CS245 2019 Outline

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Propositional logic: syntax (connectives, well-formed formulas)

**CS connections:** translations from English to propositional logic

Propositional logic: semantics (truth-value assignments)

Proving arguments valid or invalid in propositional logic

Logic laws, normal forms, adequate set of connectives

**CS applications:** logic gates, circuit design, code simplification

**CS connections:** Formal (natural) deduction

Soundness and completeness of natural deduction

**CS applications:** Automated theorem proving in propositional logic: Resolution, Davis-Putnam Procedure

**CS + biology applications:** Logic and DNA Computing
Logic and Computation (B)

- Midterm
- Predicate logic: syntax (quantifiers, well-formed formulas)
- **CS connections**: translations from English to predicate logic
- Predicate logic: semantics (interpretations)
- Proving argument validity or invalidity in predicate logic
- **CS connection**: Formal (natural) deduction for predicate logic
- **CS applications**: Automated theorem proving - Resolution for predicate logic
- **CS connections**: Undecidability of satisfiability of predicate logic
- Peano arithmetic, Gödel’s Incompleteness Theorem
- **CS connections**: Program verification