CRITICAL THINKING

Workshop #6

Assessing Arguments with Truth Tables

Professor David Emmanuel Gray

Explanation of Annotations for These Solutions

The problem is in black Futura Std type.

The solution is in red Garamond Premier Pro type.

Any commentary is in blue Futura Std type.

Please Note: When solving these types of problems for a quiz or an exam, you are expected to format your own solutions in a similar manner as I have done on these slides. Failure to do so may result in a small penalty for not following instructions or even a larger penalty because I do not understand your solution.

Part I Solutions

1. 1. $p \rightarrow (q \,\&\, r)$.
   2. $\sim p$.

   $\therefore$ $\sim r$.

				P_1	P_2	C
p	q	r	$q \,\&\, r$	$p \rightarrow (q \,\&\, r)$	$\sim p$	$\sim r$
T	T	T	T	T	F	F
T	T	F	F	F	F	T
T	F	T	F	F	F	F
T	F	F	F	F	F	T
F	T	T	T	T	T	**F**
F	T	F	F	T	T	T
F	F	T	F	T	T	**F**
F	F	F	F	T	T	T

An *invalid* argument. There *are* lines (that is, lines 5 and 7) where the premises are all true but the conclusion is false. So it *is possible* for the premises to be true with a false conclusion.

Part I Solutions

2. 1. $p \vee q$.
   2. $\sim p$.

   $\therefore$ q.

	C	P_1	P_2
p	q	$p \vee q$	$\sim p$
T	T	T	F
T	F	T	F
F	T	T	T
F	F	F	T

A *valid* argument. There is *no* line where the premises are all true but the conclusion is false. That is, whenever the premises are all true (which happens in line 3), the conclusion is also true. So it is *absolutely impossible* for the premises to be true with a false conclusion.

Comment: This is a common argument pattern known as *the disjunctive syllogism*.

Part I Solutions

3. 1. $p \rightarrow q$.
   2. $q \rightarrow r$.

   $\therefore$ $p \rightarrow r$.

			P1	P2	C
p	q	r	$p \rightarrow q$	$q \rightarrow r$	$p \rightarrow r$
T	T	T	T	T	T
T	T	F	T	F	F
T	F	T	F	T	T
T	F	F	F	T	F
F	T	T	T	T	T
F	T	F	T	F	T
F	F	T	T	T	T
F	F	F	T	T	T

A *valid* argument. There is *no* line where the premises are all true but the conclusion is false. That is, whenever the premises are all true (which happens in lines 1, 5, 7, and 8), the conclusion is also true. So it is *absolutely impossible* for the premises to be true with a false conclusion.

Comment: This is a common argument pattern known as *the hypothetical syllogism*.

Part II Solutions

1. Either the Internet is **killing** journalism or journalists are **adapting**. Well, the audience of news consumers not **widening** is a necessary condition of the internet **killing** journalism. But the audience of news consumers is **widening**! Therefore, journalists are **adapting**. (K, A, W)

1. $K \vee A$.
2. $K \rightarrow \sim W$.
3. W.

$\therefore$ A.

A *valid* argument. There is *no* line where the premises are all true but the conclusion is false. That is, whenever the premises are all true (which happens in line 5), the conclusion is also true. So it is *absolutely impossible* for the premises to be true with a false conclusion.

	C	P_3		P_1	P_2
K	A	W	~W	K ∨ A	K → ~W
T	T	T	F	T	F
T	T	F	T	T	T
T	F	T	F	T	F
T	F	F	T	T	T
F	T	T	F	T	T
F	T	F	T	T	T
F	F	T	F	F	T
F	F	F	T	F	T

Part II Solutions

2. Is the Internet is killing journalism? Well, the Internet has **widened** the audience of news consumers and it has put more news at people's **fingertips**, and both these things are sufficient for the Internet to not be **killing** journalism. So, the Internet is not **killing** journalism. (W, F, K)

1. $(W \,\&\, F) \,\&\, [(W \,\&\, F) \rightarrow \sim K]$.

$\therefore$ $\sim K$.

A *valid* argument. There is *no* line where the premises are all true but the conclusion is false. That is, whenever the premises are all true (which happens in line 2), the conclusion is also true. So it is *absolutely impossible* for the premises to be true with a false conclusion.

				C		P1
W	F	K	W & F	~K	(W & F) → ~K	(W & F) & [(W & F) → ~K]
T	T	T	T	F	F	F
T	T	F	T	T	T	T
T	F	T	F	F	T	F
T	F	F	F	T	T	F
F	T	T	F	F	T	F
F	T	F	F	T	T	F
F	F	T	F	F	T	F
F	F	F	F	T	T	F

Comment: The word "and" appears a lot in the argument, but *do not separate the conjuncts.* Use the "&" instead.

Next Class…

You will learn an alternative, more "natural" way to assess an argument's validity that uses argument patterns.