

SFWR ENG 2F04 Assignment 1: Propositional Semantics

Due: 1130 Tuesday September 25, 2001

1. Huth+Ryan p. 5-6 4, 5, 10 (c),(e),(g)
2. Huth+Ryan p. 42-44 1(f),(l);4, 7, 10, 13
3. Huth+Ryan p. 49-51 3, 5, 7
4. Huth+Ryan p. 75-76 4, 10
5. Things to do on a Desert Island

a) Check to see if NAND is:

- i) commutative
- ii) associative

From what you have learned above, would you consider $p \text{ NAND } q \text{ NAND } r$ be compact representation of a WFF?

- b) Write down the simplest tautology that uses only the propositional variable p and the binary operator NAND (i.e. find the simplest formula using p and NAND that is logically equivalent to \top , the constant symbol for T).
- c) Write down a propositional formula using only p and NAND that is a contradiction (i.e. find a formula using p and NAND that is equivalent to \perp , the constant symbol for F).
- d) Finish off the building the world with NAND example by demonstrating that \rightarrow and \leftrightarrow can be written in terms of NAND or other operators that have already been written in terms of NAND.
- e) Implement a formula that is equivalent to $\neg(r \rightarrow (\neg p \vee q) \wedge q)$ that only uses the NAND operator.