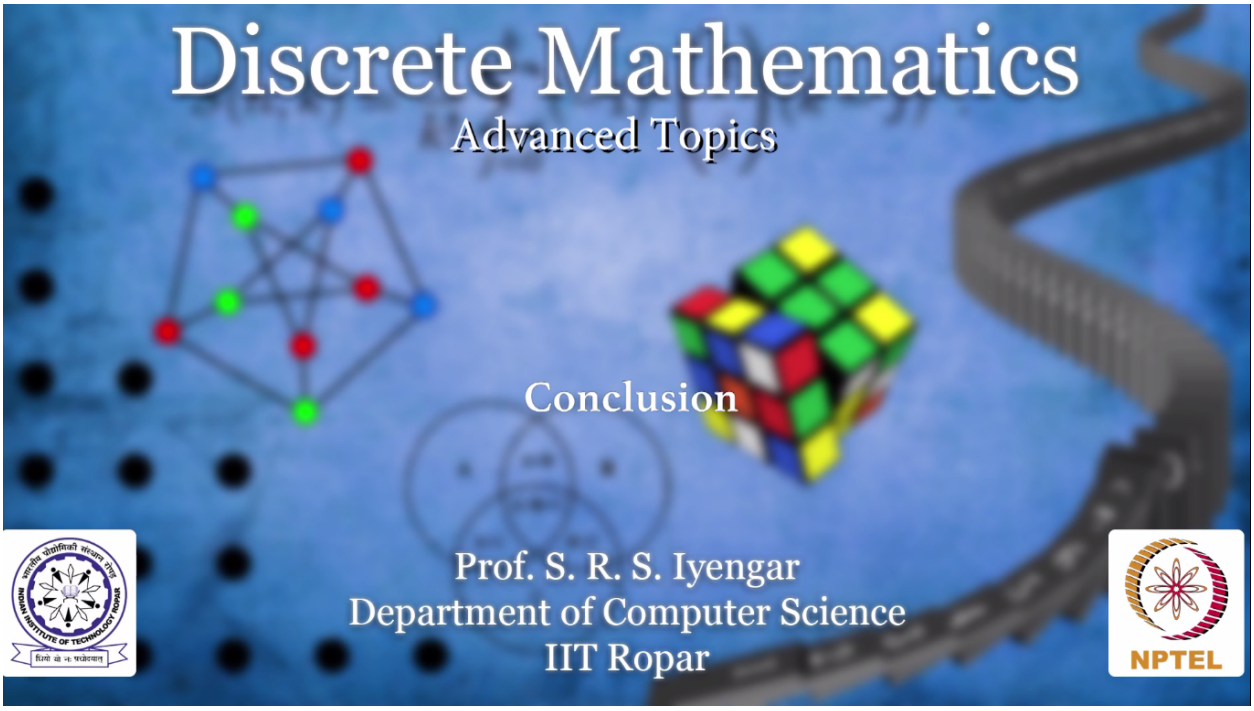
Discrete Mathematics

Functions

Advanced Topics



Conclusion

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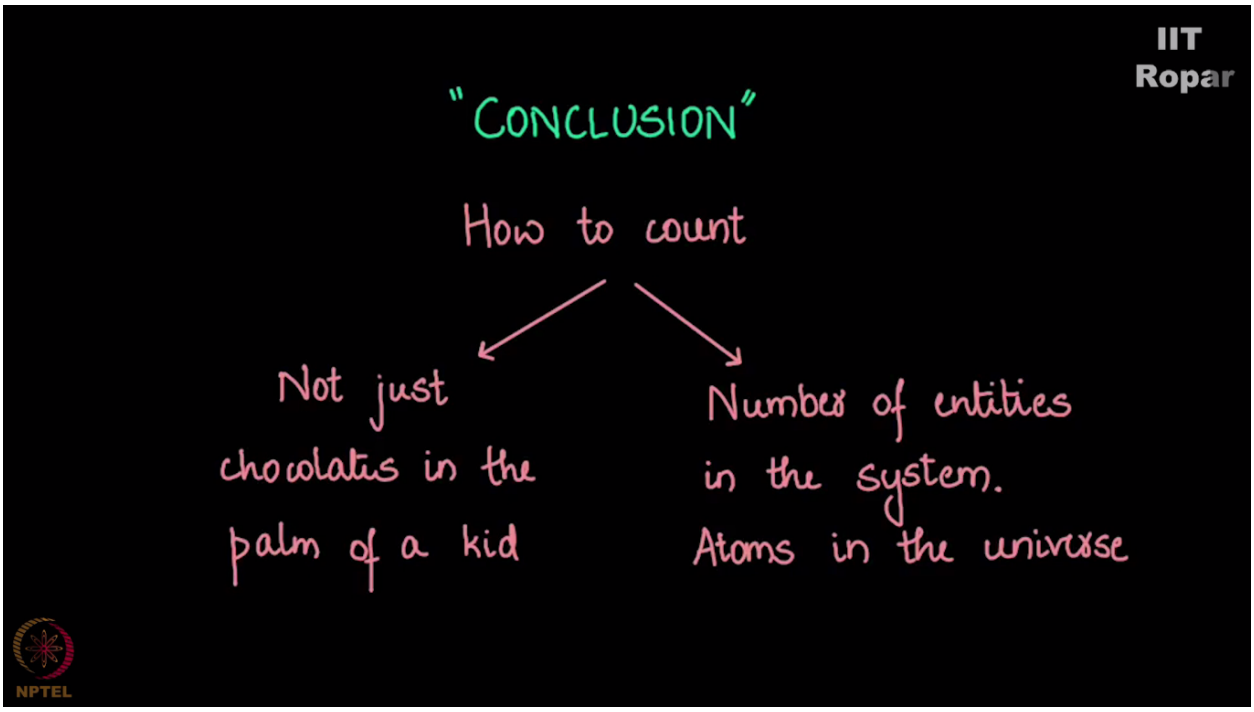
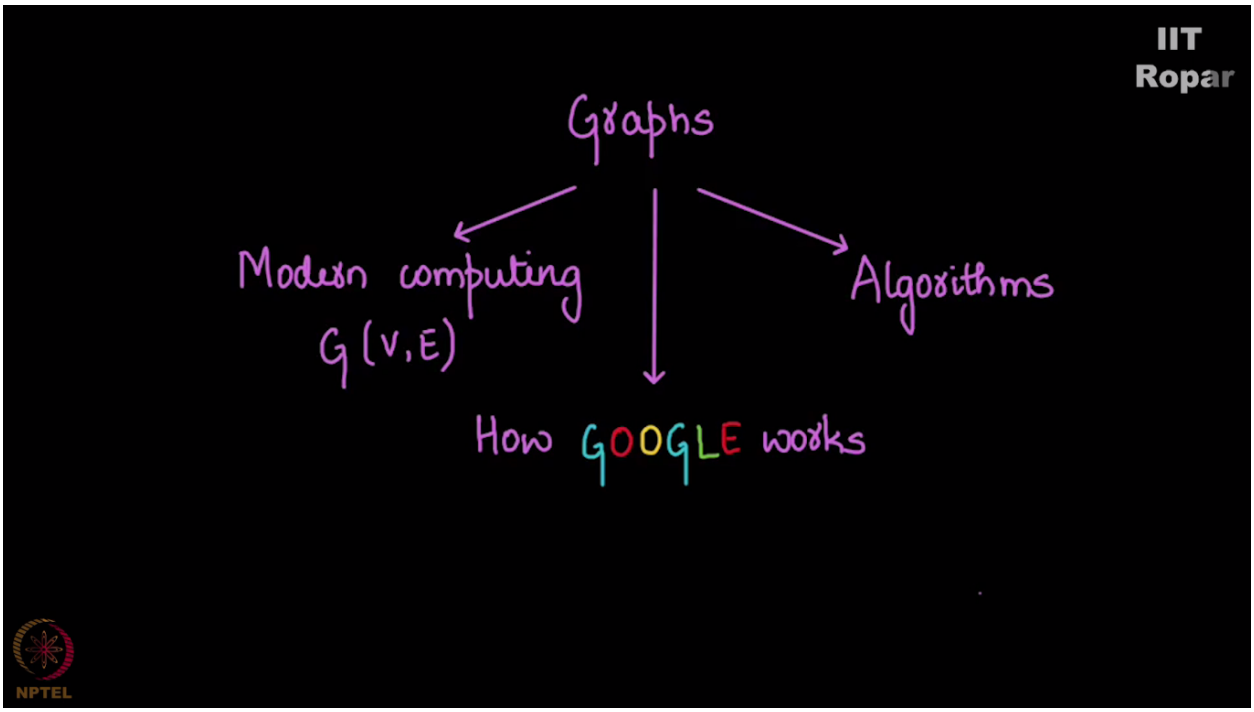
We have now come to the conclusion part of the course as you would have realized. You now have the wisdom of how to count. We have been telling you that's one of the most important toolkits for a computer scientist. You should know how to count. If you remember the first few minutes of our lecture the way we started off with this course was like counting is not about counting the number of choloates in the palm of one's hand. Counting can mean counting how complex an entity is. We also tried counting the atoms in the universe and said there could be some computational problems which can go beyond this number. We said time of the universe is 2 to the 60 seconds and there could be problems in computer science which may take more than this time to compute. So to get that wisdom you need to understand counting properly.

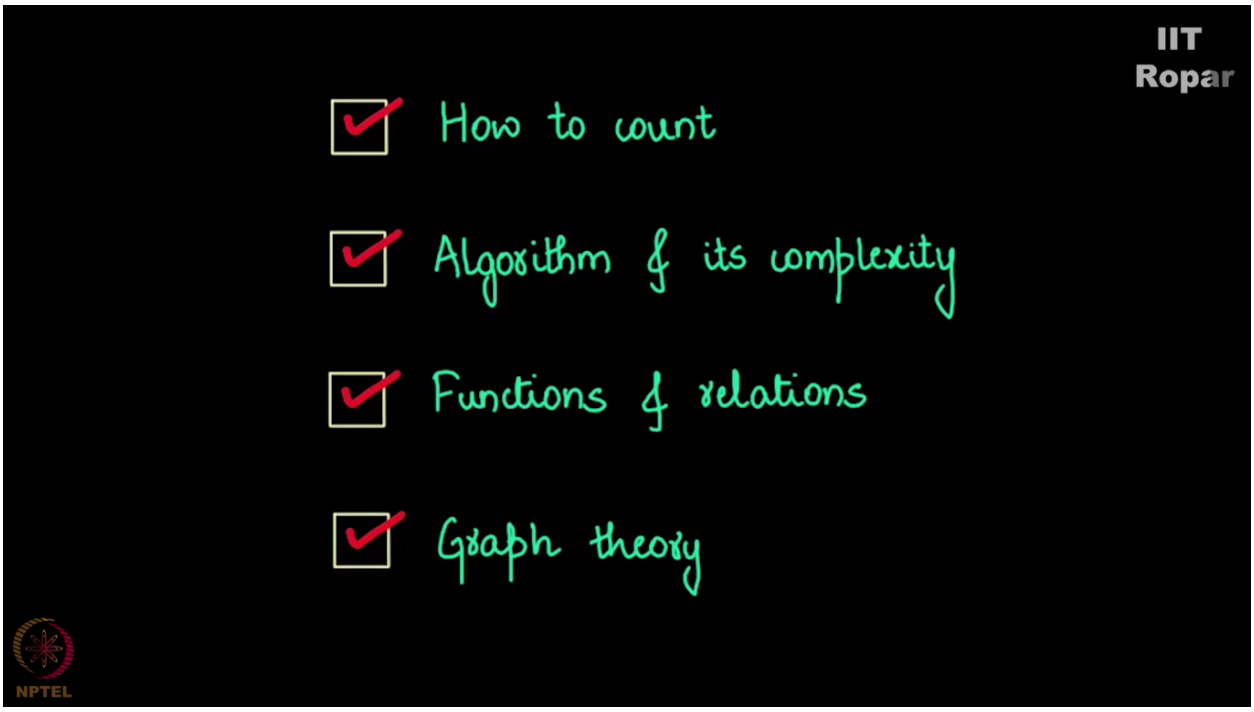


So counting made a very important part of our course. Second most important thing that we saw was functions and relations. A computer you see is actually a function. It takes an input and gives an output so it is important for us to understand functions in its own right. In several places we don't really talk about the importance of studying a concept of computer science. I feel it is important for you all to not overdo the applications. Not overdo this question of where is this

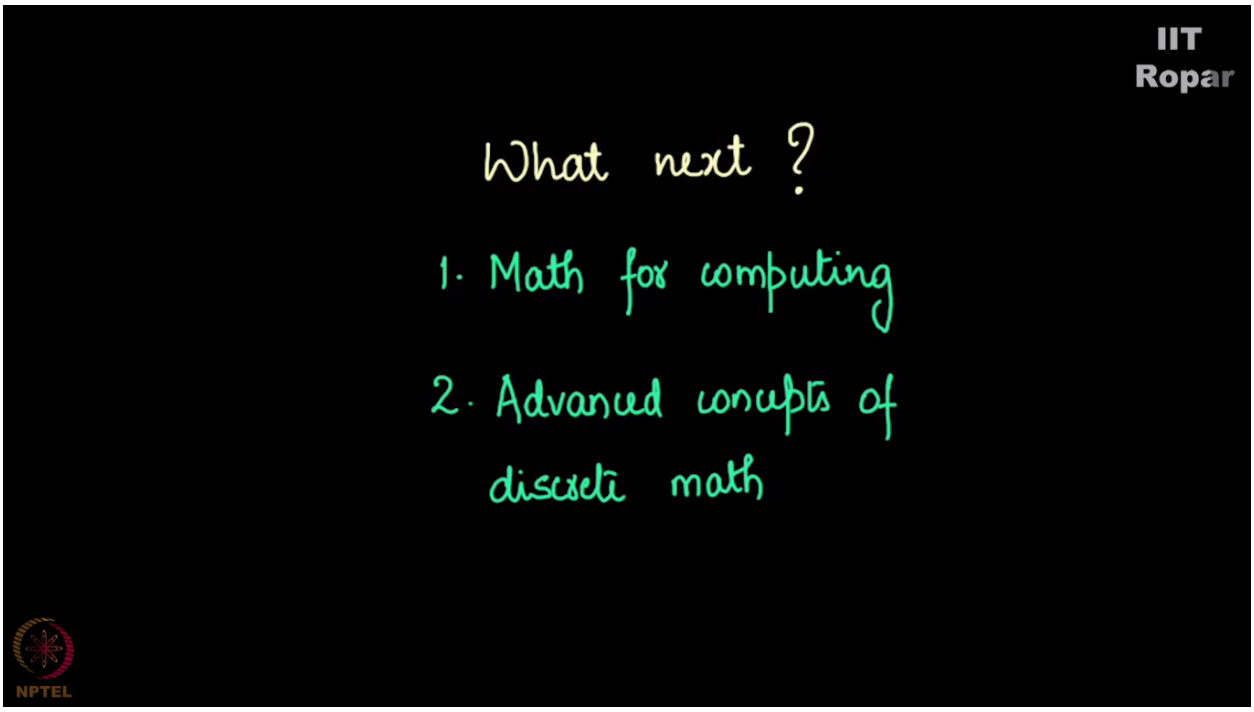
concept used in computer science. Sometimes when we realize that one needs to know something about functions and relations we say everything that is introductory about these topics. So you studied some good amount of functions and relations. We also saw a very long chapter called graphs. Most of modern computing involves structures that come very close to what a graph is G of V, E. If you are interested you can take a look at how Google works based on a very applied graph theoretic concept. In fact we taught you network X which can actually be used to understand how certain modern computer algorithms work which involves graph theoretic analysis. So graphs make a very important part of computing and we have given a good primer in graph theory.



If you remember we started off with logic in the first few chapters in our course. It is important for you to know how a proof goes, what exactly is logical inference. We also taught you different proof techniques one of the most important ones being proof by induction. Overall you can claim yourself to be well versed with discrete mathematics if you know how to count, how to see an algorithm and decide what is it's complexity, understand what is the function and relation, know some basics of graph theory. And you are good to go.



Now very important final question to address. When I say good to go you probably are wondering where to go. There are two paths that one can take from this point. One path is now that you know the basics of mathematics for computing you can feel confident when you encounter math anywhere during your tour in computer science. You will not feel let down. You will face it with enormous confidence. That's the first path. The second path is discrete math doesn't end here. In fact if anything it begins from this point onwards. Some of the advanced concepts in discrete math uses whatever we taught in the course as a prerequisite. Optionally one can take a look at advanced graph theory and advanced counting techniques and every single topic that we have discussed has an advanced prefix which one can look at. I am sure you people enjoyed the course. I clearly note that discrete math is such a beautiful subject that either one enjoys discrete mathematics or one has not understood discrete mathematics. It cannot so happen that you understand and you don't enjoy.



I am reminded of this very famous quote in math which goes like this, “God created natural numbers and left the rest to man to meddle with.” which means the basic atomic parts of a discussion has been numbers only. And how to use these ideas in computing is what will be the bridging gap between this course and some advanced computing course. I will you all a good luck in your journey into computer science.