CS 228 : Logic in Computer Science

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Recap of Basics

- A formula φ is satisfiable when ...

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- A formula φ is satisfiable when ...
- A formula φ is valid when ...

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- A formula φ is satisfiable iff $\neg\varphi$ is not valid.

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- Two formulae φ_1 and φ_2 are equivalent iff . . . Same Truth Table
- Two formulae φ_1 and φ_2 are equisatisfiable iff . . . Same satisfiability status, need not be logically equivalent.

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- A disjunction of literals $L_1 \vee L_2 \vee \ldots L_n$ is valid iff . . .
- A conjunction of literals $L_1 \wedge L_2 \wedge \ldots L_n$ is satisfiable iff . . .

Any one is true for all assignment.

all are true for any one assignment

Normal Forms : CNF Validity

Let $\varphi = C_1 \wedge C_2 \wedge \cdots \wedge C_n$ 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?