Logic and Computation (A)

- 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, circuit minimization, 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, Godel’s Incompleteness Theorem
- **CS connections**: Program verification