Algorithms and Data

Ken Baclawski
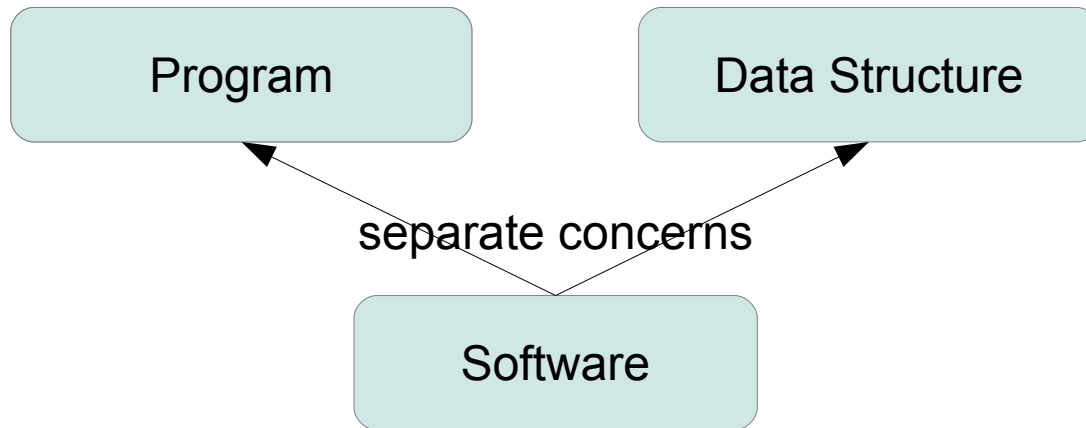College of Computer and Information Science
Northeastern University

What is software semantics?

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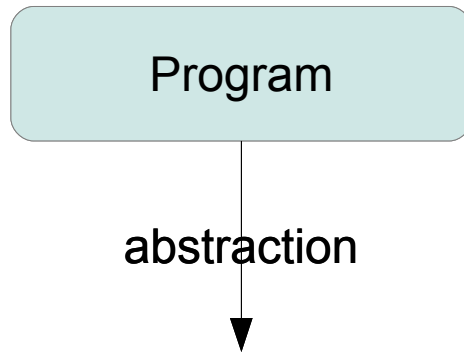
Software
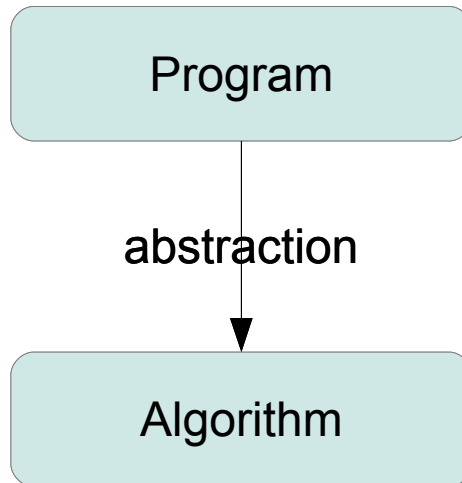
What is software semantics?

Program

Data Structure

separate concerns

Software

What is software semantics?

Program

Data Structure

What is software semantics?

Program

What is software semantics?

Program

abstraction

What is software semantics?

Program

abstraction

Algorithm
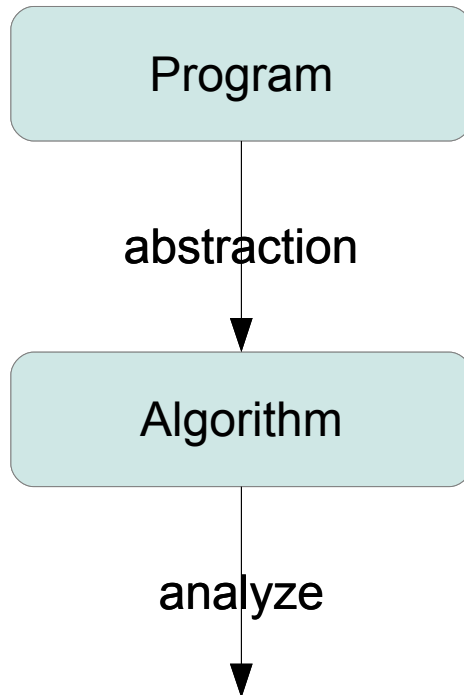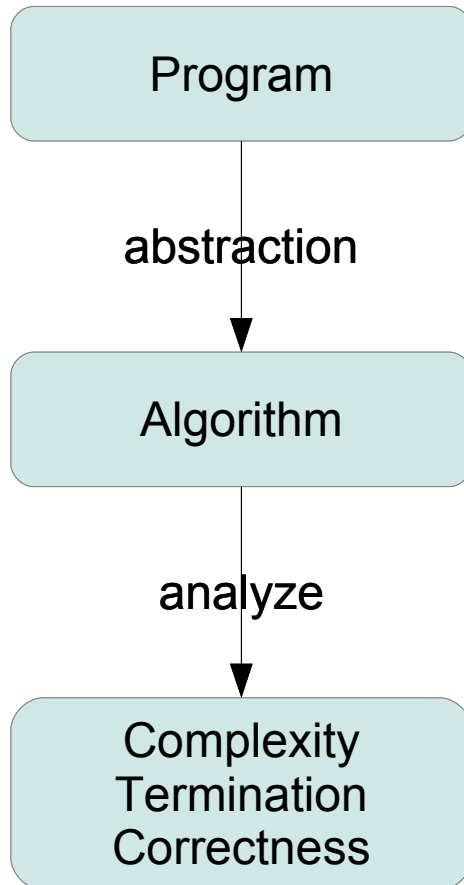
The difference between a program and an algorithm is that an algorithm is a mathematical structure and a program is not. One can prove theorems about an algorithm; one cannot do this for a program.
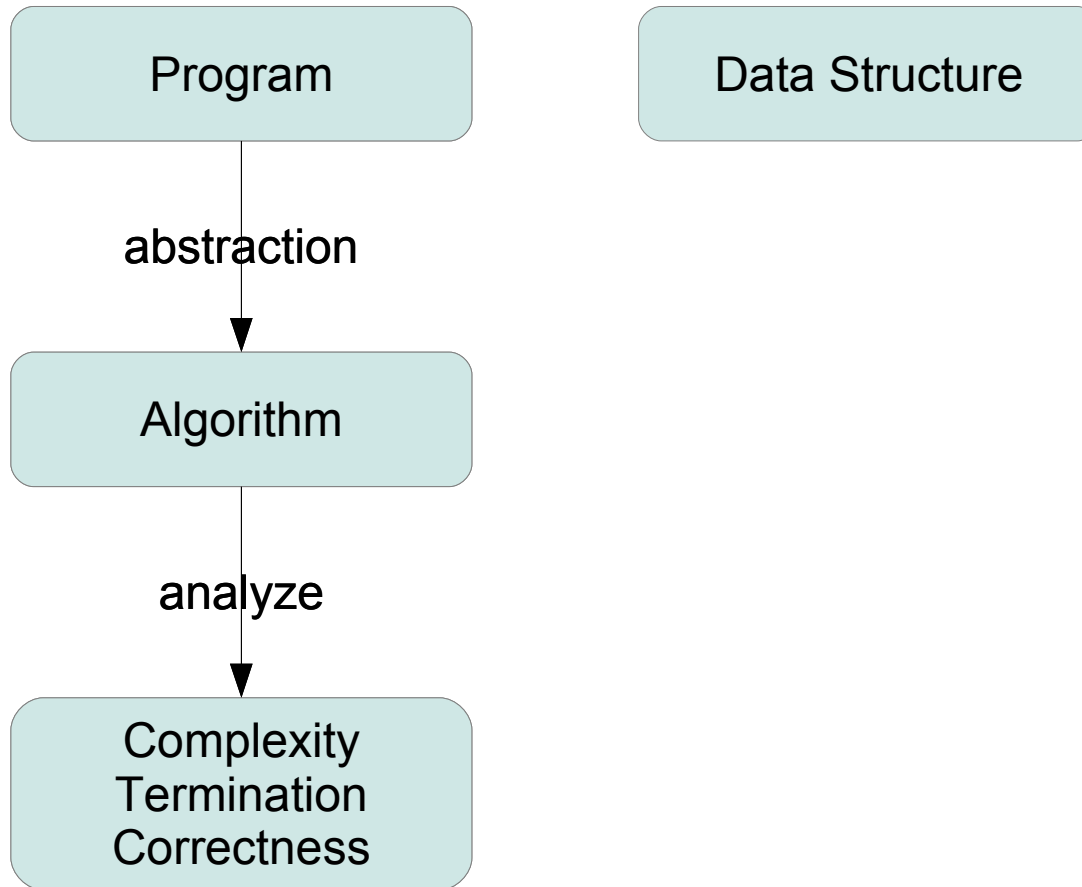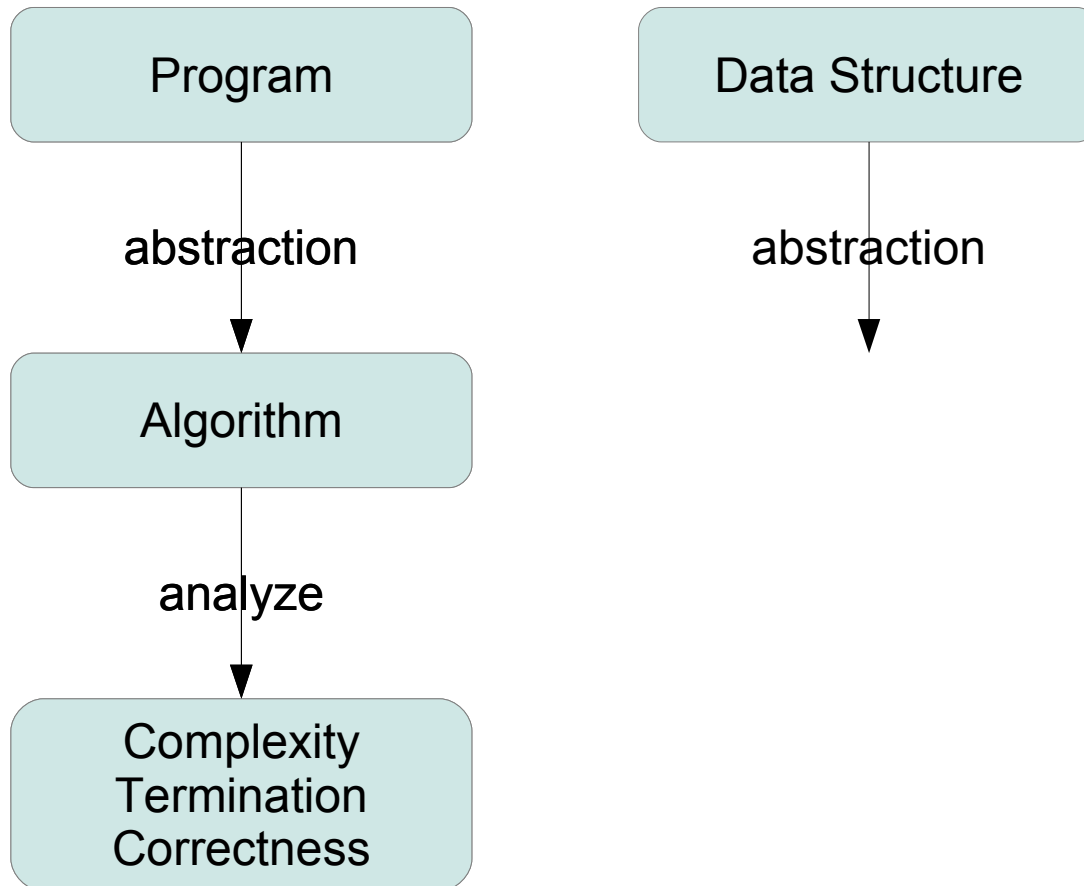
What is software semantics?

Program

abstraction

Algorithm

analyze

What is software semantics?

Program

↓ abstraction

Algorithm

↓ analyze

Complexity
Termination
Correctness

What is software semantics?

Program

|
abstraction
↓

Algorithm

|
analyze
↓

Complexity
Termination
Correctness

Data Structure

What is software semantics?

Program

abstraction

Algorithm

analyze

Complexity
Termination
Correctness

Data Structure

abstraction

What is software semantics?

Program → abstraction → Algorithm → analyze → Complexity Termination Correctness

Data Structure → abstraction → Ontology

What is software semantics?

Program	Data Structure
↓ abstraction	↓ abstraction
Algorithm	Ontology
↓ analyze	↓ analyze
Complexity Termination Correctness	

What is software semantics?

Program	Data Structure
↓ abstraction	↓ abstraction
Algorithm	Ontology
↓ analyze	↓ analyze
Complexity Termination Correctness	Complexity Consistency

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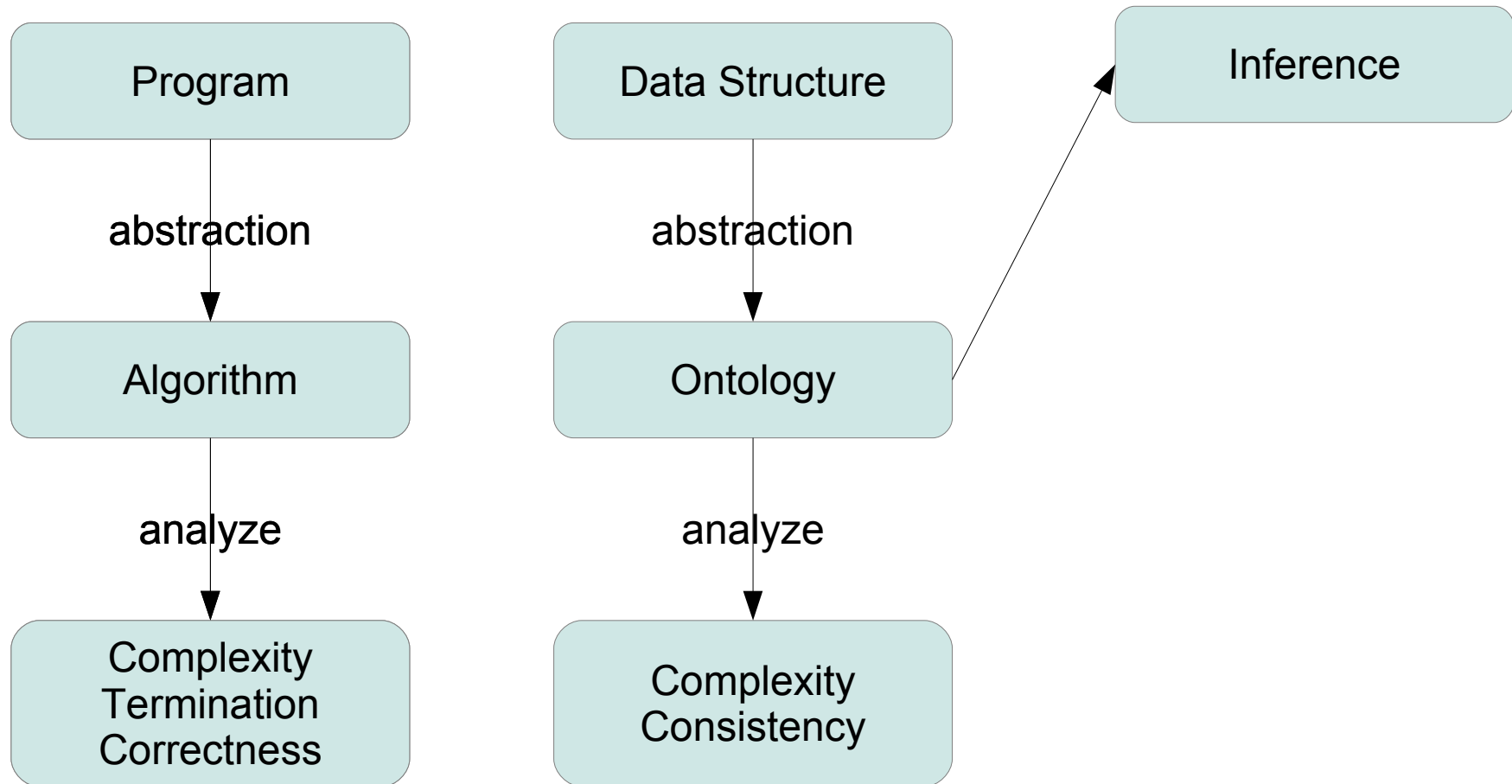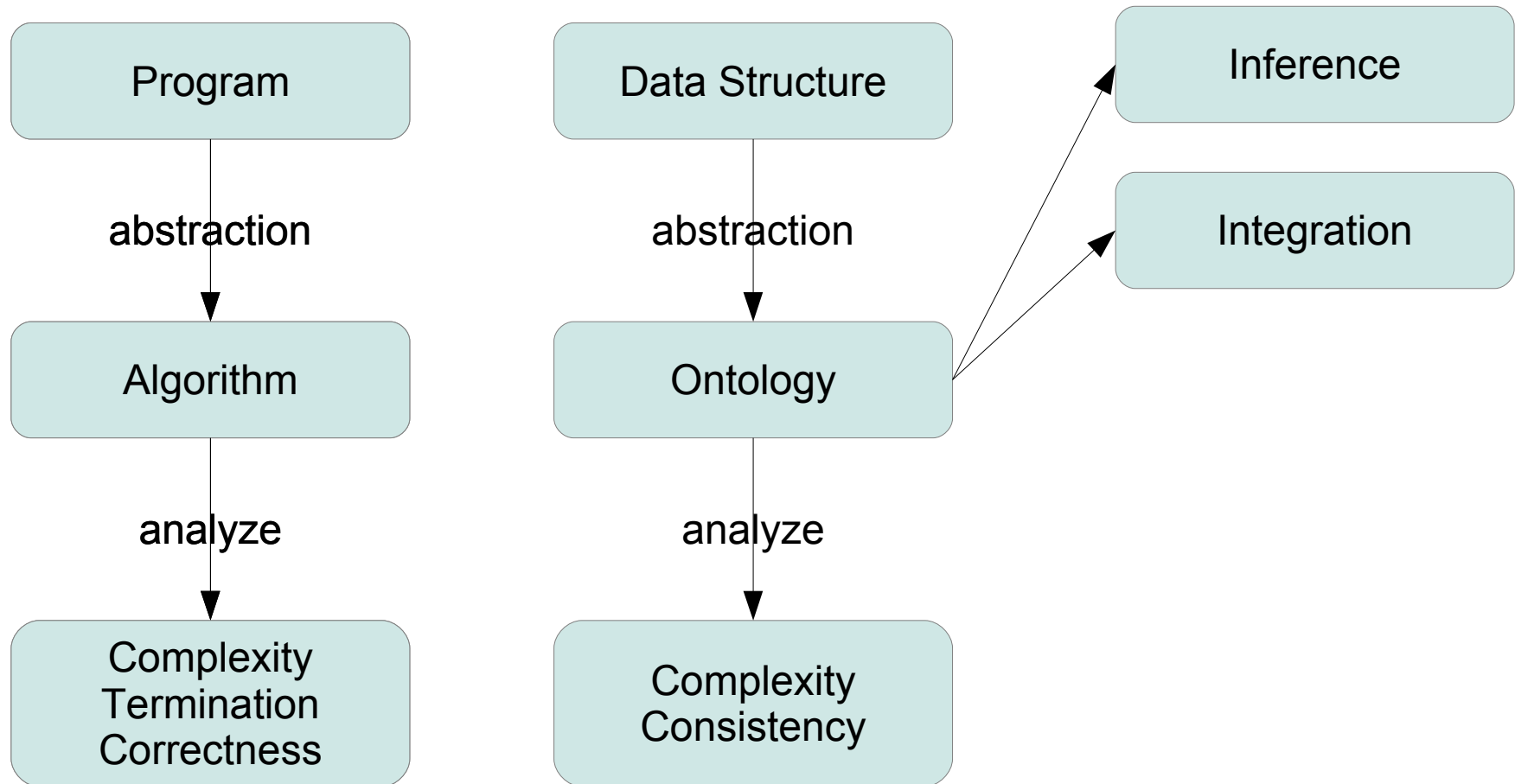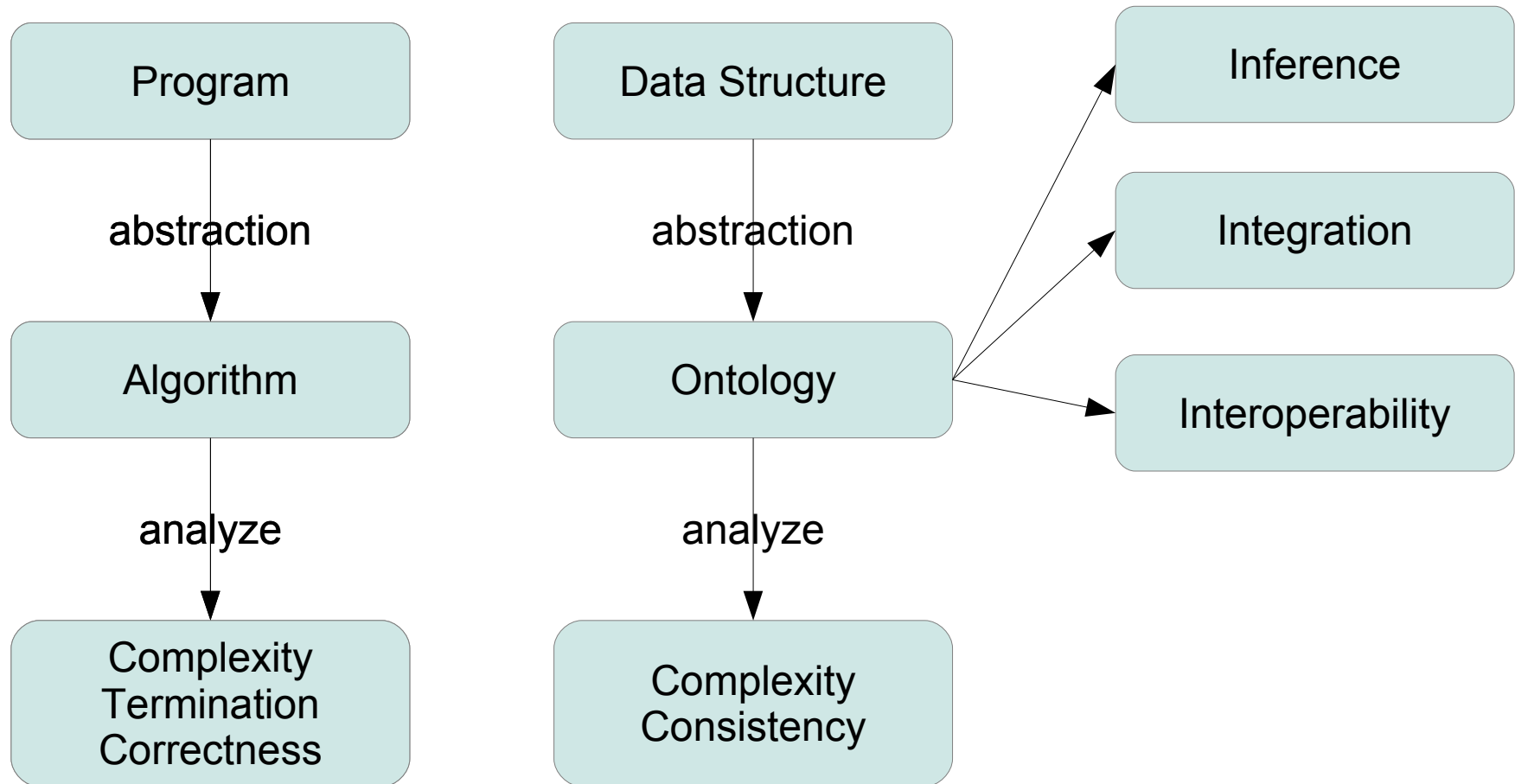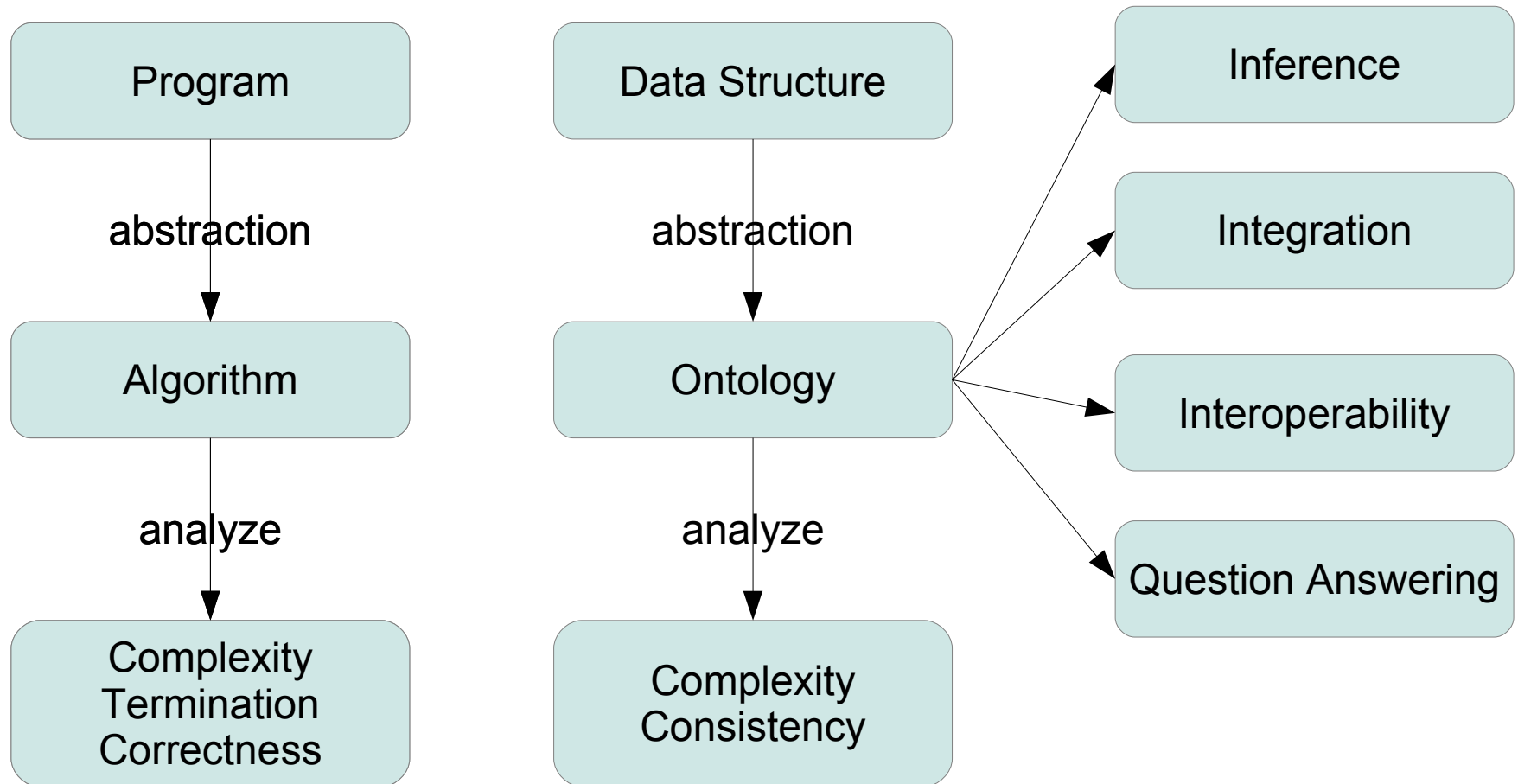
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