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.
4. Truth Tables
Write a truth table for each of the following:

(a) \((p \oplus q) \lor (p \oplus \neg q)\)
(b) \((p \lor q) \rightarrow (p \oplus q)\)
(c) \(p \leftrightarrow \neg p\)

5. Circuitous
Translate the following circuit into a logical expression.

\[\text{NOT} \quad \text{NOT} \quad \text{AND} \quad \text{OR} \quad \text{NOT} \quad \text{OUT}\]