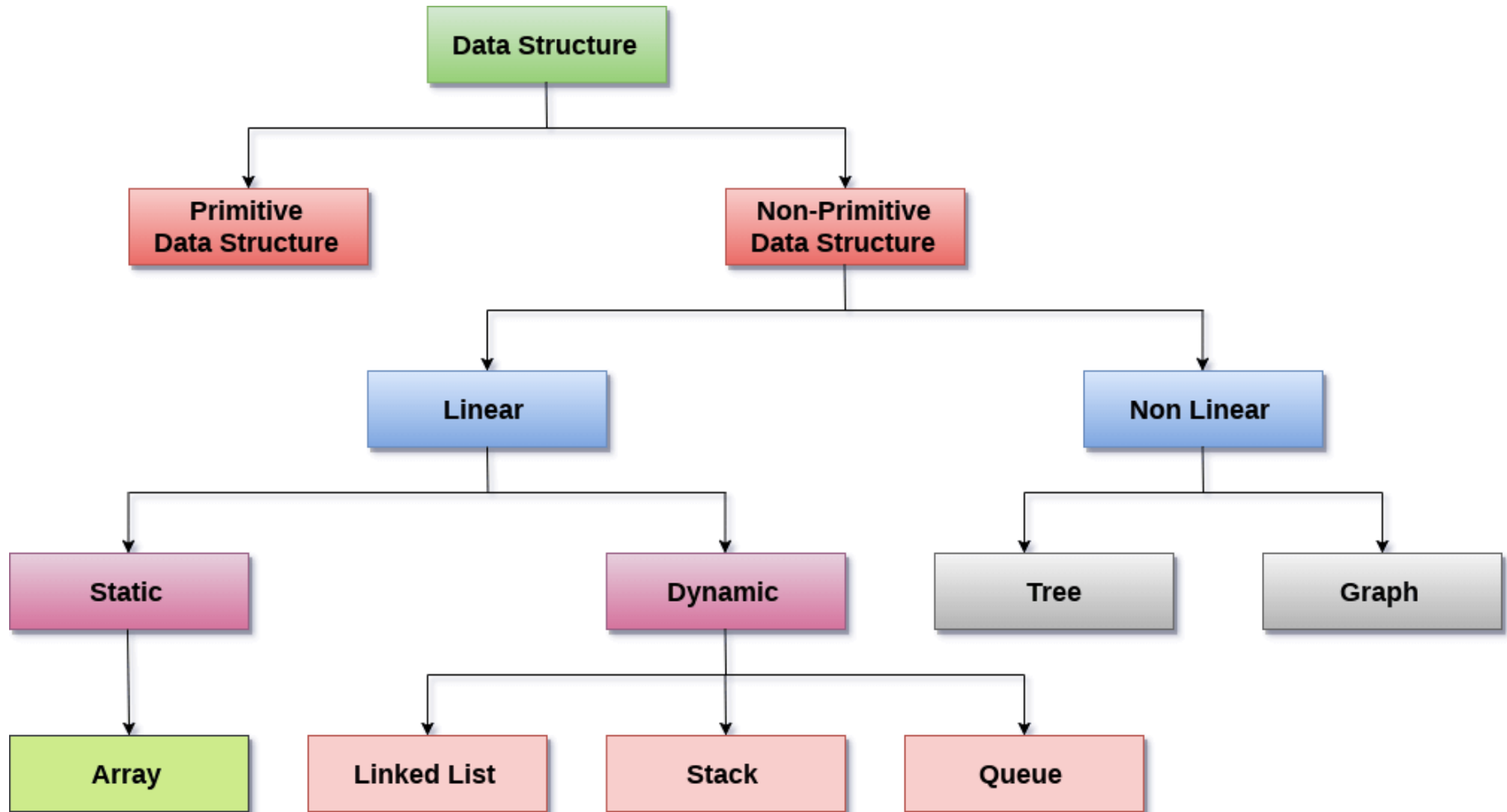
- Its a way organizing data in such a way so that data can be easier to use.

- **Data Structure ..**

- A data structure is a particular way of organizing data in a computer so that it can be used efficiently.
- A scheme for organizing related pieces of information.



Types of Data Structure





Abstract Data Type

Model of a data type

➤ Properties of the data

➤ Operations that can be performed on that data



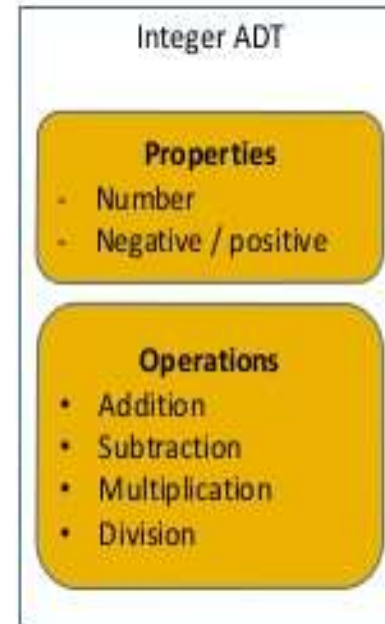
Abstract data type(ADT)

- is a mathematical model with a collection of operations defined on that model
- Type defined in terms of its data items and associated operations not its implementation



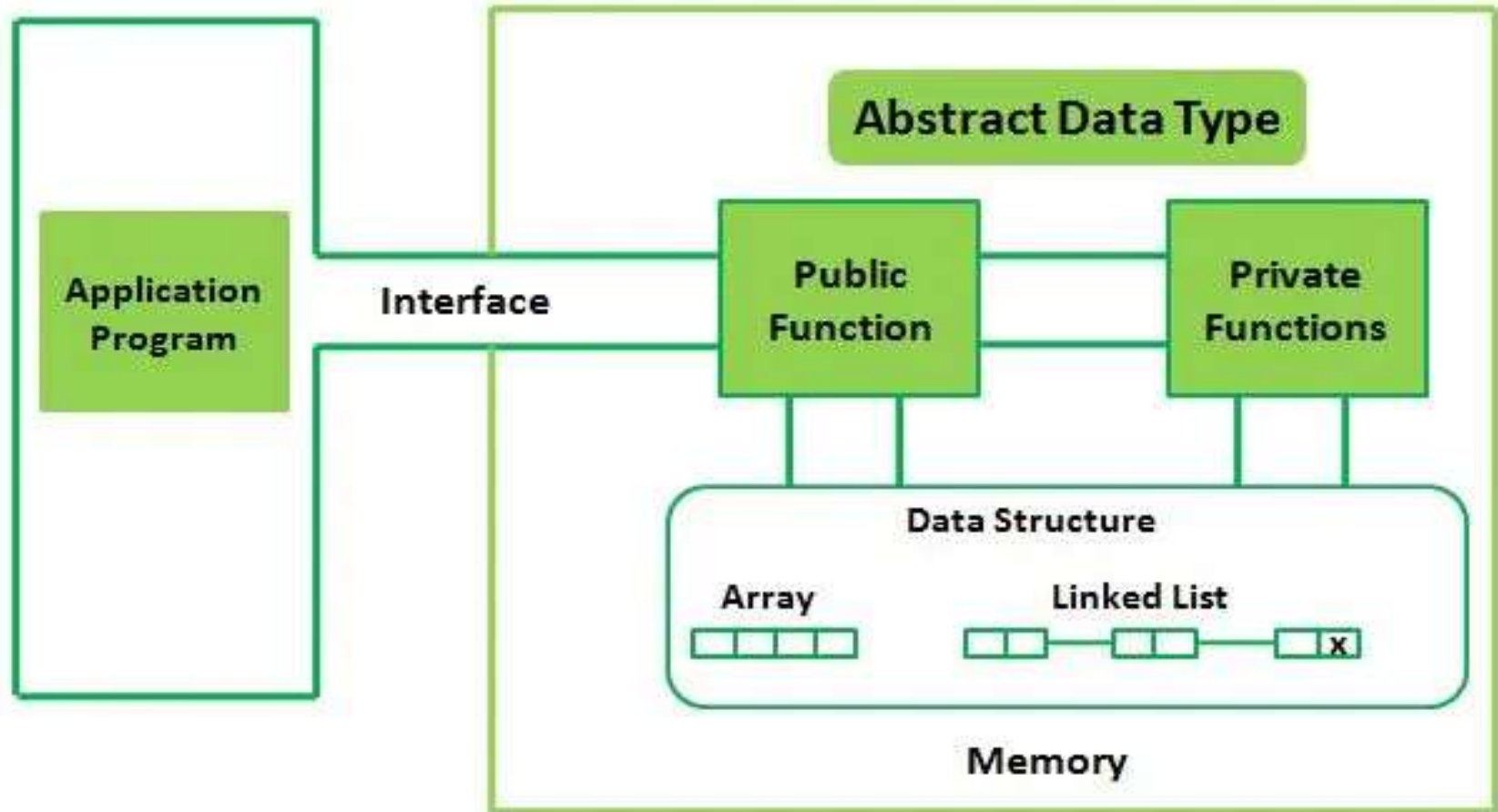
Abstract Data Type

- Integer
 - ..., -4, -3, -2, -1, 0, 1, 2, 3, 4 ...



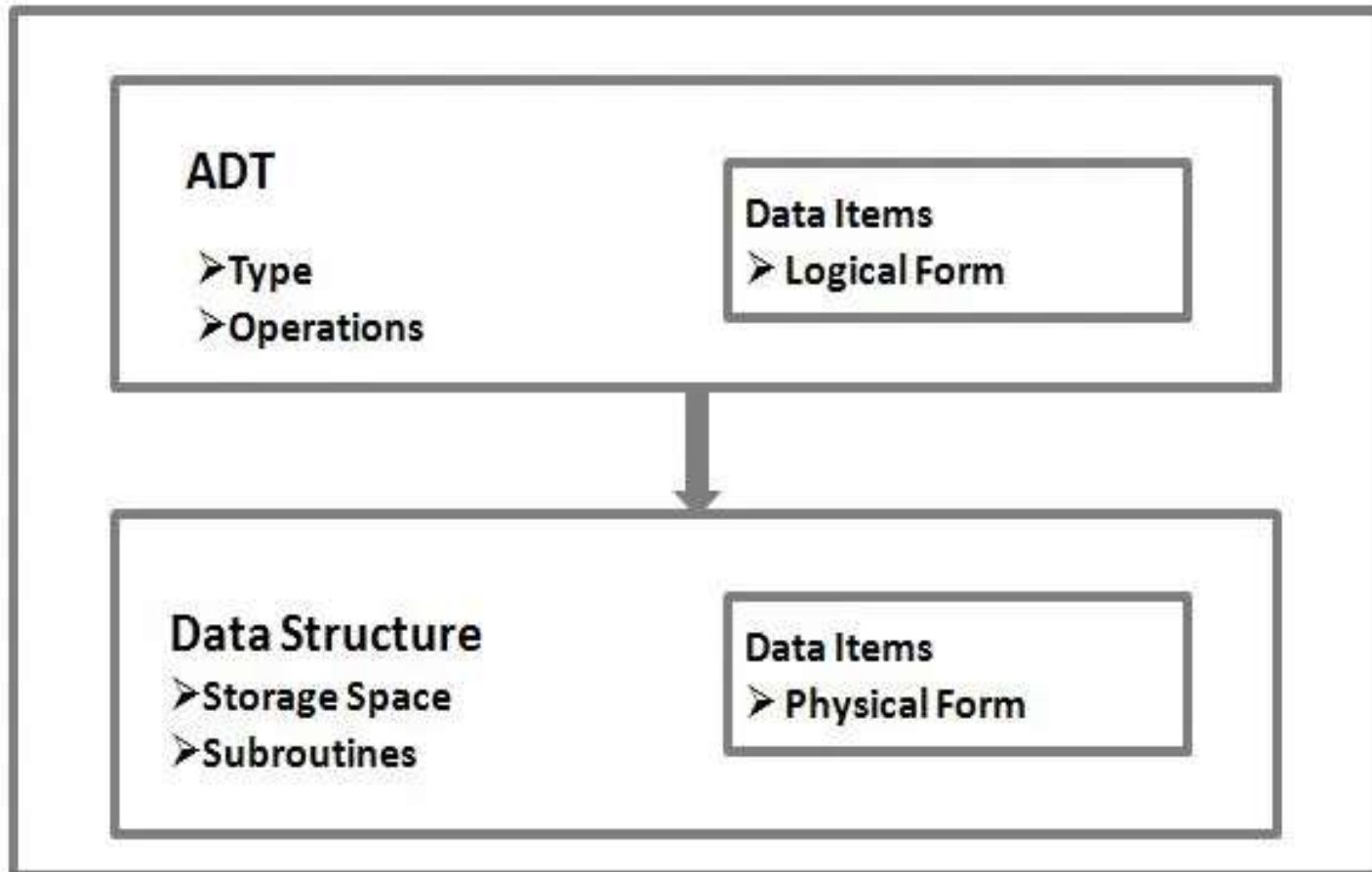


Relationship between ADT & Data Structure



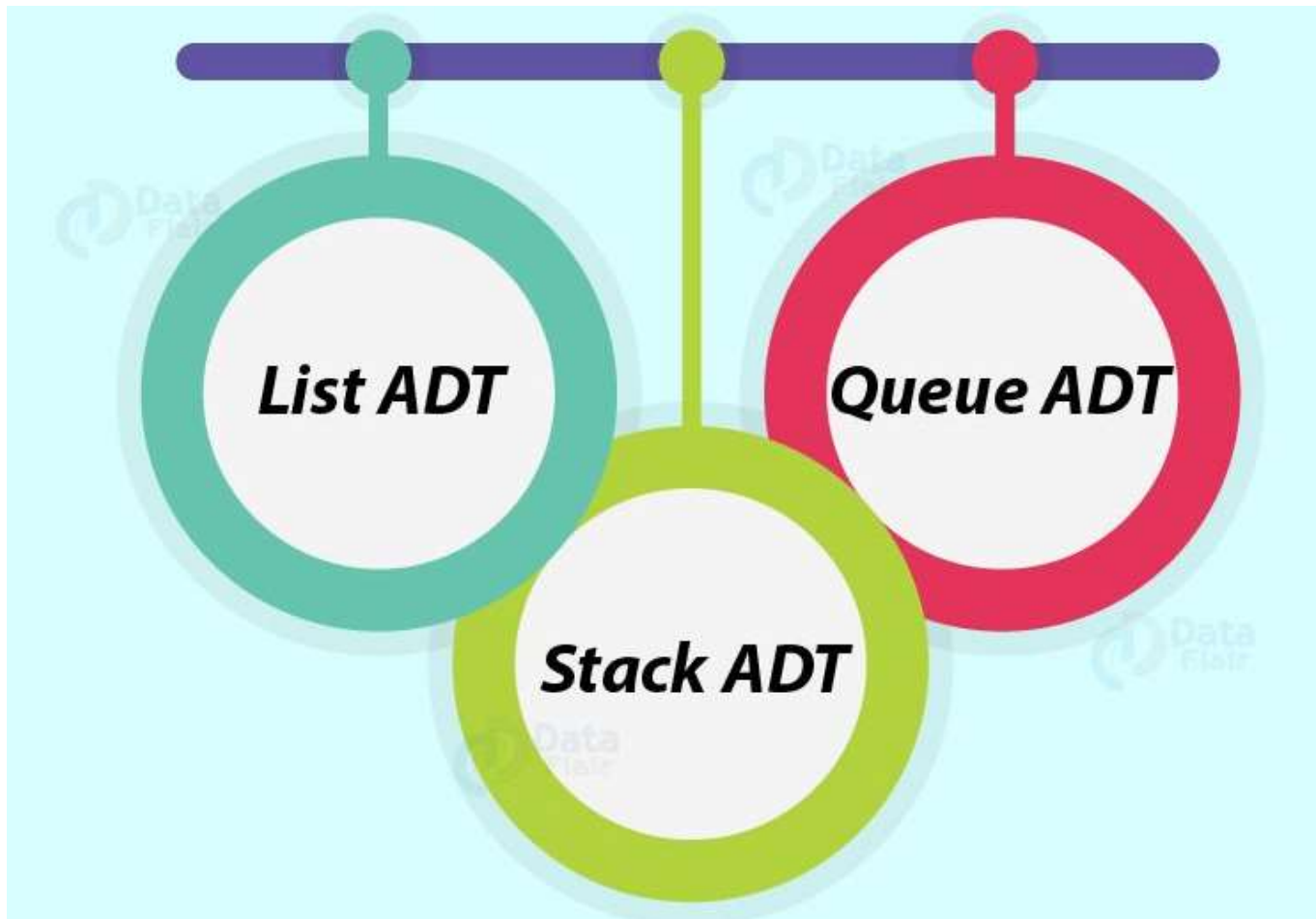


Relationship between ADT & Data Structure





Example for ADT





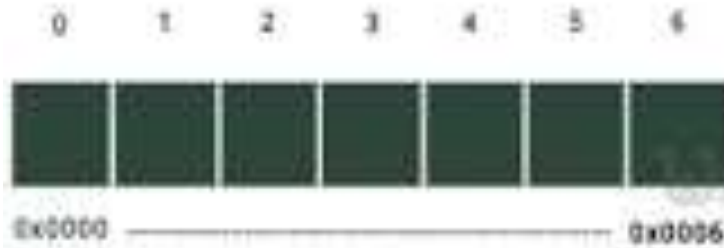
Benefits of ADT

- Reduce Complexity of Program
- Increases the Portability
- Reusability

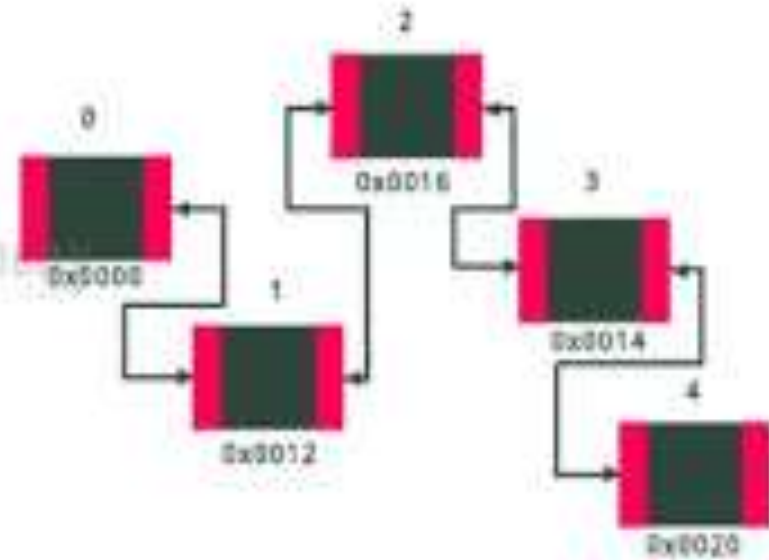


Way of Implementation

ArrayList



LinkedList





Benefits of ADT

- Reduce Complexity of Program
- Increases the Portability
- Reusability