1 Predicate Logic

Predicates are statements involving variables (x > 3, "Student x is eating lunch.")

x > 3
x is considered the subject of the statement.
x, or the Predicate, is greater than 3 (of a property.)
p(x) can be called the value of the propositional function p at x.

Once the value is assigned to x, p(x) becomes a proposition and has a truth value.

p(x) for x > 3

p(4): sets x = 4. 4 > 3, which is true.
p(2): sets x = 2. 2 > 3, which is false.

2 N-ary Predicate

It is a statement with n variables.
$p(x_1, x_2, ..., x_n)$, which is the value of the propositional function p at the nth tuple.

3 Quantifiers

Keywords: all, some, many, none, few

There are two types:

1. Universal ∀xp(x): A predicate is true for every element under consideration.

   p(x) for all values of x in the domain, for all x p(x), or for every x p(x)

   This statement is false if and only if p(x) is not always true. The element that makes p(x) false is a counterexample.

2. Existential ∃xp(x): A predicate is true for there is one or more elements under consideration.

   There exists an element x in the domain such that p(x) = true. Also can be "for some, for at least one, there exists, there is."
   There is an x such that p(x), there is at least one x such that p(x), for some x p(x)