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Individual Assignments #58

Assignment 1.2; 8, 14, 16, 20, 32

Q8:

a) Kwame will not take a job in industry and not go to graduate school.
b) Yoshiko does not know Java or Calculus.
c) James is not young or strong.
d) Rita will not move to Oregon and Washington.

Q:14

It is not a tautology, a tautology is always True. If we let p be False and q be True then we get the expression:

- $(\neg F \wedge (F \rightarrow T)) \rightarrow \neg T$

This evaluates to:

- $T \wedge T \rightarrow F$
- $T \rightarrow F$

Which is False. A tautology is never False.

Q16:

$p \leftrightarrow q$ is True when p = q.

Let A = $(p \wedge q)$ and let B = $(\neg p \wedge \neg q)$. Let C = $A \vee B$

A is True only when p and q is True, if they are False, A is False.

B is True only when p and q are False. If they are True, B is False.

Hence A and B are exactly opposite and connected by a disjunctive. Thus, C is only True when p = q and so is equivalent to $p \leftrightarrow q$.

Q20:

$p \leftrightarrow q$ is True when p = q.

$p \oplus q$ is True when p is exactly not equal to q, or when p is the opposite of q or p != q. Thus the negation of $p \oplus q$ is p = q and so they are logically equivalent.

Q32:

$(p \wedge q) \rightarrow r$ is True when p is True buy q and r are False.

Under these same conditions, $(p \rightarrow r) \wedge (q \rightarrow r)$ evaluates as $F \wedge T$ which is False. Thus they are not logically equivalent.