

# DATA ABSTRACTION

(CREATING ABSTRACT DATA TYPE)

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# INTENDED LEARNING OUTCOMES

Discuss

Discuss importance of Abstract data type (ADT)

Identify

Identify the 4 operations of ADT

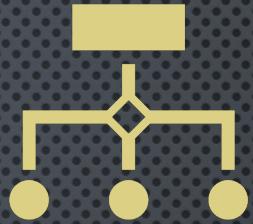
Create

Create ADT in machine solving problems



# Abstraction

- \*view something as a high-level object, ignoring business logic
- \*External appearance over internal implementation
- \*Focus on WHAT rather than the HOW



## Example :

Organization, body organ, any object, a program



# Procedural Abstraction



Function  
declaration



Function call



Use the **FUNCTION**  
to add integers,  
return the sum.

**HOW RATHER  
THAN WHAT**

```
int sumOfIntegers(int x, int y){  
    return (x+y);  
}  
  
int sum = sumOfIntegers(4, 6);
```





understand  
complex systems



easy to absorb  
and manipulate

## Benefits of abstraction

**int x;**

ABSTRACTION  
TO DATA  
STRUCTURING :  
**SEVEN  
ATTRIBUTES**

	Name	x
	Address	memory location
	Value	assigned or input
	Lifetime	run-time
	Scope	block of code
	Type	int
	Size	2 bytes

## DATA TYPE HIERARCHY – THREE LEVELS

Abstract Data  
Types

Virtual data  
types

Hardware data  
types

Stack, Queue,  
vector, etc

Arrays, Structures,  
sets, Pointers.

→ int, float,  
characters, etc

# ADT SPECIFICATIONS : FOUR FACTORS

Domain of values

Data type of components

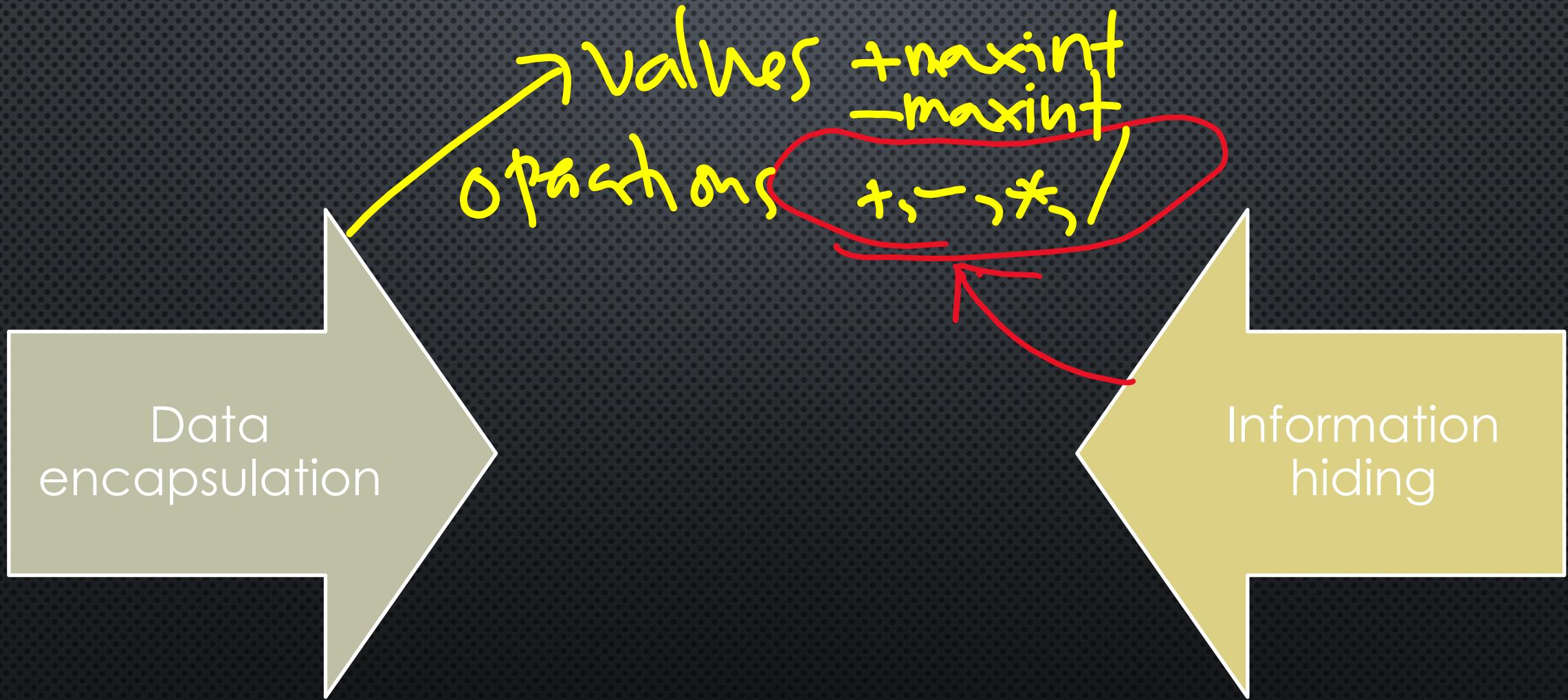
Structural relationship between components

Operations on the ADT

## DATA STRUCTURE

- AN AGGREGATION OF ATOMIC AND COMPOSITE DATA TYPES INTO A SET WITH DEFINED RELATIONSHIPS.
- IN OTHER WORDS,
  - A COMBINATION OF ELEMENTS EACH OF WHICH IS EITHER A DATA TYPE OR ANOTHER DATA STRUCTURE
  - A SET OF ASSOCIATIONS OR RELATIONSHIPS (STRUCTURE) INVOLVING THE COMBINED ELEMENTS.

# PROPERTIES OF AN ADT



# BENEFITS OF DATA ABSTRACTION THROUGH ADTS



Security And  
Software Integrity



Maintainability



Sharing And  
Reusability Of  
Software



Intellectual  
Manageability

how we  
use the  
operations



Syntax



Semantics

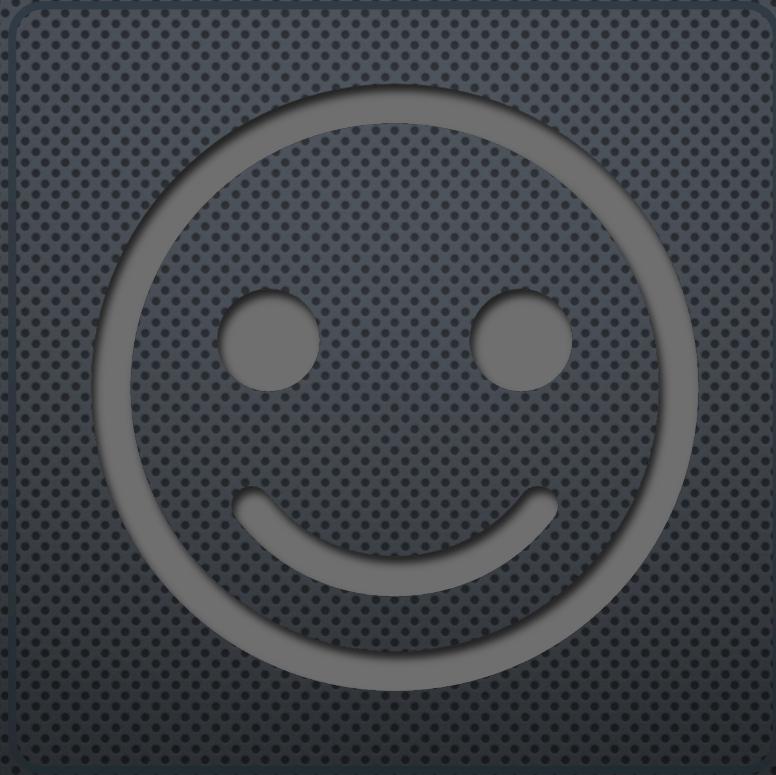
describe  
the  
actions  
of  
operation

## (ADT) CLASS SYNTAX AND SEMANTICS

# SUMMARY

- Abstraction
  - is the ability to view something as a high-level object while temporarily ignoring the enormous amount of underlying detail associated with that object
  - Viewing something only in terms of its external appearance, without regard to its internal implementation
  - It gives attention to the WHAT rather than the HOW
- Seven Attributes of Data Structuring. (Example: int x)

1. Name	x
2. Address	<i>memory location</i>
3. Value	<i>assigned or input</i>
4. Lifetime	<i>run-time</i>
5. Scope	<i>block of code</i>
6. Type	<i>int</i>
7. Size	<i>2 bytes</i>
- Three levels of Datatypes
  1. Hardware data types
  2. Virtual data types
  3. ABSTRACT DATA TYPES



THANK YOU