课后作业（Assignments）

一、阅读（Reading）

1. 阅读教材.

2. 课外阅读：

Propositional Logic（3）-by Gerard O' Regan.pdf

二、问题解答（Problems）

1. . 教材 P30：题 13（2）

2. 教材 P30：题 14（1）

3. 教材 P30：题 15（5）

4. 教材 P30：17 题

5. Prove that the following rule, called the Destructive Dilemma rule, can be derived from the original and derived proof rules.

Premises: ¬ C ∨ ¬ D , A → C , B → D

Conclusion: ¬ A ∨ ¬ B.

6. Two students came up with the following different wffs to formalize the statement "If A then B else C."

(A ∧ B) ∨ (¬ A ∧ C).

(A → B) ∧ (¬ A → C).

Prove that the two wffs are equivalent by finding formal proofs for the following two statements.

a. ((A ∧ B) ∨ (¬ A ∧ C)) → ((A → B) ∧ (¬ A → C)).

b. ((A → B) ∧ (¬ A → C)) → ((A ∧ B) ∨ (¬ A ∧ C)).

7. Consider, for example, the following argument that aims to prove that Superman does not exist.

If Superman were able and willing to prevent evil, he would do so. If Superman were unable to prevent evil he would be impotent; if he were unwilling to prevent evil he would be malevolent; Superman does not prevent evil. If superman exists he is neither malevolent nor impotent; therefore Superman does not exist.

三、项目实践（Programming）(Optional)

编程实现一个命题逻辑推理系统：输入形式化的推理描述，计算机自动判定该推理是否有效.