NPTEL
NPTEL ONLINE COURSE
Discrete Mathematics
Logic
OR operator for 3 Variables
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Given the Boolean variables P, Q and R how does the truthtable of P or Q or R look like? How can you even construct it? You saw how to construct a truthtable for two variables. It was very easy. Take simply two variables P and Q. assign P to be 0, Q to be 0. P to be 0, Q to be 1. 1, 0, 1, 1; only four lines and you are through. You would have written all possibilities but when you have three variables you got to do a little more work. What is that? Write all possible values that P, Q, R can take. 0, 0, 0. 0, 0,1. 0, 1, 0. 0, 1, 1. 1, 0, 0. 1, 0, 1. 1, 1, 0. And 1, 1, 1.Totally you are going to get eight lines here. Why is that? If you don't know the answer for this you probably should revise back your counting chapter. Right. It's a very obvious reason here. How many possible three digit binary numbers can you think of? Eight? 2 to the 3, right. That's why you have eight entries. Okay. so how do we computer P or Q or R? The idea of OR is one of them should be true. So is one of them true here? 0,0,0. None of them are true. So this is going to be 0. Remember how the R table look like in two variables. In three variables it's going to be very similar. If you spot a 1 anywhere, you must call that as true. So I see a 1 here. This second line 0, 0, 1. So it's 1. I see a 1 here. So it's 1. Everything else has a 1 for obvious reason that you will spot 1 somewhere. So the truthtable of P or Q or R will have all 1s except for the first entry where P, Q, R are all 0s and hence the OR of P, Q and R will be 0.

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