

Translating Between English and Propositional Logic

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b. Clint did not go to the Chatterbox Cafe.

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 - (1) a. Clint went to the Chatterbox Cafe.
b. Clint did not go to the Chatterbox Cafe.
- If (1a) is translated as P , then (1b) is translated as $\neg P$.

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(2) Pastor Ingqvist is a Lutheran but Father Wilmer is not.

- If *Pastor Ingqvist is a Lutheran* is translated as P and *Father Wilmer is a Lutheran* as Q , then (2) is translated as $P \wedge \neg Q$.

Disjunction

- Disjunction usually involves the word *or* (but is inclusive in PL). Sentences like *E or F* and *either E or F* are translated using or as $P \vee Q$.

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- (3) Wally eats Powdermilk biscuits only if Evelyn makes them.
- With *Wally eats Powdermilk biscuits* as P and *Evelyn makes them* as Q , we translate (3) into PL as $P \rightarrow Q$.

Biimplication

- Biimplication makes a stronger claim than the conditional. It's used to translate English sentences of the form *E if and only if F* and *E just in case F*.

Note

Translating certain English constructions into PL may involving combining one or more of the approaches described above.

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- With *Florian washed the car* as P and *Florian went to the mercantile* as Q , we translate (4) as $\neg(P \vee Q)$.

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- (5) It's not true that Clint owns both a Ford and a Chevy dealership.
- Given that *Clint owns a Ford dealership* is translated as P and *Clint owns a Chevy dealership* is translated as Q , a translation of (5) would be $\neg(P \wedge Q)$.

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- If *Myrtle cooks a Walleye* is P and *Clint catches a Walleye* is Q , then (6) can be translated as either $\neg Q \rightarrow \neg P$, $P \rightarrow Q$, or $\neg P \vee Q$.

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- Why can we choose any of these three?

Exercises

Problem 1

Come up with a translation of each of the following English sentences into PL:

- a It didn't rain in Lake Wobegon, however it did snow there.
- b Provided the lutefish shipment arrives on time, Pastor Ingqvist can have the festival on Sunday.
- c Clarence goes down the fish shack just in case the weather is perfect.
- d Myrtle didn't make it to the Sidetrack Tap today.
- e Either the mercantile is closed for repairs, or it's not a weekday.
- f Neither Clint nor Clarence were able to catch a Walleye.
- g Wally and Evelyn don't both have to show up to work the beer cart.