NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Set Theory

A proof technique

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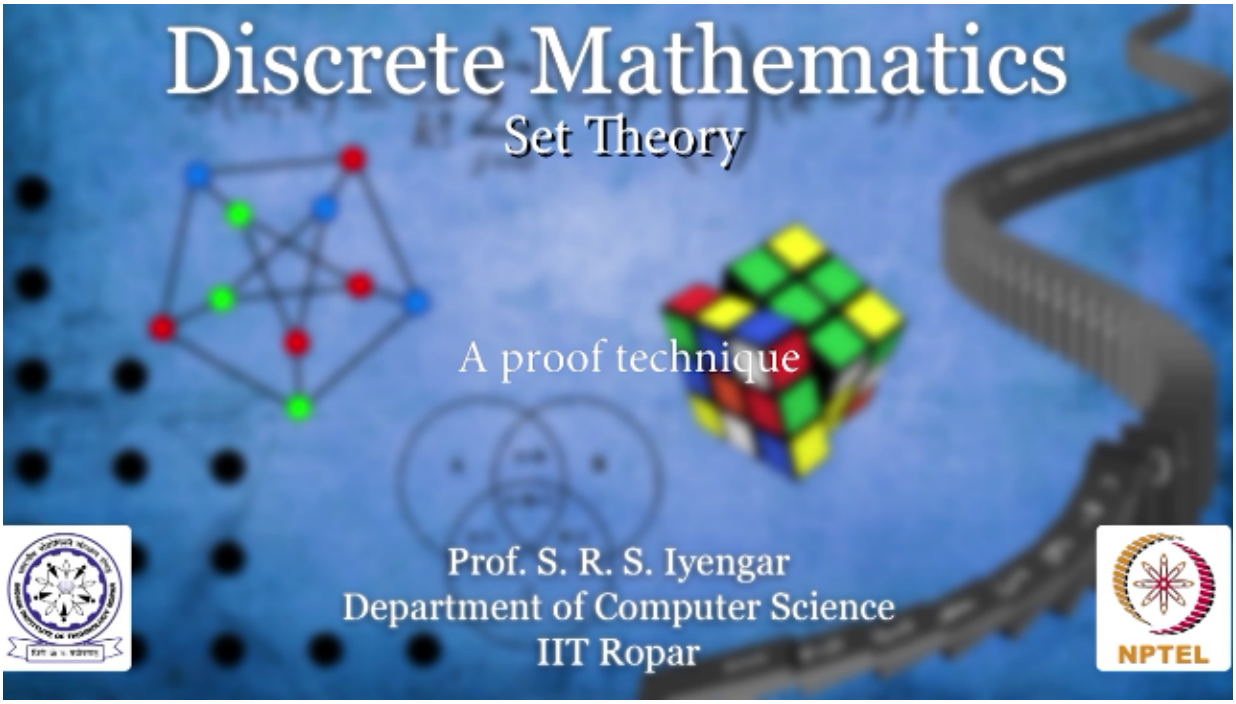
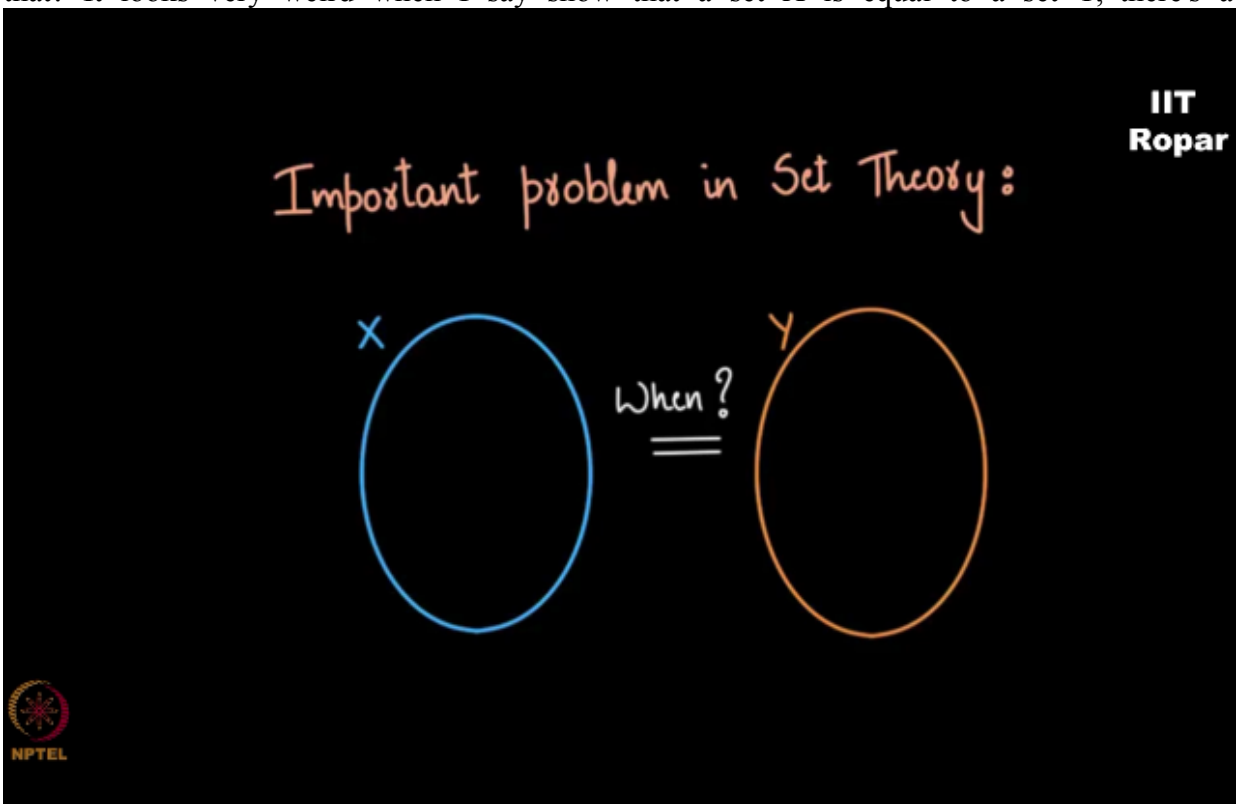
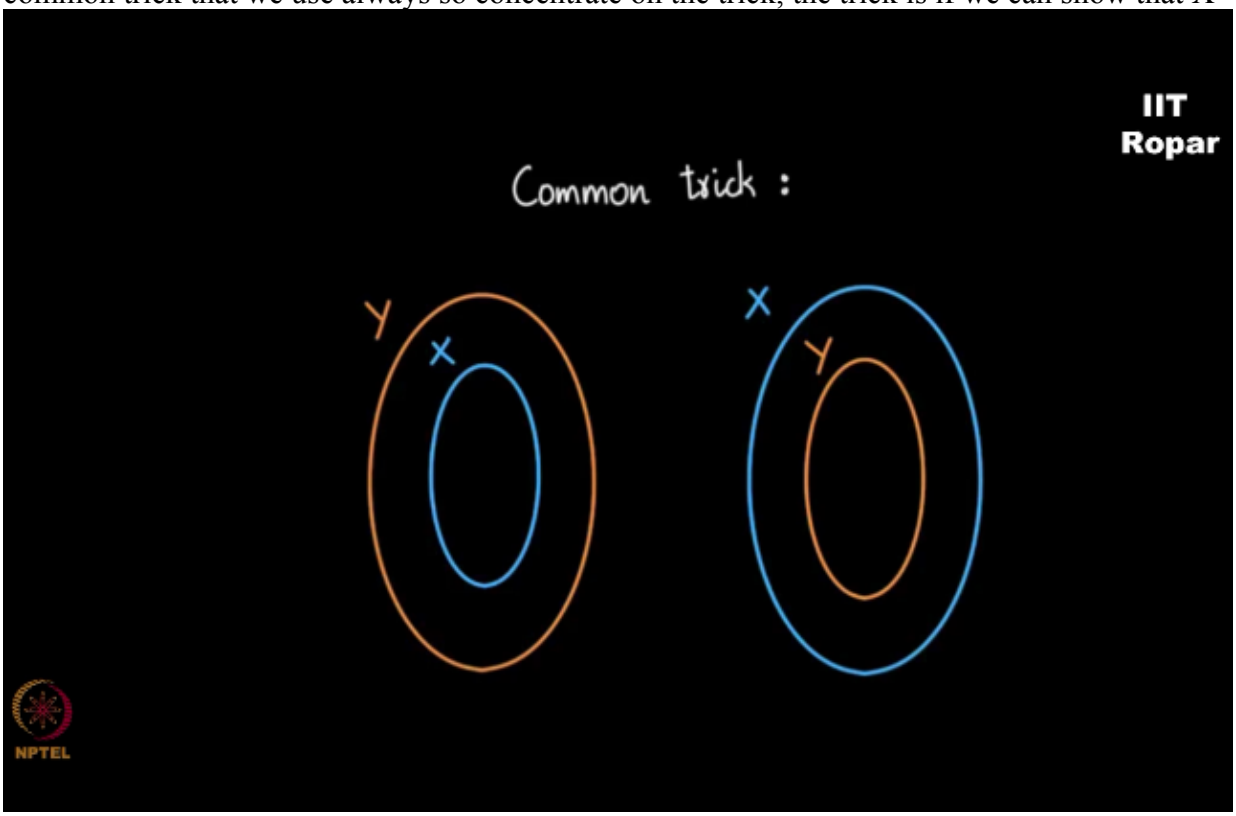


In set theory one of the important problems that you will note and you should learn as a math student or a computer science student is to show when is a set X = Y, now what do you mean by

that? It looks very weird when I say show that a set X is equal to a set Y, there's a

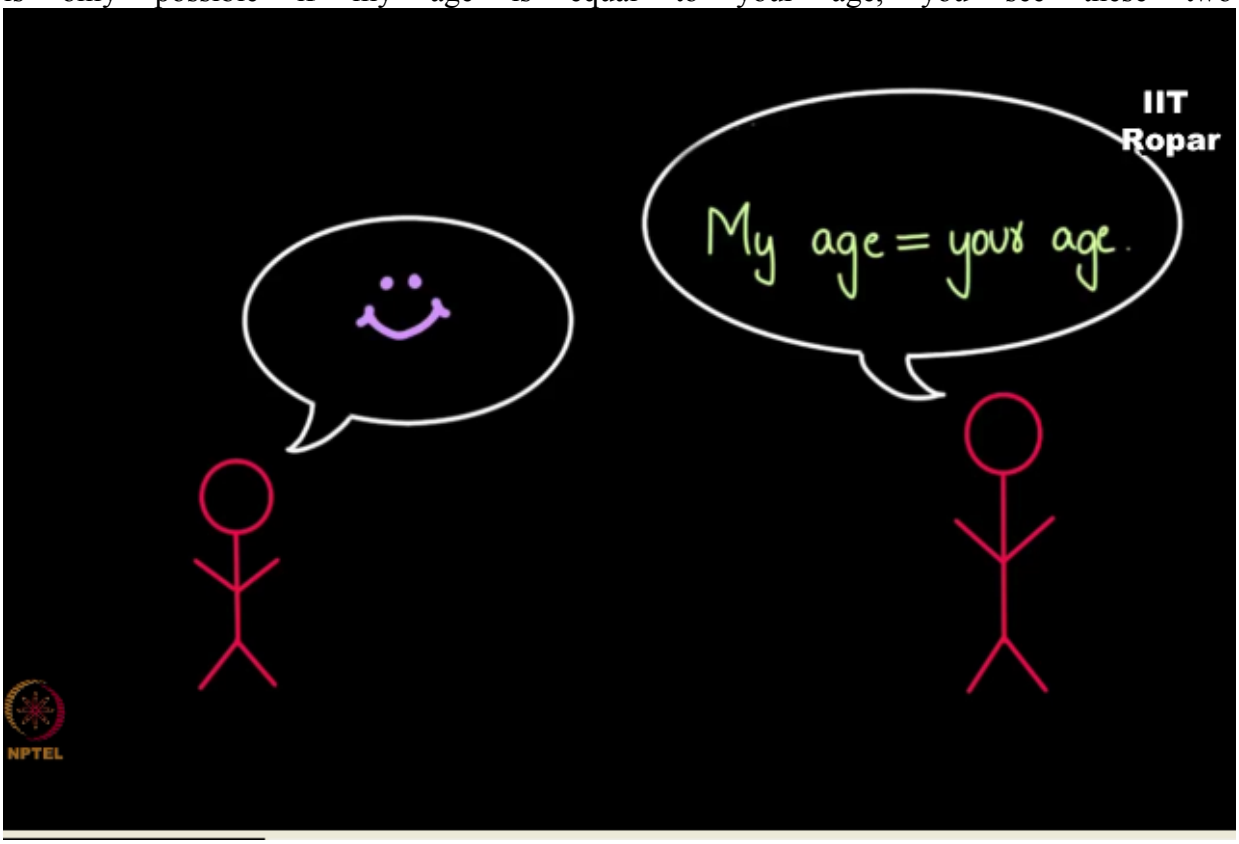


common trick that we use always so concentrate on the trick, the trick is if we can show that X



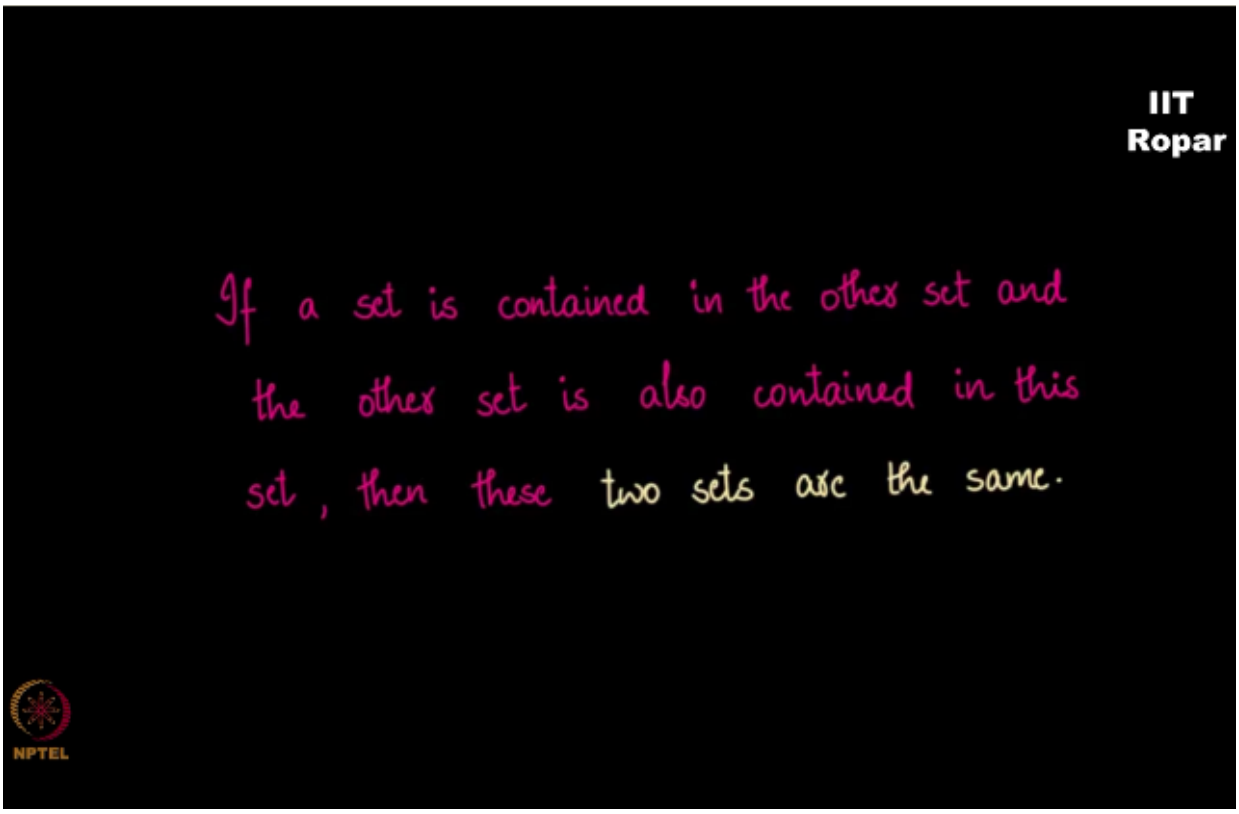
is a subset of Y, we cannot of course conclude that X = Y you see, all we say is Y is bigger than X, but if we can also show simultaneously that Y is a subset of X, then we show indeed that X = Y.

Let me illustrate this with a nice example you come and tell me what is your age, I'll tell you I know your age, your age is less than or equal to my age, now you know for sure that your age is not greater than mine, and I also tell you that my age is also less than or equal to your age, I repeat your age is less than or equal to my age, and my age is less than or equal to your age, this is only possible if my age is equal to your age, you see these two



statements put together implies that equality happens.

Similarly this is very analogous if a set is contained in the other set, and the other set is also contained in this set, then these two sets are the same, in fact all those sounds so straightforward that it doesn't deserve any explanation, this is a standard way in which we show that two things are equal, two sets are equal. So let us try showing that this very De Morgan's law is indeed true.



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