



Phil. 1200: Critical
Thinking
Sentential Logic



Introduction to SL

Sentence Letters: A, B, C...

Used to translate sentences

Connectives: \sim , $\&$, \vee , \rightarrow , \leftrightarrow

Used to join sentences letters into complex formulas in SL

Brackets: ()

Used in complex formulas of SL



Introduction to SL

\sim (tilde means “not”, this is the negation sign in SL)

$\&$ (conjunction symbol)

\vee (disjunction symbol)

\rightarrow (if..., then... implications or conditional)

\leftrightarrow (...if and only if... bi-conditional)



WFF's in SL

1. All sentence letters are WFFs.
2. If ϕ is a WFF, then $\sim\phi$ is a WFF.
3. If ϕ and ψ are WFFs, then $(\phi\&\psi)$, $(\phi\vee\psi)$, $(\phi\rightarrow\psi)$, $(\phi\leftrightarrow\psi)$ are also WFFs.
4. Nothing else is a WFF.



Scope of connectives

The scope of a connective is all the WFF's that the connective directly connects or connects to.



Scope and main connectives

The scope of a connective is all the WFF's that the connective directly connects or connects to.

$P \& Q$

$\sim(P \& Q)$

$\sim(P \& Q) \rightarrow (R \leftrightarrow (B \vee J))$



Scope and main connectives

The scope of a connective is all the WFF's that the connective directly connects or connects to.

$P \& Q$

$\sim(P \& Q)$

$\sim(P \& Q) \rightarrow (R \leftrightarrow (B \vee J))$



WFF's in SL

A) $\sim P \& Q \sim$

B) $\sim(\sim A \rightarrow B)$

C) $\vee C$

D) $\sim(K \leftrightarrow (B \rightarrow A) \& C)$



Truth Tables

x $\sim x$

T **F**

F **T**

x	y	$x \& y$	$x \vee y$	$x \rightarrow y$	$x \leftrightarrow y$
T	T	T	T	T	T
T	F	F	T	F	F
F	T	F	T	T	F
F	F	F	F	T	T



Exercises

If Roger is nice, then he'll give his students a copy of the midterm.



Exercises

If Roger is nice, then he'll give his students a copy of the midterm.

R: Roger is nice.

M: Roger gives his students a copy of the midterm.



Exercises

If Roger is nice, then he'll give his students a copy of the midterm.

R: Roger is nice.

M: Roger gives his students a copy of the midterm.

$R \rightarrow M$



Exercises

All dogs are smelly and all cats are assholes or all dogs are not smelly and all cats are not assholes.



Exercises

All dogs are smelly and all cats are assholes or all dogs are not smelly and all cats are not assholes.

D: Dogs are smelly.

C: Cats are assholes.



Exercises

All dogs are smelly and all cats are assholes or all dogs are not smelly and all cats are not assholes.

D: Dogs are smelly.

C: Cats are assholes.

$(D \& C) \vee (\sim D \& \sim C)$



Exercises

- A) If a car is blue, then it is either big or shiny.
- B) Sam will go outside if and only if it is not raining or you pay him.
- C) Dinosaurs are extinct or they are hiding in caves very well.
- D) Bob went to the store and bought grapes or peas.