NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Set Theory

Cardinality of Union of two sets – Part 1

With
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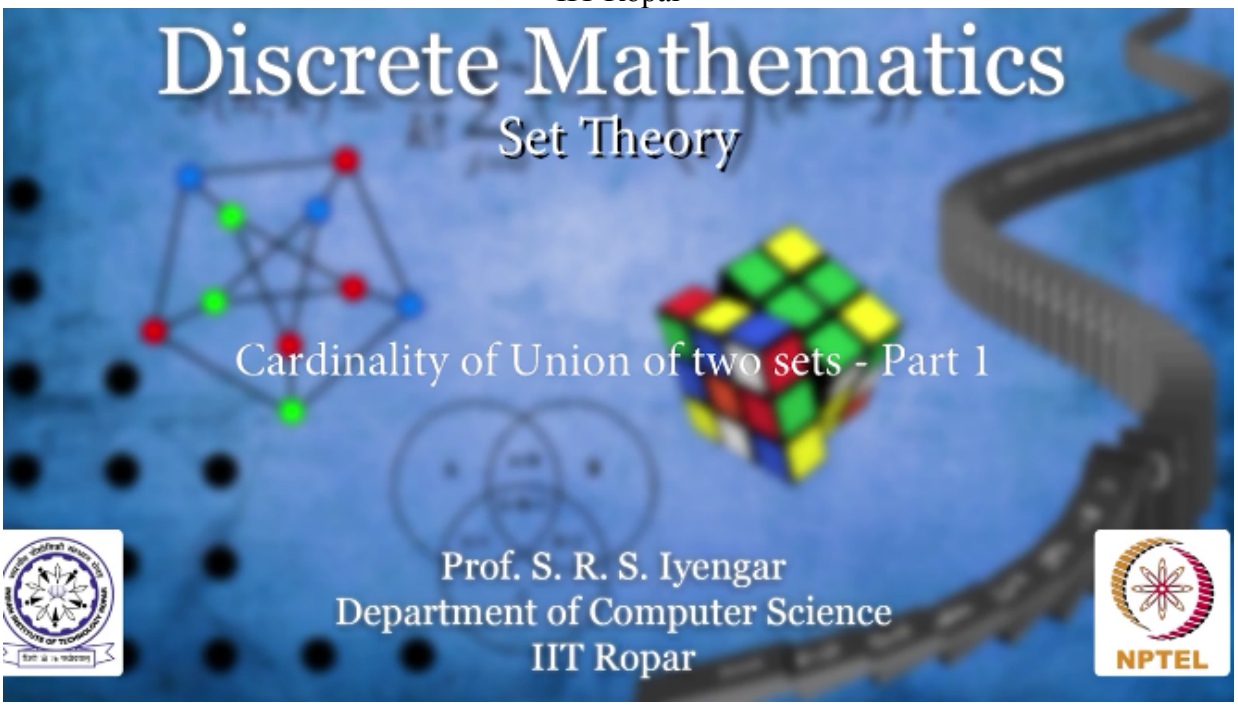
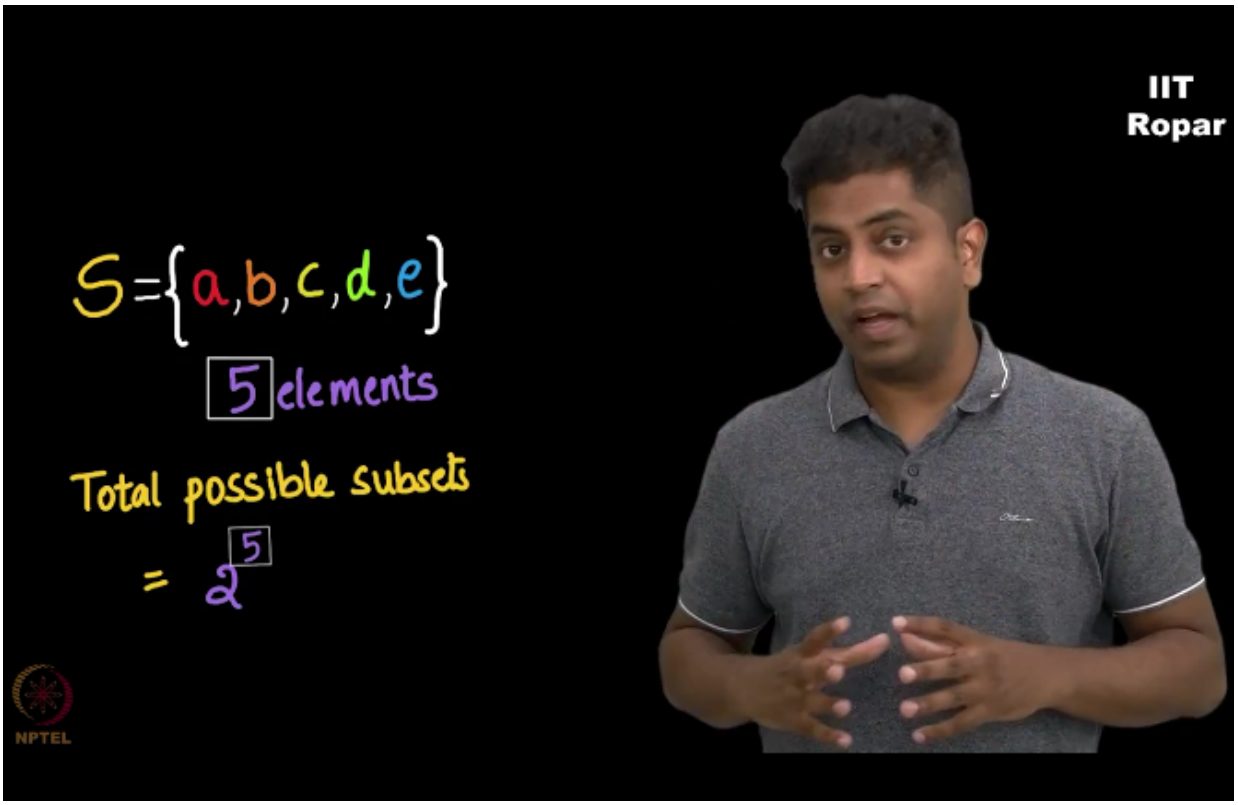
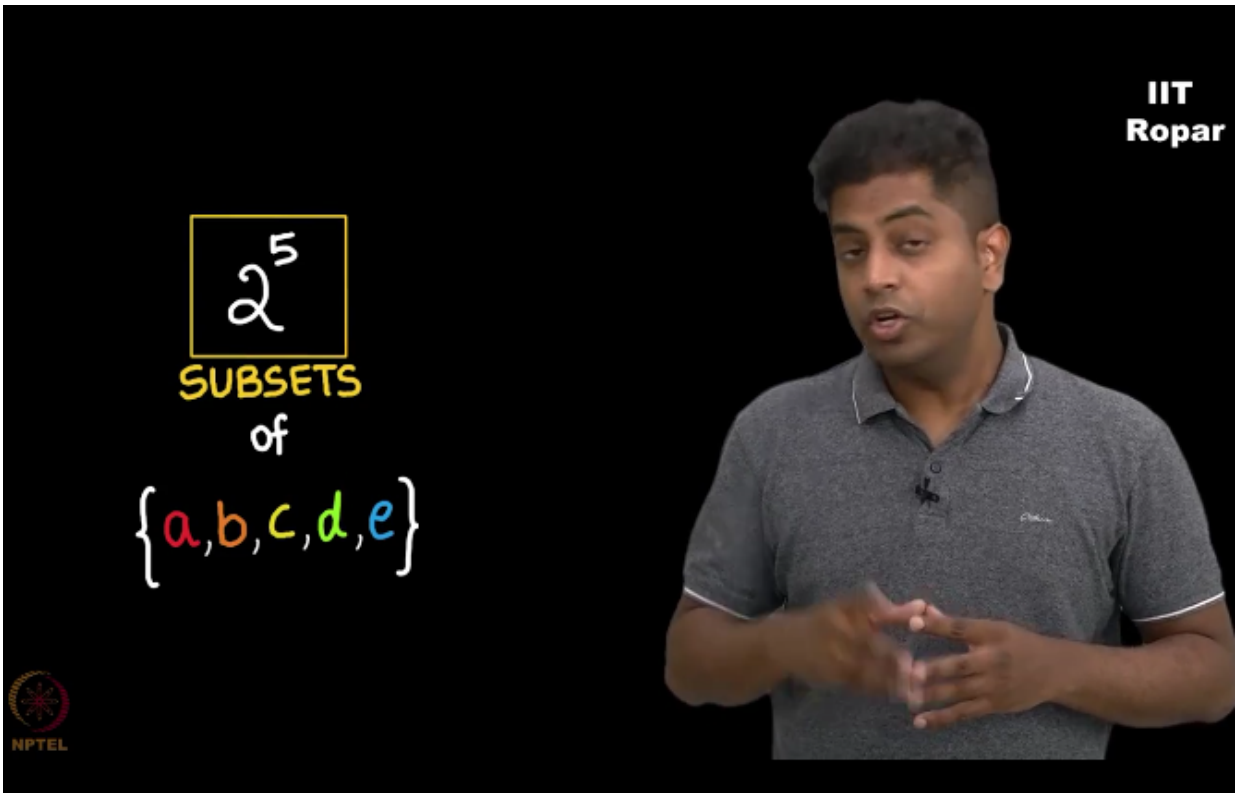


So all that we showed just now is that when you take a set with 5 elements there are 2 to the 5



possible subsets that you can think of, note and please note, many of us failed to note this fact that an empty set is also a subset apart from the entire set being subset, and in between there are more subsets such as these, put together you see there are 2 to the 5 subsets of these 5 people, correct.



Now do you see that all possible subsets of a set is also another set this is called the power set of a set, so in general if you take a set with N elements the power set will have 2 to the N elements, and the proof goes exactly the way we showed you just now, there are 2 to the N possible N-bit binary strings, right, there are many proofs for this you have in fact seen the most

elegant and the simplest of all proofs using binary strings, this is one result that appears to be very unclear when you see it in the beginning but it is pretty obvious, it is called the De Morgan's law, it goes like this the set A union B take its complement is actually equal to A complement, B complement, their intersection, similarly A intersection B complement is A complement union B complement, let us see how this is true.

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