

HOW DO I TRANSLATE ENGLISH INTO (SENTENTIAL) LOGIC? PART 2

WEEK 1 . DEEPER DIVE

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harder translations . well-formed formulas .
main connective

RECALL:

CONNECTIVES ARE OPERATORS
WHICH COMBINE ONE OR MORE
SENTENCES TO GENERATE
COMPLEX SENTENCES.

THERE ARE 5: \wedge , \vee , \rightarrow , \leftrightarrow , \neg

SO HOW DO WE KNOW WHICH
CONNECTIVE TO USE?

INDICATOR WORDS

\wedge	AND, ALTHOUGH, BUT, UNLESS
\vee	OR, EITHER...OR
\rightarrow	IF...THEN, ONLY IF
\leftrightarrow	IF AND ONLY IF, NECESSARY AND SUFFICIENT, JUST IN CASE
\neg	IT'S NOT THE CASE THAT...

HOW SHOULD I INTERPRET $\neg C \wedge D$?

Translation manual:

C is "He's a white supremacist" and

D is "He's a racist."

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Does it mean:

"He's not a white supremacist but he's a racist"?

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Does it mean:

"He's not a white supremacist but he's a racist"?

Or does it mean:

"It's false that he's a white supremacist and he's a racist"?

HOW DO I COMPLEX UNAMBIGUOUS
SENTENCES WITH CONNECTIVES?

Use the rules for well-formed formulas (wffs)

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 $(\phi \wedge \psi)$, $(\phi \vee \psi)$, $(\phi \rightarrow \psi)$, and $(\phi \leftrightarrow \psi)$

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4. *and nothing else!*

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WHY'D I SWITCH FROM "A"
TO " ϕ "?

"A" IS A SENTENCE LETTER WHEREEAS " ϕ " IS
A WELL-FORMED FORMULA ITSELF. THIS
MEANS IT COULD BE "A" BY RULE 1, BUT
IT COULD ALSO BE " $(A \wedge B)$ "!

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$(\neg C \wedge D)$: "He's not a white supremacist but he's a racist"

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NOT A WFF!

$(\neg C \wedge D)$: "He's not a white supremacist but he's a racist"

$\neg(C \wedge D)$: "It's false that he's a white supremacist and he's a racist"

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$\sim R$ and $(P \leftrightarrow (P \wedge Q))$ are wff so $(\sim R \rightarrow (P \leftrightarrow (P \wedge Q)))$ is as well.

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$\sim R$ is a wff but $(P \leftrightarrow P \wedge Q)$ is not! So $(\sim R \rightarrow (P \leftrightarrow P \wedge Q))$ is not.

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ASK YOURSELF: IS
THIS UNIQUELY
READABLE?

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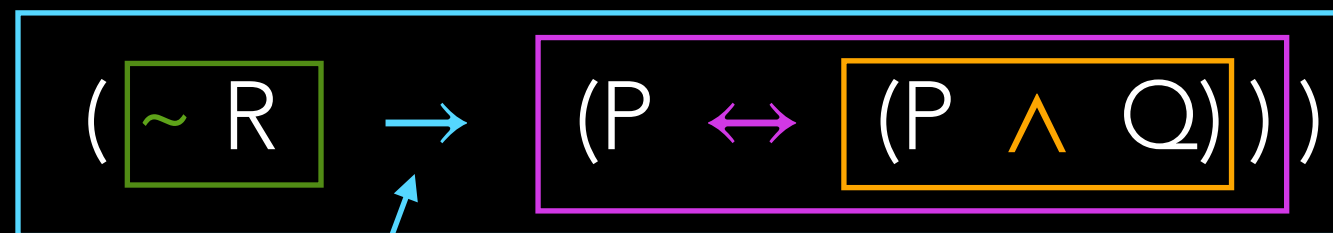
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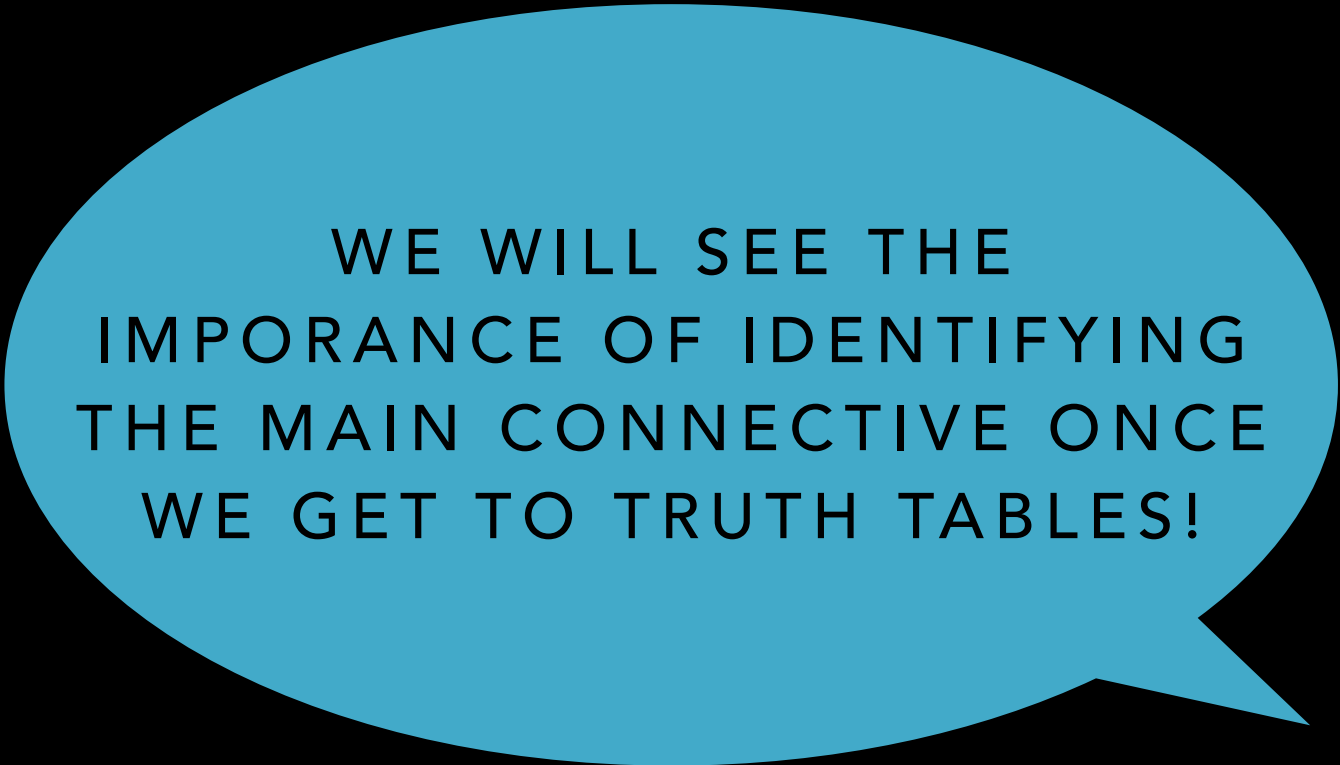
Consider:



this \rightarrow is the main connective!

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