Introduction to Logic
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Lecture - 06
Strength of Inductive argument, counter example method

Welcome back. In the last few lecture, we discuss about how to recognize and argument. And then we also identify what kind of argument it is; based on how the conclusion follows in the premises. If it is necessarily follows from the premises then it is called has directive argument, if the conclusion probably follows from the premises and it is called has an inductive argument.

So, we also discussed about important concept, which is called has validity and we said that a deductive argument is valid, if an only if it is impossible for the conclusion is false given the premises are true you will not have any example, were in which you have true premises an false conclusion. We can come across with such kind of instant then it is argument is automatically called as invalid argument; all invalid argument are unsound argument.

So, in the last class we discus in greater detail about another important property, which is called as soundness. Soundness is kind of valid kind of argument in addition to in addition to that this argument is valid, it is also having true premises in all. A sound argument is the valid argument, which has true premises.

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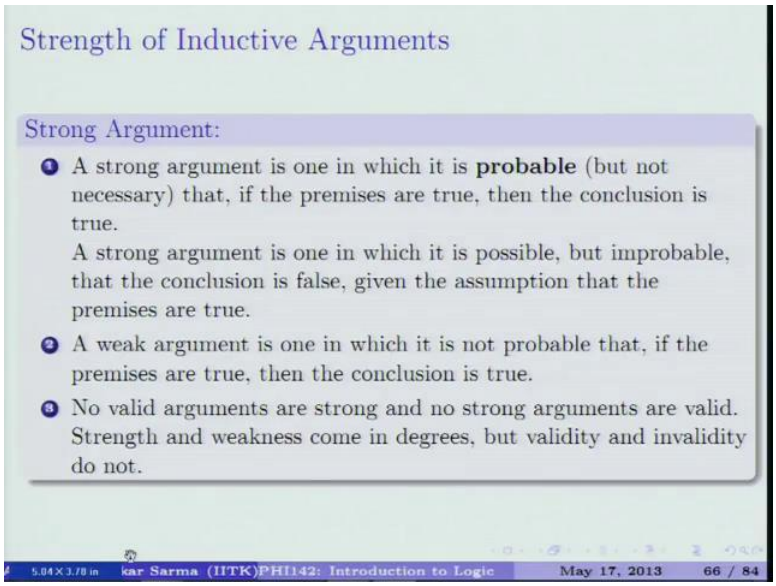

So, then we discussed about some examples, which we showed that you can have true premises you can have one of the premises for false an conclusion is still true or you can even both the premises false. And even the conclusion can also be false, but, it can be valid argument or you can have conclusion false and one of both the premises false then also, it can be valid argument etcetera an all; 1 such argument we have seen it all circles are all are circles; all circles are parallelograms, all are parallelograms enough.

So, the premises are false, but the conclusion is true, but, it is consider to be valid argument, but, in day to day discuss you do not use you kind of argument, because nobody will be position believe that all circles, all something like that. Let us go beyond on intuition and all. So, that argument valid, but it is unsound argument. So, today what we are going to do is that we going to talk about, the strength of the inductive arguments, we can all talk about the strength of the inductive argument.

So, is of mistake as will committed by the logic student that, we say that inductive argument valid an all. Inductive argument cannot valid an all, because the conclusion does not necessarily follow from the premises in all inductive arguments; however, a strong, it is they can even come off with a single counter instants were you can show that the conclusion is false given the premises are true. So, that is the reason why inductive argument is cannot talk about talk of validity of inductive arguments in an all.

We can all talk about strength of the inductive argument an all. So, 1 example, we have seen a earlier 99 percent of the commercial flights, that you took landed safely so; that means, next flight going to take that also going land safely in all. The next flight going to take is what is going beyond, what is stated in the premise. So, the 99 percent of the flight that; you have taken is 1 side of the story. And the other 1 is the next flight that information is not in the premises in all; that means, the information goes beyond what is stated in the premises in all that; makes this inductive argument defeasible.

So, now today, we will discuss about what do you mean by saying that a given inductive argument is strong, given inductive arguments weak. We can only talk about strength of the inductive arguments in all. If it is a strong argument then we talk about a what kind of argument it is it a cogent argument is a sound argument, with true premises in all; just like in the case of sound argument, in the case of deductive arguments. We said that a sound argument is 1 in which is a valid argument together we that you have true premises in all.

So, in the same way, in the case of inductive argument a cogent argument is a strong argument with probably true premises in all. If at least 1 of the premises is false, when it is called as non cogent argument; the conclusion is probably follows in the premises, but, it 1 of the premises may be probably be false in all, that is called as an uncogent argument. So, will talk about these thing with more example then we will see the a strong argument is 1 which, it is probable.

If the premises is true then the conclusion is also probably true at all. A strong inductive argument is 1, in which it is possible, but, definite it is improbable, but, it is improbable that the conclusion is false; given the assumption that the premises are probably true. So, the idea here is that in a strong inductive argument, it is very difficult to come across situation in which the conclusion is probably false and the premises are probably true at all. So, a weak inductive argument is a 1, in which it is not probable that; if the premises are true conclusion are probably is true at all.

So, I am just replacing the words necessity with probability an all. So, that is what need to note here. In the case of deductive arguments conclusion necessarily, follow form the premises there is no single counter instant which shows that premises are true in conclusion is false, but, in the case of inductive argument the necessity part it replace

probability in all because, inductive arguments is no guaranty that if premises true the conclusion also necessarily true at all. Conclusion only probably follows from the premises.

So, that is the characteristic of inductive argument. So, other important which need to note is that no valid argument are strong arguments are valid. Even if it is 99.99 percent and all and it is treated as inductive argument. For example, 99 percent commercial price took. So, for landed safely without any issue an all and from that you can inform that, the next flight that we are going to take will also land safely in all. So, even if it is 99 percent in all. It is very much possible that next flight you might take end of with some kind of issues of problem in all, it may not lands safely etcetera.

So, no valid arguments all strong is not confuse our with validity and you can say that argument is very strong an all; instead of saying that in argument is very strong, we can say its valid in all. If the conclusion necessarily, follows from the premises use language of deductive logic that is validity an all. So, if we want to incorporative necessity in to consideration that is that is want to we achieve in the case of mathematical reasoning. So, in mathematical everything as to follow certainly from the premises in all, which is also consider for some kind of mathematical statements, is the kind of necessity which is required that.

So, in that case we call those arguments as valid we cannot say strong in all. So, strong and weak argument arises day to day discuss you know, in which in nothing is 100 percent true in all. So, in those cases we use argument based on observation or beliefs etcetera an all will involve this inductive argument, were we invoke the strength of the argument, but, validity strength and weakness comes in degrees in all. It can come off with for example, in the conclusion we can say conclusion can be true by 70 percent, 90 percent or may be 85 etcetera an all.

So, you can calculated the probability values then you can measure strength of the argument an all. The strength and weakness comes in degrees that is anything, between 0 and 1 probability values, but validity and invalidity does not come with degrees in all. Suppose if you accept that allmotel so man so critics motel. So, the first statement all men or motel is accepted with 100 percent set it an all. So, there no in which there are no accept ion to that particular kind of thing.

So, it is 100 percent true. So, 100 percent true then from these set true is you will automatically say that the conclusion also necessarily, follows from the premises.

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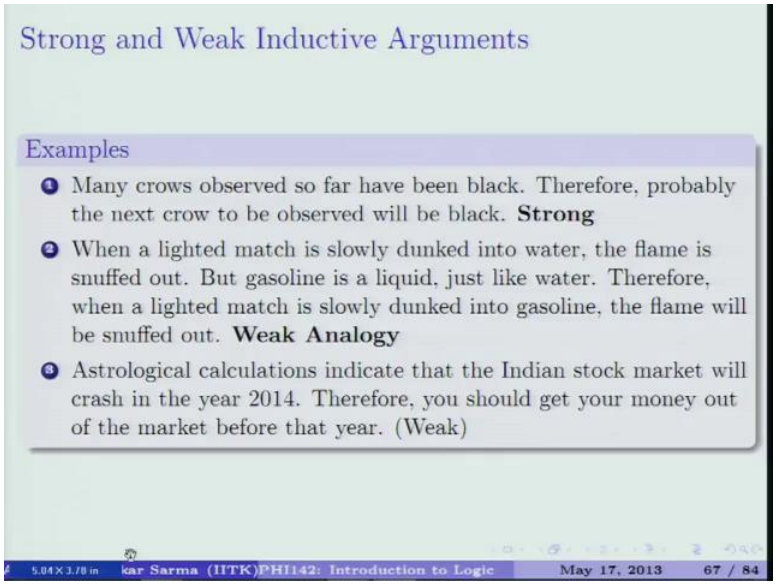

So, what are consider to be strong and weak inductive argument, it is not essay to find what constitute strong in inductive argument what constitute a weak inductive argument, it involves lot of additional factor in all. So, it depends upon you can, it is on based on case to case basis, you can say that a given argument is strong or given argument is weak an all. So, when the evidence hot to come by maybe then that case, you can say that even 20 percent of the 20 percent is also consider to be strength of the argument an all.

So, let us consider some example, with which you can understand the strength of the argument. Suppose, if you in for in this wave many crows observed so far have been black we observed meticulously, some years and you are interested etcetera birds etcetera. Then you came to know that, which your observation and repeated observation etcetera under various circumstances etcetera, you observed in IIK observed in some other case etcetera, you came to this; many crows observed for having black.

Therefore based on this observation, you will say that probably the next crow to be observed will also be black in all, because may crows already in black and all. So, this argument is a strong argument in a sense that, it is talking about almost all the crows in all is not everything in all, but, it talking about the entered class of crows in all. So, it is consider to be strong argument in all, but, for instant if observed only 23 crows in all and

the inform this particular kind of thing in all probably, next crow that you going to observed is black in all; up course, you all know that in crows always black in all.

But, with few observations under some only for few circumstances etcetera, will not gives will not leaders to the strength of the argument in all; we need how repeated observation good in of number and then it is tested in wide verities of circumstances then only we say that given argument is strong. In the same wave will come across argument from analogy in day to day discuses. So, this argument can also be come a weak argument, in this sense when a lighted match is slowly dunked in to water; the flame is snuffed out water and, but, gasoline is a liquid.

So, imagining that gasoline is also liquid and then it is just like water in a since that appears to like water an all kerosene or petrol anything, it some special feature some water an all just like water, it is appears to be same as water. So, there for when the lighted match is slowly dunked in to gasoline, the flame will be snuffed out. So, here you are tiring to bring in similarity, between 2 events. So, that is 1, 1 is these that putting matchbox in to the water and then putting matchbox gasoline expose to the gasoline in all in the first case it will stop and second case might.

So, based on 1 particular kind of instants, if you say that using the similarity, if you say that lighted match is slowly dunked in to gasoline will also be snuffed out then this argument may not be a strong argument. So, other it will not weak analogy kind of argument. So, analogies are very important in sciences in particular, we want touse loot of first to understand various phenomenon an all. So, will talk in about this thing greater detail in little bit in later. But, this movement this argument is consider to be weak argument. And if you going to the details of this argument then his argument is also consider under the category of weak analogy.

Suppose, if somebody convenes you with this particular kind of argument then particular arguer is set to have committed; a kind of mistake in the argumentation. So, that mistake is called as palsy of weak induction, which we are going to little bit later and that fallacy weak induction arises because of weak analogy. There is no approved, but, analogy between match box in to water and matchbox is in contact with gasoline an all behave in 2 different ways.

So, in the same wave in day today discuss we usually, we have lots of believes in all believes good believes astrology are sometimes cat passes through has an in for that every time in cat pass through; while you are going to office something happened, in the office then will in for that cat is responsible for all my problems somewhat correlation an all correlation should not be confused with. So, here is example which again tells that: this is the weak argument astrological calculation indicate that indian stock market will crash in the year that is say: 2014 and all behavior of stock market; some you calculated the position of the planetary position etcetera an all, when you sociology in also calculation etcetera in all calculation.

So, you cloud come of with some kind of thing that positions will lead to some kind of business in fact business in all, in that particular kind of country. So, then suppose if infect then you should get money out of the market before that year, because stock market is going to crash there is no proper evidence per particular kind of thing, it is very difficult for as to believe just base astrological and you will be taking out your money.

Suppose, it is based on some other kind of behavior in all; suppose, if have seen how the equate market is functioning are some other means GDP growth all some of the important factor, which are responsible for the stock market growth, if you observed it then it is make sense for has to believes that you should get all the money out the market what you are invest, you should get out in all makes some particular kind of sense. It is very difficult to believe the conclusion to be true based on the premises in all, just based on astrological prediction; we cannot come to this particular kind of conclusion in all.

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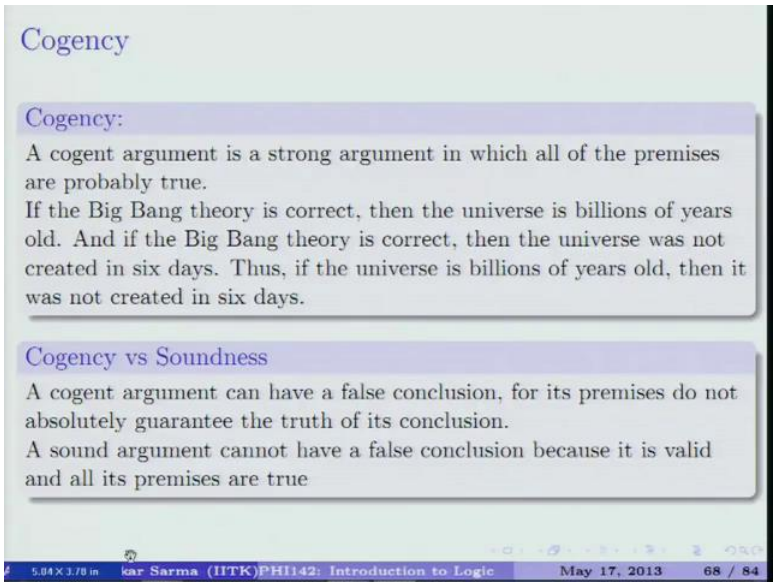

So, then the next question that comes to us is: once the inductive argument is strong enough when there is 1 extra feature, which will be adding to it that is what is called as cogency in all. Just in the case of sound argument valid argument is not just enough an all; any to in work additional future. So, the argument also has to be sound. So, just like that we have strong argument, can be cogent argument. So, what is a cogent argument? A cogent argument is a strong argument, in which all the premises.

So, happen that all the premises are probably true. So, probably true, it is based on some facts of experience you are experience suggest that is true all may be, it is the scientific fact or it may be historical fact etcetera in all that make this statement probably true. Let us consider simple example, to show that an argument is sound strong argument as well as cogent argument. So, all of no about big bang theory universe as coming existence some were some time all.

Suppose, if argue like this: if the big bang theory is correct then the universe is billions of years old universe, there was some kind of fire ball something that is started cooling and then plan started forming in all; that what we know from is big bang theory. There was huge big bang in all and how this big bang has coming to existences that is not, we are interested in it will say that at least something is something based on scientific theory in all scientific suggested. There is big bang then after that some kind of fire balls its started cooling all the formed in all.

If you argue that if the big bang theory is correct then; the universes was definitely not create in 6 days. So, that is what may be claiming that god as created entire universe in 6 days in all and 7th day it took rest that is what usually, up course in right to we every right to believe something true an all. But, you might believe so many other things an all that may be false in also. So, it is our subject to kind of opinion some kind of thus based on that if the universe, if argue that universe is billions of years of old then it was not created in 6 days probably not created in 6 days; it mix sense for as to say that this argument is strong; up course, you can verify with some good evidential.

So, in science scientific text book are kind of theory; theory of big bang big bang theory for example, verified when all this statement that we mentioned sense to be also true. So, that makes argument not only strong, but also. But, if some the argument some of the statement you have mention in this argument in the big bang theory 1 which was discuss is probably false in all. A historical fact are may be the scientific theory is claims that is not case in all then; obviously, this argument may probably fallow from the premises all, but, still it may be one of the premises false in all probably false then; this is called un cogent argument.

So, cogent argument is a strong argument with true probably true premises. So, you might confuse; so cogency with soundness. So, cogent argument can have false conclusion for it is premises do not absolutely, guarantee, the truth of the conclusion. So, it can still called as cogent argument, even if it as false conclusion false conclusion that is not 100 percent false in all probably, may be 99 percent true means 1 percent false; only I mean, at least 1already there.

So, in inductive argument cannot talk about necessity an all in that all inductive argument comes with degrees of truth. If the conclusion, will be accepting the conclusion with some degree of truth 99 percent of commercial flight landed safely implies that, probably the next flight that it going to take also land safely in all. It maybe next flight may commander category of 99 percent. So, that is why probably true that, does not mean that it is strong argument and probably, it is also cogent argument in all.

Because you verify with lots of facts in all repeated observation tells you that; that is a case tells that it cannot be false in all, but, even in that case. So, it might very happen that a cogent argument can have a false conclusion a false conclusion sense 99 percent of

thing is true means. At least 1 percent is false argument, but, in case of sound argument; it cannot have a false con conclusion. Because what is the sound argument, it is a valid argument with true premises in all. If the premises are true the conclusion false in all you cannot say with, you cannot say that it 1 percent false or 99 percent true etcetera an all.

If the conclusion is accepted, it is the accepted with 100 percent certainty is no wave which in any such kind of degrees of truth, a sound argument. A sound argument cannot have a false conclusion, but, cogent argument can have a false conclusion, but, cogent argument can have a false conclusion sense of 1; which talk detective argument. A sound argument have a false conclusion was, it is valid argument and its all premises true an all, but, it if it is valid argument.

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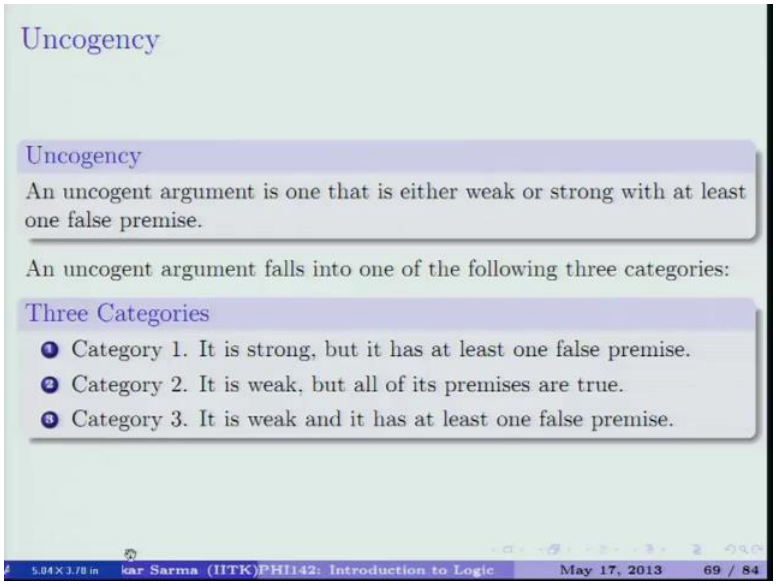

In the case that, it is impossible to the premises to be true and a conclusion is false. So, it is in this sense is sound argument cannot have a false conclusion, but, a quotient argument can have kind of false conclusion. So, what do you mean by un cogency. So, till now, we talked about cogency. Cogency is 1 in which in our strong inductive argument with probably true premises.

An uncogent argument is a 1 in which, it is eager weak we all weak arguments are automatically un cogent arguments, I means; conclusion may not probably follow from the premises automatically, it is invalid sorry un cogent are it can be, it can still be a

strong argument, but, at least with 1 probably false premises. So, an uncogent argument false into at least 1 of this categories.

So, the category 1 is like is that may be a strong argument, but, at least it as 1 false premise in 1 of the premises is probably false and at least to 1 cogent argument if both the premises are true and all then the conclusion also probably true then; it is called as a cogent argument the strong argument category 2 is that it may be weak argument, but, all is premises are true probably true in that case may be weak an uncogent argument almost all weak argument automatically un cogent argument another category in which un cogent argument false it is the weak an it at least 1 false premises. So, it slight different from category 1 category 1 say that strong, but one of the premises false category 3 suggested that is a weak, but, it has at least 1 false premises.

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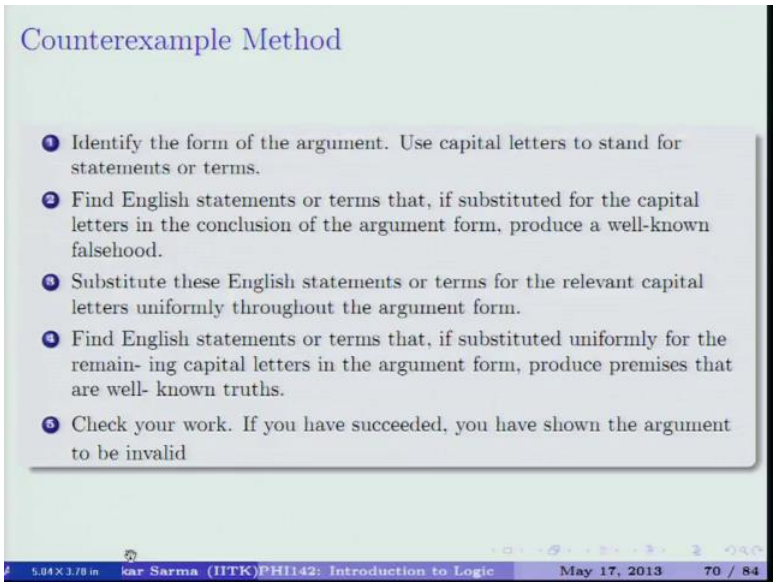

So, for we discuss about: cogency and un cogency of inductive argument, we said that we cannot talk about validity of an inductive argument. If you talk about validity of inductive argument it is mistake in all validity is something, which is which in work some kind of necessity in all connection between premises and conclusion. The relationship between in premises in the conclusion in case of validity is a kind of necessity relation in all. But, in the case of inductive argument conclusion probably follows from the premises.

So, let us consider 1simple method in. So, this basically common scenically method in all this not formal kind method, we will be entering in to different kinds of formal methods little bit later, but, let us talk about in simple method with which you can shows that a given detective argument is invalid. So, here is the method which is called as counter intuitive method. So, what is a counter intuitive method and what we are going to do a simply like this. So, what you doing is first you will identifying the form of an argument before that counterexample method is 1 in which you will.

So, that a given detective argument is invalid. So, when can you show that deductive argument is invalid; if you can up a single counter example; that means, up counter example means you are coming up with true premises and false conclusion an all. So, there are certain things obvious things, which now them to be true there obvious thing which be now them to be false in all. For example, if you say all cats dogs then automatically statement false in all is not referring, which existing the world ware for example, all dogs and animals up course dog comes under the category of animals then that seems to be; obviously, stride for an all.

Suppose, if you say that all cat fish statement is wrong all the things we know at least person who is not having any knowledge of logic or anything, you can essay understood that statement is false true at all. Suppose, if you say all fish live in water an all; it is it make some sense to believe true at all. So, all cat of fish; fish say automatically false in all. So, we using setup things, which we are which we are there true there false etcetera an all. So, you will take into consideration a set which consist of cat dog mammals fish all this things an all.

Then, you will a counter example, once you extract the form of a given deductive argument. So, here is the method, it is very interesting in all you do not require any logical method to identify that is an invalid argument it only shows that given deductive argument is invalid first you identify the form of the argument. Let us say for example, if you say grass is right and it rained an all. So, the form here is A implies B and A then B follows in all A stand for it rain and then B stand for grass; so nothing to perfectly valid argument it as valid formula.

So, now what will do in this method is you will find some English statement or terms that substituted per the capital letter in the conclusion the argument form produce well

known false hood an all. First what you will do will extract the form of the argument and then for example, if form like A implies from B and B when A flow B follows A follows then what you will do substitute some of the English term to this thing.

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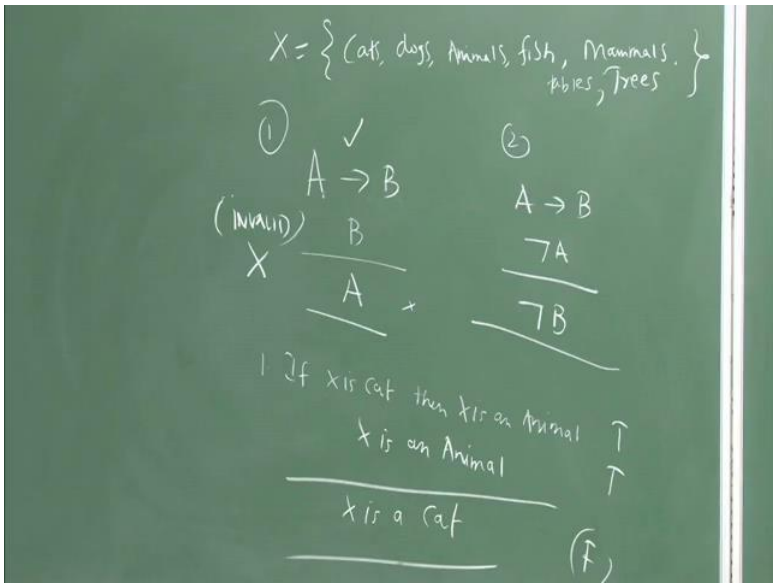

So, for example, here 2 thing which you will commonly come across for example, you extracted the form and then you written in this particular kind of sense. So, this is 1 particular kind of thing which will talking about second 1 is A implies B and not A and then not B. So, given any English language argument for example, if you said that it rain then the grass is. So, that is rained an all. So, that; obviously, say that argument is invalid an all sense that you can have a counter example, in which if it rain in the grass is the grass is in all.

But, this may be false in all; that means, it rain might false in all instead of it rained in all that might be the case that sprink at might be all or may be some other means; in which the grass. So, instead of talking about this thing, what will you doing this here is X you all this things cats, dogs, animals that different calcification in all fish or mammals all this things are which; obviously, we know that they are; obviously, you can say tables or any thin anything which you can up an all. If you say cats dogs statements is false in all; if you want make this particular kind of thing true an all.

So, then you up in which what you say that all cats or animals; if X is a cat then X is a animal an all suppose if you say if X is cat then X is an animal; obviously, all cat and

animal, it cannot be fish or it cannot be any other kind of like any other thing an all. So, this is what we have transformed in to this thing. So, now B stands for X is an animal. So, you have substituted of this terms depends upon creativity. So, what we what we done here is that: then an argument we extracted the form in all. So, once we extracted the form we forget forgot about what is menti1d in the of the argument in all.

So, now instead of this thing; obviously, take into consideration cats dogs mammals etcetera an all are trees or any other things comes in your mind in all. So, X is an animal. So, now what is a here X is cat you can easily see that this argument is invalid in sense that there are. So, many animals which are cats in all may be some other things under the category of cats in all, but, it might be pig or might be dog it may be other thing an all. So, what we are d1 here is that we have true premises, but, it you can have false conclusion an all.

So, X is an cat X is an animal assume that is true and X is an also animals is also true then if in for that X is X as to be cat in all; that means, necessarily follow from these 2 things in all then some kind of problem here; X need not be have to be cat in all you can be donkey or it can be some other thing an all dog any other thing an all. So, you have true premises, but, you could construct a false conclusion an all. So, that makes this particular argument invalid in all. Because you come off with counter instant is both are true and this is false in all in day today circumstances come off with this particular kind of example.

So, like this it counter example, method only establish is that a given deductive argument is invalid, but, when you have valid argument then this kind of technique will not help us. So, now what we done here is simply this that we substituted English statements or terms with the relevant capital letter that is A B C etcetera an all. And once you substituted is; that means, becomes a form of the argument will forget about what is A B C etcetera an all; then there certain things which; obviously, note to be true and; obviously, note to be false in all.

So, now, you find English language statement or terms that if substituted uniformly; that means, if A is there you need to substituted for A X is A cat only B is 1, which is case then it is we are representing the animal. So, animal which has to be uniformly substituted in all; suppose if substituted B for A an all then something wrong here is not

uniform substitute. So, once you substitute that 1 you check your work and then see whether, if you succeeded; that means, you come off with counter example; you show that argument is invalid in all.

Here, we clearly showed that the argument is invalid X is a cat and X is an animal let seem for us all cats; obviously, animals that is true X is a animal this is assumption which assumption true then based on that; if you infer that X has to be cats X is cat necessarily follows from these things then nobody will be position believe that conclusion that true an all X can be donkey or it is can pig, but, it can animal.

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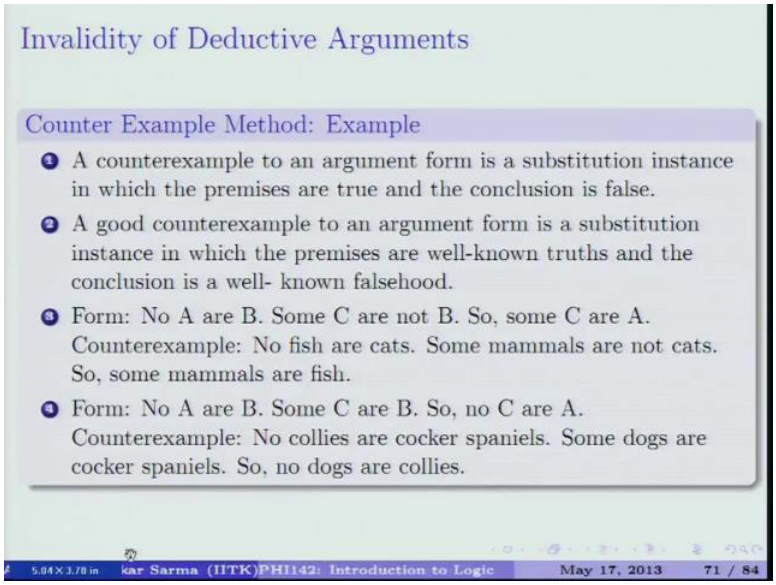

So, we are already constructed counter example, which you could shows that a given argument is in valid. So, counter example to argument form is substitution instance in, which the premises are true and the conclusion is false in all. So, what you are trait to here is you are trying come of with some kind of counter instant an all. So, thing which; obviously, true or obviously, false are the once which tried to substituted. Here the first thing which are done extracted the form of the argument; it can be A implies B or A or may be A implies B not A and not B all this thing are invalid forms.

So, once you have this form you have forget of what A B etcetera an all. So, now for A for B etcetera uniformly, substitute with A things which; obviously, no an all you can in the cats donkeys snakes rate or any things. So, that the set is not complete in all; we can involve snake are some other important futures you can add in all. So, good counter

example, argument form is substituent instants in which the premises are well non truths like: all cats animals are well known falls like: statement like all cats donkeys all this things obvious things an all. A well non true and the conclusion; obviously, well non false in all like the cat is the snake or something, you continue this example in all.

So, it will boring for as going greater depth of things. So, it only establish that a given argument is invalid you did not have to have any knowledge of logic to know that this argument is invalid an all once you extracted the forms substituted the instance; obviously, true or; obviously, you know them to be false an all 1 form is like this no is A are B some C are not B. So, some C are A 1 counter example, is this thing that now, you are taking fish cat some of all things etcetera an all. In that particular set we of mention there.

So, no A are B instead of A we substituted fish and then; B for B it substituted for cat in all we not disturbed the truth value of this particular kind of thing. No A are B we; obviously, case no fish or cats in all no donkeys or cats or no cats are monkeys etcetera an all were; obviously, case which know that this the case. So, the first 1 is satisfied with this particular kind of thing and some C are not B's instated of A is substituted mammals in all some mammals are not cats I mean; all mammals did not have be cat an all it might be a tiger, it might be a something else big or something else some other kind that also satisfied by this example.

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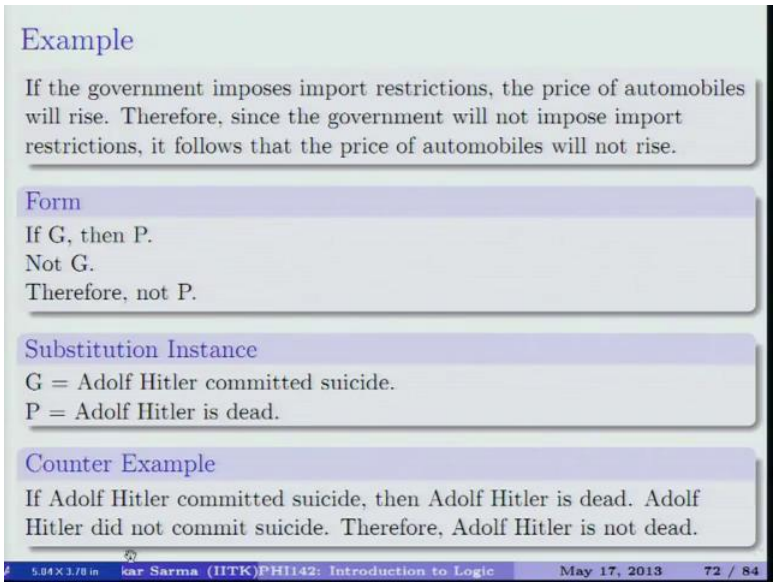

And then the other example the conclusion which were represented is uniform substituted, we came with some mammals are fish an all; obviously, some mammals are cannot be cannot be fish an all fish does not come under the category of mammals so; obviously, we have a counter example, the premises are true conclusion is false; that means, could up a single instant were your premises are true conclusion is false that makes is argument automatically invalid. If it like this you can consider, lost of examples in which you know you say that no A are B some C are B and no C are A also in invalid argument, you can think of 1 example we can already there here.

In the same wave you can take fish cat mammal's etcetera. Then up a counter example and then say is that this argument is invalid. So, there are some other instance; which you can. So, that you can given argument is purely invalid in. So, that is like: some of if take it consideration this argument, if the government imposes import restrictions the price of automobile will rise. Therefore, since the government will not impose import restrictions it follows that the price of automobile will not rise.

So, any 1 who is not having any knowledge of imposing restrictions; why how this automobile price will increase I am not interesting all this thing an all; government will not imposed restriction all this things I am nothing do with anything. For example, if you say that then being as till talk about validity of this argument in also the first thing which need to do is English language sentences; which are mention in this argument we need to extract the form of argument is not essay to come off with form of argument many argument you come across in day today life.

But inwards the cases suppose, if come off with form the argument an all then you can test the validity automatically. So, that is the reason why we set in the begging of begging that method only works for deductive argument and then you can only established that the given argument is invalid. So, now if the government is import resection stand for G that G and then price of automobile rise is representative that as P. So, when we talk about proposition logic is greater detail then; we will enter in to the details of this thing how to representing given sentence in terms of sentential letter like G P etcetera an all. So, this is safely can safely represented of G then P an all and then the next statement the government will not impose restriction is what is represented as not G.

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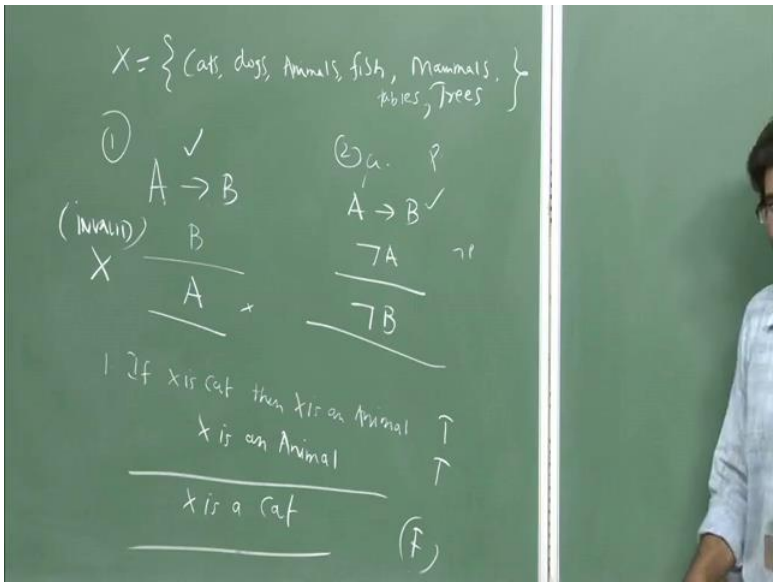

So, there for it as not p an all this is more or less is coming under the category of this 1 A implies B not A and then you got not B an all. So, for this you can thing of some kind of counter example. This is invalid argument. So, in this case, if g then p and not G and not P, it is more or less this 1 A implies B instead of A, we have G instead of B we have p. So, this is not p let us consider A implies B not A and not B. So, how to show that this argument is invalid.

So, there are obvious things we now day today discuss in all. We can verify this historical facts you may not use this particular kind of for example, you can use cats donkeys snakes etcetera all in come off with a seem kind of counter example.

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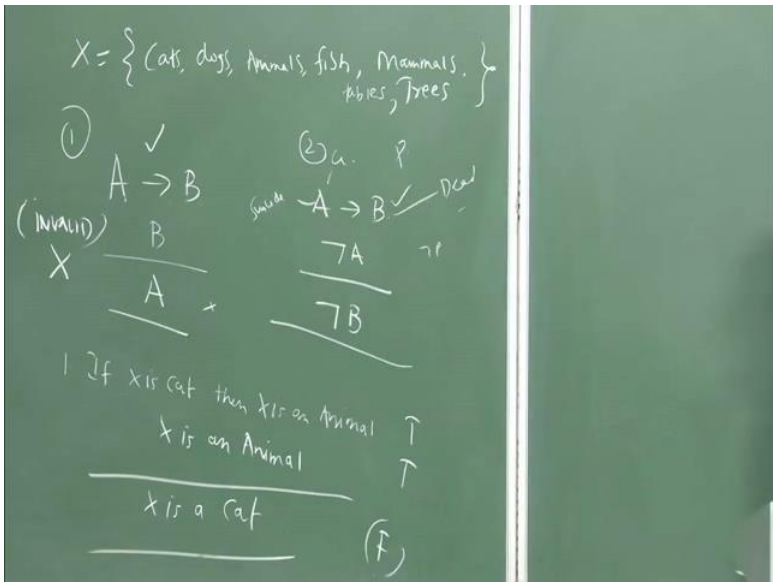

So, here is a counter example depend upon creativity of counter example. So, all of this know that for example, G stands for committed and then P stands for in this case it Adolfhitler status. So, you know all that historical. So, now, you substituted G and P in to this particular kind of argument, if G then P etcetera an all suppose, if A is in this case stand for if Adolfhitler committed suicide A in this case stands for if Adolfhitler committed suicide. This is the 1adolfhitler committed suicide Hitler dead b stands for dead a stands for suicide if a come; obviously, he has to be dead in all if it is successful in all.

So, Adolfhitler did not commit suicide; that means, second 1. That means A does not commit suicide. So, that fallows from this it fallows that Adolfhitler is not dead is because you was not committed suicide; that means that everyone has. So, you 1 if know not committed suicide, but, he might died some other wave in all he might of natural death or in might of died some other waves in all some plane crash or something like there many waves 1 can die an all. But, if not committed said does not mean not die does not seem to be acceptable is countering to do to us find the same wave, you can say that if X is cat then X is animal.

So, X is not a cat; that means, X is not animal an all. So, then there clearly shows that argument is invalid; if X is a cat and then X is an animal that is true an all. Then something like X is not a cat an all you can a cross 1 kind of that is a big an all;

obviously, that is not a cat in all. So, from that you cannot in for that X is not n animal in also inform that X is not an animal all then; it is clearly instance were true premises an a false conclusion; that means, always come off with instance where you are true premises an a false conclusion you must not that even; if you come off with a single counter example then that make this argument automatically invalid in the same way some other setup example, in which you can show that these arguments are; obviously, invalid.

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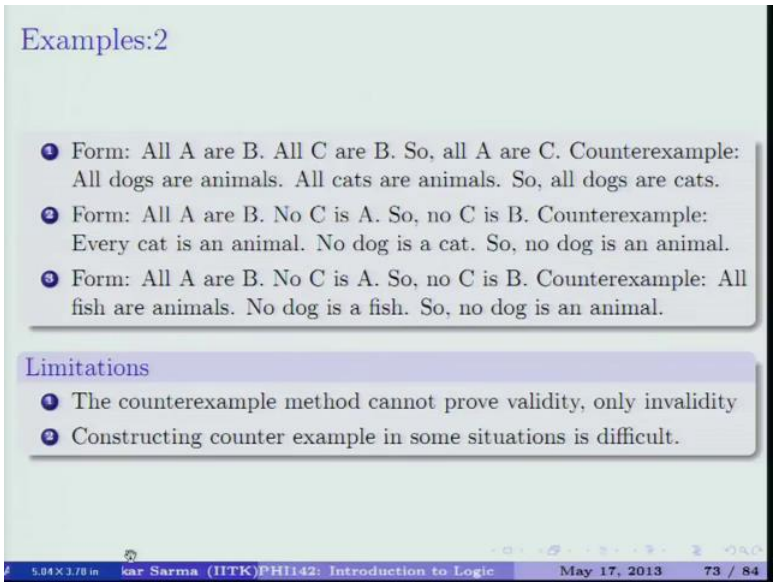

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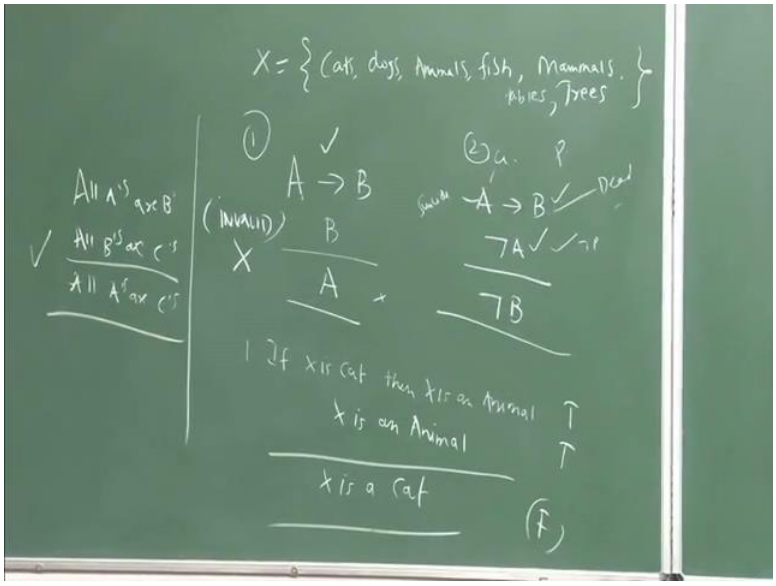

So, there like this all A are B all care B all A are C all case are. So, the actual valid form for this 1 is like this all A's are B's all B's are C's then; you will says that all A's are C's. So, this is consider to be valid kind of form in all; obviously, whatever you substituted A B and C an all. It can be donkey cat anything an all you able come off with counter example to this 1. For example, if not used in the correct form if you say all B are A are all C are a something change it little bit in it comes in invalid form; obviously, it will become any invalid argument.

So, the 1 which you have is not in that particular kind of form it slightly, different all A's are B all C's are B instead of all B's are C's all C's are B's. So, if in for that from that all A's are C's. Then you can; obviously, consider a counter example like this: all dogs animals, it satisfied the first premise and then all cats animals; we are C stands for cat B stands for animals and A stands for dogs. So, from that uniform substitution you came off with A conclusion that all dogs cats nobody, will be in position to accept is conclusion true. So, what did we do we constructed premises which are for; obviously, true, but, the conclusion is false like all dogs cats.

So, from given form invalid form is substituted some instead which; obviously, no them to true then; it will need to; obviously, false conclusion an all. So, some other example can be all A's are B is no C's is A no C is B and here is A counter example, every cat is A animal B is represented by cat and B represented by animal then the second premises no C is a no dog is A cat that is also obliviously case in all no donkey can be horse something like that. So obviously, conclusion is no dog is an animal if is no dog is animal then; obviously, dogs and animals only.

So, it is not any other kind of something like this thing. So, now we have discussed important method, in which shows that given argument is can only be invalid an all; it shows that it works only for deductive argument which are; obviously, invalid in all. So, all invalid forms suppose, if a come across invalid forms automatically the argument invalid in all. So, here are the limitation of this the counter example method; which seems to working nice for establishing the invalidity of deductive arguments. But, it as it only limitation the counter example method ca not prove validity.

So, that is why no you cannot used for establishing the validity of a given argument, but, it only shows that given argument is invalid. So, it is decision kind of procedure only for

establishing the invalidity of a given deductive argument up course, will not work for the inductive argument; it is completely another story an all. So, sometimes contracting a counter example in some situation will be extremely difficult in all. So, you has to lot of creativity is involved in constructing the counter example, if the argument is having so many variables etcetera an all we just handle with simple example, we all like models are the 1 which use transit it property etcetera an all. All not all arguments can be as simple as 1 which talk about sometimes a constructing counter example, may be kind of difficult an all sometime it will be too difficult in all.

So, in this lecture what we discussed was, simply this that we first spoke about a strength of the inductive arguments. So, we said that inductive argument can only be strong or weak in all, because conclusion probably from the premises in all is no guaranty that the conclusion necessarily follows from the premises in the case of inductive argument. So, once we identify that, it is a strong argument then we questioned our self is this argument is having some kind of false probably false premises in all that is the case then we said that a that is a weak that is a un cogent argument in all.

An uncogent argument is a 1 inductive argument strong inductive argument; which it has a 1 of the premises probably false in all. So, in a sense all weak inductive arguments can automatically be un cogent argument in all. So, then once we identify that given inductive argument is strong or weak we talk about cogency and un cogency and then a we introduced important method; which only establishes the invalidity of deductive argument it will not work for the validity of deductive argument, it only shows that a given argument is invalid.

So, that method is called counter example, method in the counter example method what we are seeing this simply that given an argument we transformed in to form. And then sense it is automatically invalid form is substituted with some instant is; obviously, no them to true or obviously, no them to be false like in all donkey cats; obviously, false statement all cats. If you say that also false statement you will constructed some example like this and then we showed that in all the invalid forms you could come off with counter example.

You could come off with counter example means; we could come off with instant are example were you true you have true premises, but it have a false conclusion. So, this is

1 which we have discussed and then in the next lecture; what we got talk about is a different kind of model for argumentation which is due to a famous British logician philosopher an up course is also I consider, to be historical in science. So, will discuss model why in the sense that is totally dis satisfied with the formal kind of logic, in which is dissatisfied with models of formal logic, it is feeling to capture the day today argumentation that we use in; obviously, in day today discuss.

So, in the next lecture, will be talking about a model of argumentation due to it is widely use that one of the important models per the argumentation, which is called as model of argumentation. So, will continue with this lecture next.