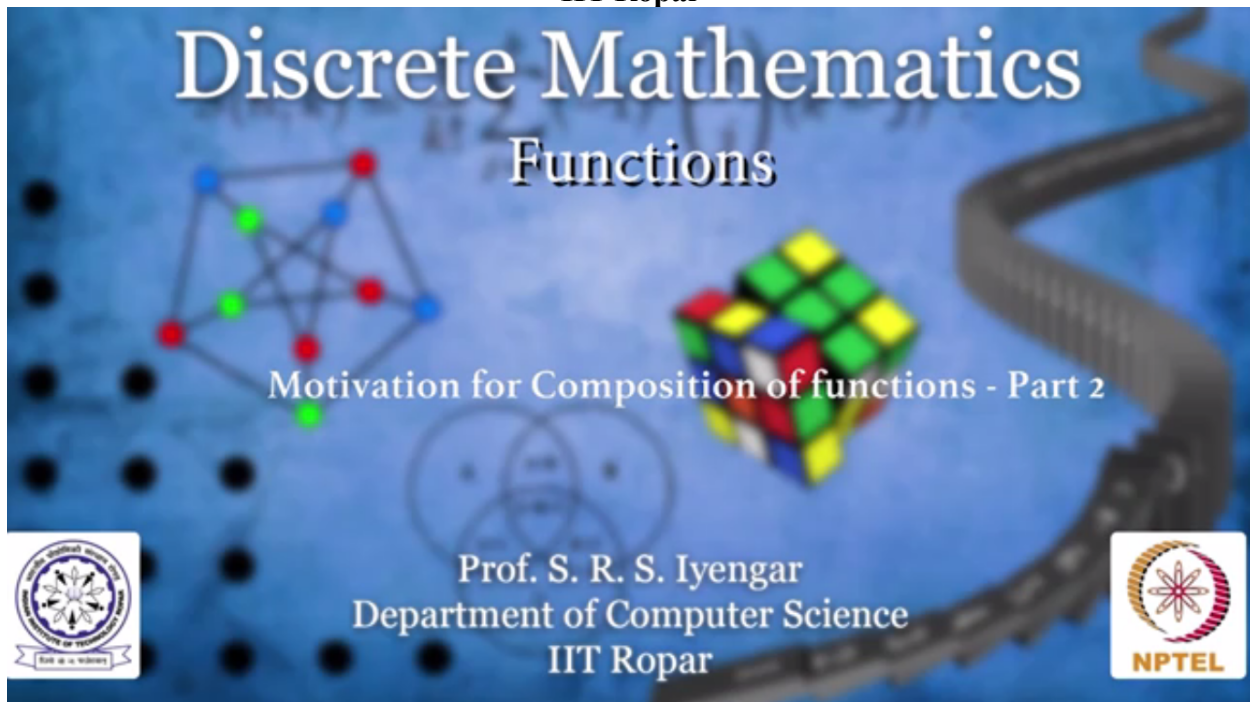


**NPTEL
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**Discrete Mathematics
Functions**

Motivation for Composition of functions - Part 2

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Taking the same example, let us consider a set of all students and a function f , which takes a student to his date of birth. Okay. Here is a set of all values from first of January to first of January of any year to any other year, you have all date of births, all possible date of births. Okay.

So given a person let's say this person Raj was born on 3rd of March 1988. Okay. And then now I see what day is this? That's another function g , which takes any given day, any given date to the corresponding day. This happens to be a Wednesday. Wednesday. Okay.

$$f: \text{Students} \longrightarrow \text{Date of birth}$$

$$\text{Raj} \longrightarrow 3^{\text{rd}} \text{ March } 1988$$

$$g: \text{Date of Birth} \longrightarrow \text{Day}$$

$$3^{\text{rd}} \text{ March} \longrightarrow \text{Wednesday}$$

$$\text{Sita} \xrightarrow{f} 4^{\text{th}} \text{ Nov } 1981 \xrightarrow{g} \text{Wednesday}$$


So now you have a function f of let's say a person Sita who was born on 4th November 1981 and if you apply g on 4th November 1981, you will get the day, which is Wednesday. Right?

So when you are given a person, any person, f of that person gives you the day of birth and g of that person gives you the exact day of the week corresponding to that date of birth. Right?

So you see there are two functions here. You can apply both the functions on the person, g and f on the person and you will get your required answer, which is the weekday of birth.

$$g \circ f: \text{People} \longrightarrow \text{Day of Birth}$$

COMPOSITION OF FUNCTIONS

$$g \circ f$$


Now you see you're taking two functions and composing to get a brand new function. You see what's happening. $g \circ f$ is a new function which takes set off all people, let's say in your classroom, to their day of birth, correct? Weekday of birth.

You are not going to do this, you are not going to consider this intermediate step here, right? Date of birth. MMDD – DDMMYY will not be considered here because this $g \circ f$ is now a new function that takes this thing to this thing. This concept is what we call the composition of two functions and we will denote it by $g \circ f$.

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Founded by
Department of Higher Education
Ministry of Human Resource Development
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