

# CSED342 Assignment 8

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By turning this assignment, I agree by the POSTECH honor code and declare that all of this is my own work.

## Problem 2a

$$KB = \{ (A \vee B) \rightarrow \neg C, \neg(\neg A \vee C) \rightarrow D, A \}$$

$$① (A \vee B) \rightarrow \neg C \text{ is } \neg(A \vee B) \vee \neg C = (\neg A \wedge \neg B) \vee \neg C = (\neg A \vee \neg C) \wedge (\neg B \vee \neg C)$$

$$② \neg(\neg A \vee C) \rightarrow D \text{ is } (\neg A \vee C) \vee D$$

$$\text{Now, the new KB is } \{ \underbrace{(\neg A \vee \neg C)}_{A \rightarrow \neg C} \wedge \underbrace{(\neg B \vee \neg C)}_{B \rightarrow \neg C}, \underbrace{(\neg A \vee C) \vee D}_{A \rightarrow C \vee D} \}$$

Then, using Modus Ponens,

$$\frac{A \rightarrow \neg C, A}{\neg C}, \frac{A \rightarrow (\neg C \rightarrow D), A}{\neg C \rightarrow D}, \text{ so } \frac{\neg C \rightarrow D, \neg C}{D} \text{ so } D \text{ can be derived.}$$

## Problem 2b

$$KB = \{ \underbrace{A \vee B}_{\neg B \vee C}, \underbrace{B \rightarrow C}_{\neg(A \vee C) \vee D}, \underbrace{(A \vee C) \rightarrow D}_{(\neg A \wedge \neg C) \vee D} \}$$

$$\text{New KB} = \{ \underbrace{A \vee B}_{\neg B \vee C}, \underbrace{\neg B \vee C}_{\neg(A \vee C) \vee D}, \underbrace{(\neg A \vee D) \wedge (\neg C \vee D)}_{(\neg A \vee D) \wedge (\neg C \vee D)} \}$$

using resolution,

$$\frac{B \vee A, \neg A \vee D}{B \vee D} \text{ or } \frac{D \vee B, \neg B \vee C}{D \vee C} \text{ or } \frac{D \vee C, \neg C \vee D}{D \vee D = D} \text{ also } D \text{ is derived by resolution}$$