Logic Reading 2.05 Translating Ordinary Sentences into Logical Statements

There can never be any surprises in logic."
-**Ludwig Wittgenstein**

_____ **Introduction.** Up until now, we have been studying arguments that we have thought up out of thin air We have been analyzing the *form* of syllogisms. But we seldom find arguments in the real world that are in the form of syllogisms. We must learn how to analyze arguments as they appear in everyday speech and writing.

It is sort of like cooking. Let's say we wanted to learn how to prepare a meal. We could go out and buy a TV dinner and put it in the oven. That's one way to prepare food-but it isn't really cooking. Whoever put the TV dinners together before they were put in the package was the real cook. But if all we had ever done was to cook TV dinners and were suddenly faced with having to cook a real meal, we would probably make a pretty good mess of it.

In one way, what we have been doing is preparing TV dinners-our arguments have mostly been prepared for you by someone else. Now this is not a perfect analogy, because we have been learning very important thinking skills by using these prepared arguments. But we do need to find out how arguments operate in the real world so we can use the skills we have learned productively.

In this reading, we will learn how to translate ordinary statements into logical propositions so we can analyze them using the principles we have learned.

_____ **What a Statement Needs in Order to be a Logical Statement.** Ordinary sentences can have their logical components all scrambled up. In many cases, some of the components you need in a logical statement are simply missing, and you need to provide them. In other cases they are lost amidst a jumble of other words.

A logical proposition needs several things. It needs a *subject* and a *predicate*. It also needs a *quantifier*. A quantifier, remember, is a word such as *all, no*, or *some*. It needs a complete predicate, which sometimes involves adding a *complement*. It needs a *copula*, which links together the subject and the predicate. In logical sentences, this is the *to be* verb: *is, am*, or *are*.

_____ Rules for Translating Sentences. There are nine rules for translating ordinary sentences into logical statements:

Rule A: Clearly identify the subject and predicate of the English sentence
Rule B: Supply the missing quantifier
Rule C: Add the missing complement
Rule D: Supply the missing copula
Rule E: Change exclusive sentences into A statements
Rule F: Change negative sentences into E or O statements
Rule G: Change exceptive sentences to E or A statements
Rule H: Sentences containing **_anyone, anything, whoever the, if_** … **_then, whatever_** should be translated into A statements
Rule I: Sentences containing **_someone, something, there is_**, or **_there are_** should be translated into I statements

_____ Rule A: Clearly Identify the Subject and the Predicate.
This rule is somewhat self-explanatory. We identify the **_subject_**-the word that expresses what the sentence is about-and the **_predicate_**-the word that tells us something about the subject. Now let's look at a few examples:

> Seldom do taxpayers get a break
> A person takes a chance when he speaks out in public
> No one becomes a politician and keeps his integrity

In a logical sentence, the subject comes first. This is also the case many times in ordinary speech. But that is not the case in the sentences above. **_Seldom_**, in the first sentence, is not what the sentence is about; taxpayers is what the sentence is about. **_Taxpayers_** is therefore the subject. **_People who seldom get a break would_**, furthermore, be the predicate.

When the subject is put in its proper place (the beginning) and the predicate in its proper place (the end), we get:

> Taxpayers seldom get a break
> People who speak out in public take a chance
> No one who wants to keep his integrity becomes a politician

_____ Rule B: Supply the Missing Quantifier. A **_quantifier_** is the word that tells us the **_quantity_** of the statement. Words like **_all,_**

some and *no* are quantifiers.

The general rule is that, unless the statement says specifically that
some is meant, *all* is meant. In the three sentences we derived by applying
Rule A, for example, we see that there are no quantifiers. We can
easily provide them:

> All taxpayers seldom get a break
> All people who speak out in public take a chance
> No person who wants to keep his integrity becomes a politician

Some statements are a little less obvious. The statement:

> Socrates is a mortal

for example, is an A statement, even though it doesn't have the quantifier
all in it. In logical terms, it really means:

> All persons indicated by the name Socrates are mortal

In this case that's only one person.
There are also some exceptions to the general rule. Take this one:

> Americans are great basketball players

Even though it does not say *some* explicitly, it is clear that we are
not talking about all Americans. Therefore, it must be written in logical
terms like this:

> Some Americans are great basketball players

Let's also look at an example having to do with the negative quantifier
no:

> There aren't any boys in the room

This one should be rendered:

> No boys are in the room

_____ Rule C: Add the Missing Complement. Many times we

encounter sentences in which the predicate is an adjective:

> All taxpayers are poor
> All people who speak out in public are brave
> No person who wants to keep his integrity is political

But we must remember that, in logic, we refer to classes of things. When we say, **All men are mortal**, we are referring to all members of the class we call **men** and to some subset of the class we call **mortal.** And when we say, **Socrates is a man**, we refer to the class we call **Socrates** (a class with only one member), and some subset of the class **men**.

When translating ordinary statements into logical sentences, we must remember to refer to them as classes. We do this by adding a **complement**, which is **a word or group of words that completes the predicate.**

Therefore, when we encounter an adjective, we must change it a little to make sure we specify the class about which we are talking. The sentences above, for example, become:

> All taxpayers are **poor people**
> All public speakers are **brave people**
> No person who wants to keep his integrity is a political **person**

In these examples, the word **persons** is the complement. Likewise, the sentence:

> All daffodils are yellow

should be rendered :

All daffodils are yellow **flowers** or **plants** or **things**

In this last example, the class referred to is not completely clear It could be flowers or plants or things. In the three previous examples, on the other hand, it is clear that the class (who are poor, brave or political) is people (or persons). In this chapter we will be very explicit about identifying the class even when it is not necessary, as in the first three examples.

_____ Rule D: Supply the Missing Copula. A *copula* is a word
that links together the **subject** and the **predicate**. In logical sentences,
the copula means the **to be** verb; in other words **is, am** or **are**.
Notice that when we applied Rule C, we also added a copula:

>   All taxpayers **are** poor people
>   All public speakers **are** brave people
>   No person who wants to keep his integrity **is** a political person

When, for example, we take the sentence:

>   Dogs bark

we notice it is missing the copula. But if we add the missing copula (and
the missing quantifier and missing complement-see Rule C), we get:

>   All dogs **are** barking animals

Be aware that both Rules C and D are not often strictly followed even
in the examples given in this book. It will be extremely useful to know
them, even if you do not strictly follow them in every instance.

_____ Rule E: Change Exclusive Sentences into A statements.
Sometimes you run across a sentence that begins with the word only.
Like this one:

>   Only men are priests

What do we do with a sentence like this? It cannot **mean All men
are priests**. So what does it mean? In logical terms what it means is
All priests are men.

Whenever we encounter a sentence like this, we must do two things:

✓ Drop the word **only** (or **none but**) and replace it by **all**;

✓ Interchange the subject and predicate terms.

In the above sentence, therefore, we would take the sentence:

and drop **only** and replace it by **all**, giving us:

 All men are priests

We would then interchange the subject (**men**) and the predicate (**priests**),
giving us:
 All priests are men

_____ Rule F: Change Negative Sentences into E or O Statements.
We translate ordinary sentences beginning with the words
nothing, none, or **no one** by doing three things:

✓ Replace the words **nothing, none**, or **no one** with the word, **no** before the subject of
the sentence;

✓ Add the copula;

✓ Complement the predicate.

Let's try it on a sentence. Let's take:

 No one frightens me

We replace **no one** with **no**, we add the copula **is** and also add the missing
complement. Then we get:

 No persons are persons who frighten me

We should also point out that English sentences of the form **All**…
are not are ambiguous; in other words, it is hard to tell how we should
say them logically Some of them should be E statements, and others
should be O statements. For example, the sentence:

 All people are not honest

could mean either **No people are honest** or **Some people are not
honest,** but most likely it means **Some people are not honest**. *The
general rule is that we should always interpret such a sentence
as an O statement unless it is clearly intended as an E statement.*

_____ Rule G: Change Exceptive Sentences to E or A statements.

There are some sentences that contain the word, **_except_**. Unfortunately, these sentences cannot be directly translated into A, E, I or 0 statements.
For example:

> Everyone except children may attend

By this we mean, not one, but two things:

> No children are people who are able to attend; **_and_**

> All who are not children are people who may attend

One of these is, of course, an E statement and the other an A statement.

But if this one statement was intended to be a premise in an argument, we are faced with a difficulty, since, in a categorical syllogism, there can only be two premises. But if one of our propositions was actually two, we would end up with three premises.

Therefore, the rule is that **_only one of the resulting statements may be used, but not both_**. Any valid argument that contains an exceptive sentence will remain valid regardless of which is used.

_____ Rule H: Sentences Containing anyone, anything, whoever, the, if, if. .. then or whatever Should be Translated into A Statements.

> Anyone who has eyes can see
> Anything that has eyes can see
> Whoever has eyes can see
> The person who has eyes can see
> If a person has eyes, then he can see
> Whatever has eyes can see

Any one of these statements can be translated into the statement:

> All persons with eyes are persons who can see

_____ Rule I: Sentences Containing someone, something, there is, or there are Should be Translated into I Statements. All statements containing these words can be translated into I statements.

These statements:

> Someone is looking at me
> Something is looking at me
> There is a thing looking at me
> There are things looking at me

can all be translated into the statement:

> Some persons are persons who are looking at me; or
> Some things are things that are looking at me

Although these rules will not cover every kind of statement, they should enable you to translate most statements you come across into logical propositions. Remember also, that some sentences cannot be translated into logical statements (questions, commands, exhortations, etc.), since they do not express a judgement; they express other things. Only sentences that express judgements can be statements.

_____ Summary. In this chapter, we cover nine rules for translating ordinary language sentences into logical statements. Generally speaking, a logical proposition needs several things. It needs a *subject* and a *predicate* It needs a *quantifier*, a complete *predicate*, which sometimes involves adding a *complement*. It needs a *copula* (a form of the *to be* verb), which links together the *subject* and the *predicate*. Some sentences, however, cannot be translated into logical statements because they do not express judgements (questions, commands, exhortations, etc.).