Discrete Mathematics

Functions

Number of functions

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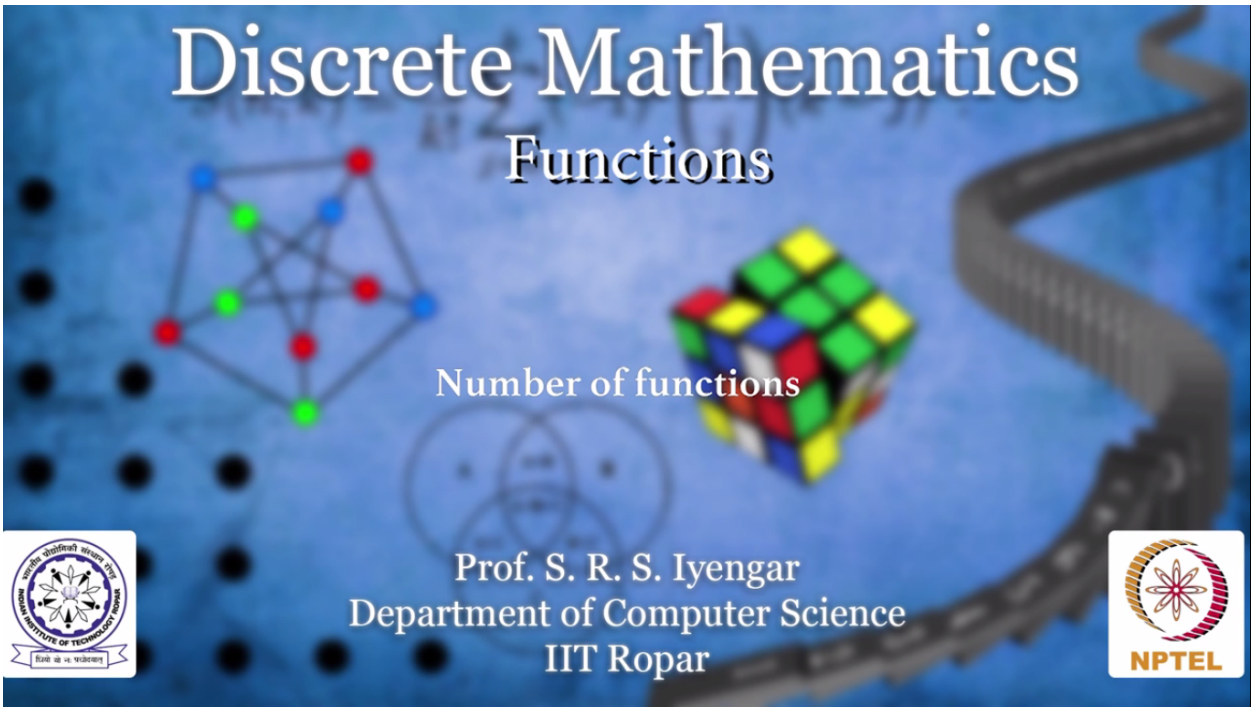
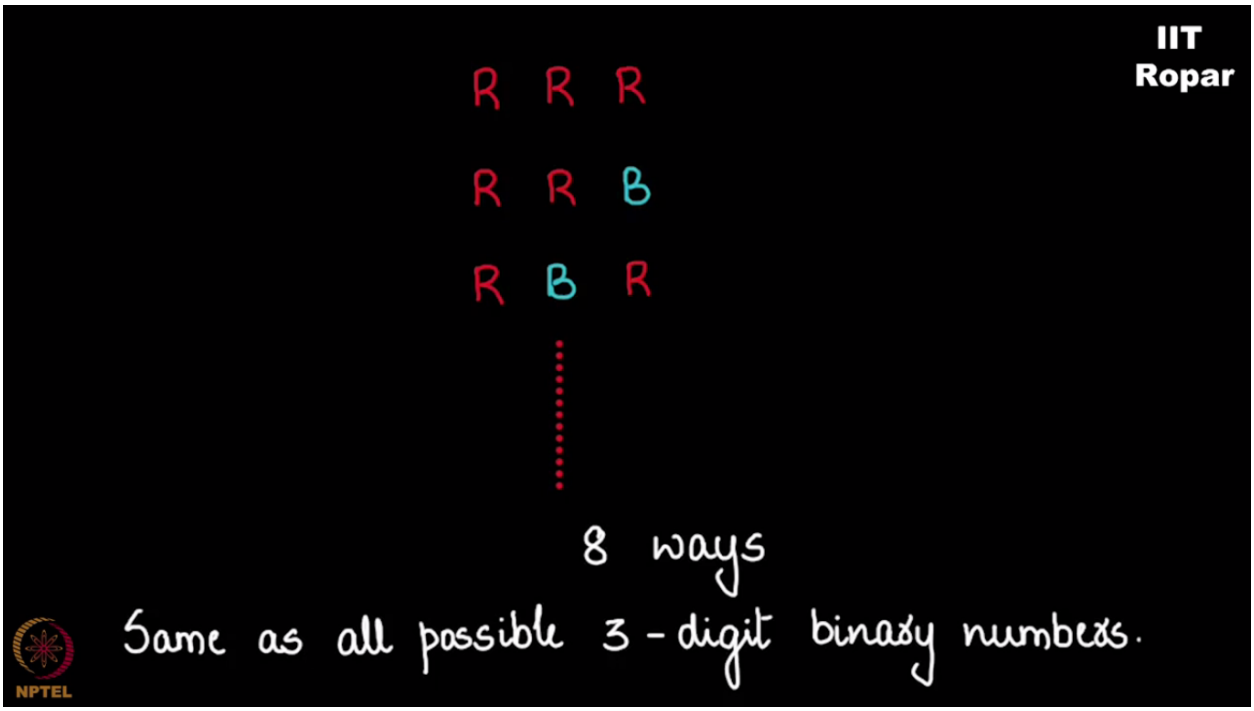


Look at these three girls Priya, Rita and Julie. They love these two colors red and blue and what they do is they always wear either a red shirt or a blue shirt or a blue shirt. They don't like any other colors assuming.

Now on any given day you can simply see what they are wearing which is Priya wears red, Rita wears blue and Julie wears Red. Now don't you think this is a function f. A function f from Priya, Rita, Julie to red and blue. It can so happen that Priya, Rita, Julie all of them are wearing red. All of them might be wearing blue. Some of them maybe wearing red. Some blue. Correct. Now this is actually a function f. Keep this aside.

Let us now ask a question in how many ways can you think of a function from A, B, C to 1, 2. How many such functions are there? You know what is a function. A function is something that takes an element from domain to a unique element - to some element in the co-domain. It doesn't so happen that the same elements goes to two different elements in the co-domain. It can only happen that two elements in the domain can go to one element that is allowed. One element cannot go to two different elements.

Now if I ask this question how many functions are there from A, B, C to 1, 2 you may want to count and then see it. When you count and see it you will realize that this question is same as Priya , Rita, Julie wearing red and blue shirts. So this question we have already observed in our attempt to count let us see how much we remember from that chapter. Priya, Rita, and Julie can wear red and blue, red and blue, red or blue.



So instead of this function I can simply write R, R, R. R,R,B. R,B,R. And so on. In how many ways can I write this? I can write this in 2x2x2 ways, 8 ways. Why? I am not going to explain it here because we have done this in detail in counting chapter. Correct. You should be able to quickly observe that this is the counting problem that we have solved already and if you are smart enough you must also observe that this is same as all possible binary three digit numbers from 0,0,0 to 1,1,1 how many are there. 8. What has that to do with this? That's your homework.