

INFO I201
Homework 2
Due 05/14/13

- **Reading assignment:** Sections 2.2-2.5.
- **Computer problems :**

1. Problems 2.1, 2.2, 2.3, and 2.4 from Tarski's World. Nothing to turn in.

- **Regular problems:**

1. Which of the following formulas are satisfiable? (Use truth trees, in case the formula is satisfiable you need to give an example that makes the formula true.)

- $(A \vee B) \longrightarrow (A \wedge B)$
- $(A \wedge B) \longrightarrow (A \vee B)$

2. Check the formulas in the problem above for tautology using truth trees. Recall that in case the formula is not a tautology you need to provide a counterexample that makes the formula false.

3. Show that $\neg P \longrightarrow (Q \longrightarrow R)$ and $Q \longrightarrow (P \vee R)$ are logically equivalent using truth trees.

4. We define two new binary connectives as follows: $A \mid B$ (read "A NAND B") and $A \downarrow B$ (read "A NOR B"). $A \mid B$ is true when either A or B or both are false and false otherwise. $A \downarrow B$ is true when both A and B are false and false otherwise.

- Construct the truth table for \mid
- Construct the truth table for \downarrow .
- Show that $A \mid B$ is logically equivalent to $\neg(A \wedge B)$.
- Show that $A \downarrow B$ is logically equivalent to $\neg(A \vee B)$.