



CS 228 : Logic in Computer Science

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Recap of Basics

- ▶ A formula φ is satisfiable when ...
- ▶ A formula φ is valid when ...
- ▶ A formula φ is satisfiable iff $\neg\varphi$ is not valid.
- ▶ Two formulae φ_1 and φ_2 are equivalent iff ...
- ▶ Two formulae φ_1 and φ_2 are equisatisfiable iff ...
- ▶ A disjunction of literals $L_1 \vee L_2 \vee \dots L_n$ is valid iff ...
- ▶ A conjunction of literals $L_1 \wedge L_2 \wedge \dots L_n$ is satisfiable iff ...

Normal Forms : CNF Validity

Let $\varphi = C_1 \wedge C_2 \wedge \dots \wedge C_n$ be in CNF.

- ▶ Checking if φ is satisfiable is NP-complete.
- ▶ Checking if φ is valid is polynomial time. Why?
- ▶ Question raised in class : If validity is polytime, so should be satisfiability. Is this true?