NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Set Theory

Set difference – Part 1

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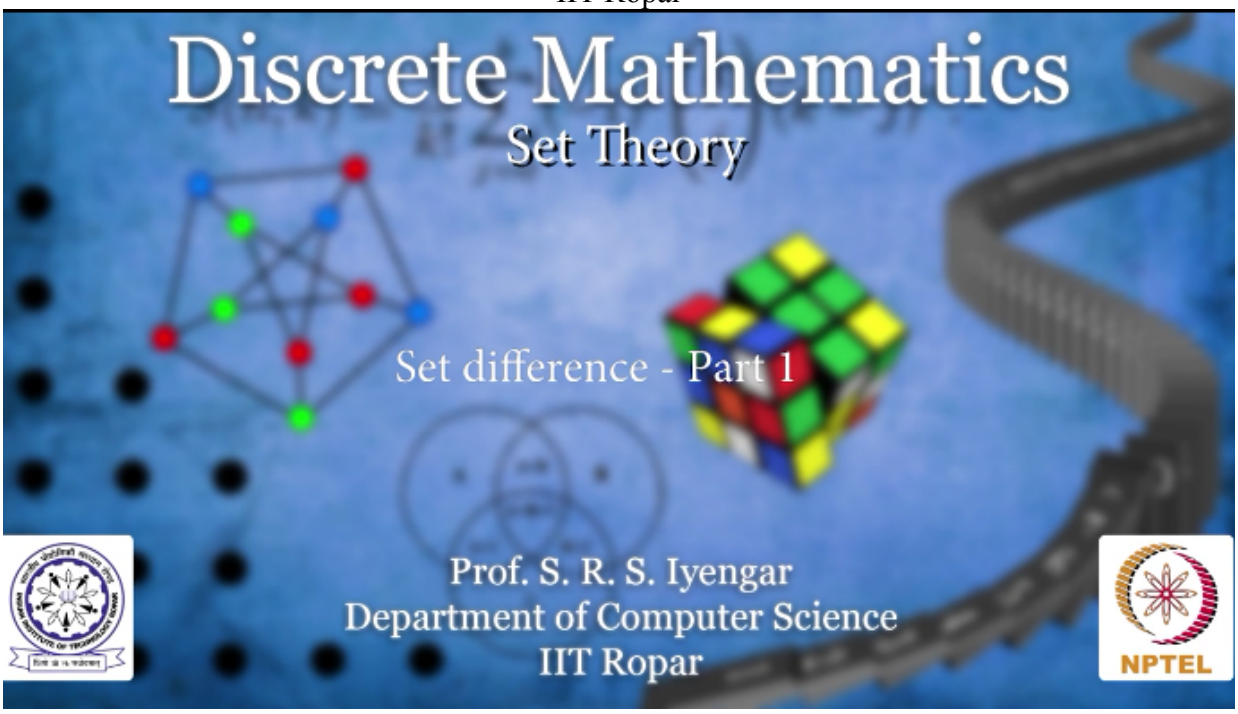
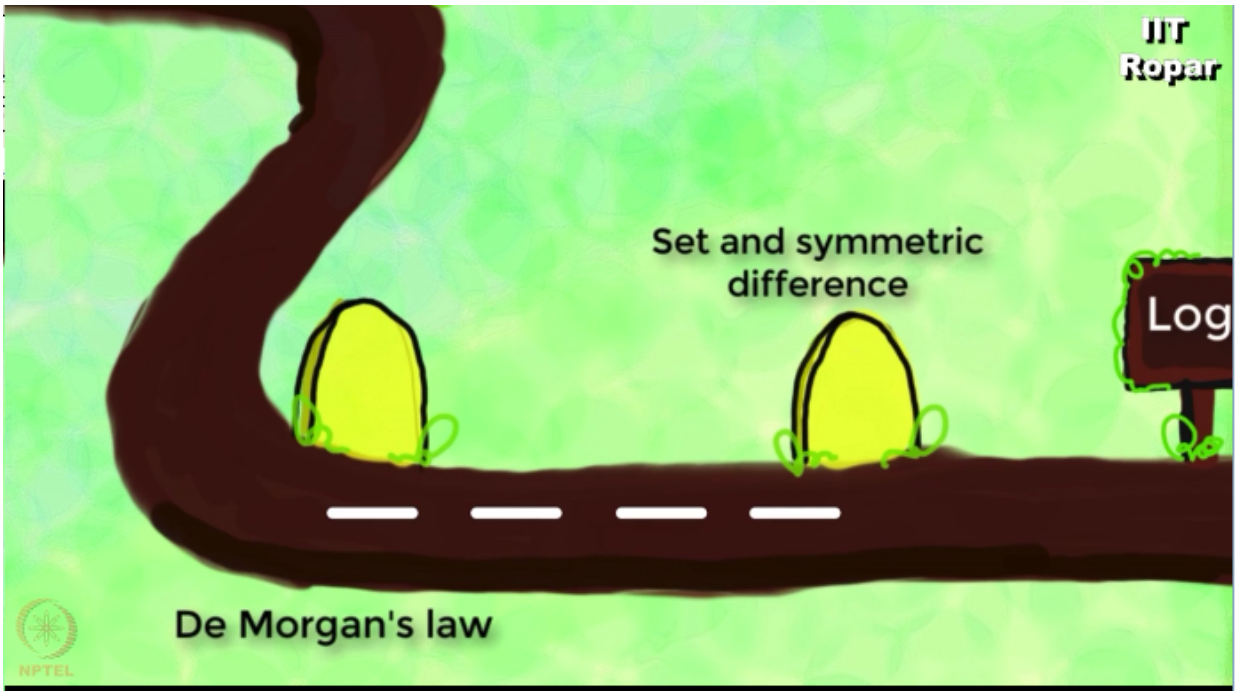
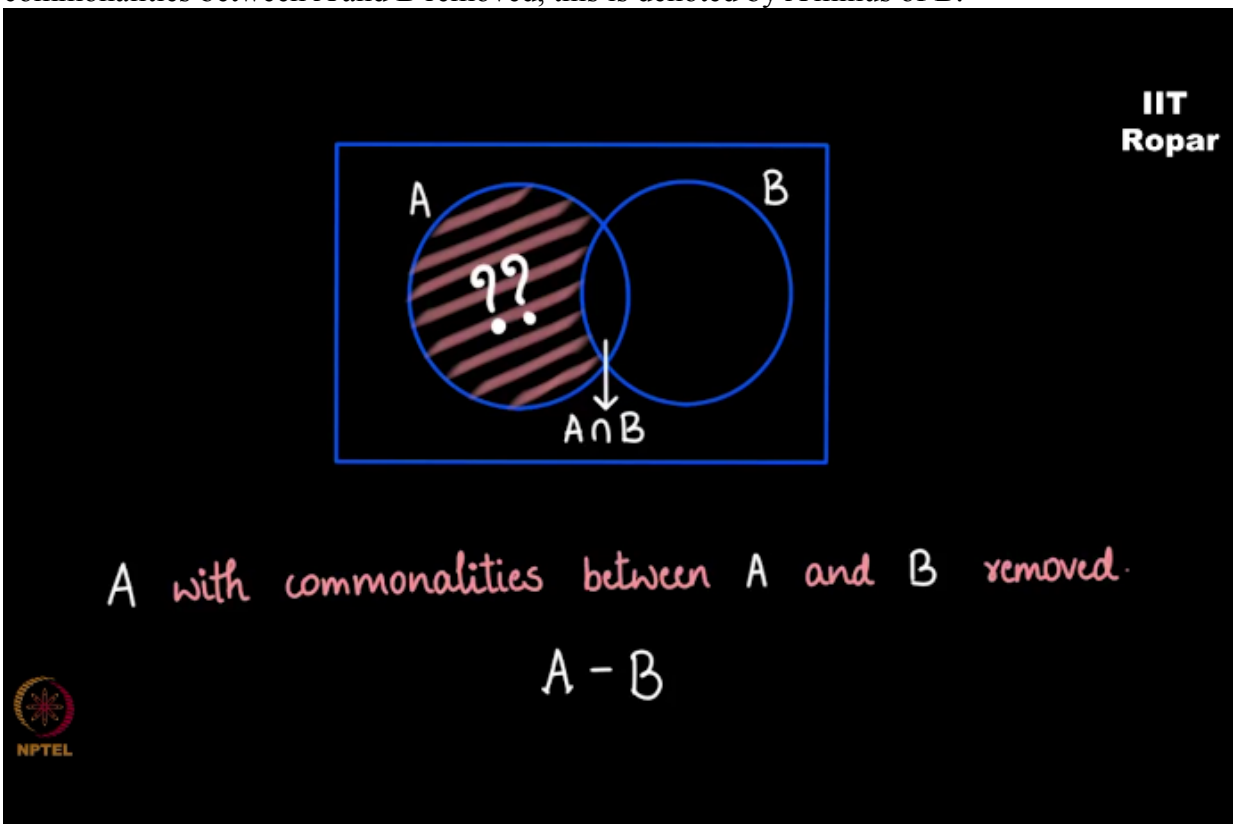


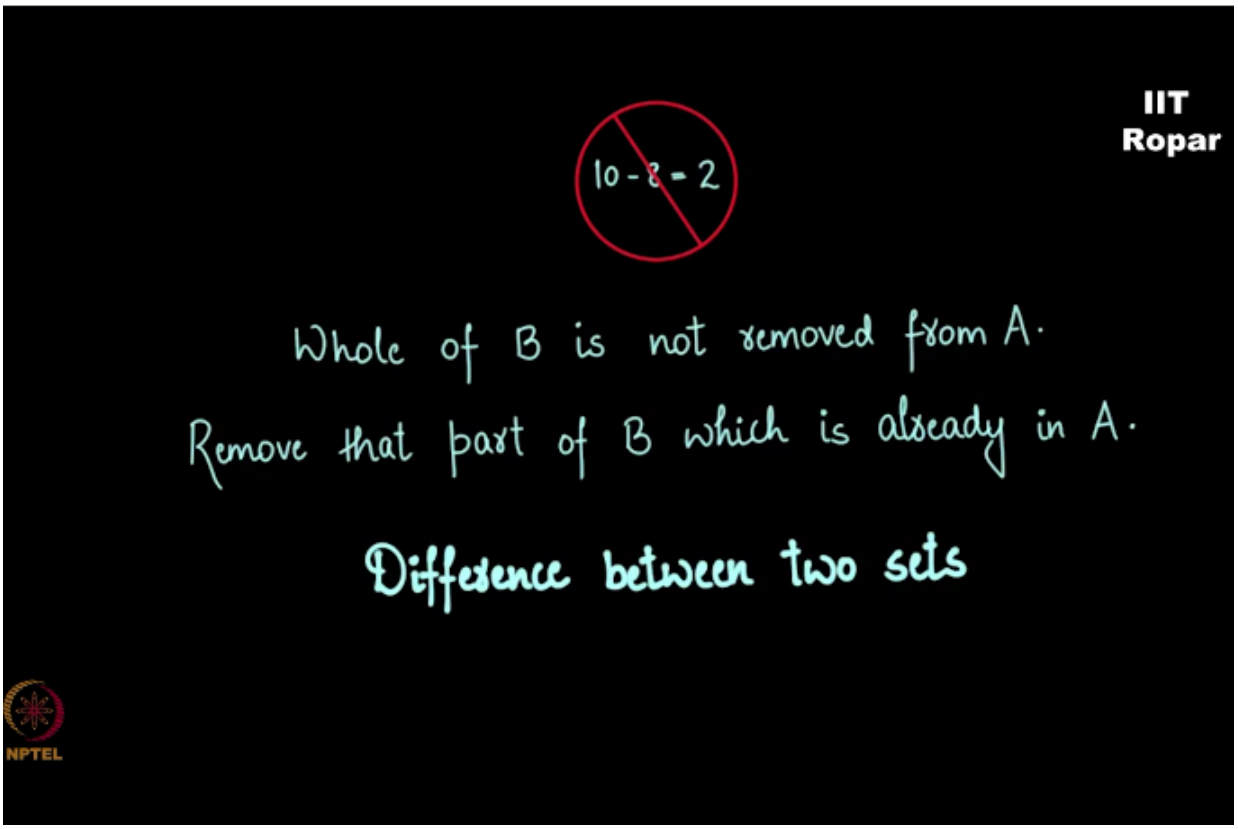
We will now go ahead and understand what one means by the difference of two sets A and B, it is not the same but very similar to the difference of two numbers that we all are familiar already.



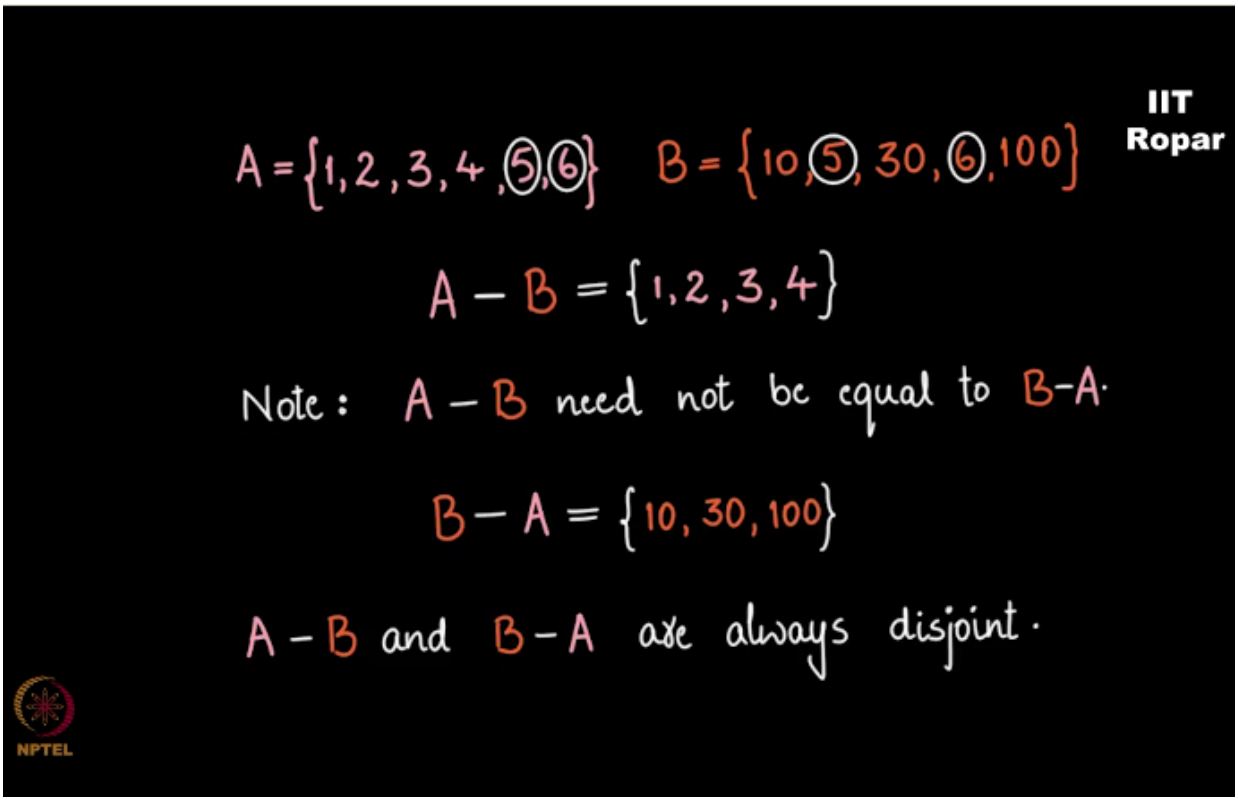
Look at this Venn diagram, you have a set A, you have a set B with some possible intersection, now look at the shaded region, what do you think this is? This is simply that part of A with commonalities between A and B removed, this is denoted by A minus of B.



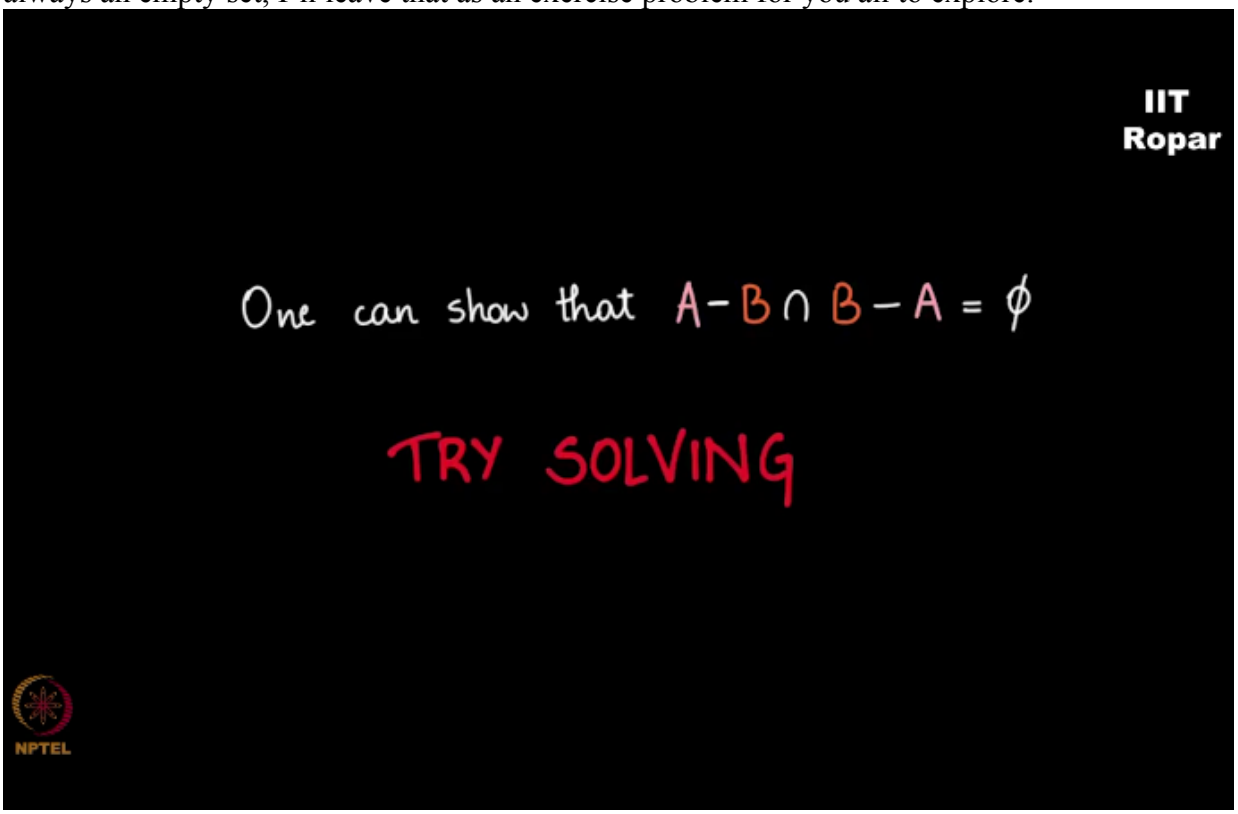
Now this is not the typical 10 – 8 = 2 that we now in arithmetic, it is slightly different from the typical subtraction, what you remove is not the whole of B from A, you only remove that part of B which is already in A, this is called the difference between two sets.



Let me illustrate this with an example, let A be equal to 1, 2, 3, 4, 5, 6 and B be equal to 10, 5, 30, 6 and 100, so what is A-B? So in A you have 5, 6, it is also present in B 5, 6 the rest are not in A, 10, 30, and 100 they are not in A, so A-B will simply be 1, 2, 3, and 4, note that A –B need not be equal to B-A, isn't clear from the example we saw just now, A-B in our example in this Venn diagram happens to be 1, 2, 3, and 4, but B-A happens to be 10, 30, and 100, in fact



they are disjoint, A-B and B-A are actually always disjoint you can observe this, you cannot have a common element in A-A and B-A, in fact one can show that A-B intersection B-A is always an empty set, I'll leave that as an exercise problem for you all to explore.



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