Distinguishing Valid and Invalid Deductive Arguments

The following method can't be used to evaluate *every* deductive argument, but it can be used to evaluate *many* of them.

Let's start by noticing that there are four very common argument forms that we tend to encounter in everyday discourse:

Valid		**Invalid**	
If (a) then (b)	If (a) then (b)	If (a) then (b)	If (a) then (b)
(a)	Not-(b)	(b)	Not-(a)
(b)	Not-(a)	(a)	Not-(b)

By translating common sentences like "All dogs are mammals" into a conditional (if___ then ____) format, we can easily test arguments for validity. Consider the following example:

"Every human has a heart. Jim is a human, so he must have a heart."

We can see that the conclusion of this argument is "Jim has a heart", so we can set the argument up as follows:

> Every human has a heart
> Jim is a human
> _____
> Jim has a heart

To test this argument for validity, all we need to do is translate the first sentence into a conditional form. Here's a rough guideline for how to do it:

> The words "all", "every", and "if" generally introduce the *antecedent* (the "a" term) of our conditional. The words "only" and "only if" generally introduce the *consequent* (the "b" term) of our conditional.

So the sentence “Every human has a heart” can be translated to read, “If something is a human, then it has a heart”

Our argument now looks like this:

If something is a human, then it has a heart.
Jim is a human.

____
Jim has a heart.

Notice that this argument has the same structure as the left-most argument in the table above. Now we know it’s valid!

Consider the next argument:

> “Only shmurples like purple. Burple is a shmurple, so Burple must like purple.”

We can set the argument up as follows:

> Only shmurples like purple
> Burple is a shmurple
>
> ___
> Burple likes purple

To find out if it’s a valid argument, translate the first premise:

> If something likes purple, then it’s a shmurple
> Burple is a shmurple
>
> ___
> Burple likes purple.

Once we compare this to the table above, we see that the argument is invalid.

“CHEAT SHEET” for testing validity

Antecendent words (“If”____):
If, all, every, when

Consequent words (“then”____)
Only, only if, only when

All cats are fluffy. = If (cat) then (fluffy)
Only cats are fluffy. = If (fluffy) then (cat)

I’m tired only when I’m sick. = If (tired) then (sick)
I’m sick if I’m tired. = If (tired) then (sick)
Every tired person is sick. = If (tired) then (sick)

Only teachers are bald. This means Toño must be bald, because he's a teacher.

Only teachers are bald=	If (bald)	then	(teacher)
	A		B
T. is a teacher	=	B	
T. is bald	=	A	

Every cat is perfect, but I’m not perfect. So I’m not a cat.

Every cat is perfect	=	If (cat) then (perfect) A B
I’m not perfect	=	Not B
___		
I’m not a cat	=	Not A