

Data Abstraction

Defn: A data-type is a collection of objects and a set of operations that act on those objects. eg: int, char, float.

Defn: An abstract data type (ADT) is a data type that is organized in such a way that the specification of the objects and the specification of the operations on the objects is separated from the representation of the objects and the implementation of the operations. □

- How does the specification of the operations of an ADT differ from the implementation of the operations?
- The specification consists of the names of every function, the type of its arguments, and the type of its result. There should also be a description of what the function does, but without appealing to internal representation or implementation details.

ADT is implementation-independent.

Classification of the functions of a data type

- 1) **Creator/constructor:** These functions create a new instance of the designated type.
- 2) **Transformers:** Also create an instance of the designated type, generally by using one or more other instances.
- 3) **Observers/reporters:** Provide information about an instance of the type, but they do not change the instance.

Ex 1.5: ADT Natural Number

objects: an ordered subrange of the integers starting at zero and ending at the maximum integer (INT_MAX) on the computer.