An Introduction to Algorithms

By

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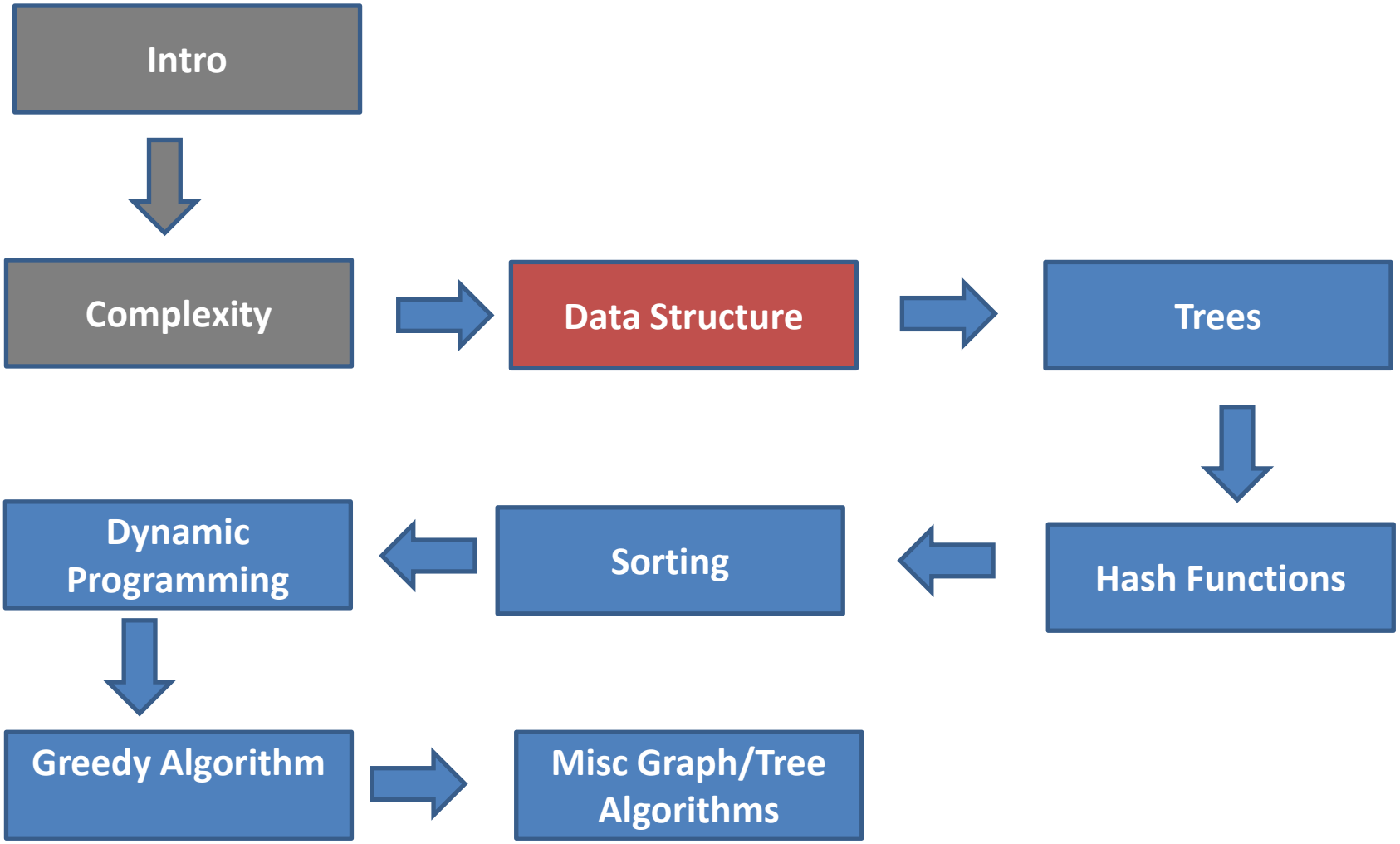

Intro
Complexity
Data Structure
Trees
Hash Functions
Sorting
Dynamic Programming
Greedy Algorithm
Misc Graph/Tree Algorithms

Data Structure

- A *construct* that can be defined within a programming language to store a collection of data
  - one may store some data in an array of integers, an array of objects, or an array of arrays

Abstract Data Type (ADT)

- Definition: a collection of *data* together with a set of *operations* on that data
  - specifications indicate *what* ADT operations do, but not *how* to implement them
  - data structures are part of an ADT's implementation
- Programmer can use an ADT without knowing its implementation.

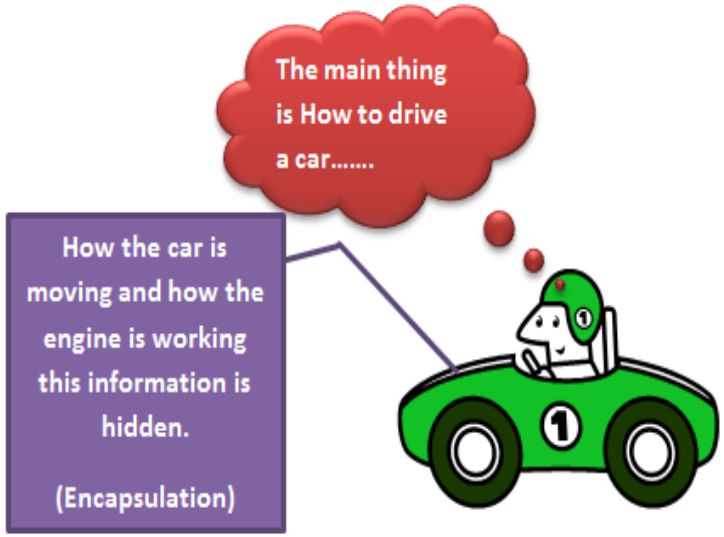
Typical Operations on Data

- Add data to a data collection
- Remove data from a data collection
- Ask questions about the data in a data collection. E.g., what is the value at a particular location, and is x in the collection?

Why ADT

- Hide the unnecessary details
- Help manage software complexity
- Easier software maintenance
- Functionalities are less likely to change
- Localised rather than global changes

Data Abstraction



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