

Example 1

It is a model A for a 4-element set of atomic formulas, where S:

$$A(A) = 1, A(B) = 1, A(C) = 0, A(D) = 1.$$

- What is the smallest set F(S), which corresponds to the definition of a set of formulas? (see slide 5 of the current slide collection for this definition)?
- Determine whether the following theory follows from this model A:
 $((A \rightarrow B) \wedge (C \vee \sim D)) \vee \sim(D \vee \sim A)$
- Determine whether by bullet proof this theory tautological, satisfiable or contradictory

Example 2

Place the following statements only by the two logical operators \wedge and \neg as well as by appropriate bracketing. Give to solve the inference rules used to

- $A \rightarrow B$
- $A \vee B$
- $(A \wedge B) \vee C$
- $(A \vee B) \vee C$
- $A \wedge B \rightarrow \sim C$

f) Which of the formulas a) - e) in conjunctive or disjunctive normal form?

Which of the following statements are tautological, satisfiable or contradictory?

- $A \rightarrow B$
- $(A \wedge B) \vee (B \wedge A)$
- $A \wedge A$
- $(A \wedge B) \vee (\sim(A \wedge B))$
- $((A \rightarrow B) \wedge (C \vee \sim D)) \vee \sim(\sim D \wedge \sim A)$
- $A \rightarrow (B \rightarrow C)$