Hierarchical Data Structures

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What are types?

Types define an ontology

Ontology:

"What exists?"

"What is a thing?"

"What categories can we sort existing things into?"

What are types?

Types are defined by sets of valid operations

Integers:

❖ Can be added and subtracted

❖ Can be multiplied and divided

❖ Produce an integer when 1 is added to them

Lists:

❖ Can be concatenated

❖ Can have items appended to them

❖ Have a first item

How are lists defined?

Inductively:

- ❖ (empty) is a list

- ❖ if x is a list then (cons y x) is a list

How are sets defined?

Inductively:

- ❖ (empty) is a set

- ❖ (singleton x) is a set

- ❖ if x is a set and for all i in x, i is not in y, then (union y x) is a set