CSE 390Z: Mathematics for Computation Workshop

Week 1 Workshop Problems

Conceptual Review

(a) What is the difference between an atomic and compound proposition?

(b) What does the *biconditional* $p \leftrightarrow q$ mean?

(c) Re-write this statement as an if...then... statement

I am at the beach if it is sunny outside.

(d) Re-write this statement as an if...then... statement

It is sunny outside only if I am at the beach

1. Translation: Running from my problems

Define a set of three atomic propositions, and use them to translate the following sentences.

(i) I am going for a run and it is snowing, or it is not snowing.

(ii) If it's snowing and it's Friday, I am not going for a run.

(iii) I am going for a run only if it is not Friday.

2. Translation: Age is just a number

Define a set of two atomic propositions, and use them to translate the following sentences.

  (i) If Kai is older than thirty, then Kai is older than twenty.

 (ii) Kai is older than thirty only if Kai is older than twenty.

(iii) Whenever Kai is older than thirty, Kai is older than twenty.

(iv) Kai being older than twenty is necessary for Kai to be older than thirty.

3. Truth Table

Draw a truth table for $(p \to \neg q) \to (r \oplus q)$

4. Propositions in the wild

Give a real-life example of propositions p, q, and r such that p and q together imply r, but neither p nor q alone imply r.