

# Reasoning for Humans: Clear Thinking in an Uncertain World

PHIL 171

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# Introductory Topics

- ✓ Arguments
- ✓ Declarative sentences, propositions
  - Representing arguments:  $P_1, P_2, P_3 \Rightarrow C$
  - Argument form
  - Valid arguments and inferences

The lecture will either be in LeFrak or on Zoom. The lecture will not be on Zoom. So, the lecture will be in LeFrak.

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S1      The lecture will either be in LeFrak or on Zoom.

(Premise)

S2      The lecture will not be on Zoom.

(Premise)

S3      The lecture will be in LeFrak.

(Conclusion)

- S1     The lecture will either be in LeFrak or on Zoom.  
      (Premise)
- S2     The lecture will not be on Zoom.  
      (Premise)
- S3     The lecture will be in LeFrak.  
      (Conclusion)

S1      The lecture will either be in the LeFrak building or on Zoom.

(Premise)

S2      The lecture will not be on Zoom.

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(Premise)

S3      ∴ The lecture will be in LeFrak.

(Conclusion)



$$\begin{array}{l} S1 \\ S2 \\ \hline \therefore S3 \end{array}$$

$$S1, S2 \Rightarrow S3$$

$$\begin{array}{c} S1 \\ S2 \\ \hline \therefore S3 \end{array}$$

$$S1, S2 \Rightarrow S3$$

Separates the premises from the conclusion

$S1, S2 \Rightarrow S3$  ← Conclusion

↑  
List of premises

- ✓ Arguments
- ✓ Declarative sentences, propositions
- ✓ Representing arguments:  $P_1, P_2, P_3 \Rightarrow C$ 
  - Argument form
  - Valid arguments and inferences

The philosophy department is in Tawes Hall. So, the math department is in the Skinner Building.

Is this an argument?

The philosophy department is in Tawes Hall. So, the math department is in the Skinner Building.

Is this an argument? Yes.

What is the premise?

The philosophy department is in Tawes Hall. So, the math department is in the Skinner Building.

Is this an argument? Yes.

What is the premise? "The philosophy department is in Tawes Hall".

What is the conclusion?

The philosophy department is in Tawes Hall. So, the math department is in the Skinner Building.

Is this an argument? Yes.

What is the premise? “The philosophy department is in Tawes Hall”.

What is the conclusion? “The math department is in the Skinner Building”.

Is this a *good* argument?



The philosophy department is in Tawes Hall. So, the math department is in the Skinner Building.

Is this an argument? Yes.

What is the premise? “The philosophy department is in Tawes Hall”.

What is the conclusion? “The math department is in the Skinner Building”.

Is this a *good* argument? No!

The philosophy department is in Tawes Hall. So, the math department is in the Skinner Building.

What's wrong with this argument?

The philosophy department is in Tawes Hall. So, the math department is in the Skinner Building.

What's wrong with this argument?

1. The premise is not true.
2. The conclusion does not *follow from* the premise.

The philosophy department is in Tawes Hall. So, the math department is in the Skinner Building.

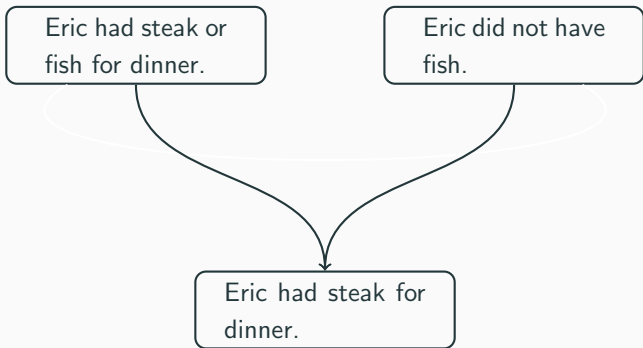
$S1 \Rightarrow S2$

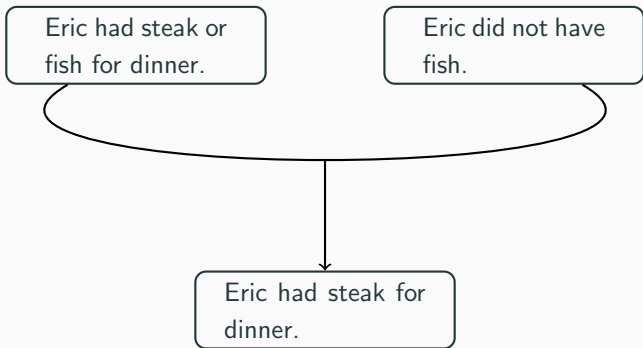
The philosophy department is in Tawes Hall. So, the math department is in the Skinner Building.

$S1 \Rightarrow S2$

Eric had steak or fish for dinner. Eric did not have fish. So, Eric had steak for dinner.

$S1, S2 \Rightarrow S3$



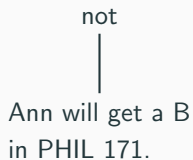
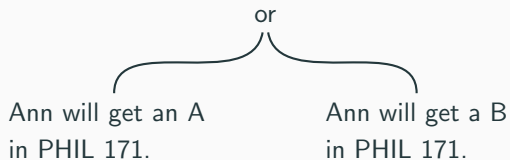


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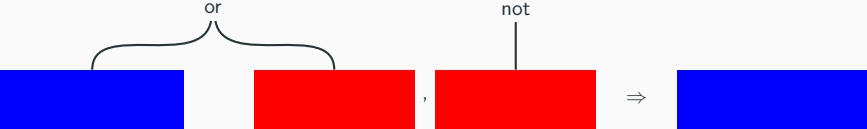


Eric had steak **or** fish for dinner. Eric did **not** have fish.  $\Rightarrow$  Eric had steak for dinner.

Eric had steak **or** fish for dinner. Eric did **not** have fish.  $\Rightarrow$  Eric had steak for dinner.











$$X \text{ or } Y, \text{ not } Y \Rightarrow X$$



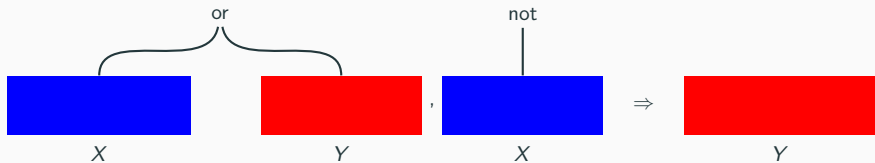


$$X \text{ or } Y, \text{ not } Y \Rightarrow X$$

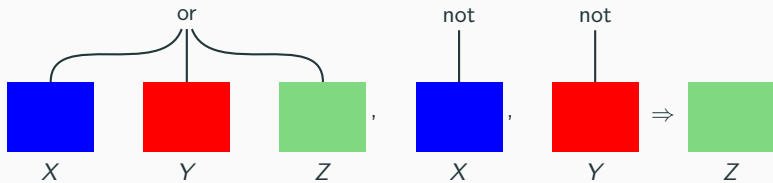
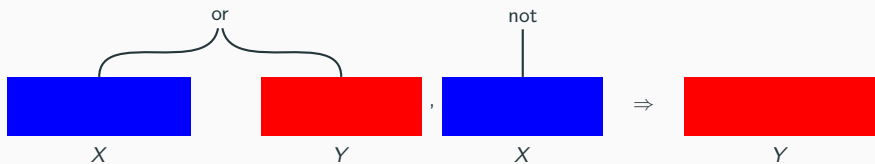
- Ann will get an A or B in PHIL 171. Ann will not get a B in PHIL 171. So, Ann will get an A in PHIL 171.
- My keys are in my office or in my car. My keys are not in my car. So, my keys are in my office.
- The lecture is in LeFrak or on Zoom. The lecture is not on Zoom. So, the lecture is in LeFrak.
- ...



$X \text{ or } Y, \text{ not } Y \Rightarrow X$



$X \text{ or } Y, \text{ not } X \Rightarrow Y$



## Restaurant Example

In a restaurant, Ann ordered Fish, Bob ordered Pasta and Charles ordered Meat. Out of the kitchen comes some new person carrying the three plates. What will happen?

The waiter asks a first question, say “Who ordered the meat?”, and puts that plate in front of Charles. Then he asks a second question “Who ordered the fish?”, and puts that plate in front of Ann.

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Meat or Pasta or Fish, not Fish, not Meat  $\implies$  Pasta

Ann ordered fish ( $F$ )

Charles ordered meat ( $M$ )



$FPM$



Bob ordered pasta ( $P$ )

How many ways could the waiter/waitress distribute the meals?

Ann ordered fish ( $F$ )

Charles ordered meat ( $M$ )



$FPM$



Bob ordered pasta ( $P$ )

How many ways could the waiter/waitress distribute the meals?



*FMP*

*FPM*

*PFM*

*PMF*

*MPF*

*MFP*

Does the waiter/waitress know how to distribute the meals?

<i>FMP</i>	<i>FPM</i>
<i>PFM</i>	<i>PMF</i>
<i>MPF</i>	<i>MFP</i>

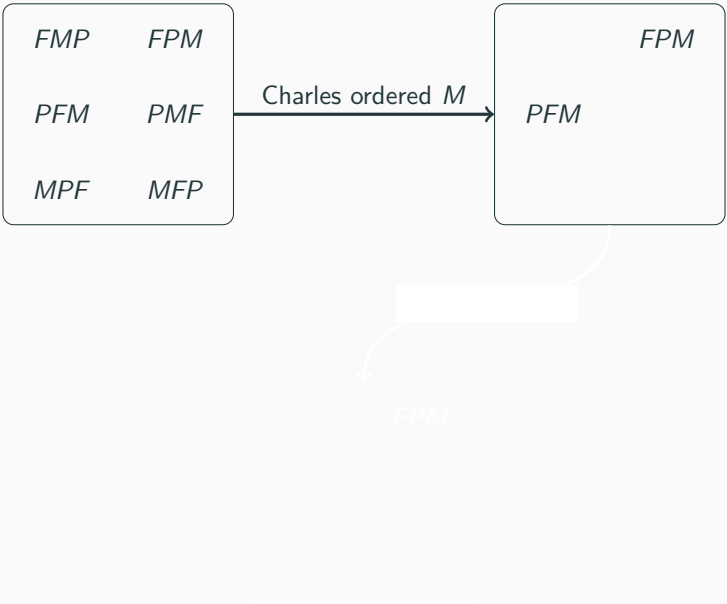
Does the waiter/waitress *know* how to distribute the meals?

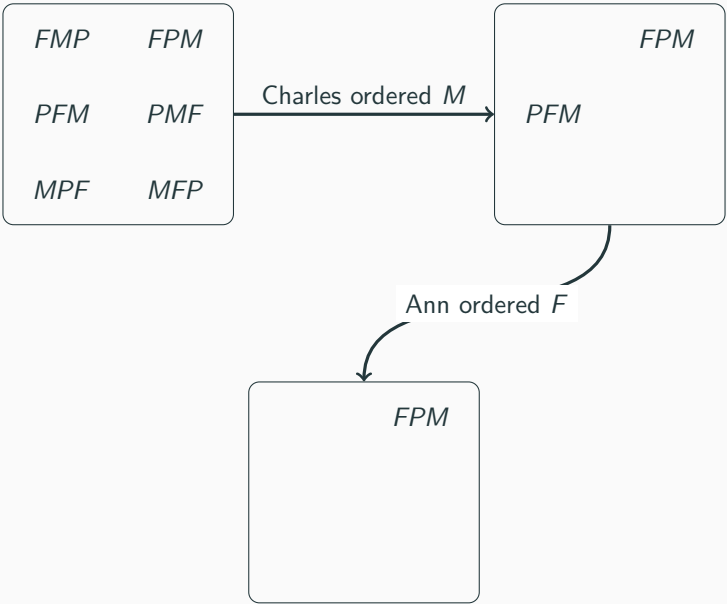
<i>FMP</i>	<i>FPM</i>
<i>PFM</i>	<i>PMF</i>
<i>MPF</i>	<i>MFP</i>

What happens after learning that Charles ordered meat (*M*)?

<del>EMP</del>	FPM
PFM	<del>PME</del>
<del>MPE</del>	<del>MFP</del>

What happens after learning that Charles ordered meat ( $M$ )?





After *observing/learning* that Charles ordered meat and Ann ordered fish, the waiter/waitress **concludes/infers** that Bob ordered pasta ( $P$ ). That is, the only possibility is  $FPM$ .

$F$  or  $P$  or  $M$ , not  $M$ , not  $F \implies P$

1		
	1	
2	3	1

1 or 2 or 3, not 1, not 2  $\implies$  3



1	2	
	1	
2	3	1

1 or 2 or 3, not 1, not 3  $\implies$  2

1	2	
	1	
2	3	1

1 or 2 or 3, not 2, not 3  $\implies$  1

1	2	3
3	1	
2	3	1

1 or 2 or 3, not 2, not 1  $\implies$  3

1	2	3
3	1	2
2	3	1

1 or 2 or 3, not 2, not 1  $\implies$  3

## Argument form/inference pattern

**From** fish or meat or pasta, not fish, not meat **infer** pasta

**From** 1 or 2 or 3, not 1, not 2 **infer** 3

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## Argument form/inference pattern

**From** fish or meat or pasta, not fish, not meat **infer** pasta

**From** 1 or 2 or 3, not 1, not 2 **infer** 3

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$X \text{ or } Y \text{ or } Z, \text{ not } X, \text{ not } Y \Rightarrow Z$

## Important point

“follows from” should be distinguished from “inferring”.

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Inferring is an activity that a person or computer performs, but “follows from” is a relationship between sentences.