Phil 2310: Introduction to Deductive Logic

Wednesday, 25 August Joel Velasco



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Introductions

Course Information

What is logic?

COURSE INFORMATION

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Joel Velasco

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Course Requirements
 30% Homework
 20% x 2 for prelims
 30% Final

 Language, Proof and Logic
 Barwise and Etchemendy

Software
 Tarski's World, Fitch and
 Boole

HOMEWORK

Assignments

posted online one week before due date: Everything is posted at: http:// courses.cit.cornell.edu/ jdv55/teaching/2310/

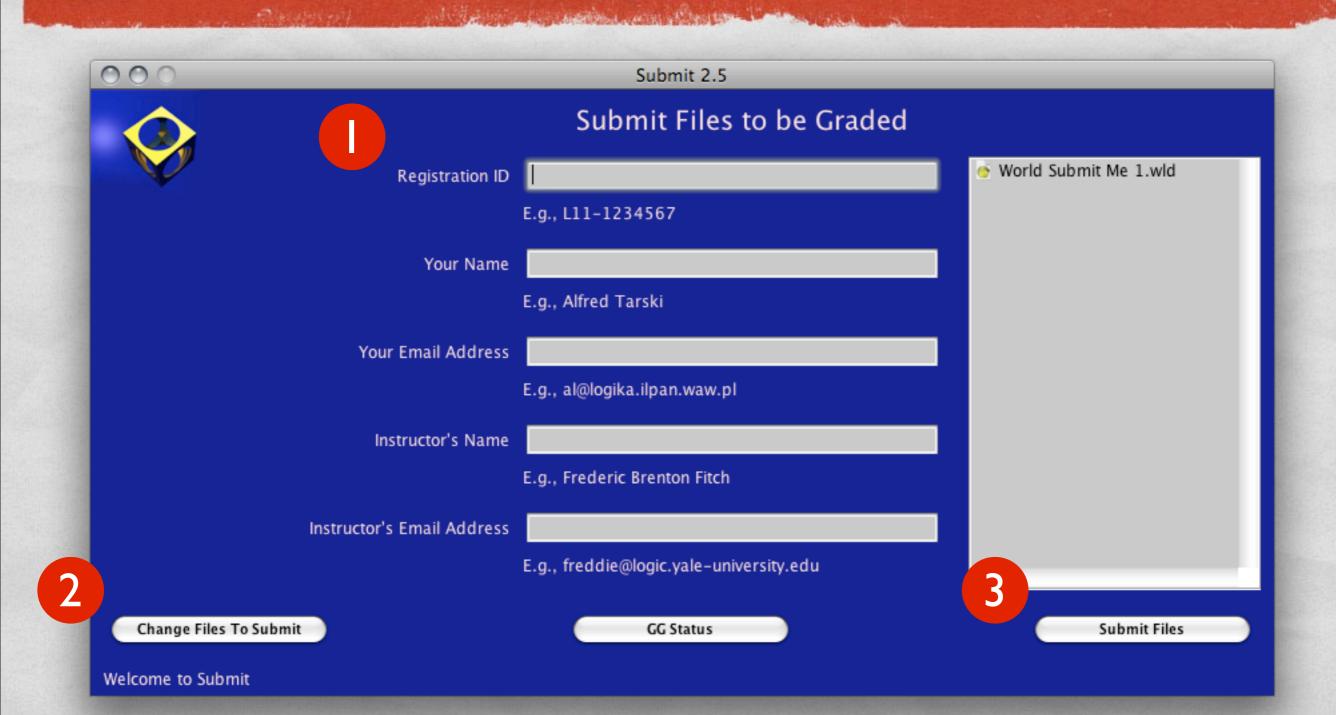
Submission

online: Grade Grinder written: bring to class typically due Monday <u>No Late Work</u>

Collaboration

- discuss anything you want
 - we encourage working in groups!
- complete/submit your work <u>without</u> consulting others or group work

GRADE GRINDER



WHAT IS LOGIC?

- Iogic as good reasoning
 - In this view, logic is about the difference between valid and invalid arguments
- In a valid argument, the conclusion follows from the premises. IF all of the premises are true, then the conclusion is (must be, would be...) true.
 - Equivalently: It is impossible for all of the premises to be true and the conclusion false.

(1) If our currency loses value then our trade deficit will narrow.

(2) Our currency will lose value.

Conclusion: Our trade deficit will narrow

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Ρ

Q

 $P \rightarrow Q$

VALID

 $P \rightarrow Q$

0

P

(1) If our currency loses value then our trade deficit will narrow.
(2) Our trade deficit will narrow

Conclusion: Our currency will lose value.

INVALID

VALID

(1) If the continuum hypothesis is true then the set theoretic universe is constructible

(2) The continuum hypothesis is true

Conclusion: The set theoretic universe is constructible

 $P \rightarrow Q$

Ρ

Q



 From these examples we can see that validity as a property of arguments is:

(I) topic neutral

(2) independent of actual truth and falsity

We didn't need to know any economics or any facts about the world to judge the validity of the previous two arguments.

WHAT IS LOGIC?

Iogic as good reasoning versus logic as a system

Control State on the States of States in

- First-Order Logic (FOL)
- computers and programming languages
- differences between FOL and natural language; the role of formal logic
- Iogical consequence and methods of proof

THIS COURSE

- Learn two systems of FOL: propositional logic and predicate logic
- Convert natural language arguments into FOL
- Create and assess proofs in FOL

Keep in mind

advantages of FOL; possible limitations of FOL; relationship between FOL and natural language

PENGUINS ARE BLACK AND WHITE. SOME OLD TV SHOWS ARE BLACK AND WHITE. THEREFORE, SOME PENGUINS ARE OLD TV SHOWS. LASBERG Logic: another thing that penguins aren't very good at.

Recognizing versus Diagnosing Bad Reasoning