



# Raising a Mathematician Foundation

Regn. No. E/8816 Thane Region  
Registered under Bombay Trust Act, 1950

## Introduction to Discrete Mathematics

### Objective |

- Expose the deeper concepts of Combinatorics, Algorithms, Proofs, Probability and Graph Theory to talented students who are keen on pursuing a career in Mathematics, Computer Science or allied areas.
- Explore the link between Mathematics and Computer Science.
- Provide them a platform to discover their potential and push their boundaries of thinking.

### Outline |

- **If a person cycles through on a hexagonal path filled with diagonals connecting all the vertices to each other, can he travel in such a way that he can pass through all the lines without retracing his steps, without going through the same path twice and return to the starting point?**
- **What is the probability that two friends get the neighbouring seats in an airplane with X rows and Y columns, if there is a randomised allocation of seats?**
- **What is the minimum number of colours required to colour the different states in the map of India such that no two neighbouring states share the same colour?**

If these are questions that interest you, then this course is meant for you!

Discrete Mathematics lays the foundations of Computer Science. The subject comprises of topics like Combinatorics, Probability, Graph Theory and Algorithms. Most of these topics are all around us staring at us all the while. Right from the cooking range in the kitchen to the software used at the workplace, from analyzing the answers in an online examination to analyzing different aspects in sports, from taking safety measures in road, rail and air transport to safety measures in pharmaceutical companies, we can see the play of algorithms everywhere. What most people fail to see is the use of Mathematical Thinking in developing powerful Algorithms. Most students of Computer Science can write programs to get a desired result. But how do we choose the most efficient program among them? How do we prove that a given algorithm is the most efficient one? To do this, one needs to be equipped with tools of Mathematics. In this course, the focus will be to create a solid foundation that will enable a student of Mathematics and Computer Science to raise their levels of knowledge and understanding so that they can benefit from courses offered by Universities like MIT, Stanford, Princeton, University of Pennsylvania, and others.



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## Course Highlights |

- Hands on experience in problem-solving skills.
- Deeper understanding of topics from Discrete Mathematics.
- Group discussions and presentations.
- Getting a grip on subtler aspects of Logic.

## Key Topics |

### Concepts:

- Permutations, Combinations, Probability, Graph Theory, Proofs, Boolean Algebra.

### Skills Development:

- Learning to question
- Critical Thinking and Reasoning
- Group discussion and peer-group learning
- Rigour in writing proofs

## Target audience |

This course is meant for those who are passionate about Mathematics and wish to pursue a career in Pure or Applied Sciences, Computer Science, Mathematics, Economics. Students of 11th & 12th grade and college students would benefit from the course. Bright students of 10th grade can also apply.

## About Raising a Mathematician Foundation |

Raising a Mathematician Foundation (RAM Foundation) is a Charitable Trust registered under the Bombay Trust Act. The objective of the Trust is to spread the beauty, knowledge and application of Mathematics to people of all ages. The primary focus is on school students, teachers and parents because these three are the pillars of a good educational system. Empowering the teachers and parents with better pedagogical tools, along with educating the students with more knowledge in Mathematics through inter-disciplinary learning, are our main objectives. The programs are conducted in the form of workshops, camps, seminars and webinars.

More details available on [www.raisingamathematician.com](http://www.raisingamathematician.com)



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## About the faculty |

Vinay Nair is the co-founder of *Raising a Mathematician Foundation* and founder of *School of Vedic Maths*. He conducts workshops and courses on ancient Indian Mathematics, Mathematical aspects of Computer Science, Mathematical Thinking, Problem-Solving skills, Quantitative Aptitude and Vedic Mathematics through the country and abroad. Recently he was invited for a 5-week summer course on *Combinatorial and Algorithmic Thinking* at Princeton University, along with three students of *Raising a Mathematician Training Program* who were among selected eighteen international students.

He has authored two books and a Postal/Online course on Vedic Mathematics for Chinmaya International Foundation. His articles have featured in Newspapers, National, International and e-magazines. He has presented research papers in three national and five international conferences.

He aims to mentor students who are passionate about Mathematics and groom them by providing courses offered at better opportunities for learning in India and abroad.

