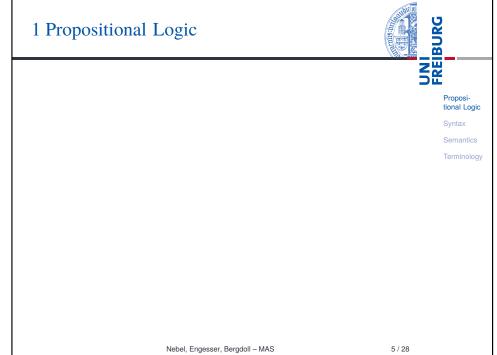
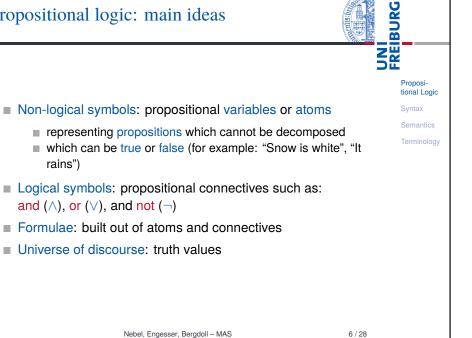
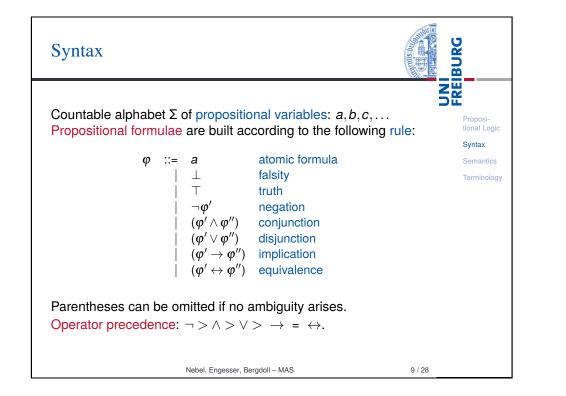


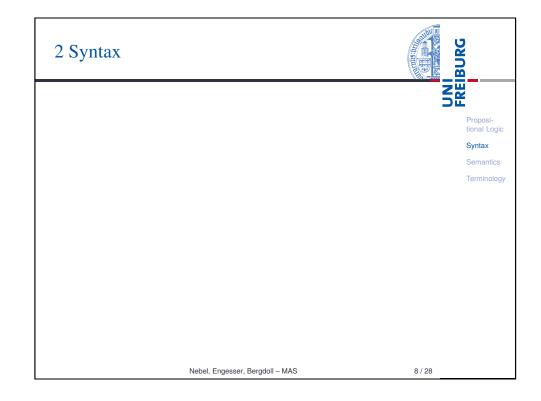
The logical approach	BURG
	FREI
Define a formal language: logical & non-logical symbols, syntax rules	Proposi- tional Logic Syntax
Provide language with compositional semantics:	Semantics
 Fix universe of discourse Specify how the non-logical symbols can be interpreted: interpretation Rules how to combine interpretation of single symbols Satisfying interpretation = model Semantics often entails concept of logical implication / entailment 	Terminolog
Specify a calculus that allows to derive new formulae from old ones – according to the entailment relation	
Nebel, Engesser, Bergdoll – MAS 2 / 28	

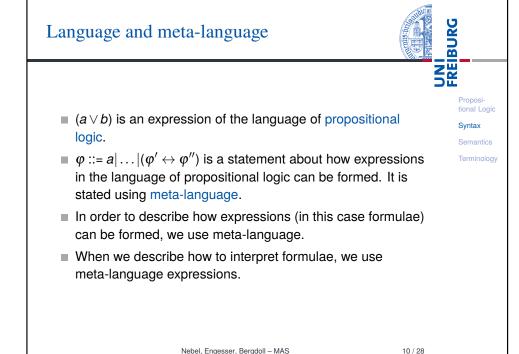


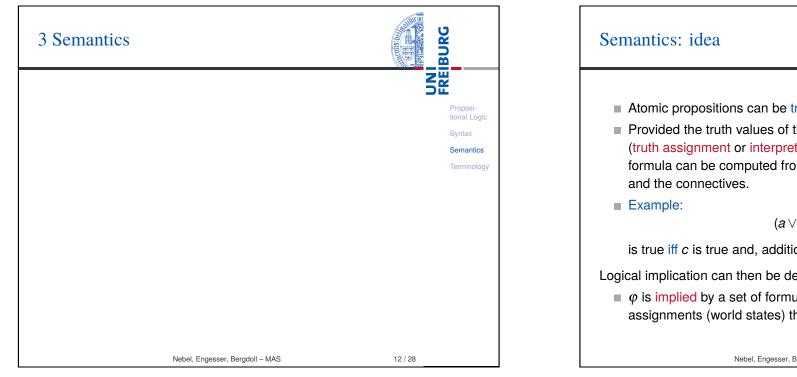
Propositional logic: main ideas

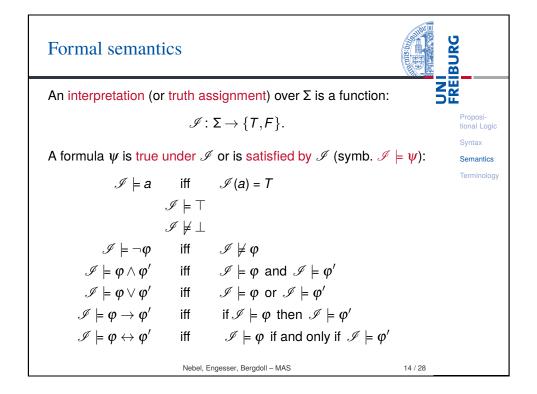


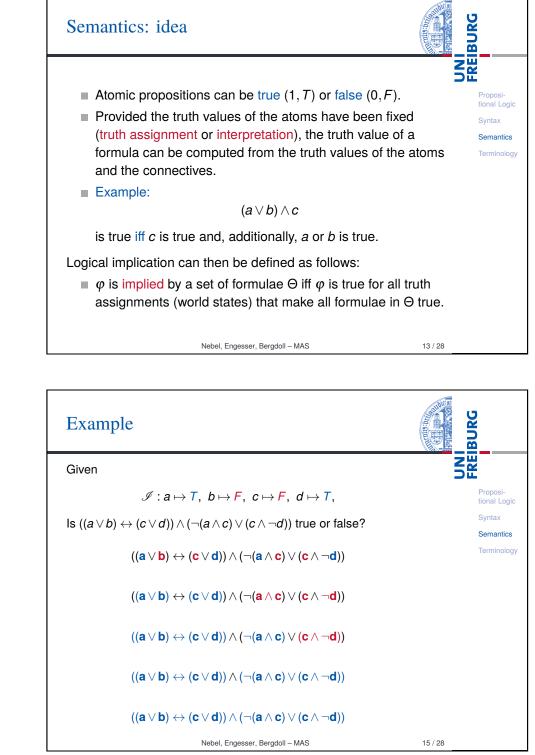




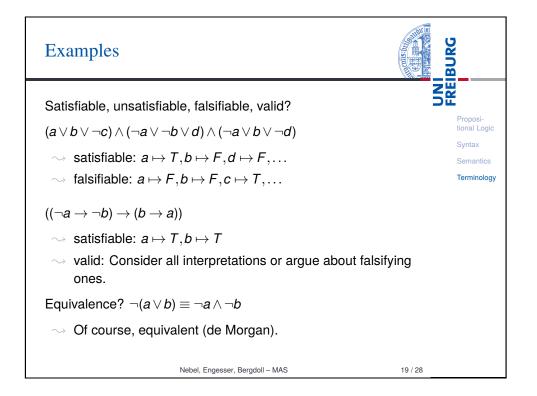


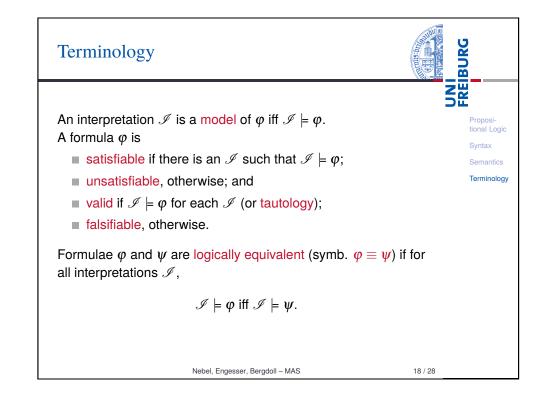


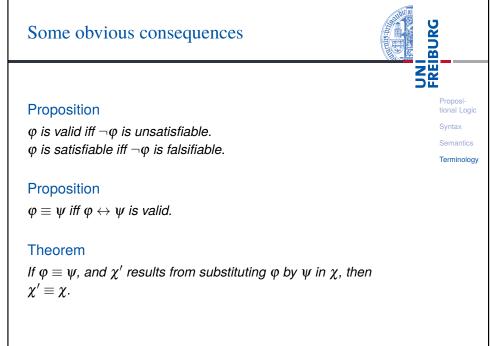




4 Terminology	FREBURG
	DE Proposi-
	tional Logic
	Syntax
	Semantics
	Terminology
Nebel, Engesser, Bergdoll – MAS	17 / 28







Nebel, Engesser, Bergdoll - MAS

Some equiv	alences						BURG
simplifications	$arphi ightarrow \psi$	≡	$ eg \phi \lor \psi$	$\phi \leftrightarrow \psi$	≡	$egin{array}{lll} (arphi ightarrow arphi) \wedge \ (arphi ightarrow arphi) ightarrow arphi) \end{array}$	Proposi- tional Logic
idempotency	$\boldsymbol{\varphi} \lor \boldsymbol{\varphi}$	\equiv	φ	$oldsymbol{arphi}\wedgeoldsymbol{arphi}$	\equiv	(1 1)	Syntax
commutativity			$\psi \lor \varphi$			$\psi \wedge \varphi$	Semantics
associativity				$(\varphi \wedge \psi) \wedge \chi$	\equiv	$\varphi \wedge (\psi \wedge \chi)$	Terminology
absorption	$\varphi \lor (\varphi \land \psi)$	\equiv	φ	$\boldsymbol{\varphi} \wedge (\boldsymbol{\varphi} \lor \boldsymbol{\psi})$	\equiv	φ	
distributivity	$\varphi \wedge (\psi \lor \chi)$	\equiv	$(oldsymbol{arphi}\wedgeoldsymbol{\psi})arphi$	$\varphi \lor (\psi \land \chi)$	\equiv	$(arphi ee \psi) \land$	
			$(arphi \wedge \chi)$			$(arphi ee \chi)$	
double negation	$ eg \neg \varphi$	\equiv	φ				
constants	$\neg \top$	\equiv	\perp	$\neg \bot$	\equiv	Т	
De Morgan	$ eg(\varphi \lor \psi)$	\equiv	$ eg \phi \land eg \psi$	$ eg(\varphi \wedge \psi)$	\equiv	$\neg \phi \lor \neg \psi$	
truth	arphi ee o o	\equiv	Т	$oldsymbol{arphi}\wedge op$	\equiv	φ	
falsity	$\phi \lor \bot$	\equiv	φ	$\phi \wedge \bot$	\equiv	\perp	
taut./contrad.	$oldsymbol{arphi} ee eg abla ee \phi$	\equiv	Т	$oldsymbol{arphi}\wedge eg \phi$	\equiv	\perp	
	Neb	el, Enç	gesser, Bergdoll – M	AS		21 / 28	

