# CSE541      EXERCISE 11

**Chapters 10, 11, 12** Read and learn all examples and exercises in the chapters as well!

**QUESTION 1**   Use the (complete) proof system **GL** from chapter 11 to prove that

$$\models (\neg(a \cap \neg b) \Rightarrow (\neg a \cup b)).$$

**QUESTION 2**

Find a counter-model determined by a decomposition tree $\mathbf{T}_{\rightarrow A}$ in **GL** for a formula $A$ below.

$$A = ((a \cap \neg b) \Rightarrow (\neg a \cup b))$$

**QUESTION 3**   Prove the COMPLETENESS theorem for GL. Assume that the Soundness has been already proved.

**QUESTION 4**

Show that

$$\vdash_{\mathbf{LI}} ((\neg A \cup B) \Rightarrow (A \Rightarrow B)).$$