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CSL302 — Programming Languages — Quiz 2
January 24, 2014 — 10 minutes — Maximum Marks: 10

Q1. (10 marks) **Definitional interpreter for boolean expressions.** Consider a simple language for boolean expressions consisting of boolean constants T and F, propositional variables $P_1, P_2, \ldots$; and closed under (unary) negation, and binary operations of conjunction ("and") and disjunction ("or"). Specify a definitional interpreter for this language, filling in the spaces below.

Abstract Syntax

$b, b_1, b_2 \in B$ ::= T | F /* const */
| P /* prop variables */
| ¬b /* negation */
| $b_1 \wedge b_2$ /* and */
| $b_1 \vee b_2$ /* or */

Semantic Domain

Boolean

Auxiliary Concepts

$\sigma \in TruthAssgn \stackrel{def}{=}$ T → True, F → False, ¬b → ¬(TruthAssgn σ)

Semantic Functions

truth: (B → TruthAssgn) → Boolean

Definition of function *truth*

of
T → True
F → False
¬b → ¬(truth b)
$b_1 \wedge b_2$ → (truth b_1) ∧ (truth b_2) → mathematical and
$b_1 \vee b_2$ → (truth b_1) ∨ (truth b_2) → mathematical or