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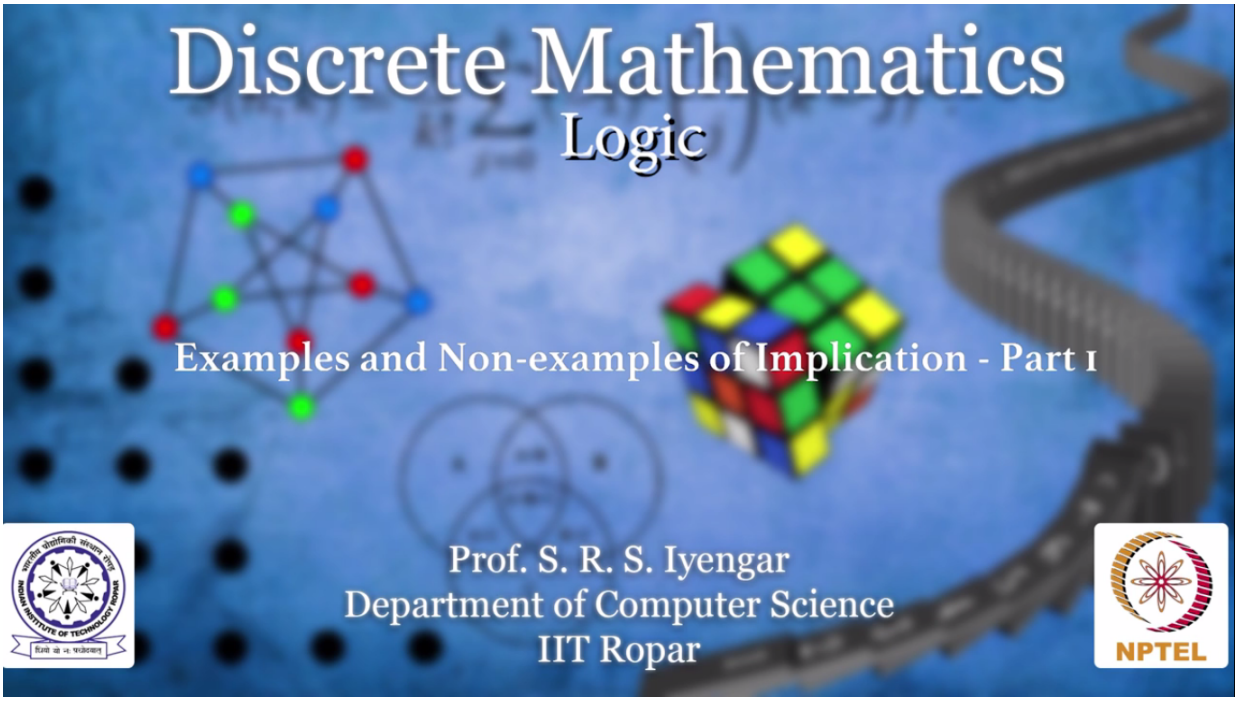

Discrete Mathematics
Logic
Examples and Non-examples of Implication - Part 1
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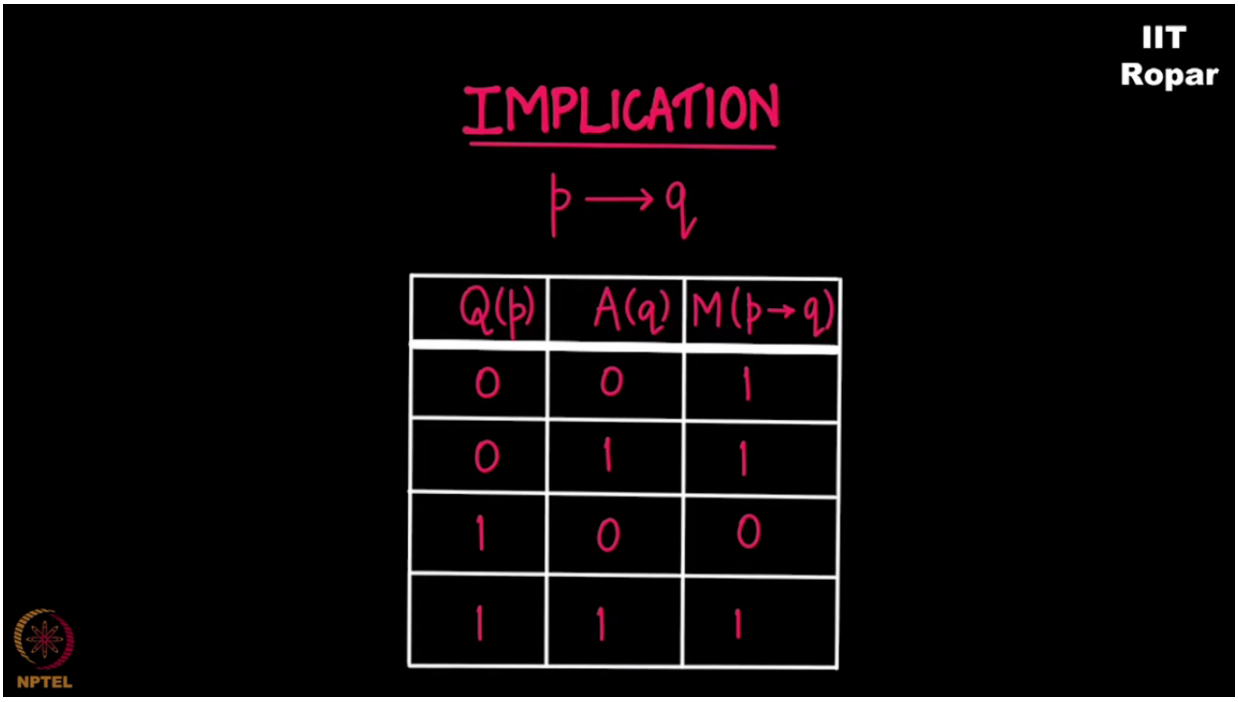
One of the most important topics in this chapter is the implication. P implies Q. So let's understand this in detail. Okay. So please note that this is the most confused part of this chapter. So we are going to go slowly and we are going to give you many examples so that things are very clear to you. Okay.

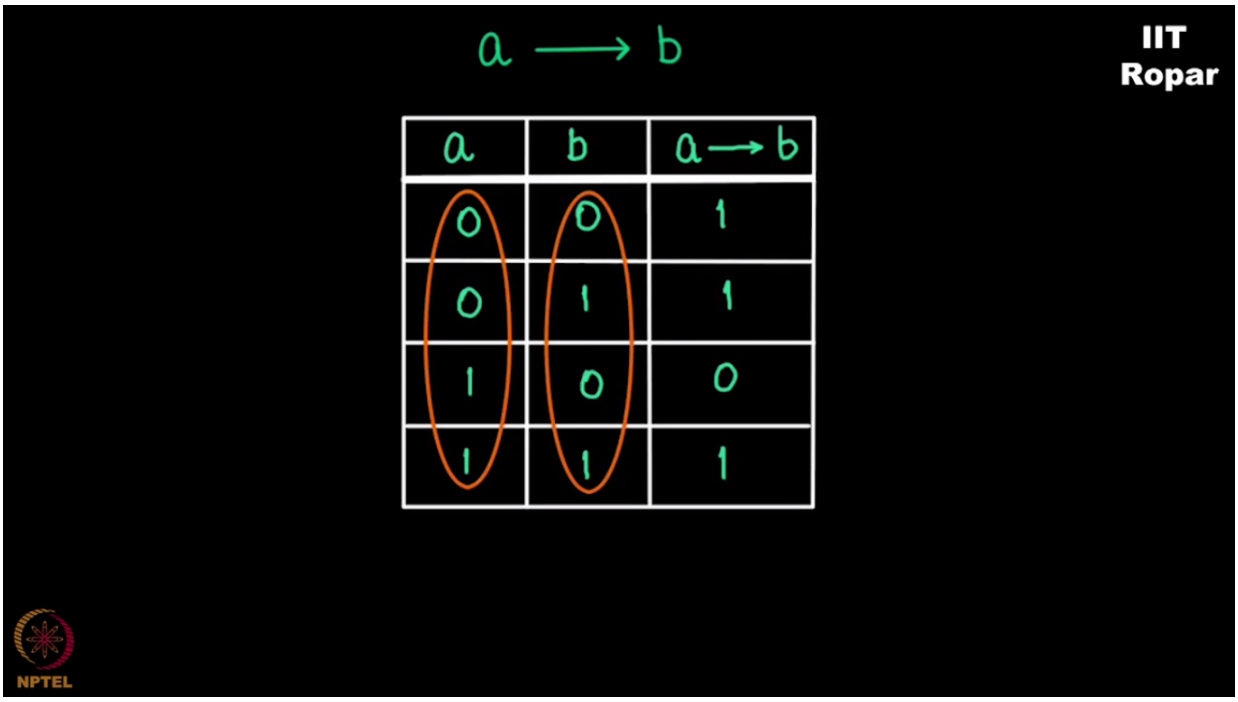
The confusing part here is there are some situations in real life that appears like P implies Q but it is not. We will explain what we are trying to say. Firstly let's look at the familiar example of you know when I was a school student when I was in my high school, I used to [Indiscernible] [0:00:54] in these examinations and sometimes the questions that they would ask would be erroneous. There will be a mistake in the question. And the verdict, the idea would be if you attempted you will get marks. Let us understand this carefully.

So on this side let me write down all the possibilities of the question being right or wrong and on this side I will write down my attempt. Here is the question. Here is the answer. Now the question is wrong and my answer is wrong. I will get marks. So I will put 1 here. So the column Q is the question type. 0 represents a wrong question. 1 represents the right question. And A column is about my answer to the question. 0 represents wrong answer. 1 represents right answer. So please note there can be a case when the question is incorrect. But I will assume what the question is and my answer will be right. Perfectly right, that's also possible. So let's start.

Question is wrong, answer is wrong. I will get marks because you see it's the mistake of the question paper setter that he gave a wrong question. I am not responsible for my wrong answer. If the question was right I probably would have written the right answer. So the benefit of doubt is always to the students as you all know. So I will get my marks.
Question is wrong my answer is right. Obviously the only genius students do this despite the question being wrong they might imagine what should be the right version of the question and then they will write the answer. No doubt this is right. Marks is 1.
The question is right, and your answer is wrong. This would be no marks. We all go and argue to the teacher that my answer is right. Teacher will say no. The question is right. Your answer is wrong. You don't get any marks. Question is right. Answer is right. Very unlikely right we will writ the right answers to the right question. So technically speaking this is – this should fetch me marks.



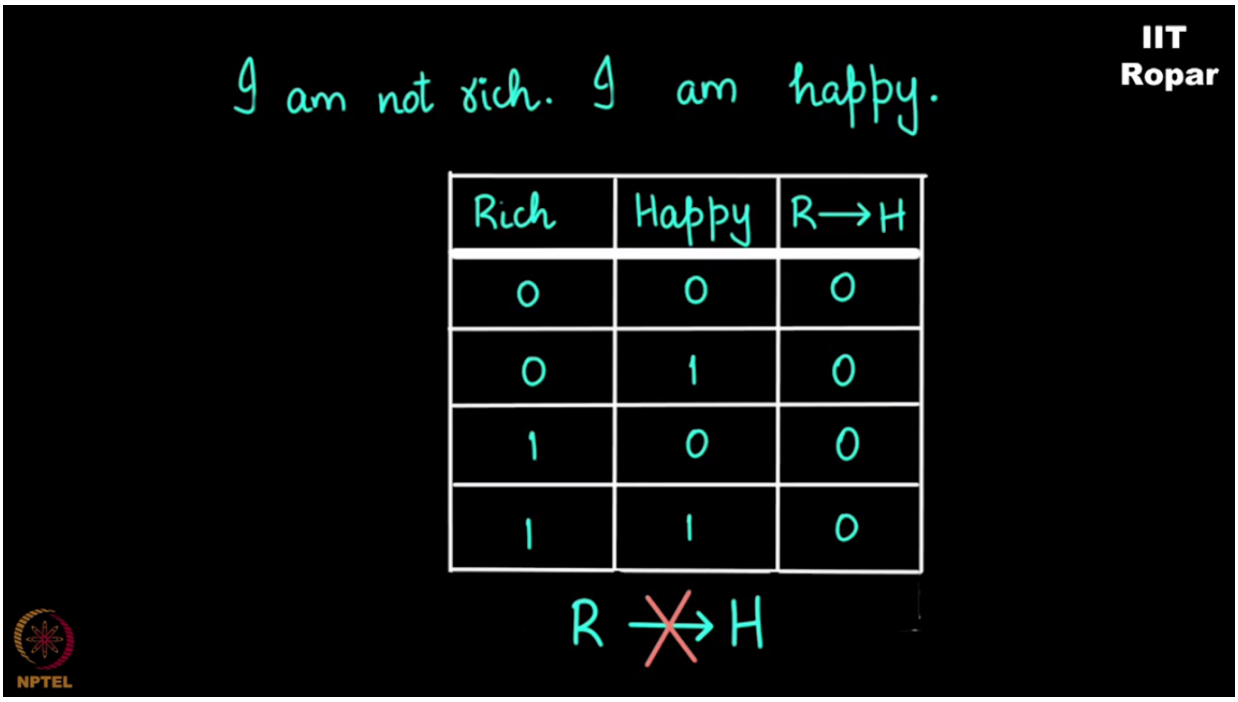
Now this is called your P implies Q truthtable. When the question is right it implies that you will get your marks M. Q implies M. the question is right and your answer is right you get marks. This is the typical P implies Q or A implies B concept. We will see more examples.



Point to note. Whenever you say A implies B then your table should look like this 0, 0 is 1. 0, 1 is 1. 1, 0 is 0. 1, 1 is 1. Only then can you say A implies B. Ath column will be 0, 0, 1, 1. Bth column will be 0, 1, 0, 1. And the last column will be 1, 1, 0, 1 if that be the case then you say A implies B.

Now is this I will give you an example, illustration of when this is not true. That will make things clear. Okay.

I am rich. I maybe rich. I may not be rich. I am happy. I maybe happy. I may not be happy. Let me consider all possibilities. I am rich. I am happy. I am not rich. I am not happy. I am rich, but not happy. I am not rich but I am happy. Now let us look at what happens in this truthtable. Is it true that a person who is not rich is not happy? What do you have to say? Can it so happen that a poor person not rich means what he is poor. And he is not happy. This is not always true. You know poor people who can be happy. So I will say 0 in the last column. If you are not rich, you are not happy is a wrong inference. Correct?



Next. You are not rich but you are happy. This again is not true. We know people who are not rich but are unhappy. There are exceptions. You cannot always say that not rich means happy. This is not true. 0. You are rich and you are unhappy. I am sure this is mostly true but then there are people who are rich and also happy. Even this is not true. You are rich and you are happy. 1 and 1. Even this is not true. Okay. We cannot say anything about a person being happy when he is rich. So rich implies happiness is not true. Correct? When will it be true? An implication will be true if the last column turns out to be 1, 1, 0, 1 only if it not that then the implication is not true. As and always let's see more examples to make it clear to you.