

DATA STRUCTURES AND ALGORITHMS

DATA STRUCTURES ARE A WAY TO ORGANIZE
INFORMATION IN SUCH A WAY THAT WE CAN
DO USEFUL THINGS WITH IT

COMPUTING IS ALL ABOUT PERFORMING
OPERATIONS ON INFORMATION

THE USE OF DATA STRUCTURES IS TO HELP
PERFORM OPERATIONS EFFICIENTLY

DATA STRUCTURES TRY TO:

MAKE COMMON OPERATIONS FAST

MAKE DIFFICULT OPERATIONS POSSIBLE

OCCUPY LESS SPACE AND STILL
REPRESENT THE COMPLEXITY OF INFORMATION
AND ITS INTERRELATIONSHIPS IN AN INTUITIVE WAY

DATA STRUCTURES LEND ITSELF TO EFFICIENT
ALGORITHMS

DATA STRUCTURES FORM THE
CORE IN MANY STANDARD ALGORITHMS

DATA STRUCTURES AND
ALGORITHMS GO HAND IN
HAND

DATA STRUCTURES CAN BE SPECIALIZED FOR CERTAIN TASKS

A **SET** MIGHT BE USEFUL
FOR EXTREMELY FAST
MEMBERSHIP AND
CONTAINMENT QUERIES

COMPILERS USE **HASH
TABLES** AS LOOK UP TABLES
FOR OPERATIONS SUCH AS
RUNTIME METHOD BINDING

GRAPHS ARE USED TO
REPRESENT RELATIONSHIPS
SUCH AS ON SOCIAL
NETWORKING SITES

STACKS CAN BE USED FOR
UNDO FUNCTIONALITY IN
APPLICATIONS AS WELL AS
THE BACK FUNCTIONALITY
IN BROWSERS

INDEX DATA STRUCTURES
SUCH AS A **SUFFIX TREE**
OR AND **INVERTED INDEX**
ARE USED IN SEARCH
ENGINE INDEXING

DATA STRUCTURES
INFLUENCE ALGORITHMS AS
MUCH AS ALGORITHMS
INFLUENCE THE DESIGN OF
DATA STRUCTURES

DATA STRUCTURES VS ABSTRACT DATA TYPES

DATA STRUCTURES VS ABSTRACT DATA TYPES

ABSTRACT DATA TYPES ARE MATHEMATICAL MODELS OF DATA TYPES, WHERE THE DATA TYPE IS DEFINED BY HOW IT IS USED I.E. FROM THE POINT OF VIEW OF THE USER

THESE DEFINE THE OPERATIONS TO BE PERFORMED ON DATA, AND WHAT THE EXPECTED BEHAVIOR OF THOSE OPERATIONS ARE

DATA STRUCTURES ARE CONCRETE REPRESENTATIONS OF DATA FROM THE POINT OF VIEW OF AN IMPLEMENTOR

THIS SPECIFIES THE ACTUAL IMPLEMENTATION OF THE STRUCTURE IN CODE TO MEET THE EXPECTED BEHAVIOR

AN ABSTRACT DATA TYPE
CAN BE DEFINED AS A
"CLASS OF OBJECTS WHOSE
LOGICAL BEHAVIOR IS
DEFINED BY A SET OF VALUES
AND A SET OF OPERATIONS"

IT DOES NOT SPECIFY HOW THE TYPE
WILL ACTUALLY EXHIBIT THAT BEHAVIOR

THAT IS WHERE DATA STRUCTURES
COME IN