NPTEL
NPTEL ONLINE COURSE
Discrete Mathematics
Relations
Cartesian Product
With
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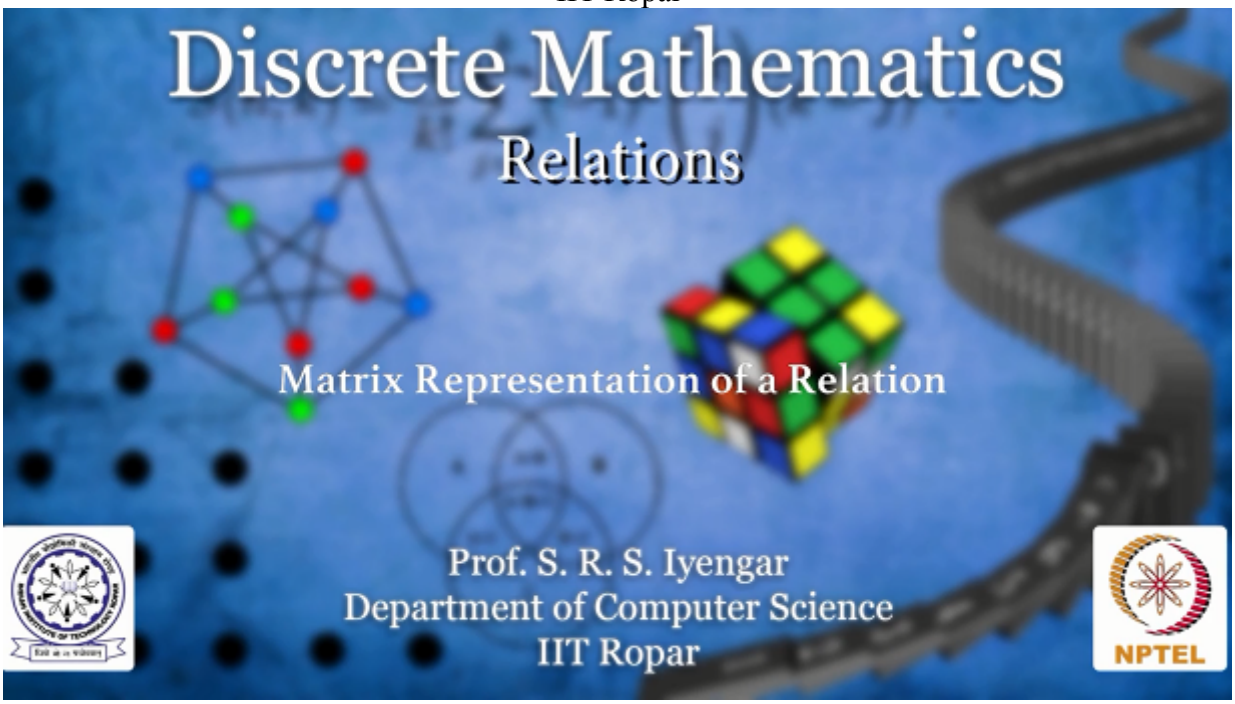
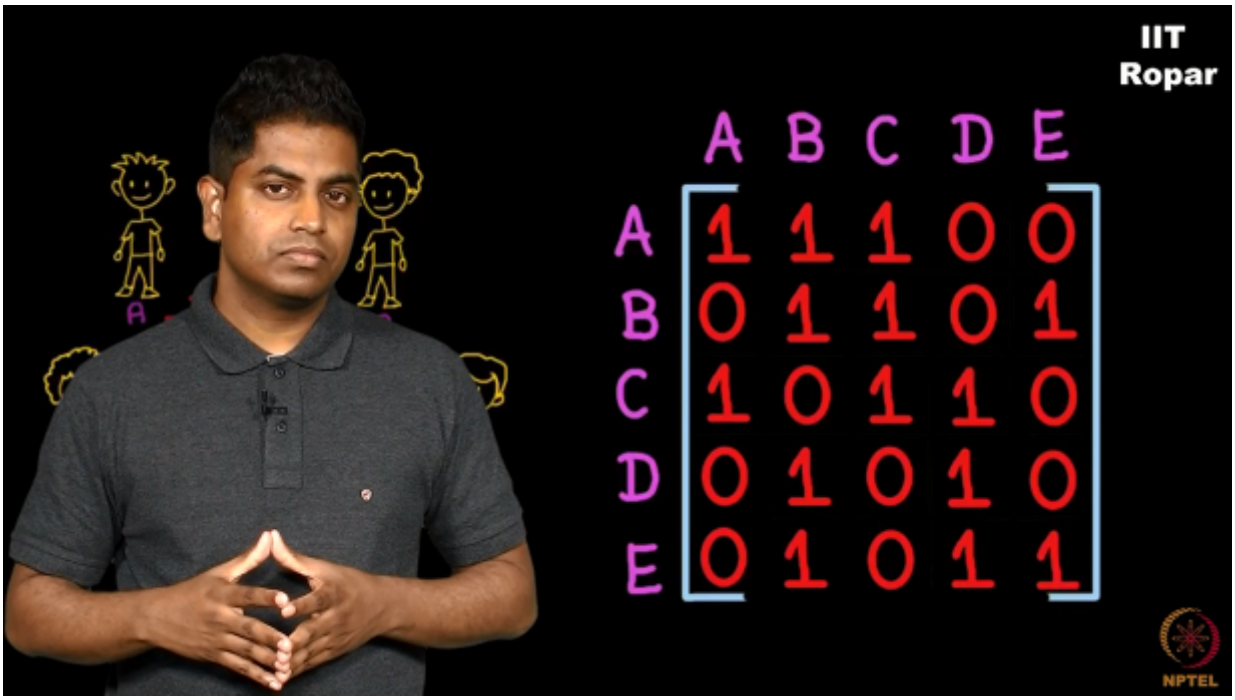
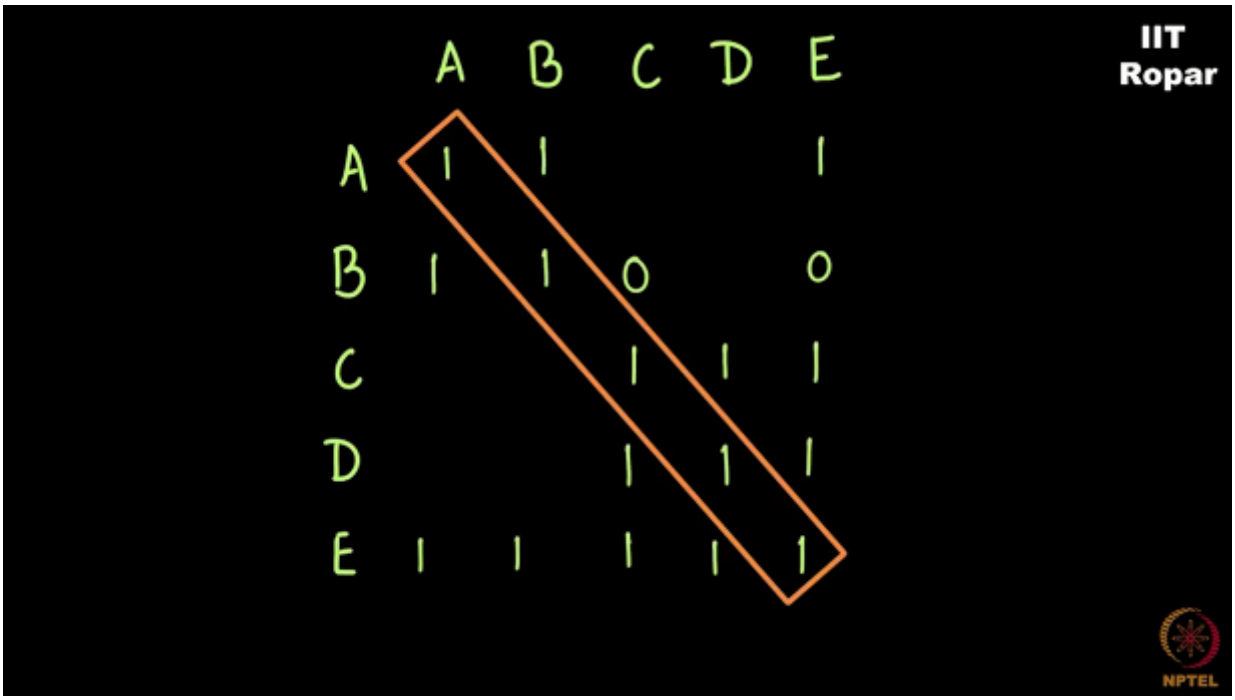


Here's a very important concept. I told you there are A, B, C, D, E, five people and some graphical representation on them, right. I drew arrow between two people, showing that A knows B and things like that. This is one way of representing a relation. There is another way which is actually a very important way to represent this relation, and that way is called the Matrix method.



What do you mean by matrix method? It is pretty straightforward. You see A, B, C, D, E, five people, some sort of relationship between them. I can represent this using ones and zeroes. How do I do that? Assume A knows B, then I'll write down A, B, C, D, E in a column like this, and A, B, C, D, E in a row like this on top of the table, this table, and then if A knows B, I look at A's row and B's column, then put a 1 there. If A doesn't know D, I'll A'th row and D'th column and put a 0 there. If, let's say, C knows D, I'll C'th row, D'th column and put a 1 there. If C doesn't know E, C'th row, E'th column, I'll put a 0, okay.

So sometimes, see A knows B, I have put a A'th row and B'th column, but B needn't know A, so B'th and A'th column will have a 0. Quite easy, but is a very important concept in the sense that we will be using it quite often throughout this chapter. So we will be giving you more example, which will make it very clear, but what you all should note is there is this important representation of a relation called a Matrix representation. Why the word Matrix? Whatever you've written here is actually a matrix. Basically, I should complete this, there'll be some more 0s and 1s coming here, depicting who knows who.



Let me illustrate this with a nice example. You see here A knows B and hence A'th row and B'th column will have a 1. B also knows A, so B'th row and A'th column will be a 1, right. A knows E, so A and E is 1;p E knows A, so E and A is 1. E knows B, but B doesn't know E, you see, so E knows B, so E'th row and B'th column is 1, but B'th row and E'th column is not 1, note that. C knows E, E knows C, so C'th row, E'th column is 1; E'th row, C column is 1. E and D know each other, so let me write that, the E and ED, C, D knows each other, so C'th row and D'th columns is 1 and D'th row and C'th column is also 1. So b'th row and C'th column is actually 0, correct. Everything else is accurate.

Now please note that in the diagonal, we've written 1s, which simply denotes that a person knows himself, right. So this is just for convenience. We can maybe write the entire diagonal element as 0s, or all as 1s. It is based no the context, right.

In this context, we are assuming that everyone knows oneself, which by the way is something that is true, so we write it as 1s.

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