



Philosophy 220



Truth Tables for SL

Building Reference Columns

- ▶ Every horizontal line (row) of a truth table represents the way that the world could be.
- ▶ The reference columns collectively represent the totality of ways that the world could be with respect to the sentences of SL under scrutiny.
- ▶ So total truth conditions of a sentence whose only atomic component is P can be described by a truth table with only two rows:

P
T
F



Building Reference Columns

- ▶ Adding one more atomic sentence requires doubling the number of rows because Q could be true or false while P is true, and Q can be true or false while P false.

P	Q
T	T
T	F
F	T
F	F



Building Reference Columns

- ▶ Since each atomic sentence can have only one of two truth-value assignments (namely T and F), the number of total truth value permutations (and thus the number of rows of a truth table) is equal to 2^n , where n is the number of atomic sentences under scrutiny.



Building Content Columns

- ▶ In addition to the reference columns there should be one vertical line (column) of the truth-table for each truth-functional connective in the sentence(s) of SL under scrutiny.



Building a Truth-Table

- ▶ How many reference columns will the following sentence of SL require in a truth-table?
- ▶ $(A \ \& \ D) \vee \sim(\sim Q \equiv A)$



Building a Truth-Table

- ▶ How many reference columns will the following sentence of SL require in a truth-table? **3, one each for A, D and Q**
- ▶ $(A \ \& \ D) \vee \sim(\sim Q \equiv A)$



Building a Truth-Table

- ▶ How many rows will the following sentence of SL require in a truth-table?
- ▶ $(A \ \& \ D) \vee \sim(\sim Q \equiv A)$



Building a Truth-Table

- ▶ How many rows will the following sentence of SL require in a truth-table? **8: $2 \times 2 \times 2 = 8$**
- ▶ $(A \ \& \ D) \vee \sim(\sim Q \equiv A)$



Building a Truth-Table

- ▶ How many content columns will the following sentence of SL require in a truth-table?
- ▶ $(A \ \& \ D) \vee \sim(\sim Q \equiv A)$



Building a Truth-Table

- ▶ How many content columns will the following sentence of SL require in a truth-table? **5, one for each truth-functional connective**
- ▶ $(A \ \& \ D) \ \vee \ \sim(\sim Q \ \equiv \ A)$



Let's build a Truth-Table!



Reference Columns			The Sentence(s) Under Scrutiny				



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q					



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q					
T							
T							
T							
T							
F							
F							
F							
F							



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q					
T	T						
T	T						
T	F						
T	F						
F							
F							
F							
F							



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q					
T	T						
T	T						
T	F						
T	F						
F	T						
F	T						
F	F						
F	F						



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q					
T	T	T					
T	T	F					
T	F						
T	F						
F	T						
F	T						
F	F						
F	F						



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q					
T	T	T					
T	T	F					
T	F	T					
T	F	F					
F	T	T					
F	T	F					
F	F	T					
F	F	F					



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	&	V	~	~	≡
T	T	T					
T	T	F					
T	F	T					
T	F	F					
F	T	T					
F	T	F					
F	F	T					
F	F	F					



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T					
T	T	F					
T	F	T					
T	F	F					
F	T	T					
F	T	F					
F	F	T					
F	F	F					



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T				
T	T	F					
T	F	T					
T	F	F					
F	T	T					
F	T	F					
F	F	T					
F	F	F					



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T				
T	T	F	T				
T	F	T					
T	F	F					
F	T	T					
F	T	F					
F	F	T					
F	F	F					



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T				
T	T	F	T				
T	F	T					
T	F	F					
F	T	T					
F	T	F					
F	F	T					
F	F	F					



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A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T				
T	T	F	T				
T	F	T	F				
T	F	F	F				
F	T	T	F				
F	T	F	F				
F	F	T	F				
F	F	F	F				



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T			F	
T	T	F	T			T	
T	F	T	F			F	
T	F	F	F			T	
F	T	T	F			F	
F	T	F	F			T	
F	F	T	F			F	
F	F	F	F			T	



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T			F	F
T	T	F	T			T	
T	F	T	F			F	
T	F	F	F			T	
F	T	T	F			F	
F	T	F	F			T	
F	F	T	F			F	
F	F	F	F			T	



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T			F	F
T	T	F	T			T	T
T	F	T	F			F	
T	F	F	F			T	
F	T	T	F			F	
F	T	F	F			T	
F	F	T	F			F	
F	F	F	F			T	



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T			F	F
T	T	F	T			T	T
T	F	T	F			F	F
T	F	F	F			T	T
F	T	T	F			F	T
F	T	F	F			T	F
F	F	T	F			F	T
F	F	F	F			T	F



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T			F	F
T	T	F	T			T	T
T	F	T	F			F	F
T	F	F	F			T	T
F	T	T	F			F	T
F	T	F	F			T	F
F	F	T	F			F	T
F	F	F	F			T	F



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T		T	F	F
T	T	F	T		F	T	T
T	F	T	F		T	F	F
T	F	F	F		F	T	T
F	T	T	F		F	F	T
F	T	F	F		T	T	F
F	F	T	F		F	F	T
F	F	F	F		T	T	F



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T		T	F	F
T	T	F	T		F	T	T
T	F	T	F		T	F	F
T	F	F	F		F	T	T
F	T	T	F		F	F	T
F	T	F	F		T	T	F
F	F	T	F		F	F	T
F	F	F	F		T	T	F



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T	T	T	F	F
T	T	F	T	T	F	T	T
T	F	T	F	T	T	F	F
T	F	F	F	F	F	T	T
F	T	T	F	F	F	F	T
F	T	F	F	T	T	T	F
F	F	T	F	F	F	F	T
F	F	F	F	T	T	T	F



Reference Columns			The Sentence(s) Under Scrutiny				
A	D	Q	(A & D)	V	[~	(~Q	≡A)]
T	T	T	T	T	T	F	F
T	T	F	T	T	F	T	T
T	F	T	F	T	T	F	F
T	F	F	F	F	F	T	T
F	T	T	F	F	F	F	T
F	T	F	F	T	T	T	F
F	F	T	F	F	F	F	T
F	F	F	F	T	T	T	F

