# Modern History of Logic

- 1847, Boole, "The Mathematical Analysis of logic"
  1854, Boole, "The investigations of the Laws of Thought"
  Boole's work on logic of classes (sets), good ideas, but many errors
- 1870, Jevons, "Elementary Lessons in Logic" (corrected Boole's work)
- 1877, MacColl, Started symbolic approach to logic
- 1879, Frege, Axioms and rules for higher-order logic (relation quantifiable)
- 1880's, Pierce, Axiomatic charac. of logic of classes, statement/relation logic
- 1880's, Schröder, "Algebra of logic", used truth-table like ideas
- 1901, Russel, Frege's axioms too power (leads to contradiction)
  Frege's logic can express, "Class with members all classes that don't belong to themselves"
  Then this class belongs to itself iff it doesn't belong to itself.
- 1910-13, Whitehead & Russel, "Principia of Mathematics"
  Axiomatized higher-order logic based on Peano's notations & Freg's work

- 1915, Lowenheim, $1^{st}$ order sentence satisfiable iff exists countable model
- 1920, Post, Completeness of prop. logic axioms given in Principia
- 1928, Łukasiewicz, Simplified Freg's prop. logic system, know as Ł system

- 1928, Hilbert & Ackermann, "Foundations of Theoretical Logic"
  Hilbert saw the value for $1^{st}$ order logic and developed axiomatized system

- 1929, Skolem, $1^{st}$ order formula unsatisfiable iff a finite collection of ground instances (prop. clauses) not satisfiable. ⟩ New way of looking at 1915 result
- 1930, Herbrand, formalized notation of ground instances
- 1930, Gödel, Completeness of $1^{st}$-order logic system of Hilbert.
- 1930's, Truth or derivability of $1^{st}$-order sentence is undecidable.
- 1949, Linial & Post, Completeness/independence of set of axioms is undecidable
- 1950's, Davis-Putnam, Resolution based algo for satisfiability
- 1963, J.A. Robinson, Resolution based on most general unifiers for $1^{st}$ order