Introduction to Logic

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Lecture - 11
Introduction and Motivation for Syllogistic Logic

Welcome back. So, far we have discussed the basic concepts and in that you know, we try to identify the arguments and we analyze the arguments in the sense that we evaluated the arguments. And then we identify the various kinds of arguments such as deductive and inductive argument and then we evaluated those arguments in the sense that, we are seen when, in or when a detective argument is valid. When it is valid when it is sound and in the case of inductive arguments we came to know about, strength of the argument and then when they are cogent and when they are uncogent etcetera you know.

So, then we presented a model for an argumentation which is due to, famous philosophers Stephen Toulmin, and then we said that both inductive and deductive arguments can be fallacious, when the deductive arguments are fallacious especially, will find it in the case of formal fallacies. So, inductive arguments can also be fallacious and then we discuss in data detail with some examples about, fallacies of week induction etcetera.

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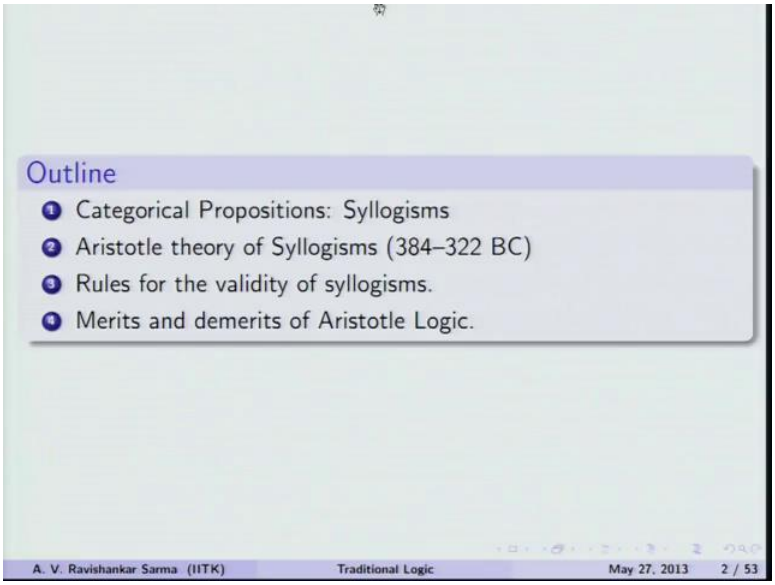

So, today we will be presenting a Aristotle Syllogistic logic, basically a in this a will be presenting a something about, Categorical Propositions and then these Categorical Propositions combine together form some specific pattern of reasoning, which are called as Syllogisms. Then we will present Aristotle theory of Syllogisms, which is presented way back in the year 3384 BC and 322 BC and then we will see with some kinds of rules a there are some rules with which you will come to know the validity of Syllogisms and then at the end we will see, the merits and demerits of Aristotle logic.

So, as you see in this slide that, Aristotelian theory of Syllogism was presented long back in 384 BC and the next question that comes to us is why are we studying the at this movement and all. So, one of the interesting thing is that Aristotelian logics are dominated for more than 1900 years now; in fact, to 2000 years. So, till 19 century the beginning of the 19 th or 20 th century these logics were still used and all, in when a in various circumstances and all.

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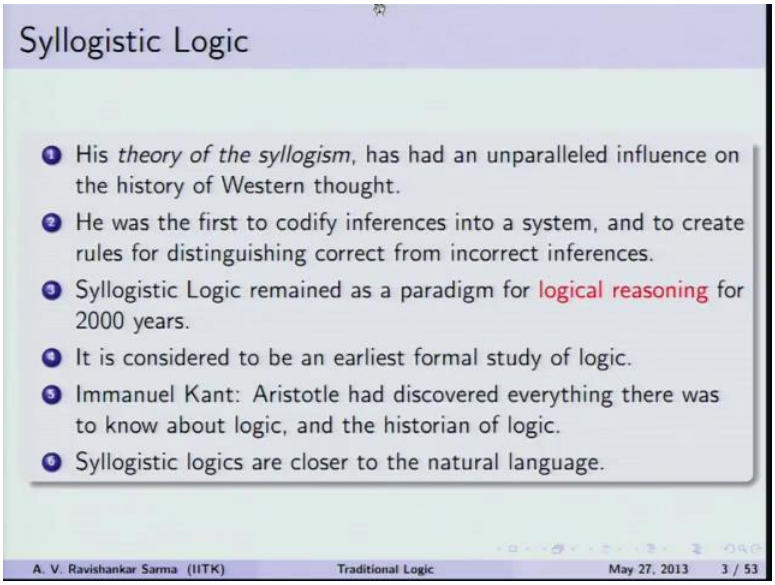

So, his theory of Syllogism has had an unparalleled influence on the history of western thought. So, he was a first codify inferences into a system. And to create rules for distinguishing correct and incorrect inferences now for example, if you say all men are mortal Socratic is man Socratic is mortal, that seems to be a valid kind of inference now and then not seems to be this is a valid inference and all.

So, on the other hand if you say all men are mortal Socratic is man Socratic is not mortal. So, that is a counter instance for this particular kind of thing; that is, an invalid kind of argument because the conclusion does not follow for the premises. So, how to distinguish the first argument with the second argument. So, then Aristotle as presented in his theory of Syllogism, he could codify inferences into a system and to create rules for distinguishing correct from incorrect inferences.

So, 1 of the interesting and important thing why we will be studying this Aristotelian logic imply because of this reason, that Syllogistic logic is logics are called as Syllogistic logic. In the sense that uses specific pattern of reasoning, which is called as Syllogism. I will come to what I mean by Syllogisms a little bit later. A Syllogistic logic remained as a paradigm for logical reasoning for more than 2000 years and all.

So, right from 3084 BC to till a the advent of modern logics which due to Frege etcetera Frege Russell whitehead etcetera. So, till to that extent Aristotelian logics are still used now, even till to date a there are there are some logicians who are interested in a working in greater a detail about Aristotelian logic and all. So, why after all this is the case that you know, a we are still interested in Aristotelian Syllogistic logics and all. So, it is considered to be and earliest formal study of logic and you can say that, this is an origin of formal logics and all. So, there is a difference between when you analyze of form of the argumentation then we say that form is what is considered to be the most important thing and all.

All men are mortal Socratic is man Socratic is mortal, it exhibit some kind of valid form. So, that is way it is a valid argument; in the same way all A's are B's all B's are C's. So, all A's are C's this is exhibit some kind of valid form. So, that is why it is a valid argument. So, in that sense on the other hand, a we need to analyze the content of the argument to know, whether there is any mistake in the argumentation and all. For example, this room is made up of atoms, atoms are invisible. So, this room is invisible and all. So, unless until you analyze the content of the Parag content of the argument there is no way in which you can find out, what is wrong with the that particular kind of argument.

So, it is considered with the beginning of formal logic after all; this course is a about, a mostly about the formal logic. So, it is better to study at least in some detail about Aristotelian a Syllogistic logic, because is a starting point for formal logics. The same thing, can be done later off course we are going to see, in the case of in predicate logics also you can do the same thing. So, but it has is a own model interpretation etcetera and all. So, one of the beautiful are for fantastic thing about Aristotelian logic is that, it is close to natural language not much a jargons etcetera used. So, it is not there no high technical stuff in world in its particular kind of thing. It is very closed to natural language and all.

Famous philosopher Immanuel Kant is author of critique of pure reason, which cons is in important book. In the in the philosophy, Western philosophy a 18th century philosopher. He is of the view that Aristotle had discovered everything there was to

know about logic and everything that historians are pointing about logic and all. He is of the view that logic is complete in an in a sense that you know yes, discuss most of the things and all because is contribution is enormous is contribution is not in not only in classic logics at we are want to talk about that is a predicate and propositional logic, but is contribution is also a also in the area such as model logics etcetera and all. So, it is a starting point for understanding this logic that we have that are available at this movement.

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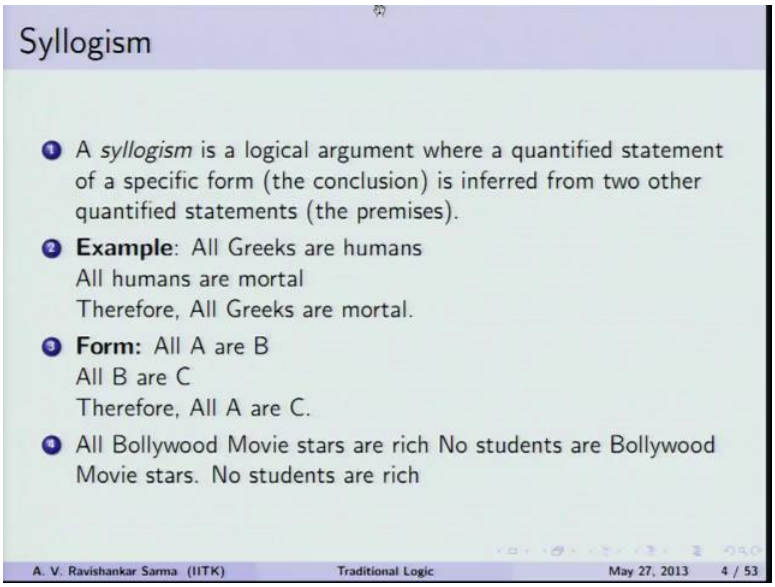

So, Syllogistic logics 1 of the important features of this 1 are that it is closed to natural language. So, as a name suggest the Syllogistic logic what we mean by a Syllogism; a Syllogism is a logical argument where, a quantified statement of a specific form usually it will be a conclusion. Which is inferred from 2 other quantified statements and all. So, you should not that, we are here all ready using some modern a concepts here quantifies are known only, in the only in the 19 century or 20th century at the end of the 19 century or in the 20 th century.

But for the sake of understanding we are using this word, quantifies are usually all it begins with statements begins with all some non etcetera. So, these are all a statements which starts with quantifies for example, if you say all Greeks are humans in that all, it

said to be a quantifier. And all humans are mortal therefore, all Greeks are mortal. So, this exhibits specific form all A's are B's all B's are C's. So, that is why all A's are C's.

So, a Syllogism is a specific kind of logical argument in which, it is combined by 2 logic 2 categorical propositions. I will talk about, what I mean by, Categorical Propositions that same as quantified statements and all. So, in the while studying the basic concepts we are seen that, a proposition is a sentence which can be spoken as a true or falls. Suppose if I say shut the door, or dirty Cockroach etcetera and all. There on a not statements and all; suppose, if we ask what is your name they are all not propositions. A proposition can be clearly spoken as either true or falls, but the categorical propositions there also propositions, which can be stated as is a true or falls, but they are straightly different from that in the sense that, all the statements begin with statements propositions etcetera.

They all begin with all some no etcetera sometimes you know you may not come across all a etcetera and all instead of all you might find every each any, all the sense all this phrases as same as that can be converted into appropriate Categorical prepositions for example, in the for example, if you say all Bollywood movie stars are rich, no students are Bollywood movie stars no students are rich. So, a thing is that is Syllogism is a specific pattern of an argument in which you will find 2 categorical propositions are leading to another categorical proposition.

So, now, the a how do we know that 1 categorical proposition which is which we are calling at as a conclusion of the Syllogistic seems to follow from the other categorical propositions and all. So, in the case of all A's are B all B's are C. How do we know that all A;s are C's follows; that means, how do we know that this argument is valid. So, Aristotle has come up with a theory of Syllogism in which, he has taken tow categorical propositions to consideration and then from that, he moved to another categorical proposition which we usually call it as the conclusion of Syllogism.

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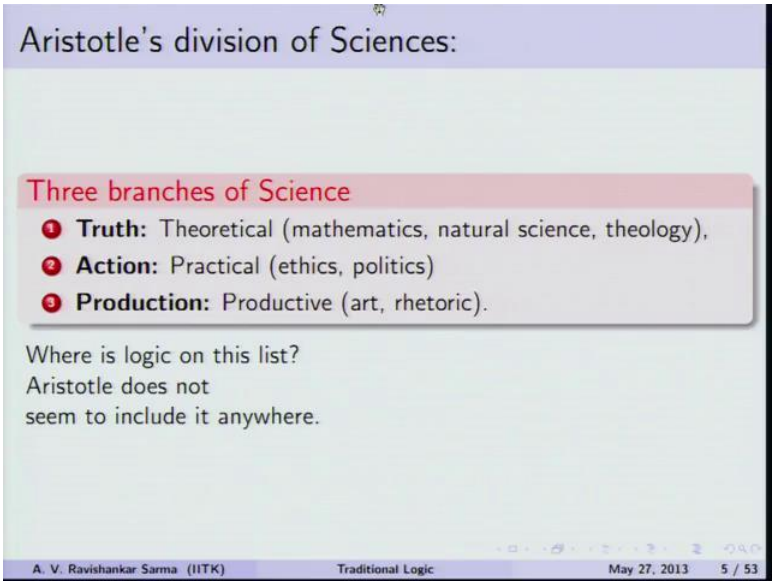

See before there little bit of background, how did Aristotle come up with this theory of Syllogism and all. Actually a Aristotle as divided natural sciences into a 3 different categories based on what it is aiming for example, there are 3 branches of science, 1 is aiming at Truth that is, considered to be Theoretical in nature mathematics, natural science, theology is to be dominant and all those days. So, this is considered to be 1 category or 1 branch of science.

So, another is based on the aim the purpose a is this the action part, that is practical in the sense ethics politics etcetera command. This particular kind of category and the other one is production that is art rhetoric etcetera and all. There basically productive in nature creativity is involved in this kind of this particular kind of thing. So, now, these are some of the branches of sciences and all, as a see clearly here. I mean you will not see logic anywhere in these things and all. So, where is logic in this particular kind of list and all? Aristotle does not seems to have include it anywhere because, he is of the view that it is there everywhere and all it might be there in the first-one second-one even in the third-one as well.

As because it can be used as a tool a in mathematics natural science is ethics and even in art and rhetoric also we might use this particular kind of, I mean logic can be used as

some kind of tools for all this things. So, Aristotle has contribution is enormous in varieties of a branches etcetera and all is contributed in physics, contributed in Meta physics and all this things, but as per as logic is concerned, is works can be combined a together can be called as a different name which is called as Organon.Organon is a some kind of instrument and all.

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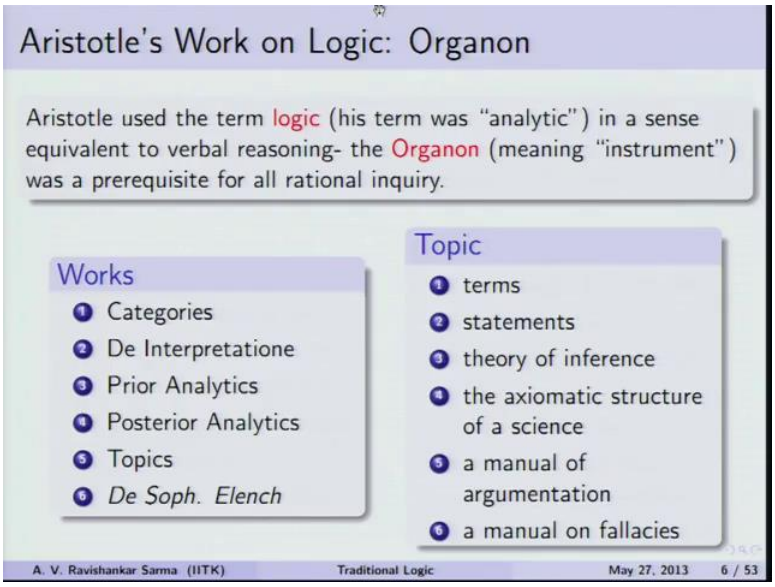

So, Aristotle use the word logic and his term is used in the sense of analytic sense equivalent to some kind of verbal reasoning and he calls it with the name Organon. Organon means some kind of instrument, which is considered to be prerequisite for all kinds of rational inquiry. So, that is a reason why in this case, a rational, such kind of rational inquiry you will find it in all this disciplines and all,this branches of science which Aristotle has classify.

A recent classification may a little bit different natural sciences and mathematics and then within natural sciences there are the n number of a different kinds of disciplines and all, but Aristotle has classified in term on the purpose that, a it is trying to achieve. If you are aiming a truth then it is called a mathematics natural science theologies etcetera theology action ethics politics etcetera. There are different classification which we have a modern classification slightly different from this particular kind. So, the point here is

that, logic a you will find it everywhere because, justificatory tool which can be used, which is a prerequisite for all rational inquiry.

So, Aristotle works in on in logic can be classified into 6 different works, which are combine together a will forms what he calls it as an Organon. So, this is the little bit important for us, because we should know where what Aristotle has discussed. So, these are the works, the first 1 is category where a it a the anilities of terms what discussed. The topic of that, categories is the terms etcetera Aristotelian logics are also called as term logics etcetera in that a in greater detail it was discussed and all.

Second is, de interpretation were the analysis of statements are made mainly categorical statements etcetera. How to categorical statements combine together and form another leads to kind of categorical statement. That is, what we find it in prior analytics various presented theory of inference and a pos posting analytics axiomatic structure of science and in the topics. There all saw the works of Aristotle, in topics yes presented in manual of argumentation, analysis of argumentation. What is a good argument, what is a bad argument etcetera in de soph elench another work? Aristotle in which, he has presented a manual on fallacies we discussed about fallacies and all. It appears a it is clear that we will be focusing our attention on prior analytics various presented theory of inference in all.

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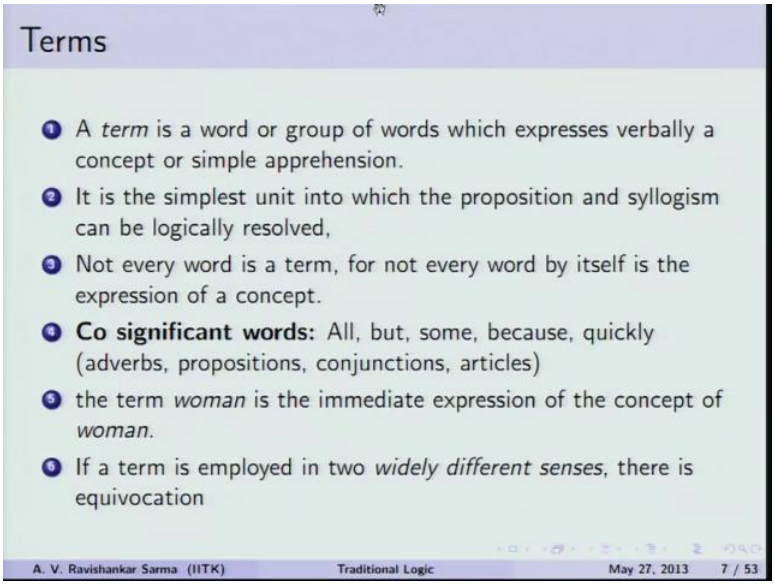

We are not going into the details of all the other things and all, mostly we will be studying a words of the things let it to categories de interpretation may be prior analytics now. Posterior analytics topics de soph e there all interesting, they are linked with a what we study in this thing, but our main purpose is to present Aristotelian theory of Syllogism and then there are rules to find out validity of syllogism. And then we will discuss what the limits of Aristotelian syllogistic logic are. So, prior analytics is the 1, which we will be referring to continue further. So, what are the basic units of Aristotelian syllogistic logic?

So, in the case of sentential logic the basic units are sentences a etcetera. So, in this case the basic units are terms. So, what is a term? A term is a word or group of words, which expresses verbally a concept or simple it can be also called as a simple apprehension. A suppose, if you say a term called heat analytics corresponding to an object which is a in some kind of or something like that. So, a term is considered to be a simple, simplest unit into which the proposition and Syllogism can be logically resolved and then you should note that not every word is can be called as a term and all.

Suppose if I say, to etcetera and all, they are not called as terms and all for not every word by itself is an expression of some kind of concept and all. So, in that sense it is not

called as a term, but there are some co significant words which can also be called as kind of terms significant words such as all, but some because quickly all these things. Sometimes, we can be adverbs; sometimes we can be propositions, conjunctions, and articles. Articles such as the a etcetera for example, if you say the term woman is in immediate expression of the concept of woman.

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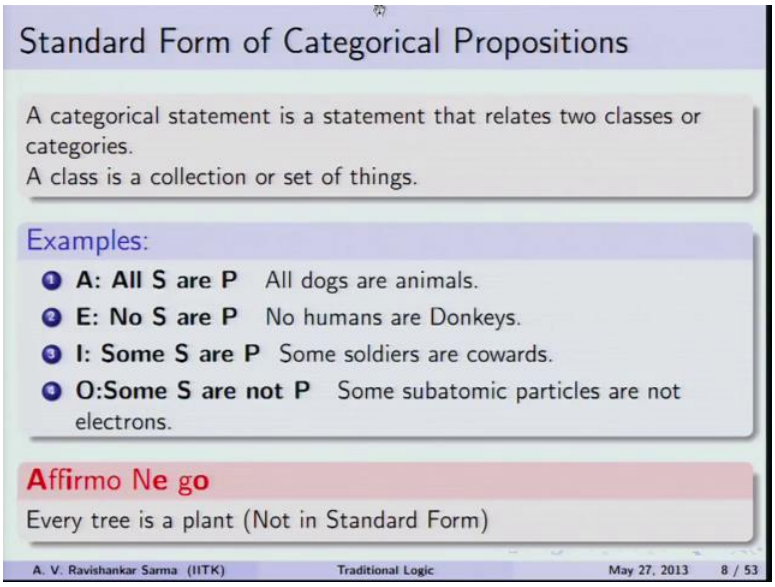

So, this these are saw the things which can be, which can command as a category of terms and all. So, in the modern notation they represent some kind of sets or class etcetera; this will talk about little bit later. So, if a term is employed in 2 widely different senses and then we call it as the problem of equivocation and all. There is a shift in the meaning of, usage of the term then it leads to some kind of fallacy which is called as equivocation fallacy.

So, a for Aristotelian syllogistic logics the basic unit are terms, a terms combines in forms a kind of Categorical Propositions. So, what is a Categorical Propositions are a statement or statement propositions there are used in the same thing; a Categorical statement, is a statement that relates 2 classes or categories. So, they are 2 categories and which you know for example, if you say all men are mortal men and mortal they have 2 categories. So, this Categorical statement relates these 2 classes of men, classes of mortal

beings and all. So, this is a modern notation which were using it class or a set is a collection of set of things and all for example, some 50 or 60 students constitutes, some in some PHI 142 classes of they are a class consist of some 50 students etcetera.

So, what are the Categorical Propositions they are simply they are the propositions which begin with all some none etcetera and all no some and all. All the statements begin with the specific kind of a quantifier that is all no and some. So, they are 4 kinds of Categorical Propositions, according to Aristotle they are like this. Each Categorical Proposition has a specific kind of structure, it has subject and it has predicate. So, predicate is attributed to the subject for example, if you say, all men are mortal; men are called men falls under the category of subject and then a being mortal is considered to be predicate of that particular kind of categorical statement.

So, they can be like this; A E I O all I mean, is can be like this all s are p; that means, all dogs are Animals that is, a proposition a Categorical Proposition E proposition is no humans are donkeys. Suppose, if you say some S are P that is, some soldiers are cowards, some soldiers are brave etcetera. Suppose O proposition is some S are not some subating subatomic particles are not electrons. So, a lots of mnemonics are used in understanding this particular kind of thing based on, what the categorical proposition trying to achieve, the quality of the Categorical Proposition A and I propositions are affirmative and E and O propositions are negative.

So, as this mnemonic says that affirmonigo, were you need to see the ovals are there in these 2 words. The first oval is a; that means, a proposition and the second one second oval let you find is A and I propositions are affirmative that is why affirm and E and O propositions are negative. So, with this you can say that you know, suppose if you forgotten somewhere other, which 1 is affirmative and which 1 is negative then you can use is mnemonic to find out A and I propositions are affirmative and E and O propositions are negative. So, what do we do with this Categorical Propositions and all.

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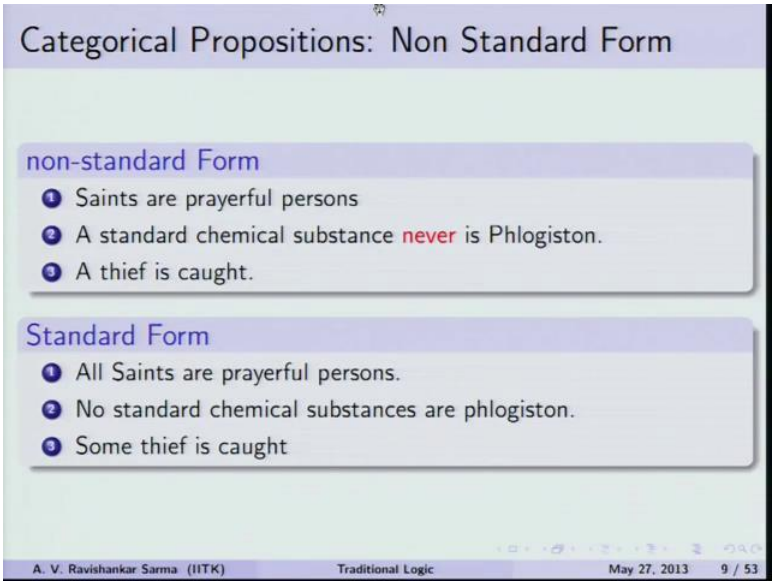

Categorical proposition in the sense that you know, it is a proposition which it links to categories. So, not all the time you will find Categorical Proposition in the standard format. A sometime it is uses in non standard format then what you need to do is you have to take some pain to convert these things into the standard format for example, if you say saints are prayerful persons always they pray a lot, saints always pray for some are for themselves for something like. So, this is not in the actual standard format, where your Categorical propositions begin with all some no etcetera. So, you have to converted into appropriate standard format that is converted into the standard format will become all saints are prayerful persons.

Now, this seems to be a standard format of a Categorical Proposition sometimes, we need to take a lot of pain to convert a this particular kind of things into Categorical that might set some kind of limitation to the Aristotelian logics, but in most of the cases you can easily convert from non standard format to the standard format for example, if you say a standard chemical substance never is phlogiston. So, it is talking about only 1 particular kind of chemical substances.

A standard chemical substance never is a phlogiston. So, this can be translated as no standard chemical substances are phlogiston. And simple things like thief is caught is

that is also not in a the standard format. In the same way you know, all men are mortal Socratic is man, Socratic is mortal Socratic is man is not in the standard format, but he need to converted into appropriate form and all. There is someone x; that x is mortal and all suppose if you says a thief is called i mean correspond it to only 1 thief and all at least one person is caught .

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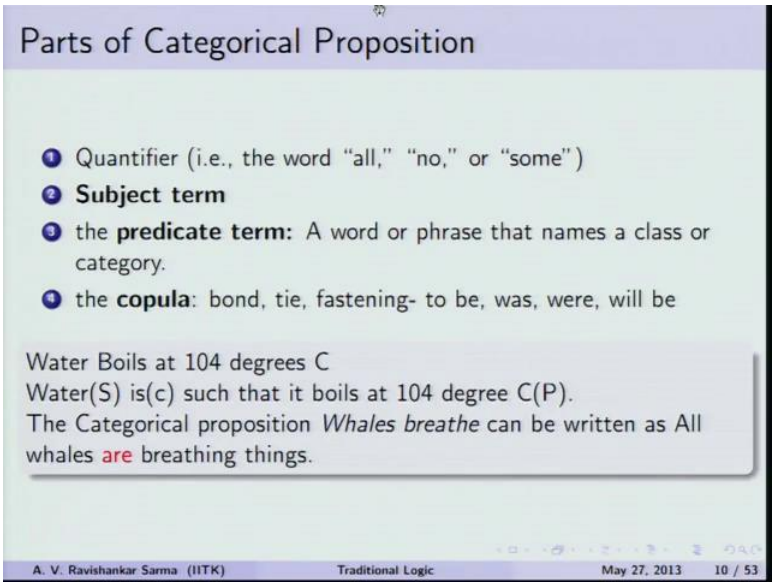

So, that is why we use some thief is caught we should not say that all thieves are caughten and all from this particular kind of thing or you cannot say that not thief is caught because it saying thief is caughten. So, this translation will sometimes be simple, sometimes with complex, sometimes would be painful to translate into standard format. So, once you converted into the standard format things will be easier now, the 1 of the important constant of Syllogism is the Categorical Proposition.

So, what are the different parts of a Categorical proposition we are trying to analyze, what we mean by Categorical proposition. So, first it begins with quantifier it all the categorical proposition should begin with all no some etcetera. So, sometimes you may not find these things, sometimes it may be instead of all you might find every each etcetera. No sometimes can be use never or something like that, some can be used in at least some of the things etcetera.

So, every Categorical proposition has a subject term all men are mortal; that means, men is consider to a subject term and it is also predicate term that is mortality is attributed to the subject that is a predicate term. And in addition to that we have something called a copula. Copula is a some kind of Latin word, which means binding something here what it seems to be binding is 2 categories and all. So, all men are mortal men is one category and other mortal beings is another category and what is binding them, is what is called as a copula these are all Latin words, tying up fastening etcetera these are the meaning of copula.

So, these are the words which you commonly use it as a copula to be was, where, will be etcetera all men are mortal r is considered to be a copula or in the same way a all men are not mortal, r not is considered to be a copula. Suppose if you say what are the boils set 144 degree centigrade and all 104 degree centigrade water yes that is a subject is water and then water is such that it boils at 104 degree centigrade. And in boils it that that it boils at 104 degrees is a predicate and water S is what is called as subject.

So, every Categorical proposition has a subject and predicate and it has a copula for example, the categorical propositions whales breathe, I mean is a not in a standard format and all suppose if you say whales breath it can be written as, talking about the whole class of whales and all. So, that is why we can right it as all whales are breathing things. So, then you know, you are seems to be converting this non standard format whale breathing to the standard for.

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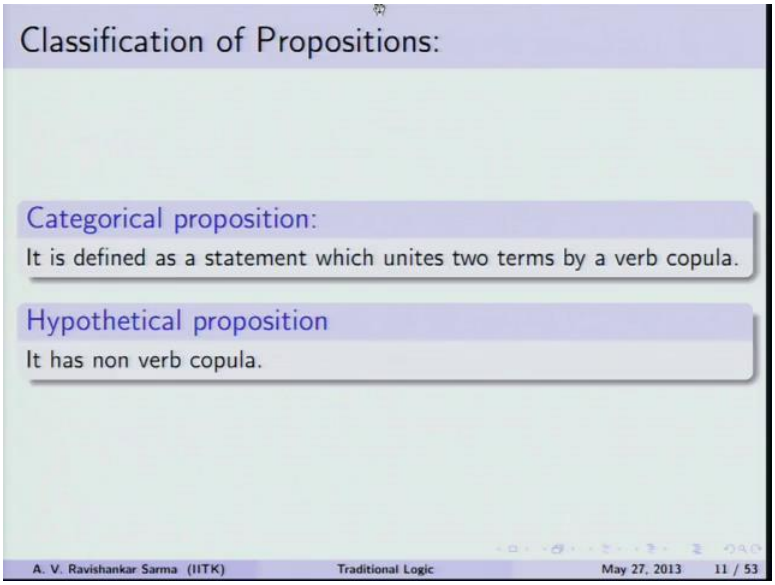

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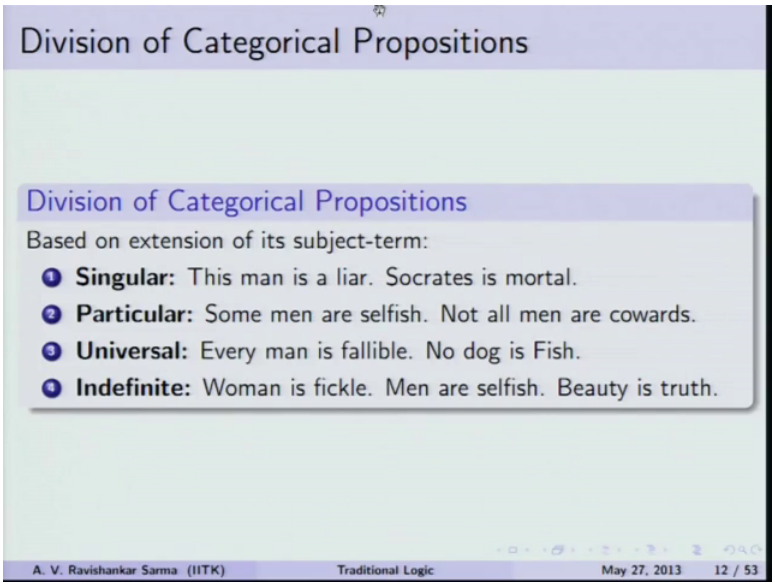

So, these are you can analyze Categorical proposition in this particular way. So, a Categorical Proportion is defined as a statement which unites 2 terms by verb. Which is called as a copula and those things which are, there are some kind of hypothetical propositions and all if p then q kind of things it has non verb copula. We will go into the details of this thing, when we while we are talking about a limitations of Aristotelian

logics. Why it fails for some hypothetical propositions, why it is not easy to infer A plus B and A and from that B follows and all using Aristotelian logics, difficult to convert sometimes in these propositions into a the actual a Categorical Propositions.

So, Categorical propositions can further we divided into a different Categories in be further divided into singular, in the sense that suppose if is if you are referring to a singular class of objects then it is called as singular. Suppose, if you say this man is a liar Socrates is mortal are something like that. You know, this doctor does not give good medicine all these things comes under singular term, singular Categorical proposition is referring to only one particular object.

Particular things are like this, some men are selfish, some includes may be at least 1 and all or it may be more also 10 people 15 20 or may be 30 also, but at least 1 person is selfish and all we can say that some men are selfish or you can say, not all men are cowards etcetera. And universal in the sense every man is fallible, I mean everyone makes mistakes etcetera, then it is referring to the entire class of human beings and all. So, it is an universal Categorical Proposition, 6 in all these things are based on the extension of subject term in every man is fallible is man.

So, is man is referring to all the class of thus, every man fallible means fallibility is attributed to whole class of men and all. So, that is why it is called as Universal proportion and there are some other kinds of proportion which posies problem for us that is, translating to the standard format than indefinite Categorical propositions. Suppose, if you say woman is fickle, men are selfish, beauty is truth all these things comes under indefinite kind of a Categorical proposition. Mostly we will use singular, particular Universal Categorical propositions.

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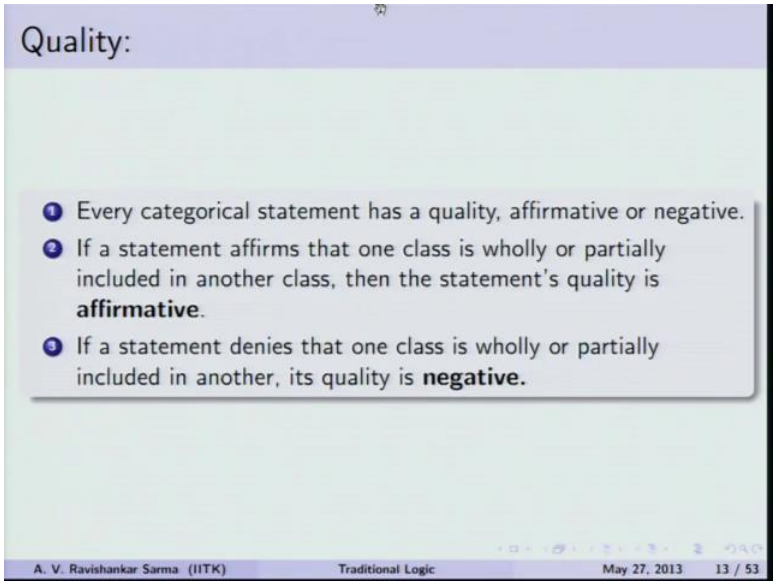

So, his kind of distinction is based on the extension of subject term. It is very difficult to say in the case of indefinite Categorical Propositions, the extension of the subject term. So, based on the quality Categorical proposition and also have subject and predicate and copula this is the things, which we have in addition to that every Categorical Proposition is having some kind of quality. Every Categorical statement is a quality and as it can be that quality can be affirmative or negative. In the case of the last we said that affirmonigo A proposition and I propositions are affirmative and O proposition and E propositions are negative.

If a statement affirms that once class is wholly or partially included in another class then the statements quality is what is called as affirmative. If a statement denies that 1 class is wholly or partially included in another, its quality is called as negative. So, it depends upon whether or not 1 particular kind of class is included in other class partially or fully and all based on that, we have a different kind of things affirmative and negative Categorical propositions.

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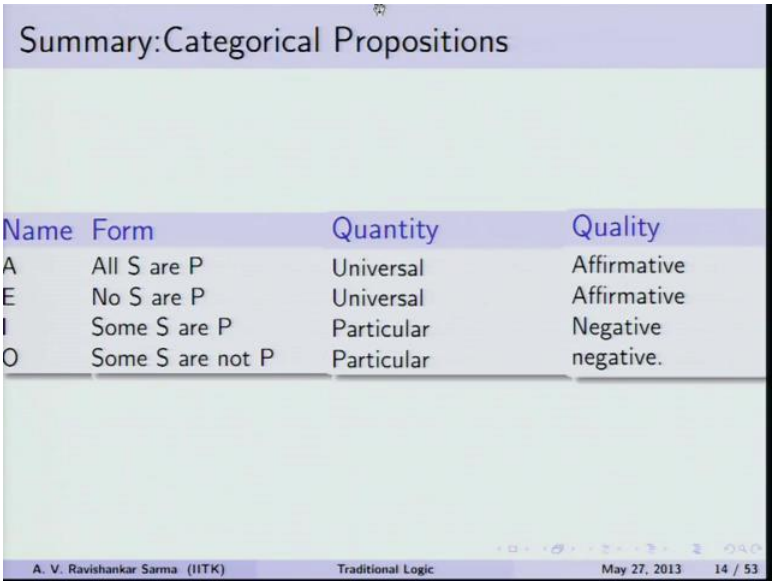

So, these are the things which we have in talking about, A proposition simply all S are P and the quantity is universal thus all S are P; that means, its referring to the whole class that is why, it is Universal proportion A and E are Universal Categorical propositions i n o are particular propositions. So, and the quality of A and E, A and O, A and I are affirmative, were as E and O are negative what started in properly, but. So, usually A proposition and I proposition are consider to be affirmative, all men are mortal, some men are mortal.

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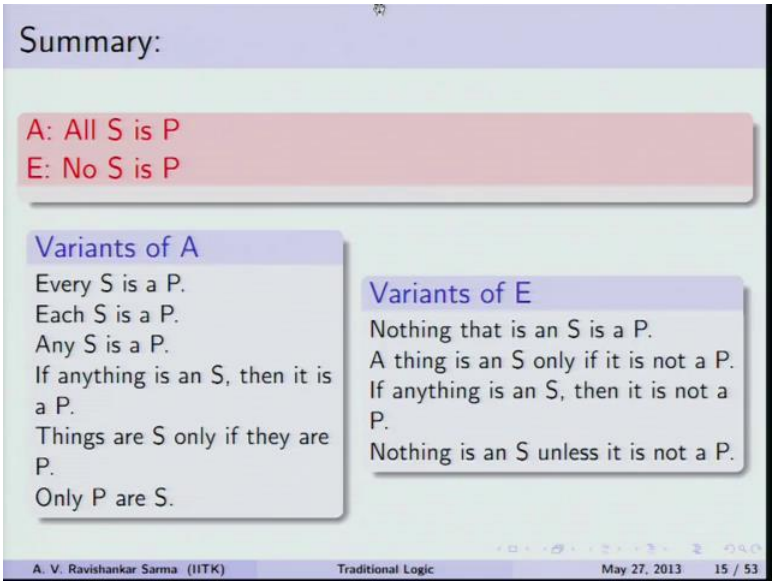

So, we are affirming something. So, if you suppose if you say no men are mortal you are negating in this particular kind of thing; that means, no 1 who is consider to be mortal and all in that particular kind of case. Some men are not mortal at least there is 1 who is not considered to be mortal. So, this first we are analyzing the categorical propositions and then we will make use of it in form in the rules in we will try to understand the rules of Syllogism etcetera little bit later. So, A propositions can be represent in all S is P or no S are P etcetera. So, there are very some variants of a which are not in the standard format, whenever you come across these kinds of Categorical propositions we need to translated into all S are P for example, if you have every S is a P every I TK student is an intelligent person.

So, suppose if you say that thing you would say, all I TK students are intelligent. Each S is P or if you come across any S is a P then also you can translated into all S is P. If anything is an S and that is also P example if you say, all Cats are animals, if anything is an a Cat then it has to be an animal also. So, things are S only if there are P or only P are S all these things can be translated into the standard form as all S are P this in the same way in the case of, E you not find in all the time, you will not come across no S are P etcetera and all, but sometimes it will be used in a different sense which as nothing that is, an S is a P is a same as no S is P. I think is S only if it is not P or if anything is an S

then it is not P all cats are dogs for example, no cat is a dog; if anything is a can it cannot be dog and all in the same way nothing is an S unless it is not P.

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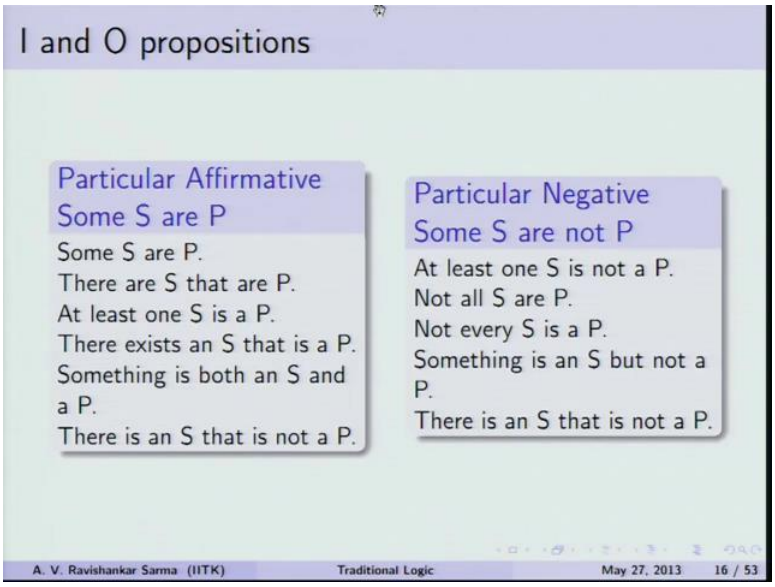

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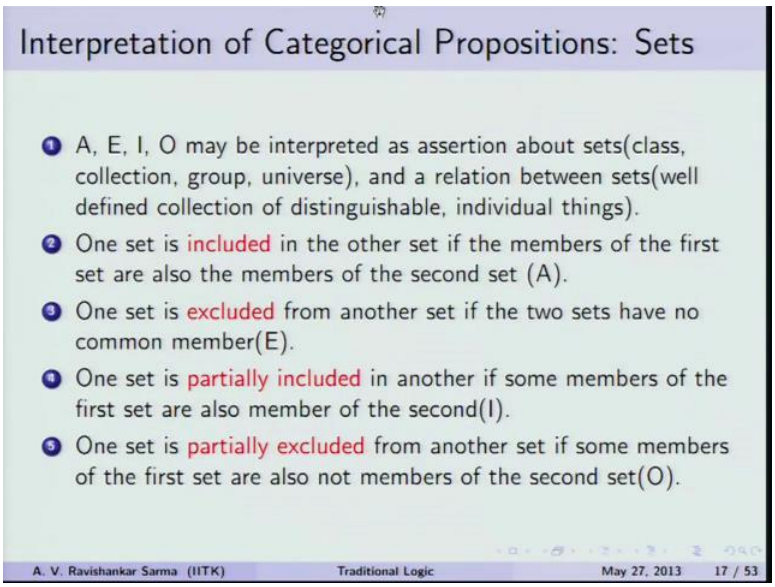

All these things comes under the same the translation of that 1 is nothing but, no S is P. And the same way I and O propositions, which you come across a sometimes they may

not be in the standard format. I propositions can simply be represent as some S are P and it can also be at least 1 S is P. There exists an S that is P or if you say some something is both S and P and there is an S that is not P etcetera, all these things comes under the I proposition that is some S are P.

Some S are not P is like this, at least 1 S which is not P and all not all S are p; that means, the some which are not p; not every S is P and something is an S, but it is not P and there is and S that is not p all these things can be safe righted into an O proposition, which does not seems to be in the standard format, but nonstandard forms can be E translated into the standard format; how to interpret this Categorical Propositions. So, far we have seen A E I O and O we classified it according to the quality and we said A and I propositions are affirmative and E and O propositions are negative etcetera.

So, how to represent terms of this is the modern notation sets and all, sets are collection of well defined things and all, which can be distinguish and all. So, A E I and O may be interpreted as assertion about sets. Sets are what, class collection group inverse etcetera all these things are important for defining the set and a relation between sets and all. Sets are well defined collection of distinguishable and individual things and all set of cat set of animal's etcetera, set of dog's etcetera, were it consists about dogs and all. So, this is the modern notation that we can use, we can represent these Categorical propositions and this particular way and then I will try to draw a diagram to show that in the modern notation we can represent is A E I and O in a certain way.

So, when we say that once it is included in the other 1 once it is included in the other set if the members of the first set are also the members of the second set and all. That is a case, in you can say that A is included in B usually represented as A is a subset of B; 1 set for example, that is all men are mortal, mortality is there included in some kind of all men and all. So, 1 set is excluded from anther set, if 2 sets have no common members and all no cats are dogs. So, cats and dogs are different entities. So, this is quite simple to understand this particular kind of thing that, this joint kind of sets and all is no connection between these things. And instead of being fully included or fully excluded from each and other, 1 can also have partial inclusion and all.

Once it is partially included and other 1 if, some members of the first set are also members of the second set. Some means, at least 1 is there its good enough for us to say that, it is partially included in the other set. In the same way, 1 set is partially excluded from the other set, if some members of the first set are also not the members of the second set. So, based on this thing the recent notation a John Venn has come up with Venn diagrams. A usually we say picture says 1000 words and all. So, let us try to represent this Categorical proposition with a Venn diagrams and then I will try to see in what sense they are different from each other.

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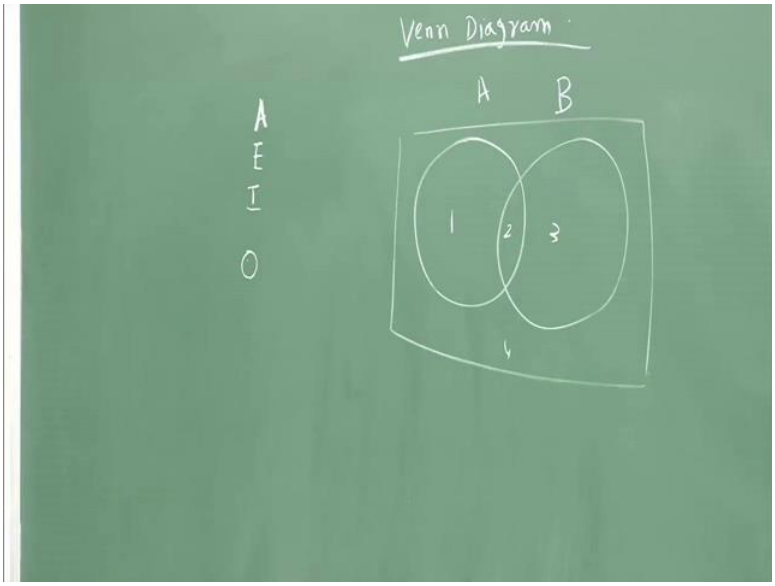

So, Venn has used this particular kind of diagrams which are very intututed and which using this diagrams 1 can show, whether syllogism is valid or invalid. So, let us talk about little bit about Venn diagram our interest is not in analyzing this Venn diagrams a, but in we are trying to represent a this particular kind of categorical propositions in terms of, Venn diagrams. So, it is like this. So, when has used this particular kind of classes. Any 2 classes when they intersect each with other, then it will be like this A B. So, now, we are trying to talk about A E I and O using this when diagram; usually a picture this 1000 words and if you know about these things, with the help of diagrams and things will make reverse a make our life simpler and all.

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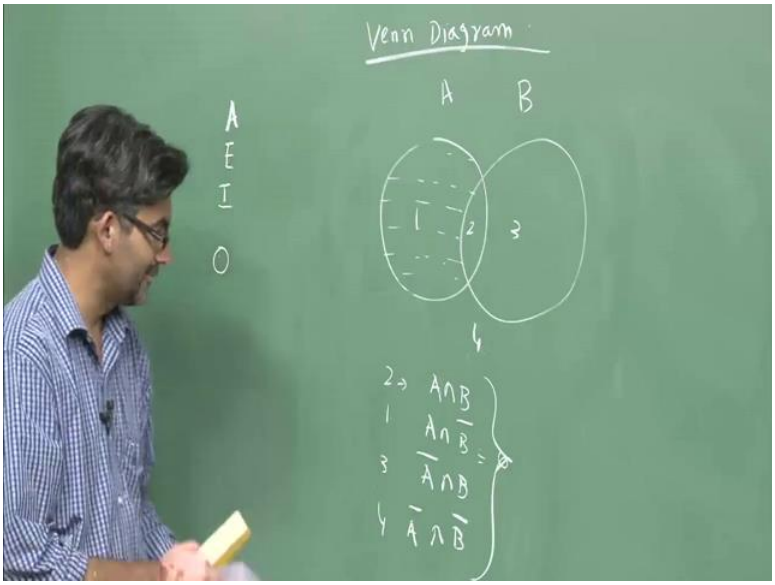

So, it has 4 portions first 1 is this, second third and there is someone outside this usually we draw like this. So, this is an Universal set usually now it is excluded and all. So, we do not take into consideration this box. In general, we do not write the particular kind of things so; that means, you know it is founded by some kind of domain and all. So, which we do not state it explicitly here, saying in terms of sect iritic notation. Suppose, if you have this particular kind of thing then what you say is, this first portion this first we will talk about the second portion, second 1 is nothing but, A intersection B and then it is a the first portion is A intersection B complement and the third-one is A intersection B and then the fourth-one is A bar and B bar. So, these are some of the things which are there in this particular kind of thing.

So, first 1 is a intersection B because for example, if you say all men are mortal, then a the first 1 A is referring to men and B is referring to mortality these are the categories which we are trying to relate with the help of a some kind of Venn diagrams. So, this portion referring to A intersection B. So, this portion referring to A intersection B and this is this particular kind of portion till here 1. So, till here that is referring to A intersection B bar; that means, what it says is intersection B bar is what is called as emptiness and all. Emptiness is the 1 which we are shading it in this particular kind of way. So, in the same way, if you take A bar and intersection B bar and all if that is an

empty set then you have to shade this particular kind of portion 3 needs to be share it and all.

So, in the same way, A complement and B complement if that is an empty set, then that is referring to the fourth-one, then nothing which is this is joint from all this things and all. So, based on this particular kind of idea, we can draw A E I and O in this particular way

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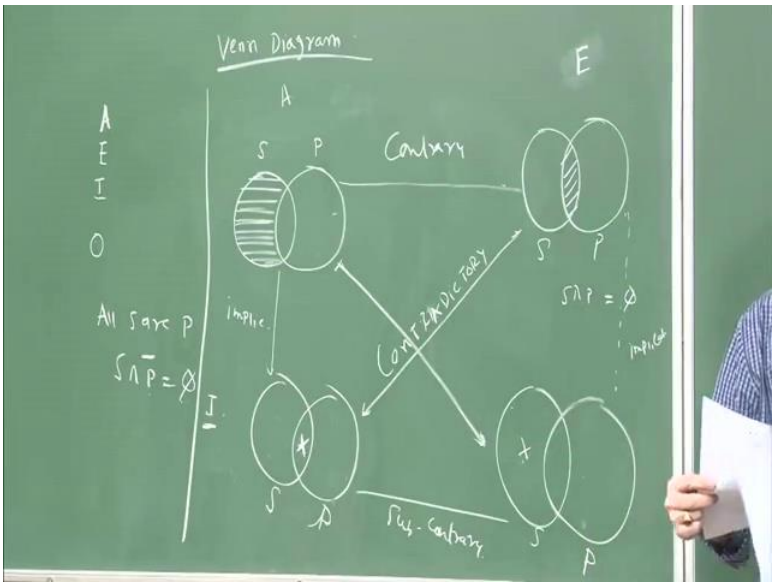

So, the first-one a proposition can be, this A proposition which is shown as particular kind of thing. So, since all S are P means, S intersection A all S are P means, S intersection P empty and all is it should be an empty set. So, what is S intersection P bar? This is S and this is be the subject term and predicate term and this is the thing which is, considered to be this S intersection P prime. So, that has to be empty and then we shaded this particular kind of portion and all. So, that is what is referring to all S are P all cats are animals means, this particular kind of thing. So, there cannot be thing which is considered to be cat a and complement of this one is 1 minus p.

So, that intersection should be empty and all that is referring to all S are P. So, in the same way, this is A proposition and I proposition is a like this. This is I A this called as

O proposition and then we have I proposition in this sense. So, this is a called as I proposition. So, you put some kind of dot here in between this particular kind of thing this a shows that there is at least 1 x, which is S and which is P and all. Some cats are a some dogs bark and all; that means, if there is at least 1 dog which is barking and all, which is a cat and which also barks and all. And that will, serve your purpose you might 100 dogs bark etcetera and all, but what is satisfied by this particular kind of thing, that some S are P is particular kind of thing.

So, this whole class is S and this is P some x are y, we need to put 1 particular kind of cross in the in this area. So, this is what is called as I proposition. So, this is called as. So, now, this is called as e proposition is this is a E proposition. So, in which is again same thing a no S is P and all. So, if you share this particular kind of portion, then this will be like this S intersection P is empty. So, if that is a case, then it is called as no S are P for example, if you say no cats are dogs so; that means, a cats if you take the intersection of cats and dogs, that should be an empty set I mean, that should not be any particular kind of elements which should be there in that particular kind of set this sets are considered to be distinct collection of objects which are arranged in a certain way.

So, A E I O and what this is called as O some S are not P. So, this is represented in this particular kind of set. So, they should be at least 1 x which is not in the p; that means, we need to put here, you should not put this star here that makes it all P are not S some P's are not S and all. So, that is not be a trying to talk about some s are not p means this particular kind of thing. So, you should put some star in this particular kind of thing. So, what is that we have done, we are try to represent Categorical propositions with the help of some diagrams and all. So, now, what we going to see is some kind of square of opposition which is considered to be most important in that particular kind of thing.

So, you have A proposition and E proposition and I proposition and O proposition. Why I have mentioned is, mention this in this particular way we are going to see in detail. The diagonals particular the dire arrows are also important. So, these diagonals are contradictory to each other contradictory to each other and then these are contrary to each other. So, I will talk about to what kind me what we mean by contradictory and this is what is called as sub contrary, and this is what is called as implies; that means, A

proposition implies I proposition in some sense. So, and thus this is also what is called as implication, from no S are no S are P we can derive some S are not P and all no cats are dogs and the some cats are not dogs.

So, why I am motioning this particular kind of thing because, not show that a proposition is contradictory to O proposition and E proposition is contradictory to I proposition for example, if you say, no cats are dogs then suppose, if you come up with a proposition in which some cats are dogs; that means, at least 1 cat is a dog and all, then it is contradicting is no cats are dogs. In the same way, in this particular kind of case all men are mortal if we can come up with one particular case in which some men are mo not mortal at least 1 person is there is good enough to show that, this is a falls and all.

So, that is why in this particular kind of sense these 2 are diagonals are contradict to each other and then we will talk about what we mean by contrary and sub contrary and all. So, these are some of the relation. So, which we will commonly, come across. So, why I am drawing diagram, this diagram tells us lots of things and all. So, we will come to know how these categorical propositions are related to each other. So, if you allow for these particular kind of thing from A you infer I and all then you call it is particular kind of thing as immediate inference. So, immediate inferences are those kinds of inferences in which the conclusion follows from only 1 particular kind of Categorical proposition.

So, suppose if you this, if you say that A implies I and all for example, if you say all men are mortal from that, you infer some men are mortal; A to in traditional logic that particular kind of inference is allowed. So, in the same way suppose if you say, no cats are dogs from that if you say some cats are not dogs and that is also called as another kind of inference and all; and then these 2 are contradictory to each other. So, will get into the details of this 1 little bit later, when I discuss about the relation between A E I and O in greater detail. So, what we have done is we have represented the categorical propositions in terms of some kind of diagrams and all.

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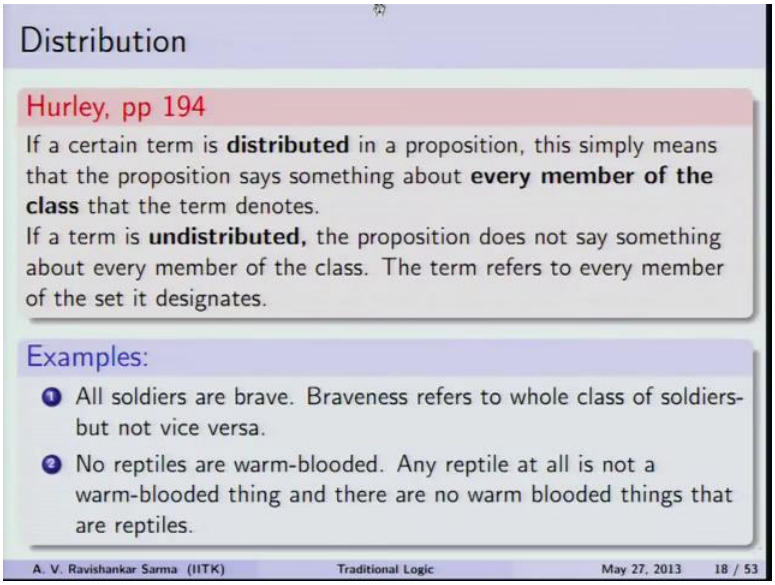

So, now, how do we know that a particular thing is distributed and particular term is not distributed and all. So, this is the book which we are following Patrick Hurley introduction to logic in 194 Page. So, it is like this, at if a certain term is distributed in a proposition this simply means that, the proposition say something about every member of the class, that the term is designating and all. If it is not talking about the every member of the class then the term is said to be undistributed and all; if a term is undistributed the proposition does not say, something about every member of the class and all.

So, the term refers to every member of the set it designates and all, soldiers are brave; that means, braveness is referring to all the soldiers and all, this distributed among all the soldiers and all. So, here braveness refers to the whole class of soldiers, but in not in the vice versa and all for example, if you say all brave people are soldiers and all, that is not all soldiers are bravest totally different from all brave people are soldiers and all. Braveness here is a term, refers to the whole class of soldiers for example, if you say no reptiles are warm blooded a things and all. So, any reptile that any is not a warm blooded thing and there are no warm blooded things that are reptiles and all. So, in both cases subject and predicate are distributed here.

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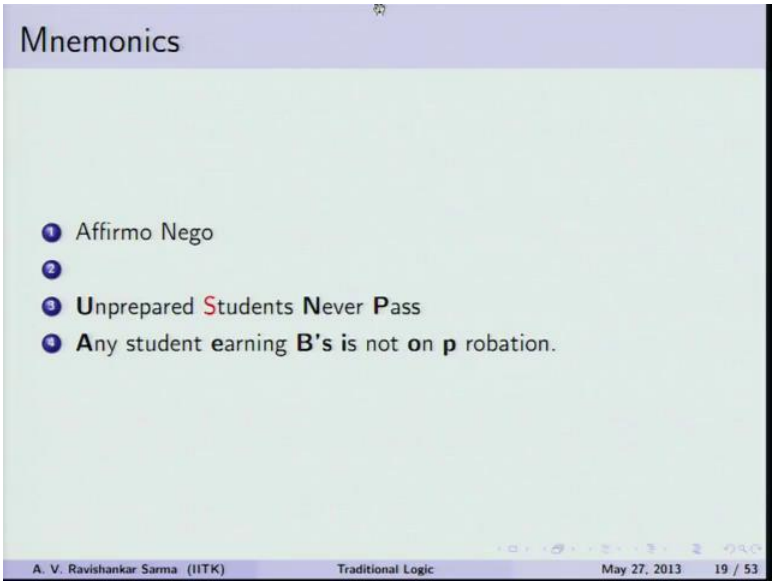

So, what is the subject here, reptiles a and warm bloodedness is the predicate reptiles are referring to whole class of warm blooded beings and the same way warm blooded beings are referring to the whole of reptiles and all. So, this is a what is called as distributed, a distributiveness and all if is referring to the whole class proposition is say something about every member of the class, that the term denotes then it is called as distributed. And if it is referring to only something about every member of the class it is called as undistributed and all.

So, why where we talking about, is distribution and undistribution. How do we know that, what proposition whether subject it distributed or predicate is distributed etcetera and all. So, there are few mnemonics at we have used earlier affirmo nego, that tells us that, A and I propositions are affirmative and E and O propositions are negative. And then there are other propositions in which, I can talk about this concept of distribution and this is like this, upraised unprepared students, never pass this is only for our understanding and then we need to find out the ovals here.

So, in the first thing U stands for Universal propositions and S stands for Subject, P means, N stands for Negative propositions, Categorical propositions, P stands for Predicate. So, Universal propositions distributes only subject and you negative

propositions distribute predicate; that is not good enough and these not giving us full details of what Categorical proposition, what term is distributed and all. So, the best thing would be this particular kind of thing. Any student earning B's is not on probation.

Now, we need to look into the ovals here, the first letter is A and immediately forward by that S is there; that means, A proposition distributes subject. Now, that is a first 2 words and all, which you can find out a proposition distribute subject and E proposition distributes B means boat and I proposition a distributes neither, some men are mortal means no term is distributed in that particular kind of thing. And O proposition distributes predicate; that means, e proposition distributes both of them, both subject and predicate and O proposition distributes only P and all.

This is the way in which, you know when they have use lots of mnemonics to identify all this shortcuts and all are hidden in this particular kind of thing. We are going to see some more mnemonics a little bit later. So, far we have defined; what is a Categorical syllogism now, we are seen what a categorical proposition is. What it consist what it consist of etcetera and all. How to represent in terms of diagram etcetera and all. So, that you we can easy understand these things etcetera and all.

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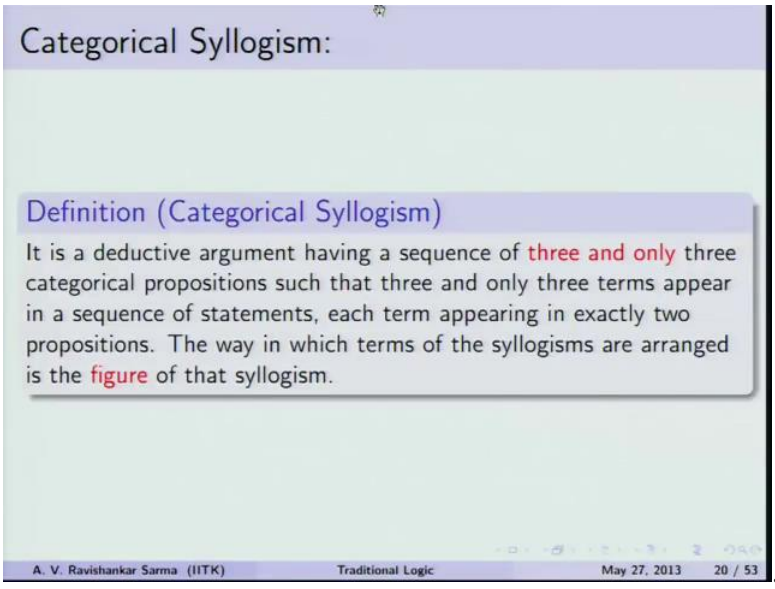

So, now coming back to a specific pattern of argument in which, you will find only categorical propositions. If it is not in standard format we need to convert into a standard format. So, a Categorical Syllogism is a deductive argument having a sequence of 3 and only 3 categorical propositions; that means, 2 will serve as premises and other 1 will serve as a conclusion, such that 3 and only 3 term of sequence of statements, each term appearing in exactly 2 propositions and all. So, these are some of the things which you will find it in categorical propositions. We will find subject term, predicate term and the middle term and all. So, the way in which these terms of Syllogisms are arranged, is what is called as figure of that particular kind of Syllogism.

So, in this lecture what we have done is simply, is that a we are trying to talk about Aristotelian Syllogistic logics a Aristotelian syllogistic logics. What considered to be important is the Syllogism, a Syllogism consist of Categorical propositions and all. So, in this lecture we analyzed, what we mean by categorical propositions and we represented this categorical propositions in terms of we have given some kind of diagram diagrammatic representation, which is due to John Venn is a mathematician, on which you know, how this A E I and O propositions are related, is the 1 which we have discussed.

We have said that A and E proposition, A and O propositions are contradicted each other, I and O propositions are contradicted each other. And then we also said that a sometimes you know, some a proposition you can infer I proposition and the same E proposition. You can infer I proposition and all in the some limited kind of sense in the next lecture we will be talking about a Aristotelian actual theory of Syllogism and then will try to find out some kind of rules, for the validity of Syllogisms and all. So, we will continue with validity of Syllogisms in the next lecture.