



Informatics Olympiad Program Level 2

Cheenta Academy for Olympiad & Research

cheenta.com

Since 2010

Passion for Mathematical Science & Research

This program is useful for Informatics and AI Olympiads (ZIO, ZCO, USACO)

Success Stories Since 2010



Aryan Kalia

Top 1% globally in American Math Competition,

Attended Math Olympiad Program and School Research Program at cheenta

Attended Student internship program at cheenta

Harvard University in 2022



Sambuddha Majumdar

Scotland Math Olympiad Awardee

Attended Math Olympiad Program at cheenta

Attended Student internship program at cheenta

University of Edinburgh



Anushka Aggarwal

Youngest Indian National Math Olympiad awardee, European Girls Math Olympiad awardee

Attended Math Olympiad Program at cheenta

Attended Student internship program at cheenta

MIT (Massachusetts Institute of Technology) in 2022



Akshaj Kadaveru

American Math Competition, AIME and USAJMO awardee

Attended Math Olympiad Program at cheenta

MIT (Massachusetts Institute of Technology)

Curriculum

61 lessons, 9 modules

Module 1



Basics of Programming

6 Lessons



Variables, Constants, Syntax



If - then - else



Strings



Loops



Pseudo-code



Advanced Problems

Module 2



Data Structure

6 Lessons



Arrays



Matrices



Linked List



Stack



Queue



Problems on Data Structure

Module 3



Basics of Algorithms and Complexity

6 Lessons



Time Complexity



Space Complexity



Big-O, Omega Notation



Asymptotic Analysis



Comparison of Algorithms - Week 1



Comparison of Algorithms - Week 2

Module 4



Searching Algorithms

6 Lessons



Linear Search



Binary Search



Time Complexity of Search Algorithms



Magic Index Problems



Interpolation Search



XOR and Problems

Module 5



Sorting Algorithms

6 Lessons



Insertion Sort



Bubble Sort



Merge Sort



Recursion



Divide and Conquer Algorithms



Complexity Analysis

Module 6



Greedy Algorithms and Boolean Algebra

6 Lessons



Strategy of Greedy Algorithms



Use Cases of Greedy Algorithm



Optimization



Boolean Algebra and Digital Logic Week 1



Boolean Algebra and Digital Logic Week 2



Boolean Algebra and Digital Logic Week 3

Module 7



Dynamic Programming

9 Lessons



Recursion



Memoization



Fibonacci Numbers



Matrix multiplication problems



Catalan Numbers



KnapSack Problem



Paranthisation problem



Rod cutting problem



Longest Common Subsequence, Edit Distance, Palindromic Subsequences and more

Module 8



Graph Algorithms

10 Lessons



BFS, DFS



Minimum Spanning Tree



Dijkstra Algorithm



Bellman Ford and Floyd Warshal Algorithm



Catalan Numbers



KnapSack Problem



Paranthisation problem



Rod cutting problem



Bipartite Graphs



Trees and Tournaments

Module 9



AI Topics

6 Lessons



Supervised Learning (e.g., Linear Regression, Logistic Regression, Support Vector Machines)



Unsupervised Learning (K-Means Clustering, Hierarchical Clustering, PCA)



Random Forests (ensemble of decision trees; used for classification and regression)



Neural Networks (Feedforward ANN)



Convolutional Neural Networks (CNNs)



Recurrent Neural Networks (RNNs) and LSTM-s

Taught by Olympians and Researchers from leading universities

Since 2010 Cheenta has evolved into a Gurukul. Our students are in leading universities in India such as Indian Statistical Institute, Chennai Mathematical Institute, TIFR, IITs and universities abroad such as Harvard, MIT, Oxford, Edinburgh to name a few. Some of them returned as teachers for the next generation of learners. And the pursuit of excellence continues.



Cheenta Team has 40+ members. Here are some of the leaders.

**Srijit Mukherjee**

Doctoral Scholar at Pennsylvania State University, BStat and MStat from Indian Statistical Institute (India)
Director at Cheenta

**Dr. Ashani Dasgupta**

PhD from University of Wisconsin-Milwaukee (USA)
Founder - Director at Cheenta

**Dr. Anirban Majumdar**

PhD from ENS Paris-Saclay, France on Theoretical Computer Science, B.Sc.-M.Sc. from Chennai Mathematical Institute

**Swarnabja Bhowmick**

B.Tech in Computer Science from the University of Calcutta. IEEE Publications.
Faculty of Mathematics and Computer Science at Cheenta.

Cheenta Academy for Olympiad & Research

Outstanding Mathematical Science Programs. Since 2010.

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