

Symbolic Logic
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Lecture – 34
Translating Non-standard Propositions into Standard Form Categorical
Propositions
What is a Syllogism

Hello. We are back and we have some interesting stuff to learn today in the Module 34 of the NOC course in Symbolic Logic.

What we are going to learn today is how to translate non-standard categorical propositions into standard form categorical propositions. You see I mean have been talking about the A E I O, but you know that there are plenty of other propositions all around. So, the system would be seriously constrained if we cannot translate some of those other non-standard propositions back into or fold of A E I O. So, we will show you how to do that today in this module.

And we are going to learn about something very important called syllogism. Remember I have told you about the immediate inferences and we have done some based on the square of opposition in the last module. Syllogism is the mediated inference. Mediated as in there would be something in the middle and you will get to see how it moves and what it is today. Without wasting our time further let us get into do this, because this is very important. Syllogism, remember I said is a definitive entity in Aristotle's logic and in fact the whole logic is sometimes call the syllogistic logic it is that important.

So, let us go on with what we have. First the translation how to do this translation and how we are going to handle this. I will give you examples, but let us follow through the standard form of categorical propositions inside our head once more. Remember the categorical proposition when it is in standard form must have quantity, quality and there has to be a certain sequence in which they should appear the subject, the verb, and the predicate and there should be only class terms where the subject term is and the predicate term is.

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1. When predicate term is an adjective, replace by closest class term

E.g. Some watches are expensive.

Std form: Some watches are expensive items

2. When the verb is not a 'to be' verb, replace with suitable 'to be' verb

E.g. Some colors soothe the eyes

Std form: Some colors are shades that soothe the eyes

3. When terms are not in right sequence, arrange them in subject-verb-predicate sequence

E.g.: Rooms are all rented.

Std form: All rooms are rooms that are rented.

So, give given that suppose you have a proposition or a statement where the predicate term is an adjective. Adjective you understand something that qualifies the noun. When that happens remember it is not in standard form as for as the categorical proposition go, not until you have replace it with the class term. Any class term, no, the answer is the closest class term to the adjective. Let us take an example.

Suppose you have this statement some watches are expensive. Now we speak like this colloquially, some watches are expensive. Colloquially this is fine this structure is fine, but if you speak about categorical propositions then it is not in standard form. Why not, because expensive is an incomplete classes it does not mean anything. You need a class term, so you need a noun to go along with it. There are various ways to convert this expensive into a class term proper, but here is what I try. And this might be gives you some idea. So, some watches are expensive items. That small change means a lot it into standard for. Remember what you need are handles the class terms are going to be handles. So, you think about a cluster the closes cluster that you can relate the adjective two.

Sometimes you might find propositions which do not have the required verb. The categorical propositions only want a to be verb. So, when that is not there then the

possibility is that you replace that verb with a suitable to be verb, the closest possible. See when you are translating your job is not to edit or to distort the meaning of the original proposition, but to help it so that only the standard form becomes clear. But you do not change the meaning of the statement thereby. So, when the verb is not a to be verb such as is are to try to preserve the original sense of the proposition as far as possible and then replace it with the suitable to be verb.

Here is some examples, 'some colors soothe the eyes' grammatically correct, colloquially ordinary language perfect sentence, but it is not a standard form categorical propositions. But we do see the potential of turn it into a categorical proposition in standard form. How? Well, we need to work on this verb a little, we need to push I is or some sort of thing, so if you do that what will happens some colors are and then whatever you want to say here will become a qualifying phrase in that.


So here is my suggestion 'some colors are shades that soothe the eyes' once more you once more you need a handle, you need a class closest class and then the and then the remaining thing whatever you are trying to say becomes the qualifier of that class. Shades that soothe the eyes is the class and these colors are member of that class. Do you understand? But, notice what has happen to the word it is gotten change to verb what we needed.

Similarly, there might be propositions where the terms are not in the right order right sequence, because what we need as I told you is subject verb predicate that kind of sequence, but you do not have that. Well, the easiest thing to do is to rearrange them in the proper sequence. For example, if you have rooms are all rented, all when in to do is to arrange them in the proper ways so that the quantity comes out, that then the subject, then the verb in the predicate. So, here is the standard form. All rooms are rooms that are rented.

Because you cannot leave all rooms are rented would still be an incomplete class, you need rented to be turned into a cluster or a class so this is the way to do that. So, this are just some examples to show you it is not a going to an exhaustive listed this not possible,

but this is to open your eyes to what are the possibilities open and that we can still do a lot to bring the non-standard form propositions back into our fold. Here more examples.

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4. When quantity term is missing, provide a suitable quantity term 
E.g. Nigerians are Africans.
Std form: All Nigerians are Africans.

5. When non-standard quantity term is used, replace with suitable standard form quantity term:
E.g. A Kangaroo is a marsupial.
Std form: All kangaroos are marsupial animals.
E.g. Two cars waited.
Std form: Some cars are cars that waited.

Sometimes the quantity term is missing; when we speak colloquially then we do not always use all some etcetera, but remember that is mandatory for the standard form categorical propositions. So what we do? We provide a suitable quantity term as for as the knowledge goes and by keeping the original intended meaning intend.

For example, suppose we find this and this Nigerians are Africans, very simple what we mean is all Nigerians are Africans right. Now in colloquial term this is not a big fault, but if you want it in the categorical logical standard form you need to supply this all that is quite important. There can be also non-standard quantity term is used. This is the case where quantity term is not even use, but there can be other times when a quantity term is used, but it is not what is known as standard quantity term. So it is not all some no, it is none of that.

Instead it is something that we colloquially use. What we need to do is to improvise and replace it with a suitable standard form categorical proposition quantity term. When in say suitable the suitability depends on the context and our common knowledge. So, there

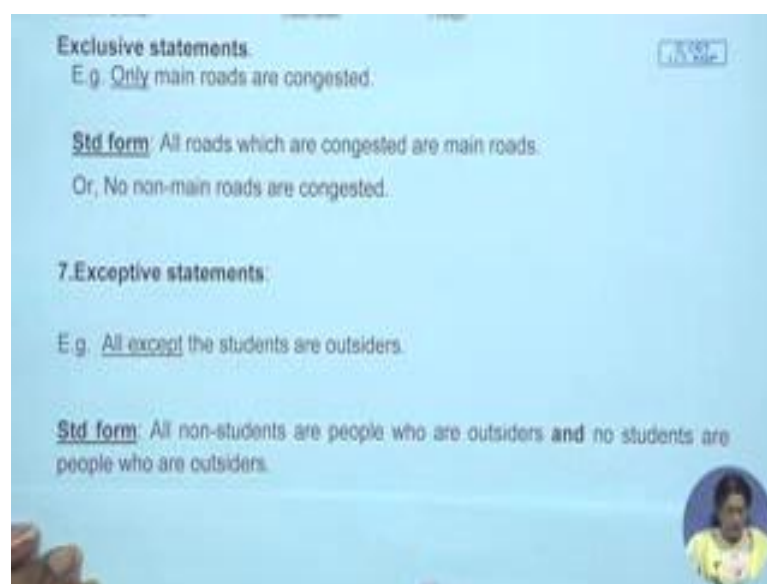
is a common understanding of what things are and you need to remain close to that. Here is an example to show you, suppose we say 'a kangaroo is a marsupial'. A kangaroo now 'a' is not exactly I mean technically speaking they have not use all, some, etcetera. What is the closest approximation to that? That is what we have to do. And we need to find one of our quantity terms standard form quantity terms and that is going to be all kangaroo's.

So, this standard form this is going to be all kangaroos are marsupial animals. Once more the marsupial in itself you can live it like that; marsupial can be also treated as a class so all kangaroos are marsupials is equally acceptable in this case or you can further explain it as marsupial animals. But this is where we save the propositional got it into our categorical logical form.

Here is an interesting example; two cars waited are any chance of turning it into a standard form categorical proposition. Well, think about two that is a non-standard quantity, but it is a non-standard quantity now what is the most suitable quantity term in our logic system that has to be some. It is not all, some. Now some cars waited, even that is not complete standard form. Why, because this waited will have to be somehow made into a class term.

So what is your suggestion? Well, here is my example some cars are cars that waited you need this cars clustered and that waited becomes the qualifier phrase again to turn it to proper form. These list is I said is long and we cannot do all of them and there is no need to either, but this is just barely to give you an idea about how things go.

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So, of you to rather interesting classification can we shown here. One is call the Exclusive Statements; exclusive statements which exclude.

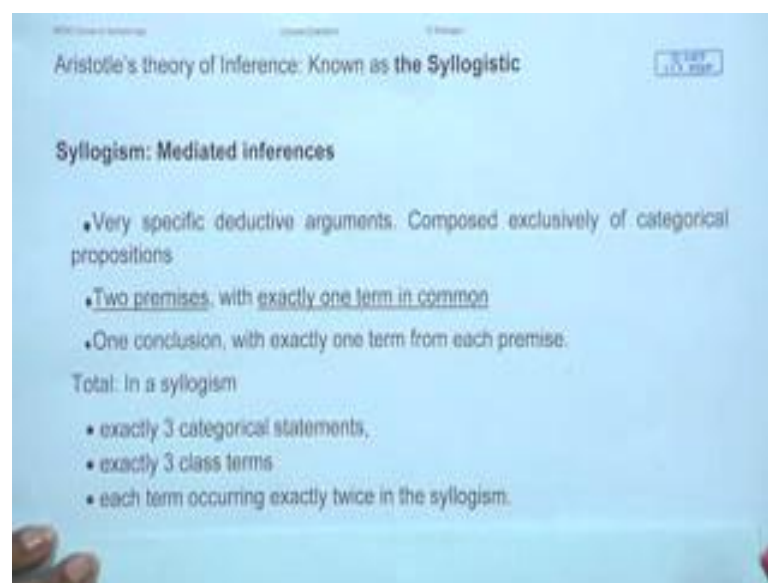
Here is for example, only main roads are congested. So, how do we understand this only? You are saying something here. Are you saying all main roads are congested? No, only main roads are congested and how do I approach it in terms of standard form categorical logic. Well, the answer is like this you can write all roads which are congested are the main roads. So, you go like this you sort of turn it on its head, you change the position. All roads which are congested are main roads. That is one way to look at this exclusivity. Or it is equivalent also you can write, but it does not sound very good but it still equivalent. No non-main roads are congested that is only possibility.

Remember these are called exclusive statement or exclusive propositions because they exclude only not everybody, but only. This is exceptive similar to exclusive, but it also works in a very different sort of way. For example, you might say all except the students are outsiders. Suppose you are having a get together and where there is a big party going on but all except the students are outsiders. How do I go about, there is all but there is also except, so what would be the best way to approach it? Well, this is not easy it is a rather complex understanding that is required. You can try; all except the students are

outsider. So, you can say all non students are people who are outsiders. And notice it is a conjunction. And no students are people who are who are outsiders. All except students are outsiders. So, students are not outsiders, but there all whole are people who are non students and they are outsiders. You can join it like so, all non students are people who are outsiders and no students are people who are outsiders.

This is just to show you that there is a mechanism which works like this to bring many more propositions into categorical logic. And I have shown you some of the mechanisms of how to do this. This requires practice and this requires knowledge of the language. You have to understand and feel the language so that you can translate it back into the logical language. Having said that I think it is time that we get acquainted with the syllogism, which I said is major vehicle of categorical logic through which Aristotle wanted to distinguish between good inferences or good arguments and bad arguments.

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So, let us take a look into this entity call syllogism. I have already said there is syllogism is the mediated inference. We have earlier seen immediate inference where from one premise you directly go into the conclusion. There a various way to do that. Syllogism is necessarily mediated, so there is something in between. What are they first of all? So, first notice that they are deductive arguments but of a very very special kind, so it is a

subset of deductive arguments which are composed only exclusively of categorical propositions. So, every proposition that you will find in a syllogism must be a categorical proposition and that to in standard form. There will be only two premises. And remember whichever proposition occurs in syllogism will be a categorical proposition. If you recall what you know about categorical proposition in this standard form every categorical proposition will have two class terms; as a subject term and the predicate term.

Now, here when the two premises of a syllogism, you are going to have two terms in each of these propositions, but notice they will show share one term in common. So, two premises four terms but one of the term is going to be common which means there will be all total between this two premises there will be only three terms; that is what. And there will be a conclusion, so two premise one conclusion situation. The conclusion does not have any new term appearing, no, new class term. What it will do, is to take one term each from the premises. So, whatever term introduction has to be happen that will happen only at the premise level. There will be a common term through which the terms will be linked and the conclusion will repeat one term each from each premise that is how the syllogism works.

All total in syllogism therefore there will be three categorical statements; two premises one conclusion. How many class terms in three propositions? Three; why, because as I said two premises will share one common term and the conclusion will have no new class term; so three class terms. And each term as you can see the pattern , each term is going to appear twice in the syllogism; ones in a premise and ones in the this conclusion. And there will be one term that will appear twice in the premises, because the premises are going to share one common term get it. So, three class term and each one is going to appear twice in the syllogism.

They will be wondering, I mean all this numbers why all this and I will try to understand that this structural rigidity is a wonderful contribution of Aristotle. To ensure that the structure of a proper reasoning must be rigid that has to be followed at all cost.

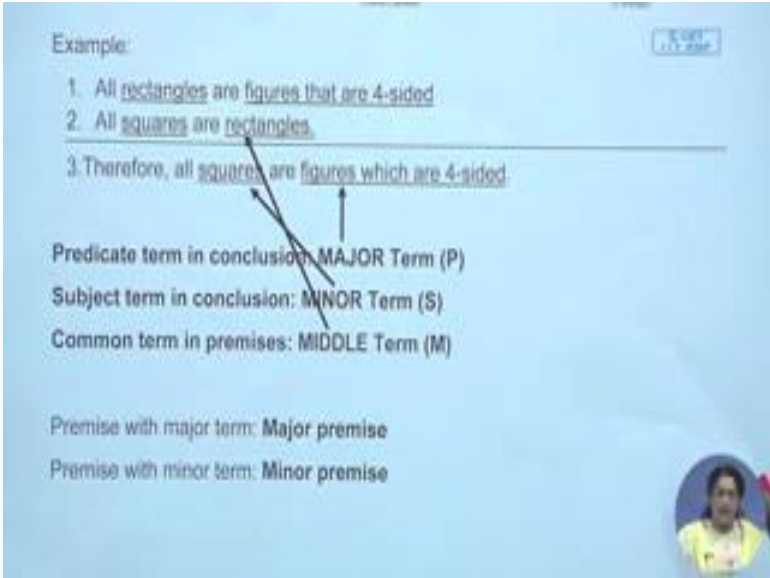
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Example:

1. All rectangles are figures that are 4-sided
2. All squares are rectangles.
3. Therefore, all squares are figures which are 4-sided.

Predicate term in conclusion: MAJOR Term (P)
Subject term in conclusion: MINOR Term (S)
Common term in premises: MIDDLE Term (M)

Premise with major term: Major premise
Premise with minor term: Minor premise



Let us take an example of a syllogism so that we can talk about other things as well. Example; we have taken like this all rectangles are figures that are four sided, categorical proposition is standard form A. All squares are rectangles again standard form categorical proposition A. Therefore, all squares are figures which are four sided.

Now let see what we have just learnt about syllogism how is it applied; so three categorical propositions, two premises, one conclusion. Now let us take a look into the class terms see in the premises you have rectangles, figures that are four sided, squares and rectangles. So, the rectangles are the common term that the premises share. Here is a square and here is figures that are four sided. Notice, that this is repeated in the conclusion. The common term in the premises is not repeated conclusion that is the link of joining these two terms in the conclusion, did you understand.

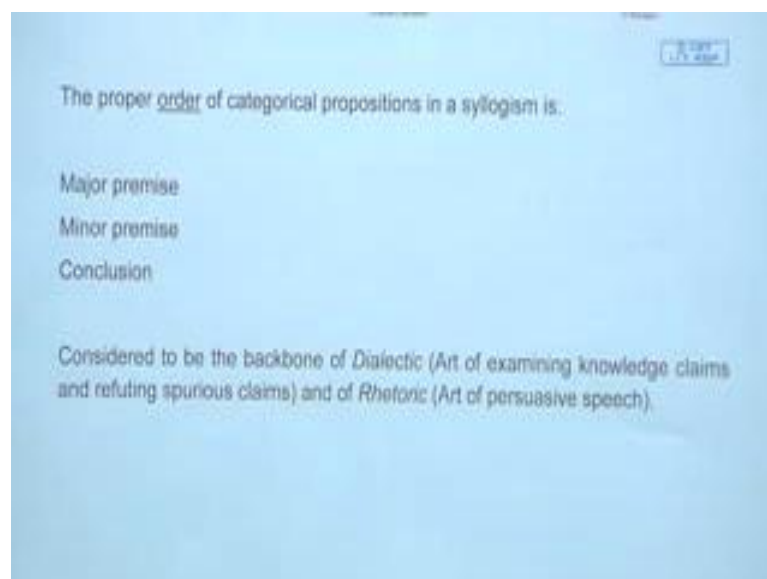
So, this is how the syllogism would look like. There is name for each of this component. The predicate term in the conclusion is known as major term and the typical symbol that we reserved of the major term is call P capital. Ones more, the predicate of the conclusion is known as major term. As suppose to the subject term of the conclusion which is known as minor term and the symbol that we reserve for it S. So, this is minor term, this is major term.

And the term that is common in the premises is called the middle term and the symbol that we reserve for it is M. The middle term is like the middle man. If you have common friend who introduce two otherwise unknown people that is the job of the middle term, it introduce us the two other terms. And then they become linked and they get repeated in the conclusion. So, this is why we call it mediated inferences, mediation has happening through the presents of the middle term. So major term, minor term and this is the middle term the rectangles here is the middle term in this syllogism.

See we have two premises so the premise with the major term is called the major premise. So here the major term is figures which are four sided, it appears in the first premise. This is major premise. The premise with the minor term is called the minor premise. The minor term is squares. Where does it appear? In the second premise, so the second premise is going to be called the minor premise.

So, let us take a look at this once more. Here is an example of syllogism and I have explained with this is what the major term is, minor term is, the middle term is. And we have also found out that the premises also are given a name major premise and minor premise depending on the term that it contains. But there is a sequence also, how it is going to show up or what is the order of these premises in a syllogism.

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And the typical and the proper order in the syllogism is first the major premise. Then comes the minor premise and then comes the conclusion. So, this is what is to be found. If this sequence is not maintained, syllogism is not in the proper format get me; so major premise first, minor premise second and followed by the conclusion. This whole structural requirement and this formal insistence upon a specific form is because what Aristotle wanted to do is to differentiate as I told you between what is known as just empty reasoning.

Sometimes in public speaking we say a lot of (Refer Time: 23:54) you know which has probably no logical content, which probably has no logical value. But people are impressed, and that kind of empty reasoning often is known as Rhetoric. It is an act of persuading people. People who are not so careful about knowing whether there is any logically correctness in it or not, sometimes you can say a lot of words and people just who are not careful listeners will accept you. That is what exactly rhetoric does.

To keep rhetoric separate from proper dialectic, dialectic is the art of examining knowledge claims and refuting spurious claims. So, this is what Aristotle was after that rhetoric must be kept away from dialectic. From the actual work of logic two examine claims made by people and to refute what are unacceptable claims, so in order to do that the syllogism is the backbone and he wanted to keep the purity of the syllogism through this kind of structural requirements.

But this is where we will end today. We have had been acquainted with the syllogism, and we also looked into the other as I told you the whole module was about also about the translation. So, we have extended our boundaries a little bit to go in to what is other kind of propositions and some of them we can now incorporate in our categorical logic. And will take a look into how to prove the validity and invalidity of syllogisms in the next module.

Thank you very much; keep up the word.