A theory T in standard formalization is a pair (**Lang**,**Axioms**), where:

**Lang** is a first-order language with the following components:

* A set of variables V.
* A set of non-logical constants C.
* A set of logical constants, which includes the following symbols:
  + The connectives: ¬, ∨, ∧, →, ↔.
  + The quantifiers: ∀, ∃.
  + The identity symbol =.
* A set of function symbols F, where each function symbol f has a natural number n as its rank, and for each n-tuple of terms t1, t2, ..., tn, the function symbol f applied to t1, t2, ..., tn is a term.
* A set of predicate symbols P, where each predicate symbol p has a natural number n as its rank, and for each n-tuple of terms t1, t2, ..., tn, the predicate symbol p applied to t1, t2, ..., tn is a formula.

A is a set of formulas in **L**. The formulas in **Axioms** are called the axioms of T.

A theory T is said to be satisfiable if there exists a model M of T. A model M of T is a structure M = (D, ⊦) such that:

* D is a non-empty set called the domain of M.
* ⊦ is an interpretation function that assigns to each constant c in C an element d of D, to each function symbol f in F an n-ary function f^M from D^n to D, and to each predicate symbol p in P an n-ary relation p^M over D.
* For each axiom α in **Axioms**, α is true in M, where "true in M" is defined inductively as follows:
  + Variables are interpreted as themselves.
  + ¬α is true in M if α is not true in M.
  + α ∨ β is true in M if α is true in M or β is true in M (or both).
  + α ∧ β is true in M if α is true in M and β is true in M.
  + α → β is true in M if α is not true in M or β is true in M.
  + ∀xα(x) is true in M if for all elements d of D, α(d) is true in M.
  + ∃xα(x) is true in M if there exists an element d of D such that α(d) is true in M.

If there exists no model of T, then T is said to be unsatisfiable.