Deductive Forms and Symbolism

Instructor: Dr. Jason Sheley

Opening puzzle:
The Experience Machine

Would you plug into the machine? Why or why not?

There are also substantial puzzles when we ask what matters other than how *people's* experiences feel "from the inside." Suppose there were an experience machine that would give you any experience you desired. Superduper neuropsychologists could stimulate your brain so that you would think and feel you were writing a great novel, or making a friend, or reading an interesting book. All the time you would be floating in a tank, with electrodes attached to your brain. Should you plug into this machine for life, preprogramming your life's experiences? If you are worried about missing out on desirable experiences, we can suppose that business enterprises have researched thoroughly the lives of many others. You can pick and choose from their large library or smorgasbord of such experiences, selecting your life's experiences for, say, the next two years. After two years have passed, you will have ten minutes or ten hours out of the tank, to select the experiences of your *next* two years. Of course, while in the tank you won't know that you're there; you'll think it's all actually happening. Others can also plug in to have the experiences they want, so there's no need to stay unplugged to serve them. (Ignore problems such as who will service the machines if everyone plugs in.) Would you plug in? *What else can matter to us, other than how our lives feel from the inside?* Nor should you refrain because of the few moments of distress between the moment you've decided and the moment you're

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What does matter to us in addition to our experiences? First, we want to *do* certain things, and not just have the experience of doing them. In the case of certain experiences, it is only because first we want to do the actions that we want the experiences of doing them or thinking we've done them. (But *why* do we want to do the activities rather than merely to experience them?) A second reason for not plugging in is that we want to *be* a certain way, to be a certain sort of person. Someone floating in a tank is an indeterminate blob. There is no answer to the question of what a person is like who has long been in the tank. Is he courageous, kind, intelligent, witty, loving? It's not merely that it's difficult to tell; there's no way he is. Plugging into the machine is a kind of suicide. It will seem to some, trapped by a picture, that nothing about what we are like can matter except as it gets reflected in our experiences. But should it be surprising that what *we are* is important to us? Why should we be concerned only with how our time is filled, but not with what we are?

Thirdly, plugging into an experience machine limits us to a man-made reality, to a world no deeper or more important than that which people can construct. There is no *actual* contact with any deeper reality, though the experience of it can be simulated. Many persons desire to leave themselves open to such contact and to a plumbing of deeper significance.[1] This clarifies the intensity of the conflict over psychoactive drugs, which some view as mere local experience machines, and others view as avenues to a deeper reality; what some view as equivalent to surrender to the experience machine, others view as following one of the reasons *not* to surrender!

We learn that something matters to us in addition to experience

[1]Traditional religious views differ on the *point* of contact with a transcendent reality. Some say that contact yields eternal bliss or Nirvana, but they have not distinguished this sufficiently from merely a *very* long run on the experience machine. Others think it is intrinsically desirable to do the will of a higher being which created us all, though presumably no one would think this if we discovered we had been created as an object of amusement by some superpowerful child from another galaxy or dimension. Still others imagine an eventual merging with a higher reality, leaving unclear its desirability, or where that merging leaves *us*.

If you agree with Nozick, that gives us reasons to consider Descartes' answer...

Let's talk about essays

Inference Rules and Games

- As we shall soon see, there are common patterns that invalid arguments fall into
- But we should also recognize there are common patterns of valid arguments.

- Here is the first set of patterns.
- (Note: this is a quick introduction. See the textbook for more rules and examples)
- If it helps, you can think of the patterns as rules that we use in a game.

Disjunctive Syllogism

A or **B**

not A

B

- You can either go right or go left.
- You cannot go right.
- Therefore, you must go left.

- Either the Angels win the World Series, or the Red Sox win the World Series.
- The Angels do not win.
- Therefore, the Red Sox win the World Series.

Disjunctive Syllogism

- A v B
- ~ B
- Therefore, A

Modus Ponens

"the mode of placing"

If A, then B

A

B

MODUS PONENS

- A ——-> B
- A
- Therefore, B

Example

- If the car is parked on the street between 8 am and 10 am, then it is parked illegally.
- The car is parked on the street between 8am and 10am.
- Therefore, it is parked illegally.

Conditional Statements

- In order to understand Modus Ponens, it helps to understand conditionals better.

Conditional Statements

- If ______, Then ____
- The "If" part of the statement is known as the antecedent.
- The "Then" part of the statement is known as the consequent.

- A conditional statement indicates that a relationship holds between two ideas.
- Conditional statements make no claims about the truth of the components alone.
- What a conditional says is IF the antecedent is true, THEN the consequent is true.

These are all conditional statements

- If there is traffic on the 5, then it is better to take the 91.
- If the Angels win, then the Angels qualify for the playoffs.
- If there is traffic on the 5, then the Angels qualify for the playoffs.
- (The above statements all have the same truth conditions.)

- Conditional statements are powerful tools of reasoning, and become all the more powerful when we use them in Modus Ponens arguments.
- Let’s get some more practice with conditionals. We are familiar with conditionals from games…

Modus Tollens

"the mode of taking away"

If A, then B

not B

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not A

Example

- If the car is parked on the street between 8 am and 10 am, then the car is parked illegally.
- The car is not parked illegally.
- Therefore, the car is not parked on the street between 8am and 10am.

- One way to think of Modus Tollens is to recall the strange truth table that is generated for Modus Ponens.

- We were mainly concerned about the case in which the antecedent is true, and consequent is false.

- Given what the conditional is saying, we can infer that if the consequent is false, the antecedent must have been false.

Hypothetical Syllogism

If A, then B

If B, then C

If A, then C

Example

- If the car is parked on the street between 8 am and 10 am, then the car receives a ticket.
- If the car receives a ticket, then the owner must pay a fine.
- Therefore, if the car is parked on the street between 8am and 10am, then the owner must pay a fine.

- Now that we have seen the valid forms, we want to also be able to prove that an argument does not work.

- There are some common mistakes. We can notice these mistakes by looking at deviations from the forms we have seen.

INVALID

- If A, then B
- B
- Therefore, A

INVALID

- If A, then B
- If C, then B
- Therefore, if A then C

INVALID

- If A, then B
- not A
- Therefore, not B

INVALID

- Either A or B
- A
- Therefore, B

Why use symbols?

To facilitate recognition and comparison of argument forms, in formal logic each is represented by a special symbol:[2]

Logical Operator	*Symbol*
It is not the case that	$\sim$
And	&
Either . . . or	$\vee$
If . . . then	$\rightarrow$
If and only if	$\leftrightarrow$

Thus, for example, the argument form disjunctive syllogism may be expressed as:

$P \vee Q$
$\sim P$
$\therefore\ Q$

It is also customary to write argument forms horizontally, with the premises separate

$P \vee Q, \sim P \vdash Q$

[2]Some authors use different symbols. Here are some of the most common alternatives:

Logical Operator	*Alternative Symbol(s)*
It is not the case that	– or ¬
And	· or ∧
Either . . . or	none
If . . . then	⊃
If and only if	≡

Logical operators: ~, &, ∨, →, ↔

Brackets: (,)

These three sets of symbols constitute the *vocabulary* of the language of propositional logic. The vocabulary of a formal language is usually divided into *logical* and *nonlogical* symbols. The logical symbols of our formal language are the logical operators and brackets; the nonlogical symbols are the sentence letters. We have already pointed out that nonlogical symbols have different interpretations in different contexts; the sentence letter '*P*', for example, may stand for 'Today is Tuesday' in one problem and 'The princess dines' in another. By contrast, the function or interpretation of logical symbols always remains fixed.

A *formula* of the language of propositional logic is any sequence of elements of the vocabulary. Thus the answers to Problem 3.5 are all formulas, but so are such nonsense sequences as '((&(P'. To distinguish these nonsense sequences from meaningful formulas, we introduce the concept of a grammatical or *well-formed* formula—wff, for short. This concept is defined by the following rules, called *formation rules*, which constitute the grammar of the formal language. The rules use Greek letters (which do not belong to the vocabulary of the formal language) to denote arbitrary formulas.

(1) Any sentence letter is a wff.

(2) If ϕ is a wff, then so is $\sim\phi$.

(3) If ϕ and ψ are wffs, then so are $(\phi \,\&\, \psi)$, $(\phi \vee \psi)$, $(\phi \rightarrow \psi)$, and $(\phi \leftrightarrow \psi)$.

Anything not asserted to be a wff by these three rules is not a wff.

Complex wffs are built up from simple ones by repeated application of the formation rules. Thus, for example, by rule 1 we see the '*P*' and '*Q*' are both wffs. It follows from this by rule 3 that '(*P* & *Q*)' is a wff. Hence, by rule 2, '~(*P* & *Q*)' is a wff. Or again, by rule 1, '*P*' is a wff, whence it follows by 2 that '~*P*' is a wff, and again by 2 that '~ ~ *P*' is a wff. (We can go on adding as many negation signs as we like; indeed, '~ ~ ~ ~ ~ ~ ~ *P*' is a wff!)

Notice that rule 3 stipulates that each time we introduce one of the binary operators we also introduce a corresponding pair of brackets. Thus, whereas '(*P* & ~*Q*)' is a wff for

SOLVED PROBLEM

3.5 Interpreting the sentence letter '*R*' as 'It is raining' and the letter '*S*' as 'It is snowing', express the form of each of the following English sentences in the language of propositional logic:

(*a*) It is raining.
(*b*) It is not raining.
(*c*) It is either raining or snowing.
(*d*) It is both raining and snowing.
(*e*) It is raining, but it is not snowing.
(*f*) It is not both raining and snowing.
(*g*) If it is not raining, then it is snowing.
(*h*) It is not the case that if it is raining then it is snowing.
(*i*) It is not the case that if it is snowing then it is raining.
(*j*) It is raining if and only if it is not snowing.
(*k*) It is neither raining nor snowing.
(*l*) If it is both snowing and raining, then it is snowing.
(*m*) If it's not raining, then it's not both snowing and raining.
(*n*) Either it's raining, or it's both snowing and raining.
(*o*) Either it's both raining and snowing or it's snowing but not raining.