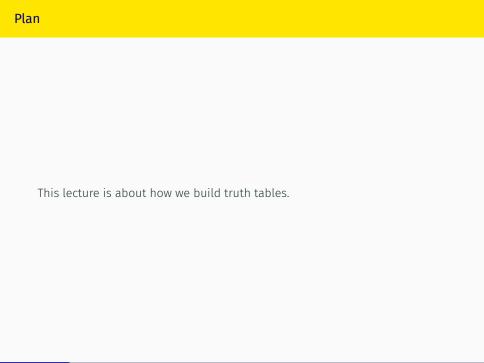
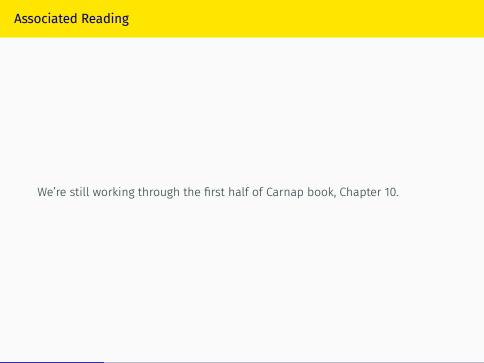
305 Lecture 16 - Building Truth Tables

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Four Main Connectives

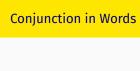
- Building truth tables requires, unfortunately, a small amount of memorization.
- In particular, you just have to memorize the truth tables for each of the connectives
- Equally unfortunately, justifying yourself using truth tables requires justifying these basic tables.
- · And as we'll see, that's not trivial.
- But that's for much down the line let's learn how to use these first, then we'll get to justifying them.

Negation Table

You should read it as saying that if A is T then $\neg A$ is F, and if A is F, then A is T.

The Conjunction Table

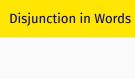
АВ	А∧В
ТТ	ттт
T F	TFF
FT	FFT
F F	FFF



• A conjunction is T if both conjuncts are T, and is F otherwise.

The Disjunction Table

АВ	A V B
ТТ	TTT
T F	TTF
FT	FTT
F F	FFF



 \cdot A disjunction is T if either disjunct is T, and is F otherwise.

The Conditional Table

$$\begin{array}{c|cccc} A & B & A \rightarrow B \\ \hline T & T & T & T \\ \hline T & F & T & F \\ F & T & F & T & F \\ \hline F & F & F & T & F \\ \end{array}$$

Material Implication

Note that these three sentences have exactly the same table.

АВ	$A\toB$	¬А∨В	\neg (A \land \neg B)
ТТ	T T T	FTTT	TFFT
T F	TFF	FTFF	FTTTF
FT	FTT	TFTT	T F F F T
F F	FTF	TFTF	TFFTF

This conditional is sometimes called material implication.

Oddities

It is certainly an odd interpretation of 'if' that makes these sentences turn out true.

- If I am 200 years old, then Michigan is part of Canada.
- · If I am in Los Angeles, then I am in Ann Arbor.

But they are both true on this table.

Arguments

- It turns out that interpreting the conditional this way makes the most sense of the role of conditionals in certain arguments, in particular to do with disjunctive syllogism.
- There is an allusion to this at the end of chapter 1 of Boxes and Diamonds.

