Raising A Mathematician Foundation®

EPSILON INDIA
Bright and Early



EPSILON INDIA REPORT 2024

April 27 to May 10, 2024

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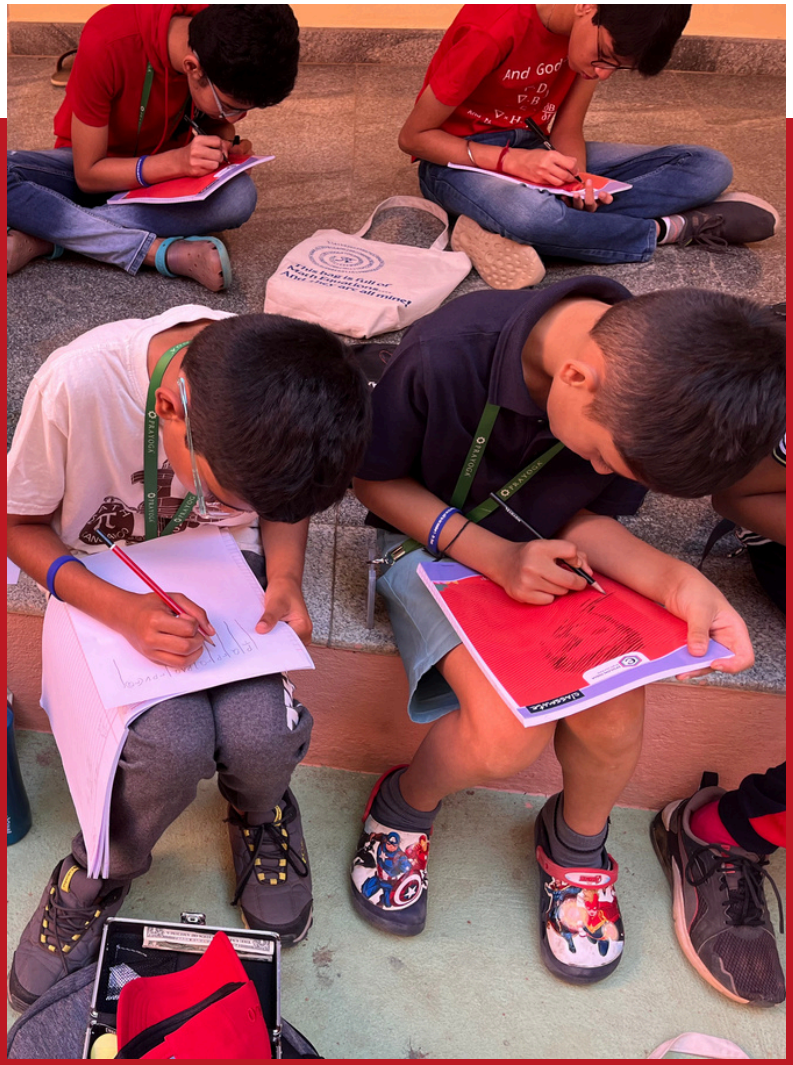
INTRODUCTION

Raising A Mathematician (RAM) Foundation was enthusiastic about organizing Epsilon India in May 2024, following its success since 2021. Epsilon India stands as the sole summer camp in the country catering to exceptionally talented Math students aged 9 to 13. The camp was hosted by Prayoga Institute of Education Research in Bangalore. Students were selected through a demanding evaluation procedure, which included an Exploratory test and an Algebra test.

Objective

The camp's objective is to offer an early introduction and advanced experience in Mathematics for students who excel and aren't sufficiently challenged in their regular school settings. The curriculum and teaching methods are tailored for these exceptional individuals. Additionally, the camp facilitates interaction among participants, creating an environment that fosters not just academic development but also social and emotional growth for these exceptional young minds.



DAILY SCHEDULE OF THE CAMP

The sessions started post breakfast at 8:30 am with three sessions of 90 minutes each and required breaks for assignments. There were sufficient breaks during the day which included outdoor game time when students played various outdoor sports like football, basketball and volleyball. The day went until 7:45 pm when the participants would retire for dinner and engage in post dinner informal discussions for more than an hour. It was lights off at 10 pm and most students would voluntarily make up as early as 4 am to work on some math problems that intrigued them.

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KEY HIGHLIGHTS

The Epsilon India Camp 2024 proved to be an appropriate environment for participants to hone their mathematical skills, develop critical thinking, and forge meaningful connections with peers and mentors. By offering a holistic approach to education that encompasses academic, social, and emotional growth., the camp has left a lasting positive impact on the young mathematical minds it nurtured.

Participation



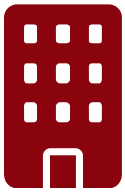
32

Male



5

Female



34

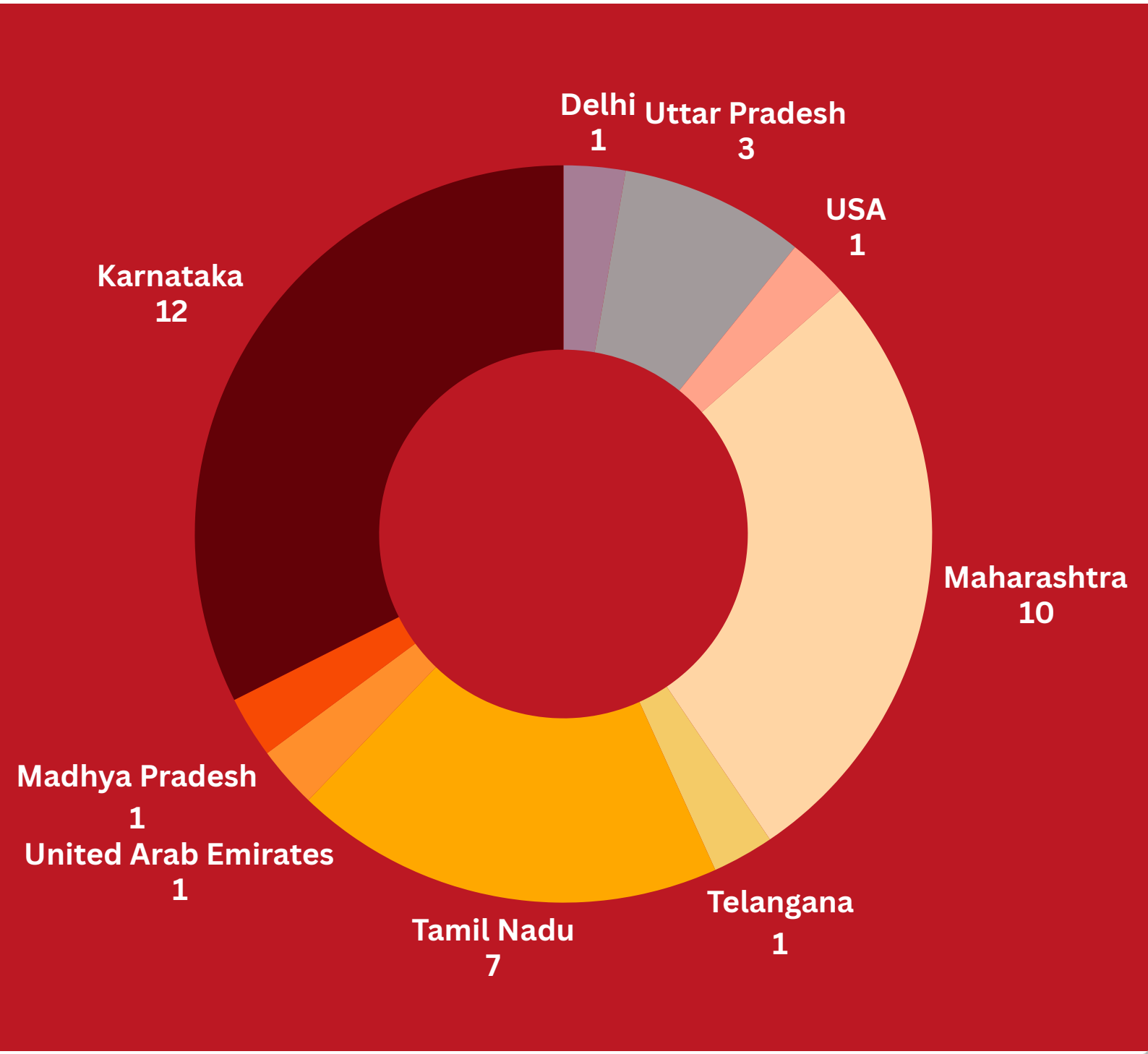
City



3

Town

Countrywise and statewise diversity





STRUCTURE OF THE CAMP

Batches and synopses

Shridhara Batch

Dr. George Thomas

Dr. Thomas' course on ‘Methods of Proofs’ provided students with a structured approach to mathematical proofs. He began with foundational concepts like Aristotle's laws of thought, De Morgan's Laws, and Modus Ponens, laying the groundwork for understanding construction of mathematical statements. Students learned to prove statements using direct methods, contraposition, and contradiction. The course also covered basic set concepts, including posets, tosets, well-ordering, and concluded with lessons on mathematical induction and Euclidean algorithms. Dr. Thomas strove to provide a confident familiarity for students to formalize their mathematical ideas.

Dr. S. Muralidharan

Dr. Muralidharan's hands-on course for Shridhara students focused on combinatorics, a subject in which he excels. From the start, he presented thought-provoking problems that required students to delve deeply into their studies, exploring all possible permutations and combinations. By incorporating concepts like 'stars and bars,' he demonstrated the formal aspects of combinatorics. The diverse range of problems and engaging teaching methods kept students thoroughly engrossed throughout the camp.

Dr. Ashwin Guha

Dr. Ashwin's course on Group Theory kept students engaged and interactive by using Rubik's cubes. Through solving the cubes, students learned about permutation groups and permutation cycles. Dr. Ashwin ensured each student received individual attention maintaining a balance between challenging content and constant learning progression.

Dr. Ajit Bhand

Dr. Ajit's course on number theory was well-structured and engaging. It began with a review of Pythagorean triples, seamlessly integrating with Dr. Thomas' teachings on proofs. Students applied these methods to number theory. Dr. Ajit then delved into the sum of squares, exploring square structures, patterns, and the universality of quadratic forms. His calm demeanor helped him quickly bond with the students, who eagerly asked numerous questions.

Brahmagupta Batch

Dr. S. Muralidharan

Dr. Muralidharan showcased his diverse mathematical interests in his course for the Brahmagupta batch. While originally focused on combinatorics, he turned his attention to geometric problems. The first half of the course covered problem-solving techniques familiar from school, including clever tricks and isometries. The second half captivated students with the power of projective geometry, using projections to simplify complex problems like Pappus' Theorem. The students were so amazed by these techniques that they dubbed them as 'black magic' for the rest of the camp.

Dr. George Thomas

Dr. George Thomas offered a course that complemented Dr. Muralidharan's by focusing on the algebraic exploration of isometries. Students began with examples of distance-preserving maps and progressed to a complete classification of these maps on Euclidean plane. The course also highlighted practical applications of isometries, such as friezes commonly seen in art and architecture.

Dr. Ashwin Guha

Dr. Ashwin Guha introduced students to Group Theory, a key area in Algebra with applications in Mathematics, Computer Science, and Physics. His course had two parts: understanding definitions and examples and applying the theory using the Rubik's cube. Students learned how the cube's configurations form a group and justified the enumeration of over 43 quintillion configurations in a 3x3 cube.

Overall, both batches of Epsilon 2024 offered a diverse and enriching educational experience, providing students with a solid mathematical foundation and exposing them to a wide range of mathematical concepts and applications.



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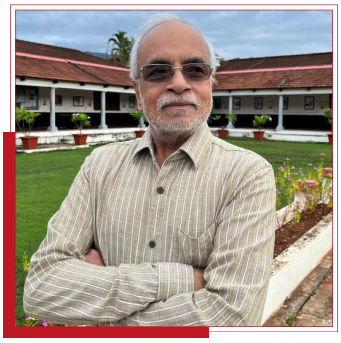
FACULTY AND GUEST SPEAKERS



Dr. George Thomas

Mathematician, Independent researcher from Canada and founder of summer camps like Epsilon Camp, MathPath and MathCamp in USA for students showing high promise in mathematics.



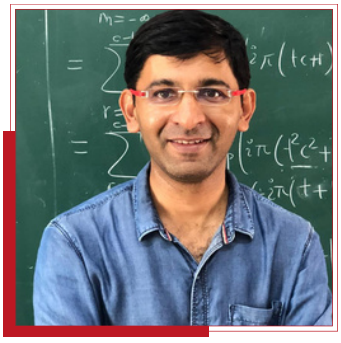
Dr. S. Muralidharan

Mathematician with a Ph.D. from TIFR, Retd Computer Scientist at TCS.



Dr. Ashwin Guha

PhD in Computer Science from Indian Institute of Science, Bengaluru. He is also the author of a children's picture book ‘The Homework’ published by Karadi Tales.



Dr. Ajit Bhand

Assistant professor at mathematics department of IISER Bhopal. Involved with the Maths Circle of India initiative of ICTS-TIFR. Co-organiser of the IISER Bhopal Maths Circle.

GUEST SPEAKERS



Dr. Anand Narayanan

Ph. D. in Astronomy & Astrophysics, Pennsylvania State University

He conducted two guest lectures where students were exposed to multiple concepts from astrophysics including how to accurately express the location of stars in the sky, & how to identify your present latitude on Earth by simply tracking the duration of the day at a given time of year.



Dr. Atanu Sinha

Principal Scientist at Adobe Research, Banglore

He spoke on Information Economics and Game Theory. The students were exposed to the basics of Game Theory, some elementary problems such as The Prisoner's Dilemma. They were shown how one can use game theoretic approaches (as both a bank and an individual) to evaluate how to provide (or access) an appropriate insurance plan.



Mr. Abhishek Dwivedi

Group Head - Strategy and business operations at Navi

He spoke to the students about mathematics in finance, giving them a flavor of how banks operate, make money and evaluate their own performance.

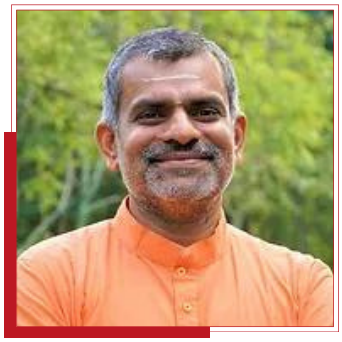
PARENTS' SESSIONS



Prof. R Hariharan

Assistant Professor at Frankfurt School of Finance & Management

He took a session for the parents on 'Interdisciplinary Mathematics Education - Depth Vs Breadth', communicated the importance of expanding the horizon rather than merely increasing the depth of math knowledge.



Swami Anukoolananda

Director of Chinmaya International Residential School

He gave a talk to the parents on 'Finding Purpose'.



Vinay Nair

Co-founder of Raising A Mathematician Foundation and Director of Epsilon India

He opened a pandora's box of various camps and courses that students can pursue in the coming years after Epsilon India.



Bhuvana Arun

A freelance academic and career counselor

She took parents through a session on profile building for Higher Education Abroad.



Sreedhar Mandyan

A founder-director of Darwin Psychology Centre

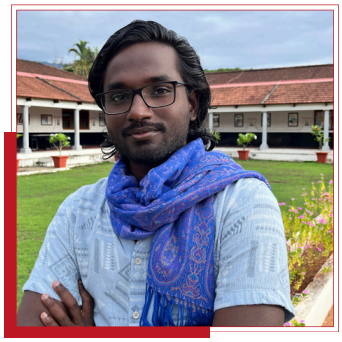
He conducted a session for parents titled ‘Connection before Correction’.



Saee Patil



Nikhil Kulkarni



Aadityan Ganesh

RAM Alumni

They did a session for the parents on ‘Road less traveled’ sharing their journey into the world of Mathematics.



TEACHING ASSISTANTS



Vishal Singh

Pursuing post-graduation at Banaras Hindu University. He has cleared NDA and played professional cricket for Mumbai Cricket Association.

Ravindrasingh Chauhan

Pursuing Post Graduation at IISER Bhopal. Attended 4 national level camps.





Sathishkumar V

Pursuing B.Sc.B.Ed.Mathematics , 4th year at Chinmaya Vishwavidyapeeth, Ernakulam, Kerala.



Omkar Sambare

Working as an Investment Advisor and Mathematics Tutor. He has been volunteering in RAM programs for last 5 years.

Vighnesh Iyer

Pursuing Master's degree in Mathematical Logic from the University of Amsterdam.





Mihir Jewalikar

Bachelor's degree in computer science and currently working in Microsoft. He has been Teaching Assistant in different math programs.

Rutuja Joshi

Master's degree in mathematics and working as a private tutor, guiding students through challenging concepts.



TEACHING AIDE



Anju Subramanian

A 12th Grader commerce-math student and RAM Alumni



Srividya Sundar

A 10th Grader and RAM Alumni

OUTINGS





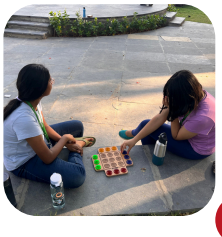


A day tour was organized, allowing the participants to explore notable destinations like the Puttenahalli nature trail with WWF and Visvesvaraya Industrial and Technological Museum. These outings not only provided a break from academic activities but also infused cultural and scientific insights into the learning process.

GAMES INTEGRATED WITH LEARNING



Othello



Tic Tac Toe



Chess



Football



Volleyball

The camp boasted a diverse selection of board games and activities that engaged and challenged the young participants. Among the board games available were classics like Othello, Mastermind, 3D Tic Tac Toe, Chess, and the intriguingly named Wall Trap – a strategy game. The inclusion of these games aimed to stimulate critical thinking, strategic planning, and problem-solving skills among the participants.

Along with indoor games, students also enjoyed outdoor games and were involved in football, cricket, badminton, etc. which gave them a refreshing break from their academic routine.



CONCLUSION

Epsilon India 2024 offered an unparalleled experience for young mathematical talents, blending rigorous academic instruction with enriching extracurricular activities. Participants gained invaluable knowledge, honed their critical thinking skills, and formed lasting bonds with peers and mentors. The camp's holistic approach has undoubtedly equipped these young minds to excel in their future mathematical endeavors.



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