

Some Full Truth-Tables from Lecture

Philosophy 12A
February 16, 2008

1 Truth-Tables for Individual Statements (Logical Truth, *etc.*)

Here are solutions to some of the problems from lecture about logical truth, logical falsity, and contingency of individual LSL sentences. In the truth-tables, the **blue** columns are the main connectives, and the others are quasi-columns. I have numbered the columns in the order in which I have done the computations (actually, my computer program made these!).

3. ' $(S \rightarrow R) \& (S \& \sim R)$ ' is *logically false (self-contradictory)*:

R	S	$(S \rightarrow R) \& (S \& \sim R)$		
T	T	T	F	F
T	F	T	F	F
F	T	F	F	T
F	F	T	F	F
		2	4	3 1

4. ' $((E \rightarrow F) \rightarrow F) \rightarrow E$ ' is *contingent*:

E	F	$((E \rightarrow F) \rightarrow F) \rightarrow E$		
T	T	T	T	T
T	F	F	T	T
F	T	T	T	F
F	F	T	F	T
		1	2	3

12. ' $[(H \rightarrow N) \& (T \rightarrow N)] \rightarrow [(H \vee T) \rightarrow N]$ ' is *logically true (tautologous)*:

H	N	T	$[(H \rightarrow N) \& (T \rightarrow N)] \rightarrow [(H \vee T) \rightarrow N]$			
T	T	T	T	T	T	T
T	T	F	T	T	T	T
T	F	T	F	F	T	F
T	F	F	F	T	T	F
F	T	T	T	T	T	T
F	T	F	T	T	T	F
F	F	T	F	F	T	F
F	F	F	T	T	T	T
		3	5	2	6	1 4

15. ' $[(F \vee E) \& (G \vee H)] \leftrightarrow [(G \& E) \vee (F \& H)]$ ' is *contingent*:

E	F	G	H	$[(F \vee E) \& (G \vee H)] \leftrightarrow [(G \& E) \vee (F \& H)]$			
T	T	T	T	T	T	T	T
T	T	T	F	T	T	T	F
T	T	F	T	T	F	T	T
T	T	F	F	T	F	F	F
T	F	T	T	T	T	T	F
T	F	T	F	T	T	T	F
T	F	F	T	T	F	F	F
T	F	F	F	T	F	F	F
F	T	T	T	T	T	F	T
F	T	T	F	T	T	F	T
F	T	F	T	T	F	F	F
F	T	F	F	T	F	F	F
F	F	T	T	F	T	T	F
F	F	T	F	F	T	T	F
F	F	F	T	F	F	F	F
F	F	F	F	F	F	F	F
		4	6	3	7	2	5 1

2 Truth-Tables for Pairs of Statements (Equivalence, *etc.*)

3. ' $H \leftrightarrow \sim G$ ' and ' $(G \& H) \vee (\sim G \& \sim H)$ ' are *contradictory*:

G	H	$H \leftrightarrow \sim G$	$(G \& H) \vee (\sim G \& \sim H)$
T	T	⊥	T
T	⊥	T	⊥
⊥	T	T	⊥
⊥	⊥	⊥	T
		2 1	3 5 2 4 1

4. ' $N \& (A \vee \sim E)$ ' and ' $\sim A \& (E \vee \sim N)$ ' are *inconsistent* (but *not* contradictory):

A	E	N	$N \& (A \vee \sim E)$	$\sim A \& (E \vee \sim N)$
T	T	T	T	⊥
T	T	⊥	⊥	⊥
T	⊥	T	T	⊥
T	⊥	⊥	⊥	⊥
⊥	T	T	⊥	T
⊥	T	⊥	⊥	T
⊥	⊥	T	T	⊥
⊥	⊥	⊥	⊥	T
			3 2 1	2 4 3 1

6. ' $R \& (Q \vee S)$ ' and ' $(S \vee R) \& (Q \vee R)$ ' are *consistent* (but *not* equivalent):

Q	R	S	$R \& (Q \vee S)$	$(S \vee R) \& (Q \vee R)$
T	T	T	T	T
T	T	⊥	T	T
T	⊥	T	⊥	T
T	⊥	⊥	⊥	⊥
⊥	T	T	T	T
⊥	T	⊥	⊥	T
⊥	⊥	T	⊥	⊥
⊥	⊥	⊥	⊥	⊥
			2 1	2 3 1

8. ' $Q \rightarrow \sim (K \vee F)$ ' and ' $(K \& Q) \vee (F \& Q)$ ' are *contradictory*:

F	K	Q	$Q \rightarrow \sim (K \vee F)$	$(K \& Q) \vee (F \& Q)$
T	T	T	⊥	T
T	T	⊥	T	⊥
T	⊥	T	⊥	T
T	⊥	⊥	T	⊥
⊥	T	T	⊥	T
⊥	T	⊥	T	⊥
⊥	⊥	T	T	⊥
⊥	⊥	⊥	T	⊥
			3 2 1	2 3 1