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In addition to the below given problem, kindly study the first chapter of the lecture notes. Referenced problems can also be found there. In the lecture only marked problems will be discussed; for solutions to the other problems please contact Georg Moser.

- 1) Problem 2.2.
- 2) Problem 2.3.
- 3) Problem 2.6.
- 4) Show Theorem 2.3.

Hint: First consider the cases where (i) A is a contradition or (ii) B is a tautology. For the remaining case proceed by induction on the number of atoms that occur in A and B.

5) Consider the following alternative to Definition 2.7:

$$\begin{split} &\operatorname{Res}_1^0(\mathcal{C}) := \mathcal{C} & \operatorname{Res}_1^{n+1}(\mathcal{C}) := \operatorname{Res}(\operatorname{Res}_1^n(\mathcal{C})) \\ &\operatorname{Res}_1^*(\mathcal{C}) := \bigcup_{n \geqslant 0} \operatorname{Res}_1^n(\mathcal{C}) \;. \end{split}$$

Is this definition equivalent to the original one? In particular try to establish whether we have $\Box \in \mathsf{Res}^*(\mathcal{C})$ iff $\Box \in \mathsf{Res}_1^*(\mathcal{C})$ for any clause set \mathcal{C} . (*)