

Normal Form (9A)

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Horn Clause

	Disjunction form	Implication form	Read intuitively as
Definite clause	$\neg p \vee \neg q \vee \dots \vee \neg t \vee u$	$u \leftarrow p \wedge q \wedge \dots \wedge t$	assume that, if p and q and ... and t all hold, then also u holds
Fact	u	u	assume that u holds
Goal clause	$\neg p \vee \neg q \vee \dots \vee \neg t$	$false \leftarrow p \wedge q \wedge \dots \wedge t$	show that p and q and ... and t all hold [note 1]

https://en.wikipedia.org/wiki/Horn_clause

Conjunctive Normal Form

a formula is in conjunctive normal form (CNF) or clausal normal form if it is a conjunction of one or more clauses, where a clause is a disjunction of literals; otherwise put, it is an AND of ORs.

As a normal form, it is useful in automated theorem proving. It is similar to the product of sums form used in circuit theory.

All conjunctions of literals and all disjunctions of literals are in CNF, as they can be seen as conjunctions of one-literal clauses and conjunctions of a single clause, respectively.

As in the disjunctive normal form (DNF), the only propositional connectives a formula in CNF can contain are and, or, and not.

The not operator can only be used as part of a literal, which means that it can only precede a propositional variable or a predicate symbol.

https://en.wikipedia.org/wiki/Conjunctive_normal_form

Disjunctive Normal Form

A logical formula is considered to be in DNF if and only if it is a disjunction of one or more conjunctions of one or more literals.

A DNF formula is in full disjunctive normal form if each of its variables appears exactly once in every conjunction.

As in conjunctive normal form (CNF), the only propositional operators in DNF are and, or, and not.

The not operator can only be used as part of a literal, which means that it can only precede a propositional variable.

https://en.wikipedia.org/wiki/Disjunctive_normal_form

Canonical Normal Form

One application of Boolean algebra is digital circuit design. The goal may be to minimize the number of gates, to minimize the settling time, etc.

There are sixteen possible functions of two variables, but in digital logic hardware, the simplest gate circuits implement only four of them: conjunction (AND), disjunction (inclusive OR), and the respective complements of those (NAND and NOR).

Most gate circuits accept more than 2 input variables; for example, the spaceborne Apollo Guidance Computer, which pioneered the application of integrated circuits in the 1960s, was built with only one type of gate, a 3-input NOR, whose output is true only when all 3 inputs are false.

https://en.wikipedia.org/wiki/Canonical_normal_form

Argument

https://en.wikipedia.org/wiki/Horn_clause

References

- [1] <http://en.wikipedia.org/>
- [2]