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Discrete Mathematics
Logic
Problems
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Let us write a very simple truth table for P implies not P . how does it look like? P will be 0, 1. Not P will be 1,0 and then you will get P implies not P which means 0 implies 1 which is 1. 1 implies 0 means it is false. So it will be 0. This is how the truth table looks like. We need to now write the truth table for P XOR P OR Q . Okay. How do we go about? P will be this. Q will be this. P OR Q will be simply OR of this P column and Q column which will give you 0, 1, 1, 1. Okay. And then we have XOR in P the first column with P OR Q , the third column. So what is exclusive 1? Precisely one of them should be true and the other one should be 0. As you can see 0 XOR 0 will be 0. 0 XOR 1 will be 1. 1 XOR 1 will be 0. See how XOR, XOR. Again 1 XOR 1 will be 0. So the entries will be 0, 1, 0, 0. Let us write the truth table for this weirdly looking, weird looking expression. Q and P implies an implied by Q . what do you mean by implies and implied by Q ? I'll explain. So P entries Q entries in the table, first 2 columns and then P implies and implied by Q means when P is 0, Q should be 0 and vice versa. Both of them should be of the same value, same parity to be precise. Right. Okay. So this will be 0 implies 0 means it should be 1. 0 implies 1 means as I told you they are of different parity so this will be 0. 1 implies 0 will be 0. 1 and 1 will yield 1. Now what should we find Q AND P is implied and implies Q . 0, 0 so which is basically what we should do is 2nd column and the 3rd column we should take and write. 0 and 1 is 0. 1 and 0 is 0. 0 and 0 is 0. 1 and 1 is 1. I'm sure you all are as fast as me. There's nothing much here. So why are we doing all these things? It sounds like waste of time. No you should get used to how to write truth tables. I mean that's a very important skill not something that will make you become a champion in computer science or math. It is just that someone who claims he knows everything about these operators should know how one writes truth tables. That's it.

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