

CSE 311: Foundations of Computing I

Section 1: Logic

1. Exclusive Or

For each of the following, decide whether inclusive-or or exclusive-or is intended:

- (a) Experience with C or Java is required.
- (b) Lunch includes soup or salad.
- (c) Publish or perish
- (d) To enter the country you need a passport or voter registration card.

2. Translations

For each of the following, define propositional variables and translate the sentences into logical notation.

- (a) I will remember to send you the address only if you send me an e-mail message.
- (b) If berries are ripe along the trail, hiking is safe if and only if grizzly bears have not been seen in the area.
- (c) Unless I am trying to type something, my cat is either eating or sleeping.

3. Teatime

Consider the following sentence:

If I am drinking tea then I am eating a cookie, or, if I am eating a cookie then I am drinking tea.

- (a) Define propositional variables and translate the sentence into an expression in logical notation.
- (b) Fill out a truth table for your expression.
- (c) Based on your truth table, classify the original sentence as a contingency, tautology, or contradiction.

4. Truth Tables

Write a truth table for each of the following:

(a) $(p \oplus q) \vee (p \oplus \neg q)$

(b) $(p \vee q) \rightarrow (p \oplus q)$

(c) $p \leftrightarrow \neg p$

5. Circuitous

Translate the following circuit into a logical expression.

