CS 131 – Spring 2017 – Lab 2

Question 1 Which of the following formulae are equivalent to each other?

(a) $p \to (q \to r)$

(b) $q \to (p \to r)$

(c) $(p \to q) \wedge (p \to r)$

(d) $(p \wedge q) \to r$

(e) $p \to (q \wedge r)$

Question 2 Show that $(p \to q) \to r$ and $p \to (q \to r)$ are not logically equivalent.

Question 3 Determine the truth value of each of these statements if the domain consists of all integers, if the domain consists of all positive integers, and lastly if the domain consists of all natural numbers.

(a) $\forall n(n + 1 > n)$

(b) $\exists n(2n = 3n)$

(c) $\exists n(n = -n)$

(d) $\forall n(3n \leq 4n)$

Question 4 Translate each of these statements into logical expressions in three different ways by varying the domain and by using predicates with one and with two variables.

(a) A student in your school has lived in Vietnam.

(b) A student in your school knows Java, Prolog, and C++.

(c) Everyone in your class enjoys Thai food.