Data Structure (CS-303)

Basics

DATA STRUCTURES & DATA TYPES

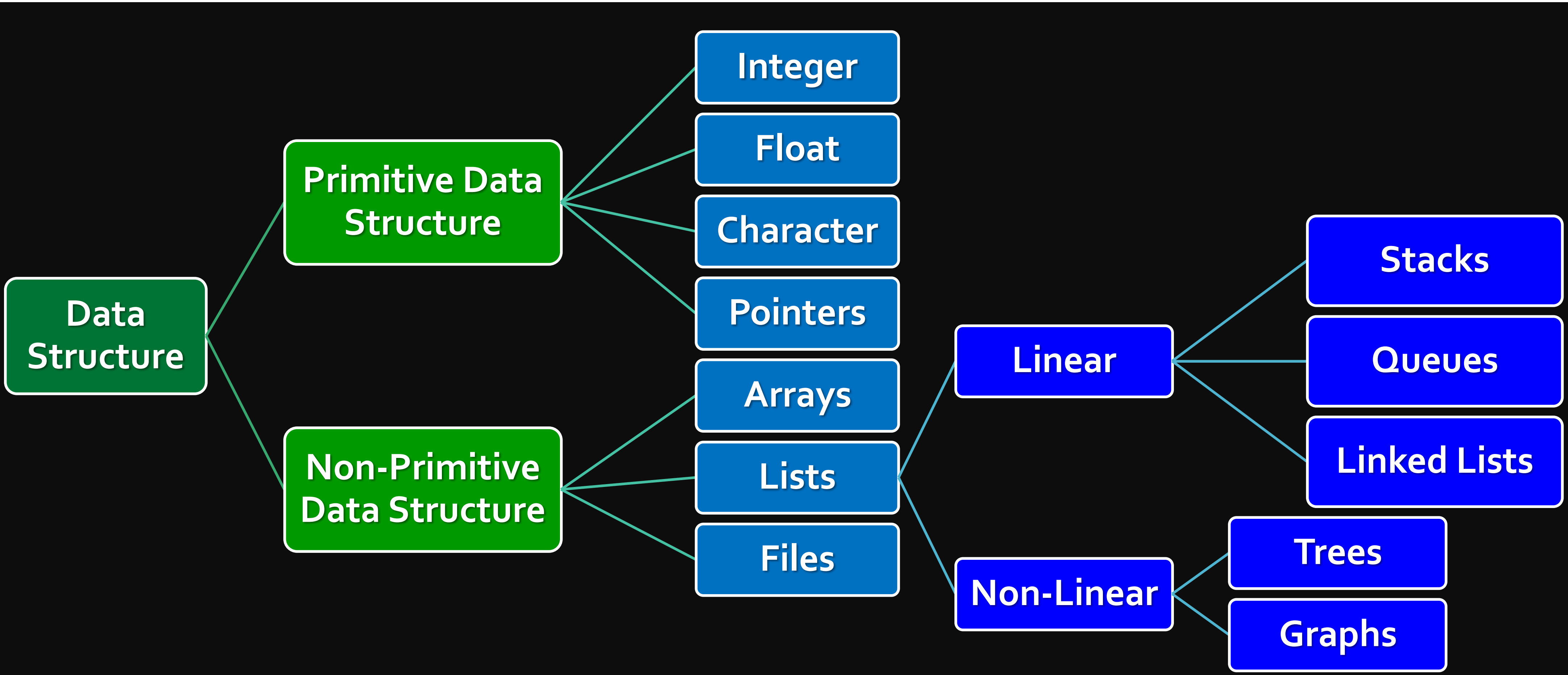
A data structure is a storage that is used to store and organize data. It is a way of arranging data on a computer so that it can be accessed and updated efficiently.

Data Type	**Data Structure**
The data type is the form of a variable to which a value can be assigned. It defines that the particular variable will assign the values of the given data type only.	Data structure is a collection of different kinds of data. That entire data can be represented using an object and can be used throughout the program.
It can hold value but not data. Therefore, it is dataless.	It can hold multiple types of data within a single object.
The implementation of a data type is known as abstract implementation.	Data structure implementation is known as concrete implementation.

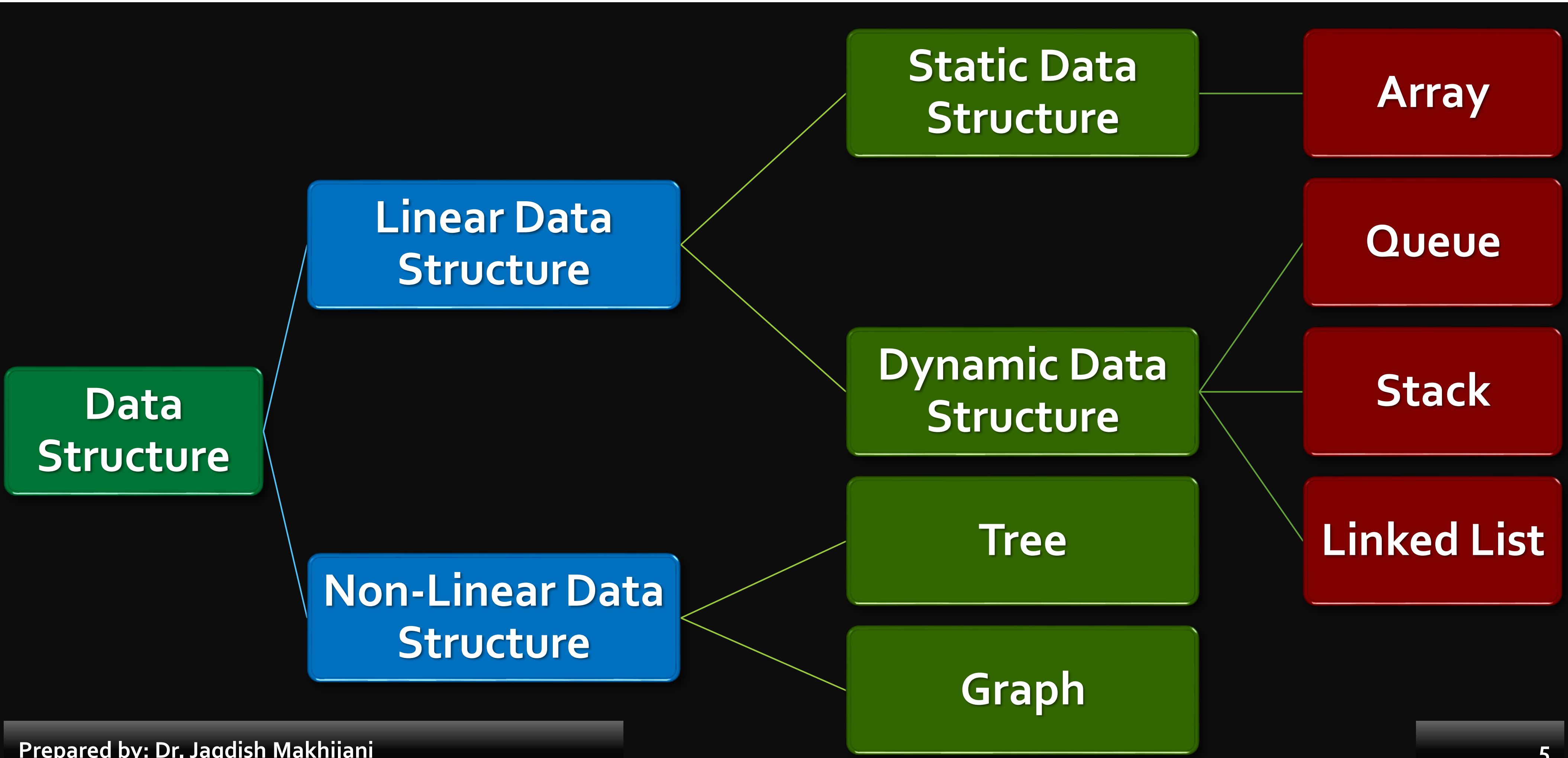
DATA STRUCTURES & DATA TYPES

Data Type	Data Structure
There is no time complexity in the case of data types.	In data structure objects, time complexity plays an important role.
In the case of data types, the value of data is not stored because it only represents the type of data that can be stored.	While in the case of data structures, the data and its value acquire the space in the computer's main memory. Also, a data structure can hold different kinds and types of data within one single object.
Data type examples are int, float, double, etc.	Data structure examples are stack, queue, tree, etc.

CLASSIFICATION OF DATA STRUCTURES



CLASSIFICATION OF DATA STRUCTURES



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PRIMITIVE VS NON PRIMITIVE

Primitive Data Structures

- **Primitive Data Structures** are the data structures consisting of the numbers and the characters that come **in-built** into programs.
- These data structures can be manipulated or operated directly by machine-level instructions.
- Basic data types like **Integer, Float, Character,** and **Boolean** come under the Primitive Data Structures.
- These data types are also called **Simple data types,** as they contain characters that can't be divided further

PRIMITIVE VS NON PRIMITIVE

Non-Primitive Data Structures

- **Non-Primitive Data Structures** are those data structures derived from Primitive Data Structures.
- These data structures can't be manipulated or operated directly by machine-level instructions.
- The focus of these data structures is on forming a set of data elements that is either **homogeneous** (same data type) or **heterogeneous** (different data types).
- Based on the structure and arrangement of data, we can divide these data structures into two sub-categories -
  - Linear Data Structures
  - Non-Linear Data Structures