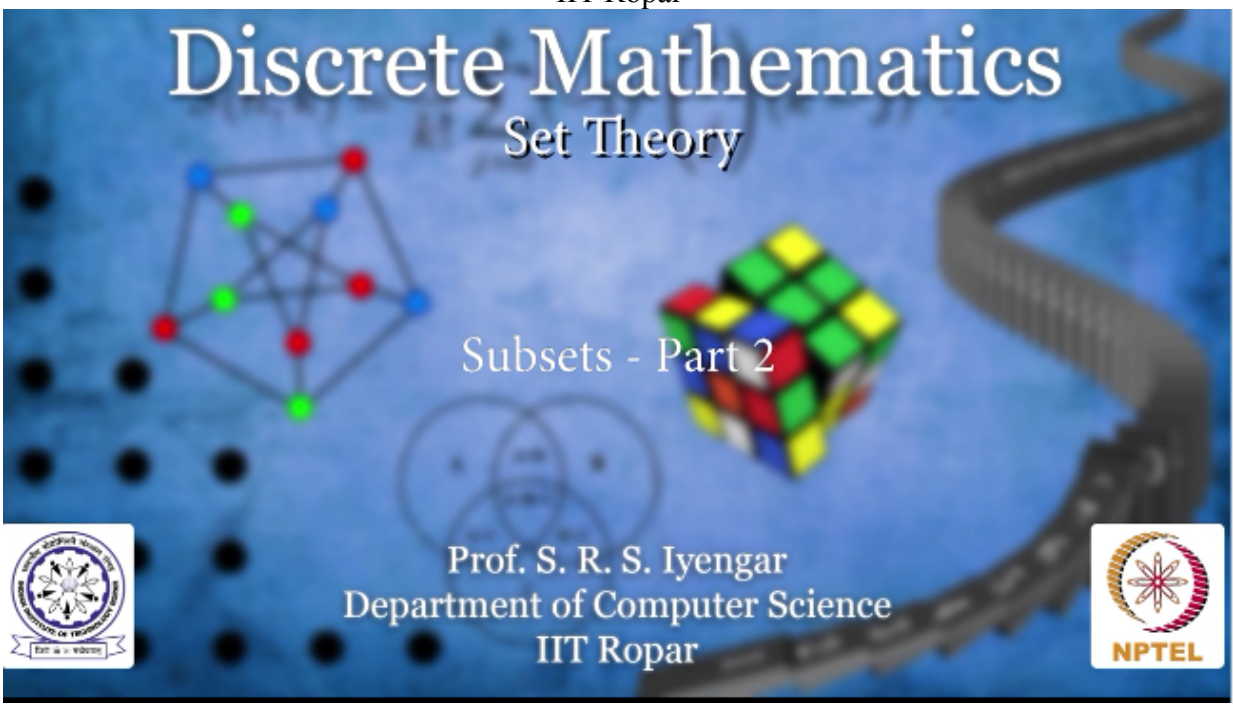
NPTEL

NPTEL ONLINE CERTIFICATION COURSE

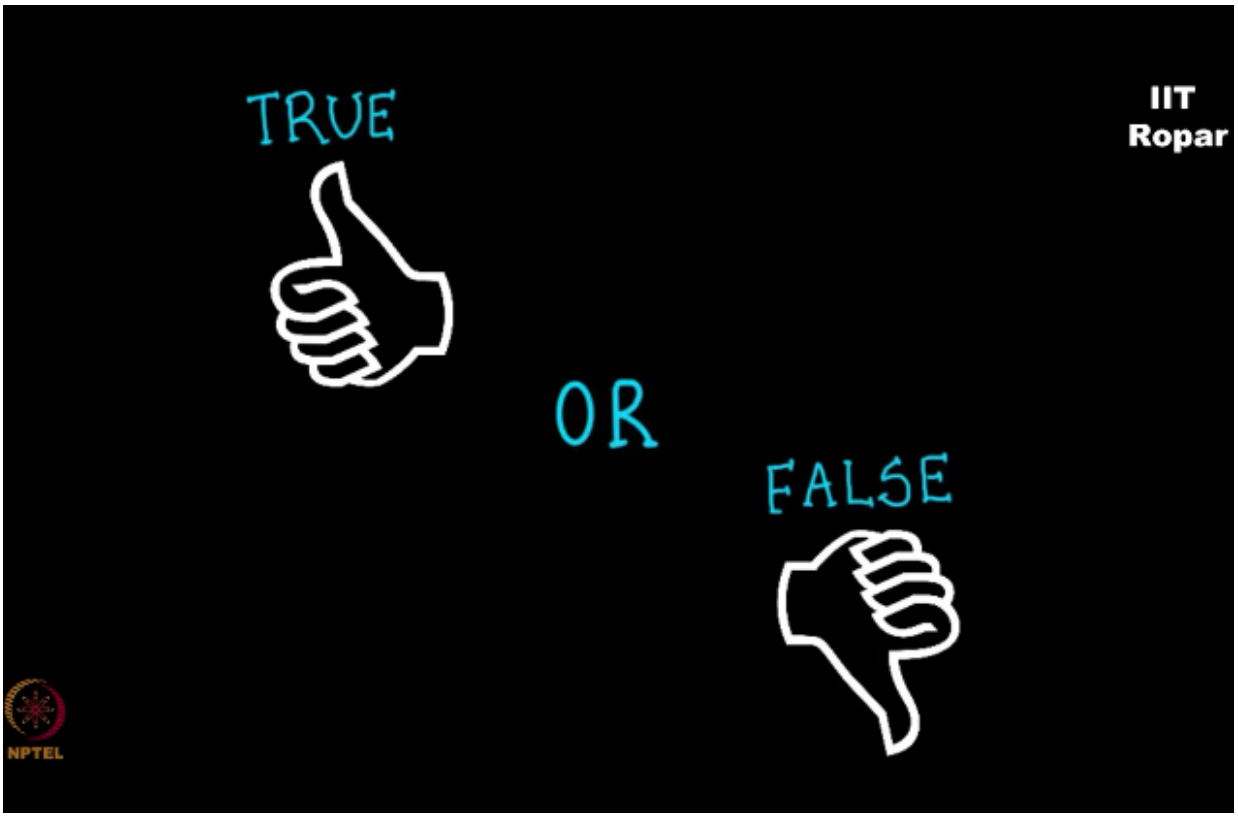
Discrete Mathematics
Set Theory

Subsets- Part 2

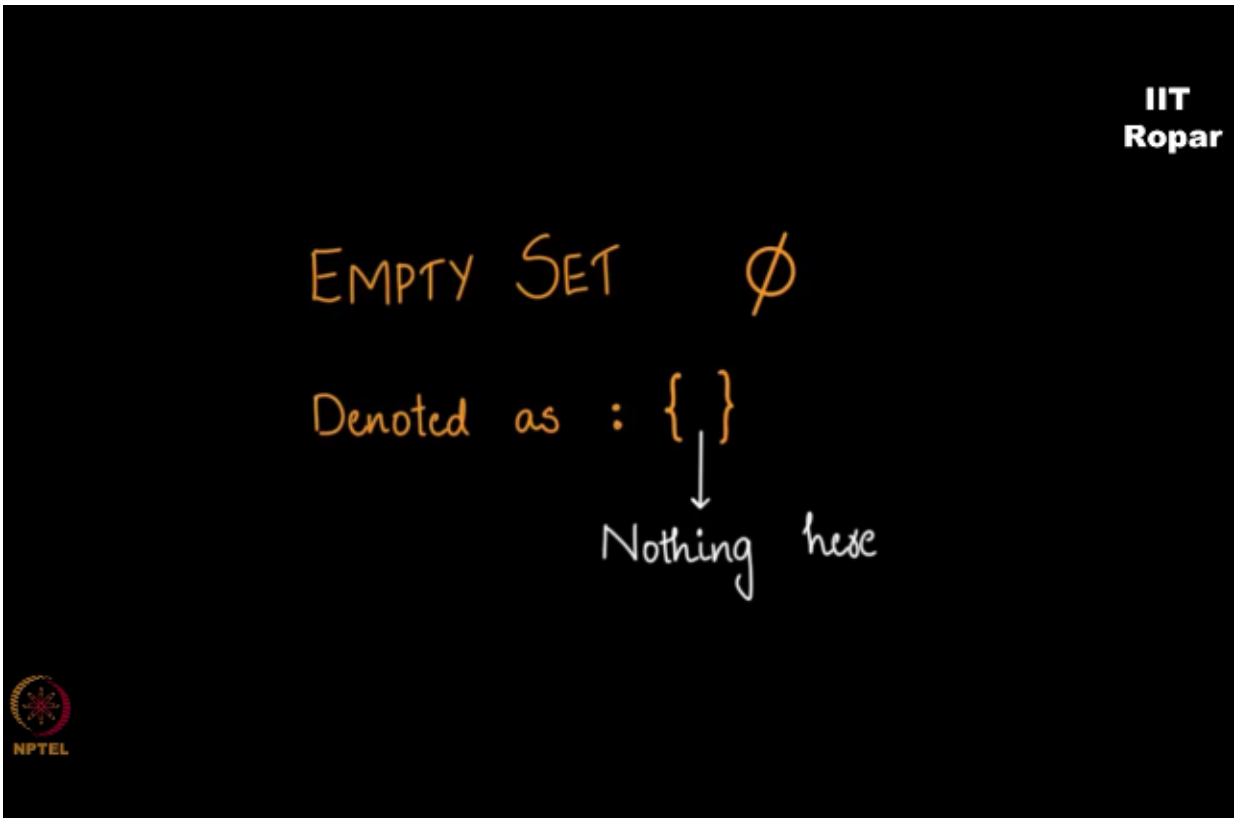
With
Prof. S.R.S. Iyengar
Department of Computer Science
IIT Ropar



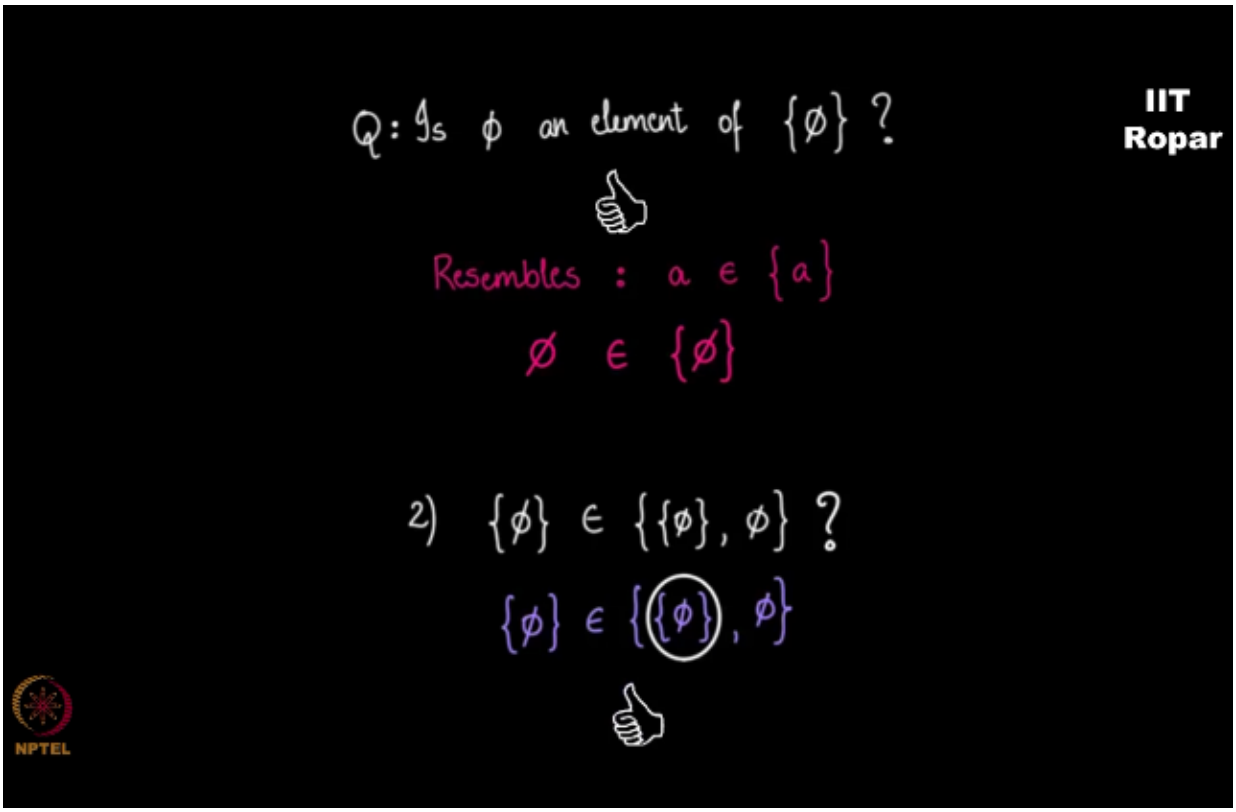
We are now going to start with a series of true or false questions. Let us start with the simplest



possible question one can ask on empty sets, you have an empty set fee which is denoted by simply open flower bracket and closed flower bracket and that's it, nothing is inside. Now this will be denoted by fee which stands for an empty set.



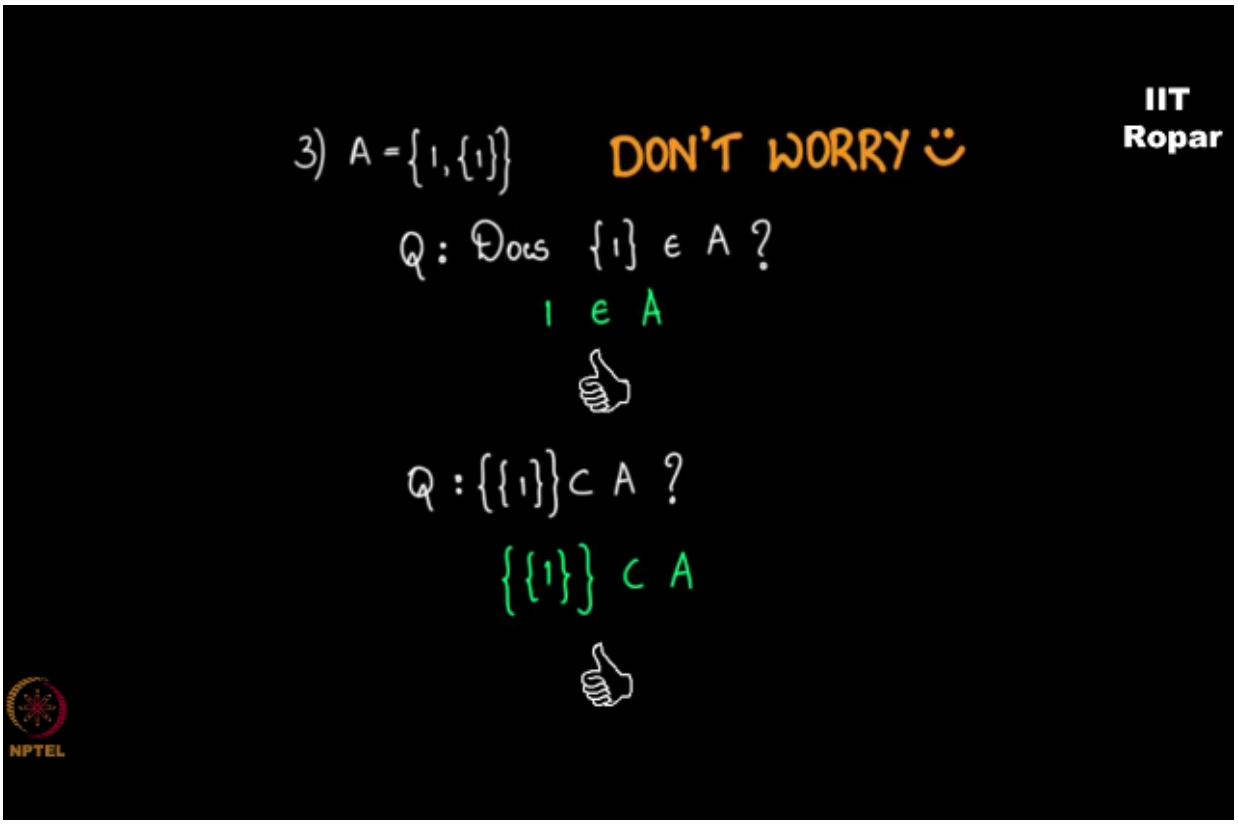
Now my question happens to be this, is fee an element of a set containing fee, now this is obviously true, why is that? Don't you think this resembles A belongs to a set containing A, irrespective of what fee is, fee stands for an empty set, but fee is an object and you are considering a set containing one object and that object happens to be fee irrespective of what fee denotes, you should say yes this is true because fee does belong to this set containing one element fee.



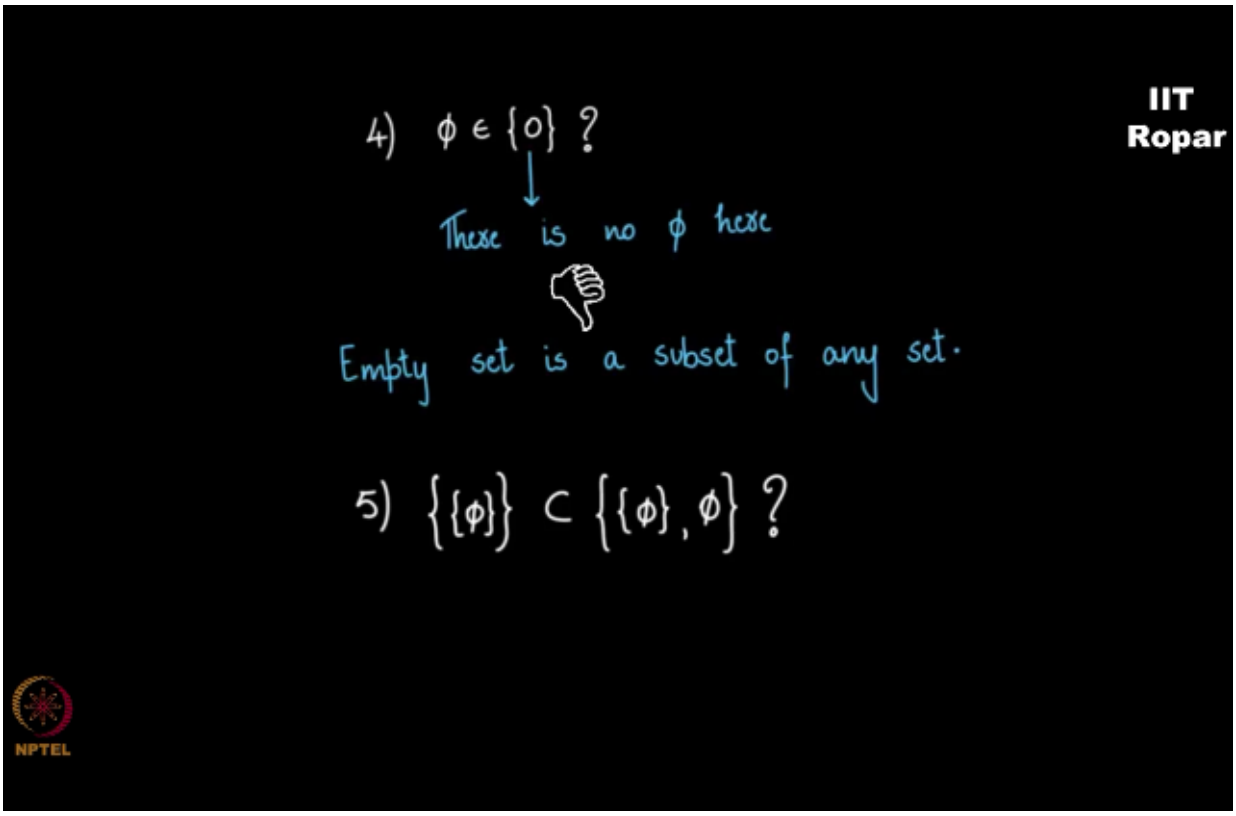
A set containing fee, does it belong to the set? A set containing fee and fee, look at this carefully this set containing fee does indeed belong to this set because it is there as an element of this set and hence this is true, here is a tricky question, a set A comprises off as an element 1 and an element which happens to be a set containing 1, now these things are all very confusing that this is, it doesn't mean that if you don't get these right you don't know set theory, but it is a true test of your complete understanding, proper understanding of set theory, all right.

So my question would be do you think a singleton set with one element namely 1 belongs to A, is this true that 1 belongs to A? Absolutely yes, here is an element of A and this element is indeed belong to A so this is true.

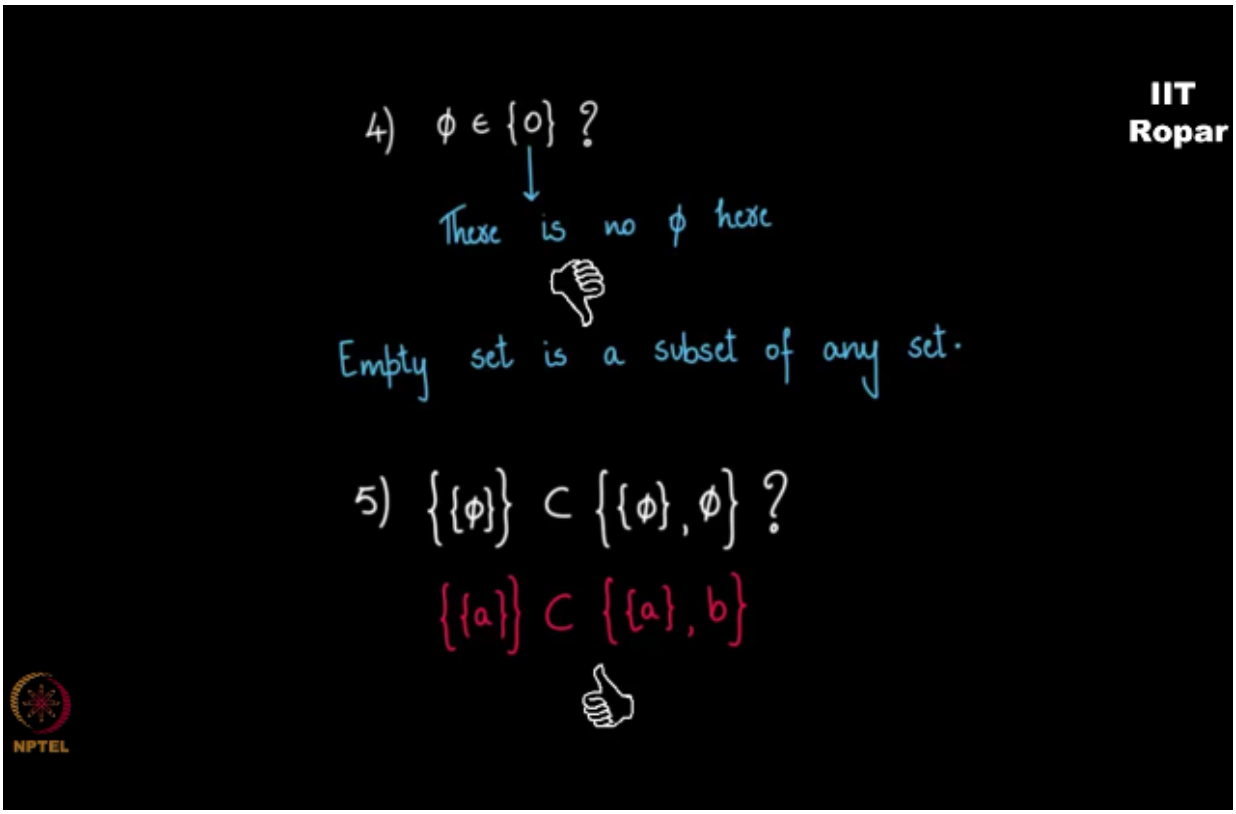
Next I'm saying a singleton 1, by singleton we mean a set comprising only one element singleton one means a set comprising only one element and that one happens to be this element one, so does it, is it a subset of A? Yes it is a subset of A, why? That's because if you consider this element alone number 1, and put that in a set this happens to be a subset of this set, correct set A and hence this is also true.



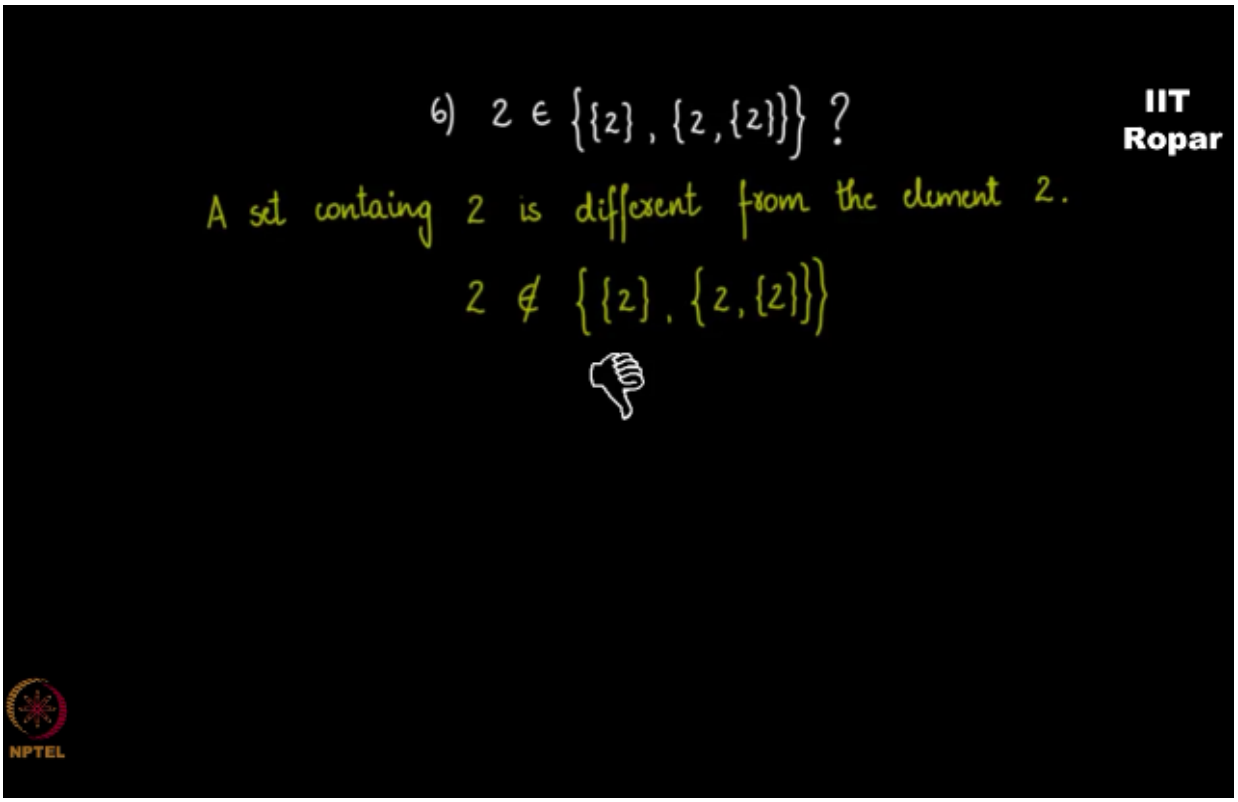
Fourth question, empty set belongs to a set containing 0, now this is not true, why is that? That's because you do not spot a fee in the set, right, and hence this is indeed false, this takes a minute to sink him, many people would think but an empty set is obviously there in the set no by definition we don't consider an empty said to belong to a set, in fact an empty set is a subset of any set, correct why is that? A set containing no elements is obviously a subset of any set that you can think of by definition of subsets, correct, so the answer is false, okay, look at this question stare at this question, I'm not going to state this question, stating would be complicated



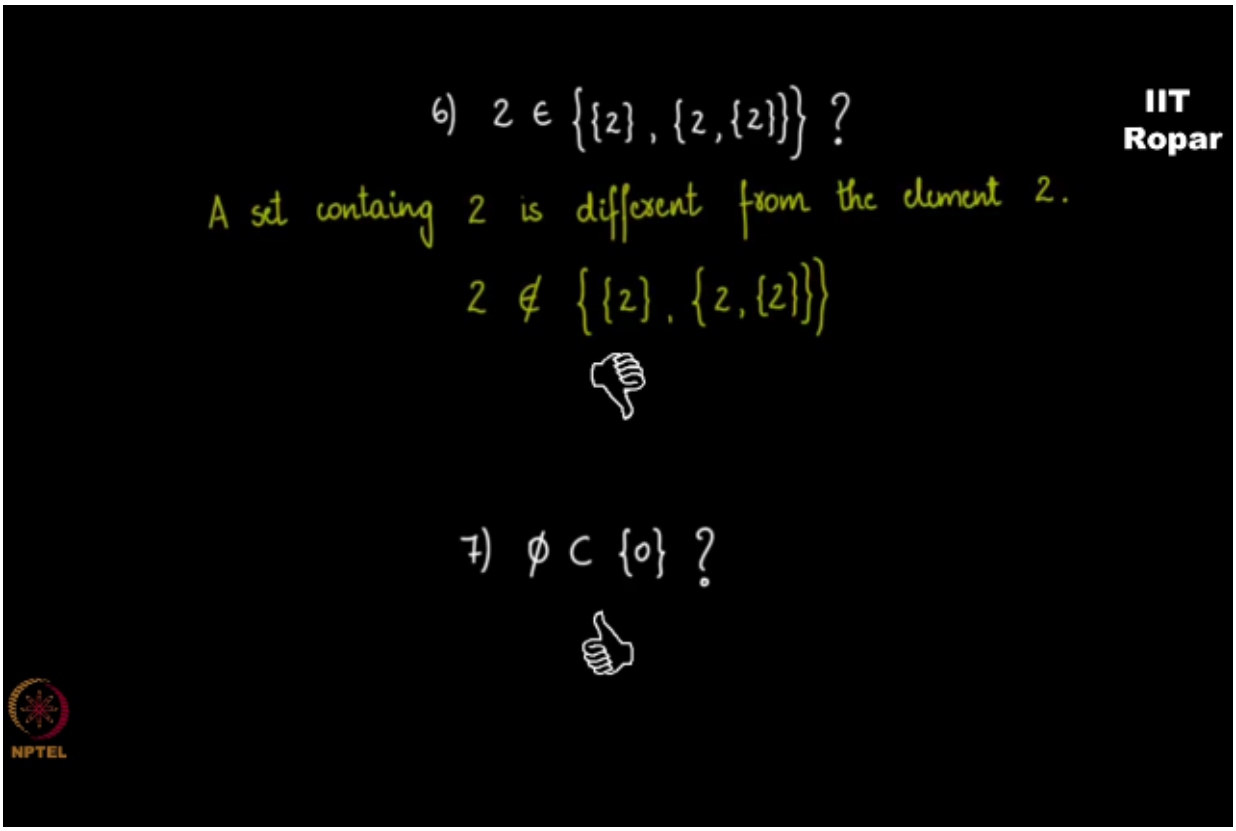
from no onwards, so you stare at the question and you tell me whether it's a subset or not, the left side which is basically a set containing, a set containing an empty set, now that's why I said I'm not going to recite the question, it's getting complicated. Is it a subset of this, a set containing, a set containing an empty set and an empty set? Yes it is indeed because let me write down a set containing, a set containing A, don't you think a subset of a set containing a set containing A and another element B that's true because you picked this element set containing A, and you put that into a new set which makes it start flower bracket, again start flower bracket put A, and flower bracket and flower bracket, this obviously is a subset of this set, so and very similar grounds the given question is indeed true, a set comprising of an empty set and that within a set that is an element within a set is indeed a subset of a set containing a set containing null set and a null set.



So here is a bouncer question, stare at the question, the element 2 belongs to the set, do you spot this element 2 anywhere in the set? No, a set containing 2 is different from the element 2, correct, so 2 does not belong to this set so this should be false as I said this comes with little bit of wisdom, there's nothing complicated about this, but it demands that you give it a thought and



do not, you should not jump into conclusions, look at this question is empty set a subset of a set containing 0? No, if someone were to ask is empty set, does empty set belong to a set containing 0, I would say no that's not true, but all that we are asking here is if an empty set, is it a subset of a set containing 0? In fact we discussed already that empty set is indeed a subset of any possible set that you can think of, in particular a set comprising of 0 is no exception, so indeed an empty set is a subset of a set containing 0, so this happens to be true without doubt.



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