

Introduction to Logic
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Lecture – 13
Aristotle Theory of Syllogism

Welcome back, in the lecture we presented Aristotle the theory of syllogism in a way that we are presented with a **mine** by a categorical syllogism. Categorical syllogism is a specific kind of argument **is** considered to be **a directive argument in the sense** that conclusion **scariness fellow** premise. And the categorical syllogisms are found in some certain way that all the preposition that we premise the categorical syllogism are considered categorical preposition. What are categorical preposition? So, what are categorical propositions A E I and O are considered the categorical preposition.

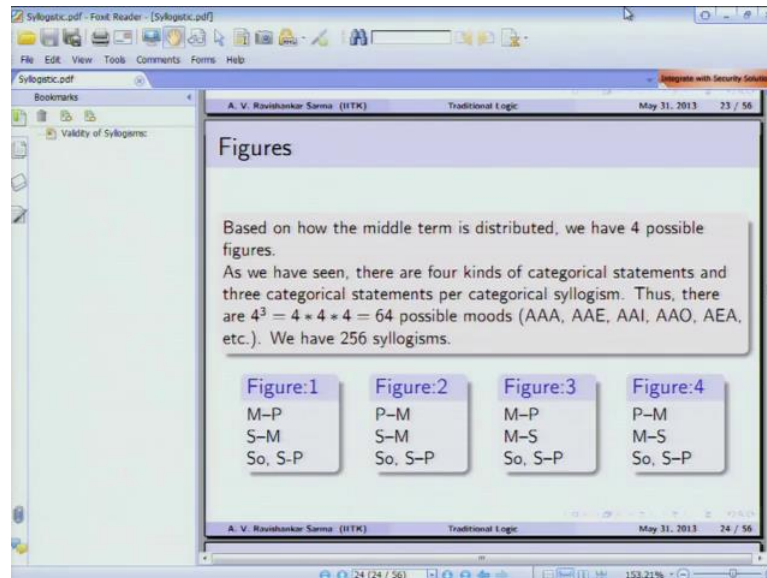
A categorical preposition stands all mine mortal I preposition stands for some men are mortal and preposition stands for some no men are mortal and E preposition stands no men are mortal. So, depending on the continually the quality Aristotle classified this categorical preposition in 4 different categories. And then a given syllogism at list 2 categorical preposition will premises will be there which will serve as premise and the other 1 will serve as the conclusion; so which is the also to be considered to be a categorical proposition. So, what we are basically discussing is that how to categorical preposition leads to another 1 which construed the problem of validity of syllogism.

In this class what will be doing is will be studying in the details a the validity of syllogism is in Aristotle theory of logic. And then will talked about on the roles of interneer from the rules which validity syllogism and then we well move on to the reduction of syllogism.

Then we will talk about some impotent operation which will help us in making same kind of imitate inference. So, then at the end will talked about the limitations of Aristotle logic. So, to begin within the last class we discuss in details how Aristotle classified verses syllogism in to different kinds of figures. So, this can be expend and like this. So, beside on how the middle tern is distributed Aristotle has calcified a versus kinds of

sylogism into 4 different figures in all.

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So, in the first figures the middle term acquires the positions of the subject and in the second permits of figures number 1 the middle term acquires positions of a predicate. Where in figures number 2 is a it acquires positions predicate in both the terms and both the terms, in the in figures number 3 the middle term acquires the positions of a subject and in figures number 4. In the first term permits the middle term acquires positions of a predicate of sentence and it acquires the positions of a subject in the second permits of figures number 4.

So, according to Aristotle figures number 3 and figures number 4 are contrast to be imperfect moods imperfect figures. And this figures can be reduces to a either figures number 1; our figures number 2 will be sensing the how the moods of the cure figures number 3 and figures number 4 can be reduces to figures number 1 which is construed to be stander kind of figures perfect kind figure according to Aristotle.

So, why he us why is the beau that figures number 1 the moods that fellow under figures number. First a follow what we main by mood is like this that any triplets like A A A A E A these things constitutes moods of argument. And then correspondent the mood we

have a figures, then it is simply present has per exam ply if i say a a a 1 means is the moods which are occurs figures number 1. Exam ply if i say A A A 2 then it occurs figures number 2; in the moods first 2 letters stands for premise and other 1 conclusion.

So, this is what we have depend pan how the middle is a distributed we have 4 different kinds of figures and then there are 4 kind of categorical statement which you have A E I and O and syllogism we have only 3 categorical statements. So, there for we have 64 moods possible in each and every figure. So, 4 to the power of 3; that means, 64 possible moods like A A A E A E I I I I all things constitutes different kinds of mood depending upon how the middle term is distributed. So, hear the middle term takes the position of a subject in the first and primes middle term takes the position of predicate in the second primes in figures number 1. So, each in the every figures has 64 different moods and; that means, we have 4 in to 4 in 64 that mains we have 256 syllogism possible, if you construct this things in this way.

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Valid forms of Syllogisms:15

Unconditionally Valid

- 1 First figure: AAA[BARBARA], EAE[CELARENT], AII[DARII], EIO[FERIO]
- 2 Second figure: EAE[CESARE], AEE[CAMESTRES], EIO[FESTINO], AOO[BAROCO]
- 3 Third figure: BOCARDP[OAI], EIO[FERISON] IAI[DISAMIS], AII[DATISI],
- 4 Fourth figure: AEE[CAMENES], IAI[DIMARIS], EIO[FESAPO]

Conditionally valid:9

- 1 First figure: AAI[barbari], EAO[CELARONT]: There are S's
- 2 Second figure: AEO[CAMESTROP], EAO[CESARO] (There are S's)
- 3 Third figure: AAI[DARAPTI], EAO[FELAPTON] There are M's

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So, out the 256 syllogism a according to Aristotle 15 are considered be a unconditionally 15 are considered unconditionally valid and 9 are considered to be conditionally in valid. So, in the first figures this are the syllogism which are moods to be which are conditionally valid in A A A and it us own letter in all they name it with same kind of

Latin name in all. The name Barbara suggests that we are look at the whole in all and even the consent also conveys some kind of in information here we will talk about this thing in greater details. Then I analyze this this syllogism which we will be talking about little bit later.

So, in Barbara the oval set are A A A, that mains the first 2 categorical proposition are a proposition and to the conclusion is also and a proposition E A A in the same way it has own name Celarent we have to observe the a oval set occur in this Latin word Celarent a the letter a the first word which you come across after C is E and after R you will find E and all. So, the mine E A E is construed to be the mood of this particular conducting. And Aristotle could come of with this unconditionally we good come back with the view that only this kind of syllogism are unconditionally valid. But, how the now that is are what do you main by seeing that are unconditionally valid there now specific external condition which are imposing on this 1.

So, this also happened to the true in the case of modern logic us well. So, later rule has worked extensively on Aristotle theory of syllogism which constitutes some more and logic. So, there you will see that syllogism Aristotle under the category of unconditionally valid syllogism where going to valid even in more logic us well. But, there are same condition valid syllogism which depends upon where are not the term. There Aristotle theory Aristotle in logic also called is term logic what are important in Aristotle logic the basic in the terms subject in middle and predetermine a middle term major term and the miner term.

So, this are considered be 3 term with are important which are decide at the regular syllogism is valid or not. So, Aristotle theory by defoliate it is taken for granted that all the term are noun empty. So, that miens no way which you will construed on empty setter the set corresponding to the which the difficult, suppose if i say set of tigers it considered to be noun empty kind of it.

So, what hipped to if we taking to consultations there may be with you take about empty set. For example, you can still 1 can still reason abut word ware 3 and then we can talked about how to prevent that word ware 3 etcetera and which dissent exist foment it is

considered to be empty side because still reason abut. In the same way what happened when you have unicorns on dinosaur are same thinks like that with are construed to be an empty set all this.

So, it set same kind of limitations to Aristotle in logic, but Aristotle a according to Aristotle there are certain syllogism which i considered to be valid basic on whether or not the whatever term of subject passion actually exist are in the other case; whatever occupies is the middle term whatever actually exist in the world etcetera and all. Based on that, he made some other syllogism valid. So, in total there are 24 syllogism out of 256 syllogism which considered to be valid syllogism according to Aristotle. So, here is a poem a with which they could remember what can be syllogism are valid with aspect what kind of figures and all. It is this pneumatic poem a which is also called like this syllogism poem first appearance first appearance like this.

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Corrected New Version

First Appearance

Barbara celarent sarii ferio baralipton
 Celantes dabit is fapesmo frisesomorum;
 Cesare campestres festino² baroco; darapti
 Felapton disamis datisi bocardo ferison.

Barbara, Celarent, Darii, Ferioque prioris
 Cesare, Camestres, Festino, Baroco secundae
 Tertia *grande sonans recitat* Darapti, Felapton
 Disamis, Datisi, Bocardo, Ferison. Quartae
 insuper addit Bramantip, Camenes, Dimaris, Fesapo, Fresison.

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Then it is later being change to a the second part of this line that is Barbara, Celarent, Sarii, Ferio mins is continually to first figure. And in the second 1 is Cesare, Camestres Festino, Baroco, Secundae mains second figure. And then that is somethings which this word refers 2 tertia grade sonans ricitat darati etcetera and all. So, the idea here is that any who moderate this particular kind of poem the can come to now a what kind of

syllogism are considered to be valid.

So, this is a kind of coded kind of language and all when all in which for example, if take any particular latin word and at say Barbara and all in that ovals stands for the moods syllogism A A A per example and then the consents also some minus. So, in the first syllogism you do not find any such kind of think because there considered perfect moods and all. So, where as in the case of starting from the second figure and words that manse is are a Camestres etcetera and all. Suppose, if you abuser Cesare C E S A R E east stands oval that manse it is a e a e preposition.

Then immediately after e we have a consent s. S terms for some kind of an any kind cordon all which are bitter later, S stand per simple conversation a exerts and all sir consents also express some kind of think and all other letters for the used in some kind of think is city sense at all. So, when analyses this poem when all when i talking about reduction of syllogism I well coming to the details of this syllogism poem is greater details.

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Rules for valid syllogisms:

- 1 The middle term of a valid syllogism is distributed atleast once in the premisses.
- 2 If any term in the conclusion of a valid syllogism is distributed, that term is distributed in the premisses.
- 3 If any valid syllogism has one positive and one negative premiss, its conclusion is negative.
- 4 No syllogism is valid if it has two negative premisses.
- 5 If any valid syllogism has only universal premisses, its conclusion is also universal.

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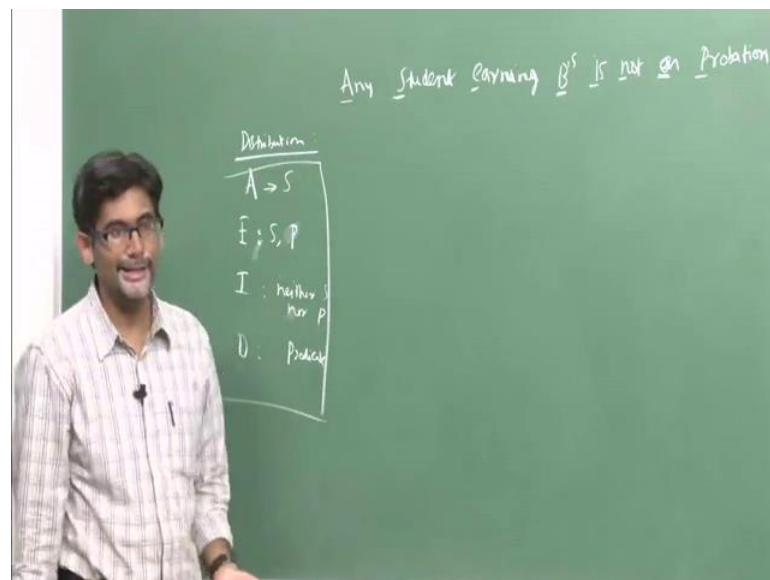
So, now so far we are said that out of 256 syllogism fifty are unconditionally valid and 9 are constructed to be conditionally valid. So, the how do we now that this 50 syllogism

are unconditionally valid. So, Aristotle come up with same rules for the valid syllogism after logic is all about studies of principle of valid reasoning. So, there some kind of rules for this valid syllogism and the rules are like this.

So, the first rules is that the middle term of a valid syllogism if it is a valid syllogism then the middle term it occurs in the syllogism has to be distribute is once at least in the premises. If it is not distributed at least once premises then it's construct and invalid kind of a syllogism.

So, we need to know about something about what you means by distributed and all. A term is distributed especially when it is different to the whole class that it refers when all. So, we talked about this distributed greater details in last 5 classes, but it you want to you remember using mnemonic and all. Then the reason mnemonic which is why you using in most the logic test book that is like this any student learning this is a not a probation. So, this like a this is the 1 which we need a remember.

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If you can remember this 1 will come to know what term is distributed etcetera in what kind of the category preposition. Any student earning this, but is not an academic prostration that is smile write as this think. So, what this sentences convince. So, now,

we need look per the first letters of this particular kind of sentences.

This is considered to A A preposition A preposition distributed subject the next 1 which is immediately date hear and the first letters in this 1 ward is E. E preposition distributed both that is subject and subject and predicate. So, this is distributed this is the theory of Aristotle ... Aristotle has come up the distributed that in a preposition only subject is distributed where is in e preposition s and p are distributed. And in the case of i prostration that is hear in the third this the ward which here and stands for neither of them that mains this the neither subject in r predicated.

So, neither the terms distributed in this prostration and the last 1 is O preposition and in O preposition this 1 which we have is not an preposition this is on preposition. O preposition distributed only predicate. So, this the 1 which we need to remember and then there are other ways to a no about this 1. If you can draw Venn diagrams our id draw oilier diagrams that also you will come to know, which term is distributed etcetera and all.

So, the first things which you need to now is which term is distributed extra and all. So, now second rules is that it any term conclusion of the valid syllogism it distributed; the term as to the distributed in the premises. That means, nothing is distributed in the conclusion which is not distributed a near in the premises. That is a case and if it is distributed conclusion, but not distributed in their premises and all when they syllogism considered to be valid in valid.

In the same way any were at syllogism a has at least 1 positive and 1 negative premises the conclusion in always negative at all. We have 1 affirmative , let say a preposition is there and any you have negative preposition let say E or O then conclusion has to be and with i were prostration are E and O preposition are concentrate to be appetizer and E and or concentrate to be negative preposition.

So, this is 1 of the rules which a which make same syllogism valid and the fourth rules is that no syllogism it is valid it us to negative premises. So, that manse if a categorical syllogism us 2 negative premises in all. That means, what are the negative premises E

and O concentrate to be negative premises of using if you have E E and any is for and all first of all if you have 2 negative premises you cannot per anything at all. So, this is very important think important observation is that a over did syllogism to valid at least 1 affirmative prostration should be.

So, in the premises, so that is the 4 rules it to negative premises on it came be positive and final 1 is if any valid syllogism us only universal premises that mains E A kind of think. And is concoction also should be universal and all, but is only the case of Aristotle and logic if there are 2 universal preposition it us premises a concoction came still be a particular kind of preposition in all. So, that make is 9 preposition categorical syllogism conditionally valid. So, we will be seeing with same examples off course will take more something more about this rules are syllogism beside on obscured vast ion that we have.

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Rules of Syllogism

- 1 There are only three terms in a syllogism (by definition).
- 2 The middle term is not in the conclusion (by definition).
- 3 The quantity of a term cannot become greater in the conclusion.
- 4 The middle term must be distributed atleast once in the premises.
- 5 At least one premise must be affirmative.
- 6 If one premise is negative, the conclusion is negative.
- 7 If both premises are affirmative, the conclusion is affirmative.
- 8 At least one premise must be universal.
- 9 If one premise is particular, the conclusion is particular.
- 10 In extensional logic, if both premises are universal, the conclusion is universal.

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So, Aristotle has preposition particular kind of theory than it has particular kind of things; so there only 3 terms in a syllogism. So, make say there are more than 4 terms and all what mains to be d 1 and all. So, it has to reduce to on 3 term at all per example if you say all B's are c this is are C's all C's are D this is exert the mains A B C D there 4 term in that form.

So, that case what you need to do is reduce to categorical syllogism preposition another 1 it i say all A's or B or C reduced to all A's r see are. So, now, is the next preposition is all cared is; that means, all A's r D's, but it is not us simple us 1 which i am trying to express and all in actual practice it not be the cases. So, this again the some kind of serious limitations to Aristotle in a logic.

If there are more than 3 term in all then things will come become difficult to expressing this simple theory of formal theory of syllogism which talks about the validity of syllogism. So, the second rules it that the middle term is not in conclusion in all. So, middle term in the premises in the by chains occurs in conclusion middle term occurs only in the premises by chins is the middle term occurs in the conclusion. Than that something wrong with the arrangement of the preposition than i if not consider to be a it is not permit actual a first follow at to be are valid or invalid. So, third rules this that condition of the term cannot be grated than grated in the conclusion in all. So, if there 2 a preposition in all it can be e preposition and all.

So, per example if a have to particular kind of preposition in all I preposition it cannot be in universal preposition in the conclusion all. So, the quantity of a term cannot become in the case of concoction and all. So, in the since the Aristotle permits all from 2 a preposition second still in I preposition. There the quantity of the terms that occurs in the conclusion is not greater in the conclusion when components to the premises and all. So, this rules need to be explanation in the greater details, but it is not that important that is this more. So, the fourth rules is that they are all same observations a from the rules at we have already presented in the last line. So, the middle must distributed at least once in the premises. So, that we all started already if it is not distributed at least once then the syllogism is consented to be invalid than all.

For example, if a you take to particular kind of preposition in all same dogs are animals same animals are why are intelligent something if see like that. From the 2 particular premises you cannot in for anything and. So, because of that this in the I preposition which n 1 of the terms are distributed in I preposition distributed means that of then. So, a what we what is important theory syllogism middle in expressly when you take middle term is considered it us to distributed at least once in the preposition. So, that means the

middle term has to be r O kind of variation and all were at least the term distributed and all. So, the a anther rules is this that general observation in all the fifth rule is that at least 1 premises must be prematurely at all what to the prematurely preposition categorical preposition A and I R affirmative categorical preposition at all.

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Valid forms of Syllogisms:15

Unconditionally Valid

- 1 First figure: AAA[BARBARA], EAE[CELARENT], AII[DARII], EIO[FERIO]
- 2 Second figure: EAE[CESARE], AEE[CAMESTRES], EIO[FESTINO], AO[BAROCO]
- 3 Third figure: BOCARDP[OAI], EIO[FERISON] IAI[DISAMIS], AII[DATISI],
- 4 Fourth figure: AEE[CAMENES], IAI[DIMARIS], EIO[FESAPO]

Conditionally valid:9

- 1 First figure: AAI[barbari], EAO[CELARONT]: **There are S's**
- 2 Second figure: AEO[CAMESTROP], EAO[CESARO] (**There are S's**)
- 3 Third figure: AAI[DARAPTI], EAO[FELAPTON] **There are M's**

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So, now this observation we can see this 1 clearly. Now, you see you unconditional valid kind of syllogism at all in the first figures be have A A A in that at least 1 affirmative preposition is already there a preposition in affirmative preposition. So, in the same way e a e again a is the an affirmative kind of preposition. In the third 1 A I I there 1 A is the even I is the also affirmative kind of preposition. E I O again I is in a affirmative preposition also in the this way in the all the unconditional valid even the conditionally valid syllogism. At least 1 affirmative preposition should be there in the premises in all.

In the same way E I I O preposition is concentrate to be and affirmative kind of preposition. So, even the third figures per example if you see in the book called that is O A I. So, a preposition is concentrate to be affirmative preposition. So, in all the syllogism if you do not have at least 1 affirmative preposition you cannot per anything that not you have beaning sensing. Per example if have negative a preposition E E E preposition you cannot in per any thinks no cats or dogs no dogs are donkeys. So, if you something yells

like no cats are donkey's ester and all in if you are concoction carat and all, but cannot in per any thinks this since that 2 negative in for any thinks.

So, this is the a fifth rule at least 1 affirmative preposition should be there in that syllogism it us to be valid 6 rules is that if 1 premises is the negative with the conclusion automatically be and negative preposition. So, if the conclusion is negative the vices and size also applied hear if the conclusion is negative then at least 1 of preposition should negative and all. So, than only ... So, with the conclusion is negative preposition all should be negative and all if exited the case and the syllogism concentrate to be valid invalid.

If both premises are affirmative the concoction also should be affirmative at all suppose if have A A A preposition I I I preposition is ruled on because you cannot per any thinks because middle term is not distributed in that particular kind of a proposition and all. So, if you have A A A preposition you cannot per e preposition and all. So, in the same way if you have A I in same way A A A preposition in very cannot in per a o preposition our E preposition and all.

So, 8 rules that eighth rules at least is 1 premises must be universal and in all. So, these are the very interested observation which we can make out. So, at least 1 of premises must be have in same kind of should be and universal preposition what are the universal proposition A and E R concentrated to be universal preposition.

So, we look the proposition of all the valid syllogism and all then you will find this that at listed in all the valid syllogism you will find other a r e in this valid syllogism and all. So, that is another interested and important observation and the ninth rules a say that 1 preposition is particular is the conclusion is also particular per example if we becomes with all s are y and same y are z and all and the conclusion also should particular and all.

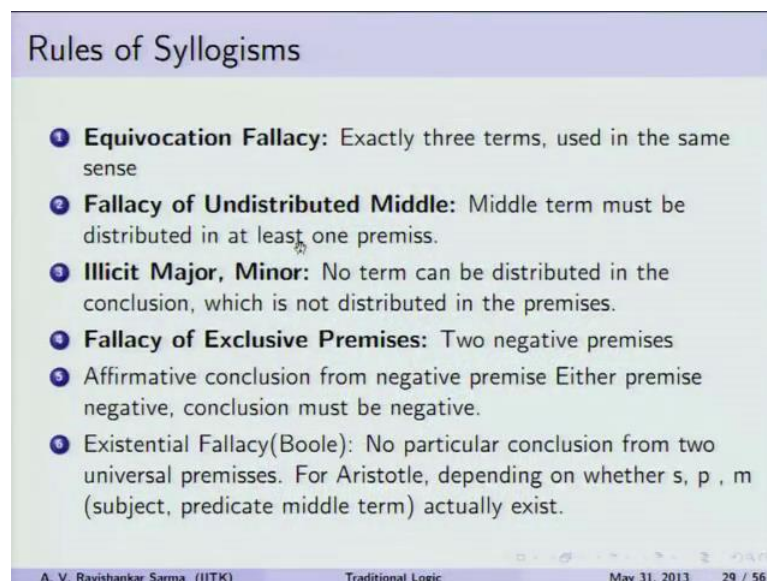
In the existence logic; that means, more and logic after in bole a both premises are universal than the conclusion should also be universal and all cannot particular. If cannot the particular and in the scene that if you becomes particular than we are importing exist into the concoction which is not there in the premises.

Also suppose if I say that all cats are dogs and all the does not; that means, that in all the cats and dogs are to exist say that it is you can be a soon the as well soon be not the case of all cat are dogs actual be to true and all and cats exist and dog dogs exist etcetera. But, if you say same cats and dogs and all there means is talks about exist of cats which are considered to be dogs.

So, a that is means dogs actual exist. So, we are importing exist which is not there in the premises in the conclusion that is need to a according to the model logic her extensional logic which is called us and existent logics which will take about little battle are again is its limitations to Aristotle in logic. So, it is concentrated to be kind of places expressly when you inform from to universal proposition you inform particular proposition and that is concentrated to be and existential places in modern logic.

So, suppose if you do not for rules does not satisfy and all then are; obviously, mistake is argumentation and is the 1 which you are concentrate in the case of formal peerless there concentrate to be peerless in all. So, this song the peerless at we have if the rules are not a rules the are violated and all.

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Rules of Syllogisms

- 1 **Equivocation Fallacy:** Exactly three terms, used in the same sense
- 2 **Fallacy of Undistributed Middle:** Middle term must be distributed in at least one premiss.
- 3 **Illicit Major, Minor:** No term can be distributed in the conclusion, which is not distributed in the premisses.
- 4 **Fallacy of Exclusive Premises:** Two negative premisses
- 5 Affirmative conclusion from negative premisses Either premiss negative, conclusion must be negative.
- 6 **Existential Fallacy(Boole):** No particular conclusion from two universal premisses. For Aristotle, depending on whether s, p, m (subject, predicate middle term) actually exist.

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Suppose, it is the first rule is presenting the arguments and all and it is also taking for

greater that is the no filed location in the a present in the argument and all. That means, there should existed the 3 terms and this term should be use the in same sense and all is not be used in 2 different sense and all. Per example if say all a, this pet ems and in usable and this room is in usable and the item are used in the premises 2 different way and all. The first premises used in same sense and the second premises item are in usable in that it is you item are used in a different sense.

So, this what is if you 1 action policy it us all the term should use in a the same sense above there is no shift. In the meaning of the words at their use in the premises in all that is shift in the meaning of usage of this word the premises than something wrong with argument that is policy location peerless and all.

So, middle term must be distribute at least 1 s in the premises that what be outside in the rules and all. If it is not distribute then it is called of pleases of undistributed middle and in any syllogism we have major term minor term a and middle term and all. Suppose, if it is case that no term can be distributed in conclusion which is not distributed in the premises that is not be we are studies in the rules. Suppose it is distributed in the conclusion, but it is not distributed in the premises and all. So, depending the p 1 what is a major premises minor premises exert and all. So, this rules is valeted with respect to a major premises which is called us illiterates major in rules is the valeted with respect to the minor premises. Minor premises is the 1 and which were you will find the minor term major term in the premises which were you will find the major term.

So, major term is considered to be the predicate the conclusion and minor term considered to be the subject of a conclusion in a syllogism. So, where were the subject term a of conclusion occurs in the premises. That considered to be minor premises and were over the major term occurs a that is the predicate conclusion that considered to be a the major term and all.

So, when the problem lies with the major term and minor term is the 1 which need to be look per were this undistributed is taking place that that is that not that is where this kind it all fallacy is. So, the fourth fallacy is an exclusive to premises; that means, if you have 2 negative premises the think and been provide be same way if you have 2 particular

premises nothing can be infected.

Then the fifth 1 affirmative conclusion from negative premises is not allowed and either the premises negative than conclusion also negative. Then the conclusion is negative premises 1 of the premises also have negative then. So, this fallacy which I take about in the last line is no particular conclusion from then universal, if you have to universal premises categorical proposition cannot in particular proposition.

But per Aristotle depending on whether are not a the term is qualified position of a subject a term subject qualified predicate the middle term they actual exist in the world and all. If it is non empty and all then there is no problem for the validity of a syllogism it makes it conditionally validate for example: unicorn, dinosaurs etcetera they would not exist and all they do not actually exists and all. So, in that case i mean it is it is difficult to say whether Aristotle theory applies or not.

So, Aristotle theory in general it takes into consideration that all terms are non empty and all. So, whatever term you take into the syllogism that is that is already taken for granted or by default it is it is referring to it is not referring to any empty class. Empty sets are those sets which do not have any elements and all for example, if you say set of unicorn etcetera and all, then no unicorn exists in the world or set of goals etcetera is an empty set. So, Aristotle theory is little bit silent about these particular kinds of thing, but Aristotle compromise with these particular kind of thing. And he says that he is of the view that depending upon whether or not s p m etcetera actually exists and all it makes these syllogism conditionally valid.

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Some examples:

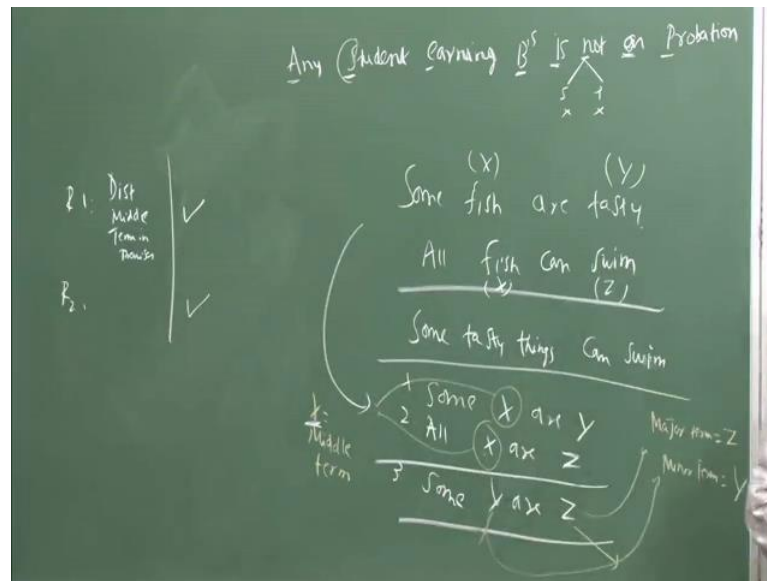
Test the validity of each argument.

- 1 Some fish are tasty. All fish can swim. Therefore, some tasty things can swim.
- 2 Some doctors are dentists. Some dentists are surgeons. Therefore, some doctors are surgeons.
- 3 All hogs are smelly. Some swine aren't hogs. Therefore, some swine aren't smelly.
- 4 All burglars are criminals. Some thieves are criminals. Therefore, some burglars are thieves.
- 5 Some food preparers aren't cooks. All chefs are cooks. Some food preparers aren't chefs.
- 6 No thieves are saintly. Some congressmen are thieves. Therefore, some congressmen aren't saintly.

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So, now so far we have seen different rules and all. So, now, we will like to see whether these following syllogism are valid or invalid. So, now, observe the first syllogism and all and then we will work on 1 or 2 examples. And then we will move on to some other kind of things that is reduction of syllogism and all which we can talk about the immediate inferences and all. The immediate inferences are those inference in which from 1 particular kind of categorical proposition another categorical proposition follows and all. So, now, let us consider some examples which are there and all and then we will analyze.

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If we will analyze these example in greater some fish are tasty and then of course, all fish can swim all can swim. Then what is the conclusion here some tasty things can swim tasty things whatever things the tasty and all can sum forgive what manes at exerts and all.

So, us long us form is a there in all we do not have to very much important. So, this can be trances d into a we does not meter were the fish are tasty things are swim etcetera. All this things there exist are now we can transfers into some x are y were is transfers per this things and y per transfers this. And then we fixes x per fish and all. So, already the and then swim is considered to z and all x are z and this is the on the of this and then same tasty things.

Same y are A we can swim is find us z. So, now we transfers this swim into this 1 and does not matter what you means by fish donkey cats does not matter. So, 1 s we transfers did to form and all now can see this argument is valid our not. So, now the first things which you need to know a about this 1 is this particular kind of things. So, what is this the sentence in which y is considered to be subject and z is considered to be predicate this is the conclusion and this to are premises.

So, now the predicate of the conclusion is called us major term major term hear is z. So, now the subject of the conclusion is called us minor term minor term minor term minor term is this the minor term y now whatever term used twice in the promises. So, that is considered to be a the middle term in all.

So, this the x is a middle term. So, this the first well which we need to find out be for no engine whether is particular kind of syllogism is valid are invalid. So, now, now there same rules which we need to applied an then a need to see whether a this particular kind of things is valid are invalid. So, this is some of the rules that we will give applied and then we will see whether it does not manes that, the 1 of the rule static fly. Then syllogism is valid or invalid why it has to static fly all the rules in all it is as convention of this rules.

So, now what first things which need to see is the distribution of a middle term. So, what the middle term hear x? So, now, a wherever you have x and all the middle term should be distribute at least 1 s in the premises and all. So, hear it is not distributed and all because i preposition i preposition distributed neither of them neither subject not delicate it is distributed and all. So, in that may very much about it, but observed this second statement and all x and z and all were x is consider to be middle term.

So, if it is a preposition is distribute subject and all. So, what occupies the subject position hear if x. So, a so middle is distribute distribution of middle term in premises. So, this is the rules number 1 and all. So, this satisfies now we need to look for a other rules and all. So, the other rules is this that a it any term in the conclusion valid syllogism is distributed the term us to be distributed in the a premises and all.

So, now look at the conclusion and all conclusion is an i preposition I preposition distributed nether of them and all. So, nothing is distributed in the conclusion and all I there y is y is not distributed even z is also not distributed. And also it is it i preposition I preposition distributed nether subject term are not even the predicate term.

So, now we need to see the whether this y and z are distributed in the a promise and all. So, since it is in the i preposition the first 1 there is no question of that distributed of term

y and since it is in a preposition a preposition distributed only x and all, but not the predicate and all. So, it is all; so not distribution and all. So, the idea here is that hear nothing is distributed in the conclusion which is not distributed in premises and all. Here it is not distributed even in the promise also it is not distributed and all. So, rules number 2 also applied hear and then 3 is this that.

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Rules for valid syllogisms:

- 1 The middle term of a valid syllogism is distributed atleast once in the premisses.
- 2 If any term in the conclusion of a valid syllogism is distributed, that term is distributed in the premisses.
- 3 If any valid syllogism has one positive and one negative premiss, its conclusion is negative.
- 4 No syllogism is valid if it has two negative premisses.
- 5 If any valid syllogism has only universal premisses, its conclusion is also universal.

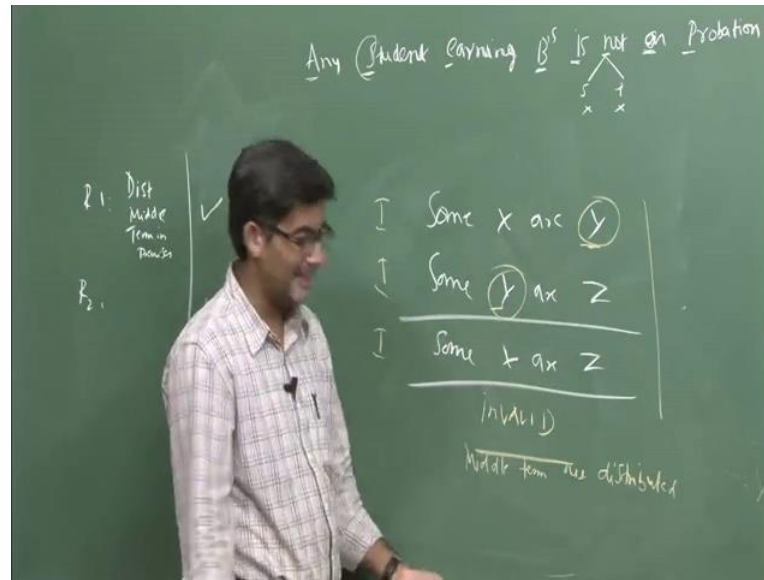
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If it is has 1 positive and 1 negative promise the conclusion us be negative and all. So, hear you want find any positive and negative kind of conclusion and all. So, that rules do not applied and all. So, that is also followed and all automatically. We do not this rules will not applied an the particular kind of things and is the fourth rules also is it that no syllogism valid it has to negative premisses. We do not have any negative premisses hear all are appreciative proposition it is the night proposition it is the day proposition and this is I proposition.

So, even fourth rules also static fly and fifth 1 if any valid proposition 2 universal proposition you does not have any 2 universal proposition and all. So, it is in this sense more as all rules applied and all in this particular kind of things a. So, same of the rules may not eve n 1 directly apply to the this 1 we not bother much about it is this it is applied to the when i need see to the rules is a followed are not. So, it is in this sense this

particular kind of argument is considered to be valid is argument is considered to be a valid kind of argument in all.

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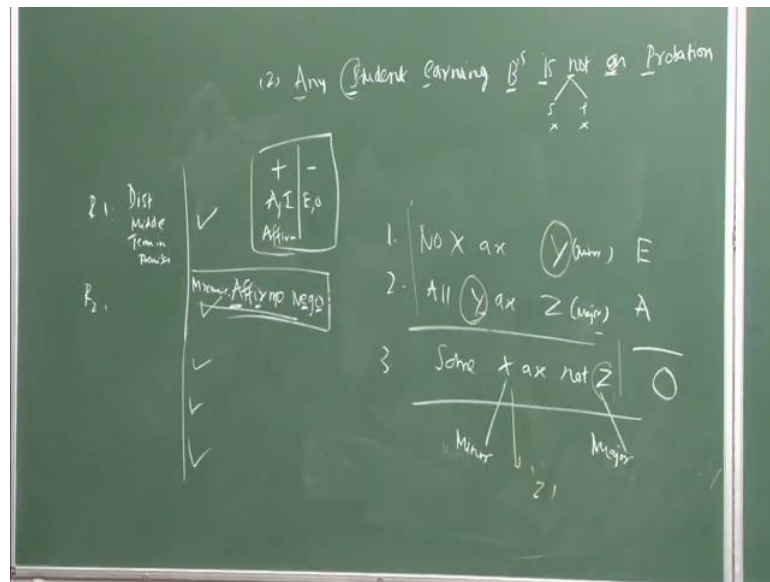


So, now let us considered some more example 1 not 2 example with which a particular kind of syllogism is valid our in valid this things you write same things in all. Same X are y same Y are Z; same there simple things and all. For now, the problem with is particular kind of things you might say that 4 things and all you can say same cats are animal same animal are animal bark can all. So, that means, same dogs bags and all at by seeing to be sensible per and you all. What the problem here is that a according to the theory of syllogism all are I proposition and all first allowed.

When you have 2 particular kind of proposition I proposition you connoting in per any things way because aging a the middle term hear is Y. So, middle term has to distributed at least once in the premises and all. That means, it have to be a the middle has to the propulsion which concentrate of middle term should be at least has a proposition are at least E proposition her. And see when o proposition and, but it should definitely should not be and I preposition. I preposition middle term is not distributed this the middle term because it occurs twice in this premise and all.

So, this conclusion this categorical syllogism is clearly in valid and all because of this particular kind of things middle term is not distributed at least once middle term not distributed at least 1 s in the premises. But, in it is both the premises it is not distributed in all. So, in this sense we can talk about several other kind's argument is x and y reaper to cats dogs donkey any things we replace it to somethings. Then you will see whatever you replace it with than that argument is ways to going to be any invalid kind of argument.

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Another example per these things you will you taking the consideration. No x are y y are z consideration an than 3 is the same x are not z. So, now this a e preposition negative preposition and then this A A preposition according to our rules of syllogism. It is clear that if than you have negative preposition your conclusion also has to be negative.

So, is swim to be the case that our conclusion is also a negative preposition because a positive preposition are A and I because is are all affirmative affirm something and all. Negative preposition r E n O so there is a mnemonic that we have used to earlier that is affirmo affirmo and nego. So, you observed this ovals that affirmo in this ward A and I there means A and I are affirmative and e and o are concentrate to be negative it all.

So, this called as a mnemonic. So, mnemonic we used and all, so other mnemonic which is quiet useful for us in this particular kind of things. So, now, this appear that your premises are at least 1 of premises in the negative the conclusion also negative and all thread or fourth rules applied and all. Now, we need to see the first things we need to find out is what is a predicate and what is a subject of your conclusion.

So, this is considered to minor term and this is considered to major term and wherever this z occurs the term z occurs that is a major term. That is considered to be the major term is and all this is the major premises and this is called us minor premises because x occurs hear. Whereas, z is the predicate of the conclusion because it occurs hear it the major premises. And also the conclusion it that we all ways states major premises followed by that you have minor premises. Then you have a conclusion that is is the style which is followed in most of the syllogism in all.

So, it will bet i will be boring interning in to greater than of this 1 which same of the things which i already cover it. So, now need to talk about the distributed of middle term in all where is this rules applied to this 1 are. So, what is the middle term hear Y, Y is considered to be in the middle term hear. So, the rules see that the middle should distributed at listed 1 in. So, in both the cases it is distributed because it is in e preposition e preposition distributed both of them means subject and predicated whatever occupies the subject and predicated position in all. So, that term in all that to distributed both X is distributed and Y is also distributed.

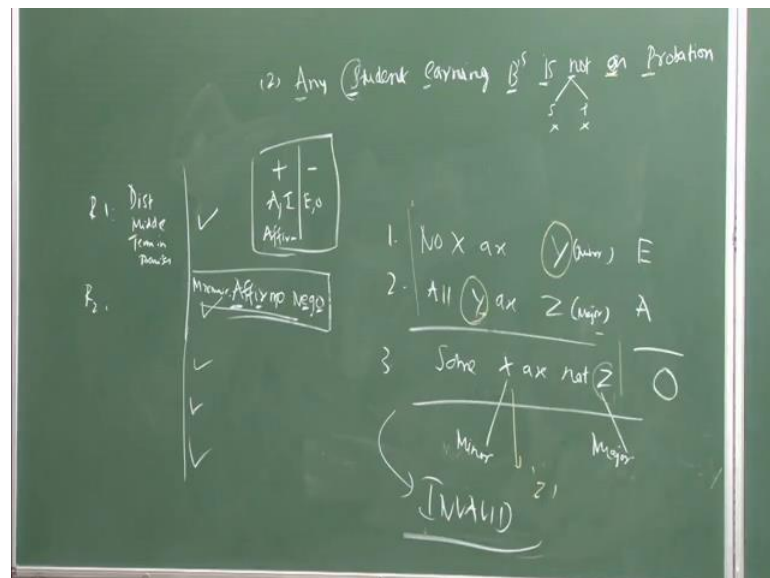
So, I am in this middle term this distributed even at listed once static fly in all not and the that things even 1 second premises also categorical preposition. The term Y is set way distributed then all. So, middle term distributed of middle term is having no problem and no the second rules is that nothings distributed in the conclusion which is not distributed in the premises. Suppose, is the term of distributed term in the conclusion it has to be distributed at least 1 s in the premise in all.

So, now in this case it is in o preposition o preposition distributed only the term which occurs in the predicate position. So, that menses is distributed only Z. So, Z is distributed hear. So, now we need to see whether Z is distributed in this 1. So, now in this

preposition only y considered to be distributed and all. In this preposition and x and y are to be distributed, but not z also. So, now, this is reading to problem that a something distributed in conclusion hear that is the term it. But, it is not distributed anywhere in the premises and all always is occurs hear, but it is in a preposition a preposition only X in considers to be distributed.

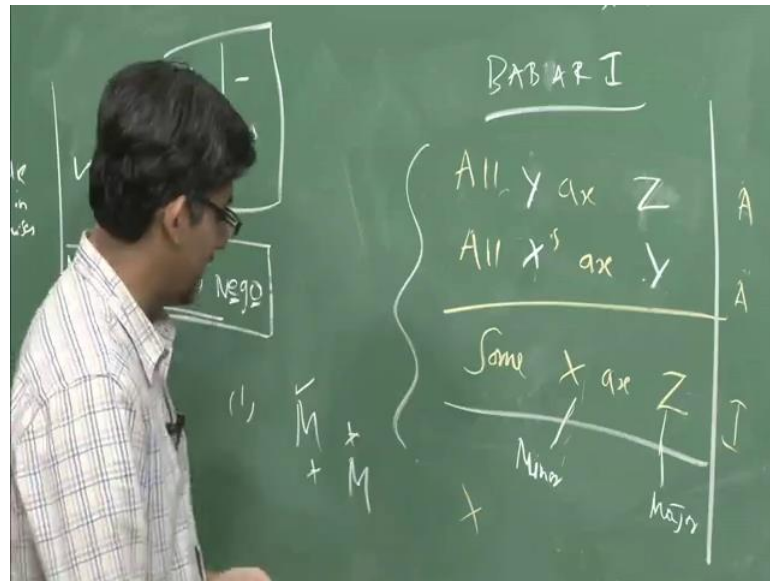
So, the problem hear it is that in conclusion the ward is Z is term Z is distributed, but is not distributed in the premises and all. So, that means, it validates this particular kind of rule that is this second rules of it violate.

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So, that is means this particular kind of R argument is in that. So, like this we can find out whether or not a given syllogism is canst red to be valid our not. And out of this 256 syllogism Aristotle could come of which 15 syllogisms, which are concerned to be a conditionally valid. And 9 are concerned to be a conditionally valid. So, we will take about 1 in 10 se of conditional syllogism and all. So, that is A A AI.

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So, this like this suppose if you have an any argument in which you have this particular kind of things all X all Y. All all Y are Z and then from this you in per same X are Z. This is with respect to figure number 1 in figure number 1 a the middle term should be like this M. And M in the first premises the middle should occupied the subject position. And in the second preposition categorical preposition middle term should occupied the position of predicated.

So, now you have change to the little bit and all this 1 it is not in the slandered format. So, now if first you identify the major term and the minor term, so this is the major term Z is the considered to be major term and is considered to be the minor term. So, wherever this z occurs; so that need to be stated for first and forward by that a then we have this particular kind of things mince premises and all.

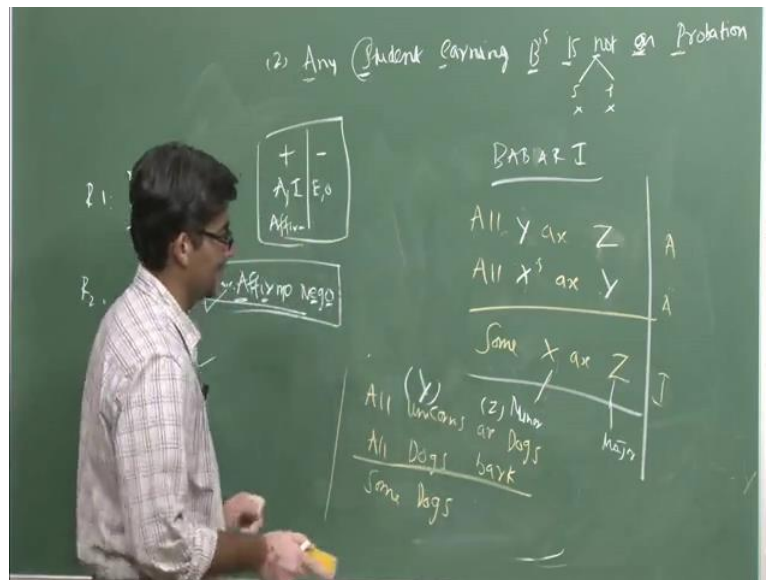
So, this becomes this things all Y are Z then becomes all X are Y. So, why we are have d 1 like this because the predicate of conclusion is a major term major occurs wherever the major term occurs that is considered to be major is. And should premises is and forward by that minor term is and we should have a conclusion and all. So, now it is in this particular kind of format. So, the middle term occupied the position of a subject here because this considers to middle term because it occupied prices in the premises. So, this

is exactly same as this Barbari insured of Barbari it is Barbari. So, this is A A and I prepossession.

So, now per Aristotle this is considers to be a kind of valid kind of argument and all depending of on the whether or not the term A. For example, this is going to valid according to him specially when the subject term that your referring to that is this 1 same X. Whatever you are referring to that actual exist in the word in all. Suppose if you are referring to same unicorns same dinosaur same kind of other things which are noun existing kind of things goes etcetera. And all then Aristotle is silent about in those things and all.

So, it Aristotle theory of syllogism directly applied to the thought things which this things are X Y Z etcetera. And all are considers to be non empty and all, but in modern logic in particular a if this kind of problem is a and all.

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Per example we can taking the consideration same example and all A A all. Forget about things in all unicorns are dogs forget about true and false does not matter. You can arums distributed to be true and all are dogs bark it say it is also aging wrong and all, but must of the dogs may not bark's, but they fit when all.

So, form this if in per that same x are what same dogs are Z Z menses a this not the 1. So, this is y unicorns and this considered to be Z and now from same X A, 1 second what is this same unicorns are on dogs. Let A say Y is a this things and Z is this once then A same X are Y A X means should be some other things and all. Forget about it particular kind of example well talk about little bit. But, the ideas were is that a in modern logic in particular a whenever you have all Y are X and all X are Y and etcetera and all from that you in per this particular kind of things and X are Z.

This suppose that this same x are z means let us say that some cats and animal and all there same cats which are considered to be animal and all. That means, with list to same kind of things which called us the existence of the this particular kind of things the abject that in deferring the cats are animals are what are its dogs donkeys etcetera. Which suppose, in the existing of this things of in the conclusion and all suppose if you say all y are x and bark and all. Means that, there are some dogs which bark and all to be existed to be existence in the actual word in all.

But, if you say that same dogs are same dogs bark's and all then it have it is it is the it is it means that there same dogs with actual barks and all. So, the list of existence of dogs, So, this list to what we called us same kind of conditional kind of validity and all.

So, depending of the on the weather are not s p m term are empty are non empty is non empty then. And then only we can talk about validity of this syllogism and in all. Suppose, is there empty and in all unicorns etcetera, ghosts etcetera and all dinosaur etcetera. Than Aristotle theory fails in all in this particular kind of case, because it proposes that all that term if you are referring to in syllogism are considers to be empty.

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Rules of Syllogism

- 1 There are only three terms in a syllogism (by definition).
- 2 The middle term is not in the conclusion (by definition).
- 3 The quantity of a term cannot become greater in the conclusion.
- 4 The middle term must be distributed atleast once in the premises.
- 5 At least one premise must be affirmative.
- 6 If one premise is negative, the conclusion is negative.
- 7 If both premises are affirmative, the conclusion is affirmative.
- 8 At least one premise must be universal.
- 9 If one premise is particular, the conclusion is particular.
- 10 In extensional logic, if both premises are universal, the conclusion is universal.

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So, now we look in to a the other aspect that is this that in the ancient past a 2 in 3 peered we come off with this particular kind of a syllogism poem. And we this poem they told identify what kind of syllogism A is concentrate to valid with respect to what kind of figures and all.

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Analysis of Syllogistic Poem

- 1 The first letter indicates to which one of the four perfect moods the mood is to be reduced: "B" to Barbara, 'C' to Celarent, 'D' to Darii, and 'F' to Ferio.
- 2 The letter 's' after the *i*'th vowel indicates that the corresponding proposition has to be simply converted, i.e., a use of s_i .
- 3 The letter 'p' after the *i*'th vowel indicates that the corresponding proposition has to be accidentally converted ("per accidens"), i.e., a use of pi .
- 4 The letter 'c' after the first or second vowel indicates that the mood has to be proved indirectly by proving the contradictory of the corresponding premise, i.e., a use of ci .
- 5 The letter 'm' indicates that the premises have to be interchanged ("moved"), i.e., a use of m .
- 6 All other letters have only aesthetic purposes.

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So, quickly as we can analyze syllogism poem in this way all the vowels in a. Syllogism poem correspond to the moods a and then all consent etcetera are correspond to same kind of operation that we can use etcetera and all. So, that all the A moods occur in the second third fourth figures can be reduction to the first figures and all.

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The slide, titled "Further Analysis of Syllogistic Poem", lists the following moods: Barbara, Celarent, Darii, Ferioque prioris; Cesare, Camestres, Festino, Baroco secundae; *Tertia grande sonans recitat* Darapti, Felapton; Disamis, Datisi, Bocardo, Ferison. Quartae; insuper addit Bramantip, Camenes, Dimaris, Fesapo, Fresison.

At the bottom of the slide, the footer contains: A. V. Ravishankar Sarma (IITK), Traditional Logic, May 31, 2013, 33 / 56.

So, in this class what we discussed is we presented some kind of rules of syllogism which makes a particular kind of syllogism valid are invalid. So, the rules are like this, that there are 5 rules which are followed after that 4 are 4 4 rules are followed even in modern logic as well. But, only in the with respect to the fifth rules, so that is if have 2 universal premises according to modern logic. We need to have in universal preposition all if you say that if you particular kind of preposition from 2 into universal a preposition. Then that leads to same kind of fallacy this a mistake in the argumentation because a we are importing existed conclusion. It is not there in the premises that, according to modern logic leads to fallacy which is called us exists fallacy.

So, Aristotle in theory of syllogism models to work for this fifteen a both Aristotle logic as well as modern logic which followed after that, 1 works for the this first 15 syllogism which are considers to be unconditionally valid in all. So, there are few problem with respect to Aristotle in theory of syllogism for example, if have more than 3 term there is

a problem. Than if it is a different to same other kind of preposition, which are not in the slandered format then also if present kind of problem.

In the next class you will be analyzing this syllogism poem and then you will talk about. So, the important rules of immediate inference such as conversion or variation and contradiction rules which help us in transforming from 1 categorical preposition. Another 1 our it tells us how this A E I and O preposition are related to each other. So, we will continue the same discussion in the next class.