



Unit I

CHAPTER 2 DATA ABSTRACTION



Learning Objectives

After the completion of this chapter, the student will be able to Understand

- what is Abstract Data structures.
- Abstract data type.
- Difference between concrete and abstract implementation.
- Pairs.
- Data Abstraction in Structure.

2.1 Data Abstraction- Introduction

Data abstraction is a powerful concept in computer science that allows programmers to treat code as objects — for example, car objects, pencil objects, people objects, etc. Programmers need not to worry about how code is implemented — they have to just know what it does.

This is especially important when several people are doing a project. Here project refers to the programming. With data abstraction, your group members won't have to read through every line of your code to understand. They can just assume that it does work.

Abstraction provides modularity (modularity means splitting a program in to many modules). Classes (structures) are the representation for “Abstract Data Types”, (ADT)

2.2 Abstract Data Types

Abstract Data type (ADT) is a type for objects whose behavior is defined by a set of values and operations.

The definition of ADT only mentions what operations are to be performed but not how these operations will be implemented. It does not specify how data will be organized in memory and what algorithms will be used for implementing the operations. It is called “abstract” because it gives an implementation independent view. *The process of providing only the essentials and hiding the details is known as abstraction.*

You can see that these definitions do not specify how these ADTs will be represented and how the operations will be carried out. There can be different ways to implement an ADT, for example, the List ADT can be implemented using singly linked list or doubly linked list. Similarly, stack ADT and Queue ADT can be implemented using lists.

Data abstraction replicate how we think about the world. For example, when you want to drive a car, you don't need to know how the engine was built or what kind of material the tires are made of. You just have to know how to drive the car. *To facilitate data abstraction, you will need to create two types of functions: constructors and selectors.*