Discrete Mathematics

Functions

Numbers adding to 9 - Solution

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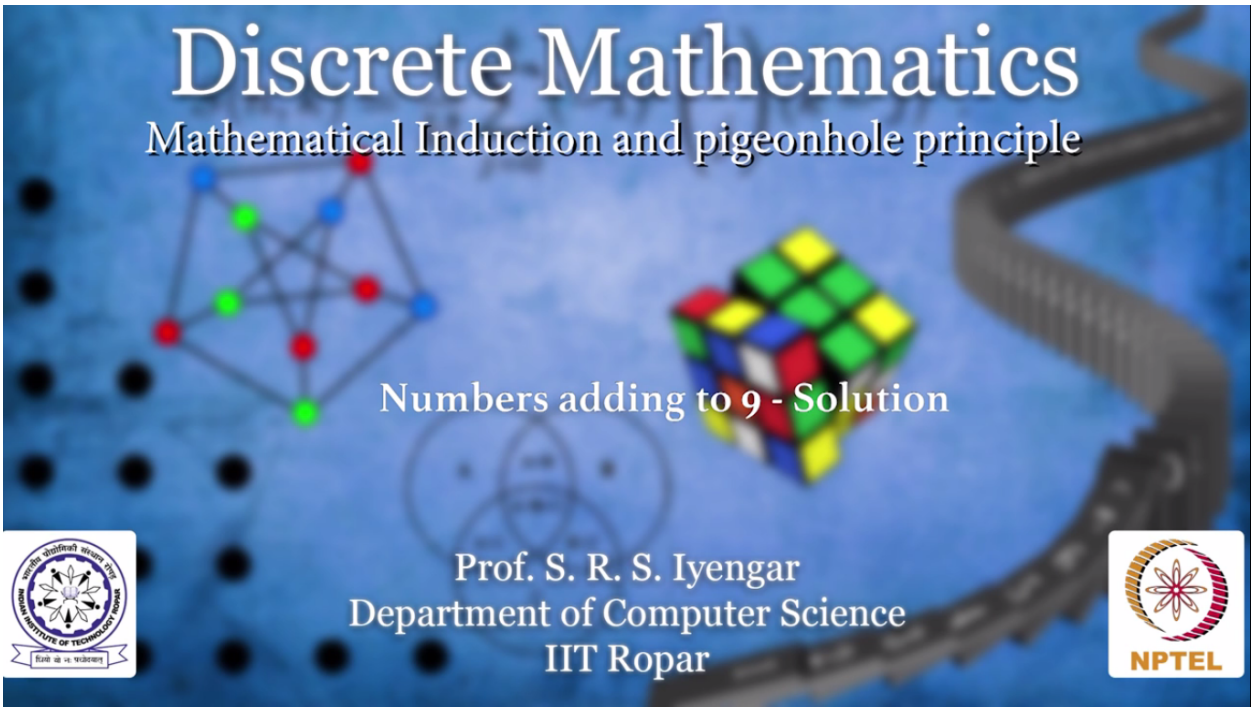
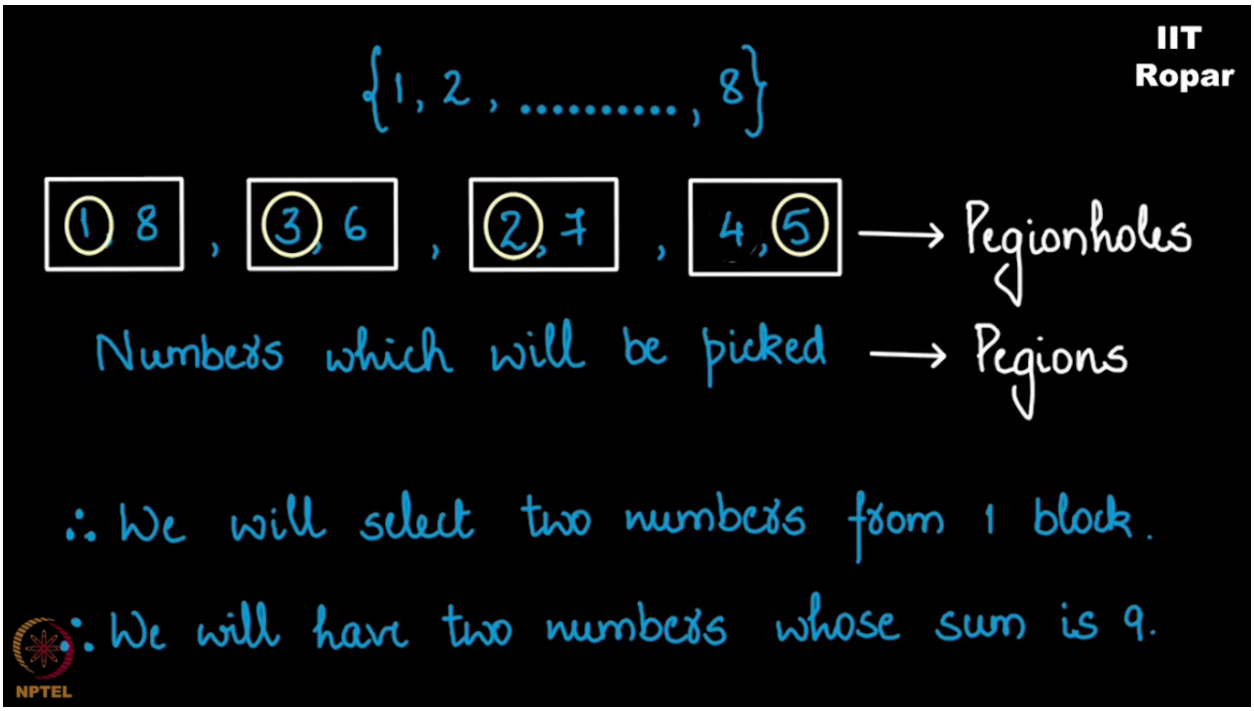


How does the proof go? It goes like this. I have these numbers 1 to 8. What I'm going to do is I'll pair up these numbers so that it's sum is 9. That is 1 and 8 I will pair up because 1 plus 8 is 9. 3 and 6. 2 and 7 and lastly 4 and 5. Each of these pairs gives me a sum of 9, correct. Identify these pairs as pigeonholes.

Now you must be quickly guessing what are the pigeons. Yes, pigeons are the integers which I'm going to pick. That is pigeons are the numbers which I am going to pick from these pigeon holes. I have to pick 5 pigeons 5 numbers where two of them will add up to 9. That was the question. So I have these four squares here comprising of these pairs of numbers. When I pick 5 numbers from these four pairs what do I end up having? It is very obvious that definitely I end up selecting two numbers from one block whichever block that is. Right. And hence I definitely end up having two numbers whose sum is 9.

Now let me give you an example if I pick 1, 2, 3, & 5 these are my numbers, four numbers I'll have to pick one more. Say if I pick 8, 1 and 8 will sum up. If I pick 7, 2 and 7 will sum up to give 9. If I pick 6 it is 3 and 6, and if I pick 4, 4 and 5 will give me the sum 9.



So did you see what happened? Picking 5 numbers from the numbers 1 to 8 will definitely give two numbers whose sum is 9 and hence the proof.