

CSE 311: Foundations of Computing I

Section: Logic Solutions

Exclusive Or

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

- (a) Experience with C or Java is required.

Solution: Inclusive Or.

- (b) Lunch includes soup or salad.

Solution: Exclusive Or.

- (c) Publish or perish

Solution: Exclusive Or.

- (d) To enter the country you need a passport or voter registration card.

Solution: Inclusive Or.

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.

Solution:

p : I will remember to send you the address

q : You send me an e-mail message

$$\boxed{p \rightarrow q}$$

- (b) If berries are ripe along the trail, hiking is safe if and only if grizzly bears have not been seen in the area.

Solution:

p : Berries are ripe along the trail

q : Hiking is safe

r : Grizzly bears have not been seen in the area

$$\boxed{p \rightarrow (q \leftrightarrow r)}$$

Truth Tables

(a)

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

Solution:

p	q	$p \oplus q$	$p \oplus \neg q$	$(p \oplus q) \vee (p \oplus \neg q)$
T	T	F	T	T
T	F	T	F	T
F	T	T	F	T
F	F	F	T	T

(b)

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

Solution:

p	q	$p \vee q$	$p \oplus q$	$(p \vee q) \rightarrow (p \oplus q)$
T	T	T	F	F
T	F	T	T	T
F	T	T	T	T
F	F	F	F	T

(c)

$$p \leftrightarrow \neg p$$

Solution:

p	$\neg p$	$p \leftrightarrow \neg p$
T	F	F
F	T	F