

INFO I201
Homework 3
Due 05/16/13

• **Computer problems :**

1. Problems 2.5-2.10, 2.12, 2.17 from Tarski's World. Nothing to turn in.

• **Regular problems:**

1. Are the following sets of formulas consistent?

(a) $\{A, A \rightarrow B, B \vee C, D\}$

(b) $\{A \wedge B, B \rightarrow C, \neg C \wedge A\}$

(c) $\{A \rightarrow B, B \rightarrow C, A, \neg C\}$

2. Check the validity of the following argument. Either prove that it is valid or show by a counterexample that it is invalid.

$$\begin{array}{l} B \rightarrow (\neg S \vee M) \\ S \vee M \\ M \rightarrow H \\ \hline B \rightarrow H \end{array}$$

3. In each case translate the given statement into propositional logic using the letters given.

(i) It snows, only if the wind blows from the Northeast or weather is very cold. (S,W,C).

(ii) For you to win the contest it is necessary that you have the only winning ticket. (W,T)

(iii) I will remember to send you the address if and only if you send me an e-mail message. (A,M)

(iv) If the president knew about the diversion of funds to the rebels, then he deliberately violated the law and does not deserve to be president; but if he did not know about the diversion of funds, then he did not have control of his subordinates and does not deserve to be president. (K,V,D,C)

4. Consider the following argument:

“The Republicans will lose power only if the dollar drops or the debt increases. If the dollar drops and the debt increases, then the Republicans will lose power. The debt does not increase if the dollar does not drop. The dollar drops. Therefore the Republicans will lose power.” (Use: L, D, I .)

Is this argument valid? If yes, give a proof, else give a counterexample.