ACM ICPC ASIA Amritapuri Multisite Regionals 2014
Amrita University - Amritapuri, Coimbatore

acm International Collegiate Programming Contest

IBM | event sponsor

Platinum Sponsor

Infosys®
POWERED BY INTELLECT
DRIVEN BY VALUES
http://campusconnect.infosys.com

Silver Sponsor

facebook

Silver Sponsor

Directi
Intelligent People. Uncommon Ideas.
GO FOR GOLD INITIATIVE
www.codechef.com/goforgold
₹ 5 lacs in Prizes for ACM-ICPC finalists

AMRITA VISHWA VIDYAPEETHAM
UNIVERSITY
श्रद्धावान् लभते ज्ञानम्
Established u/s 3 of the UGC Act 1956
A multi campus university accredited by NAAC with 'A' grade

Platinum Sponsor

Infosys®
POWERED BY INTELLECT
DRIVEN BY VALUES
http://campusconnect.infosys.com

Silver Sponsor

facebook

Silver Sponsor

Directi
Intelligent People. Uncommon Ideas.
GO FOR GOLD INITIATIVE
www.codechef.com/goforgold
₹ 5 lacs in Prizes for ACM-ICPC finalists

Contents

Chancellor's Message

Through this holding of hands and sharing of knowledge and experience, new horizons of knowledge will open in the highest realms of science and technology to those thirsting for knowledge in India and others parts of the world especially to students, teachers and researchers. "Today, we are witnessing the world becoming like a single village. This is due to the efforts nations are putting towards cooperating in all fields. Thus, they are becoming like one. This venture to collaborate and share knowledge is a gigantic step in this direction. "Knowledge is like a river-its nature is to flow. The dharma of knowledge is to flow to all corners of the world and nourish the culture there. We should never stem its flow and thereby turn it into a stagnant pond." It is said that knowledge is the greatest gift one can give, for knowledge is imperishable. Even if we light a thousand lamps from one flame, the lustre of the first lamp never diminishes. Similar is the greatness of knowledge. Knowledge does not diminish, no matter how much it is shared. In fact, the more you give, the more it develops and expands. "By sharing knowledge and experiences, we can prevent the flower that is this world from ever wilting and ensure that it remains eternally beautiful. By bringing together diverse streams of knowledge, we can create a magnificent river. May this great river of knowledge flow to caress the countries and communities of the world. May it overflow the borders between people and countries. May it impart the water of life to all of humanity, and thus nature the blooming of culture throughout the world."

---Sri Mata Amritanandamayi Devi
Chancellor, Amrita Vishwa Vidyapeetham

Greetings from Vice Chancellor & Regional Contest Director

It is with immense pleasure that we host the ACM ICPC Regionals – Asia, here at Amrita Vishwa Vidyapeetham. We extend our hearty welcome to all the participants to our campus. Drawing its inspiration, guidance nourishment, energy, and resources directly from our Chancellor and world renowned humanitarian leader, Sri Mata Amritanandamayi Devi (AMMA), Amrita University has now grown into a dynamic, 5-campus, multi-disciplinary University with over 15 schools, 100 academic programs (undergraduate, postgraduate, and doctoral), 1500 faculty, and 14000 students, all united in their mission towards solving the monumental scientific and societal challenges being faced by the world today. The campus you see here is both young and immensely dynamic, with a unique holistic approach to produce the best engineers, scientists, healthcare professionals, entrepreneurs, managers, and societal contributors in all of its disciplines. We hope you all get the opportunity to feel this experience during your stay here. Many congratulations to the Amrita ICPC team for organizing this prestigious event here at Amrita.

P. Venkat Rangan,
Vice Chancellor, Amrita Vishwa Vidyapeetham
Regional Contest Director, Asia-Amritapuri Site

About Amrita University

Mission

To provide value-based education and mould the character of the younger generation through a synthesis of science and spirituality, so that their earnest endeavour to achieve progress and prosperity in life is matched by an ardent desire to extend selfless service to society, one complementing the other.

The Amrita Vishwa Vidyapeetham is a dream come true, a dream nursed by Mata Amritanandamayi Devi to have a centre of excellence in learning for the benefit of all. The dream became a reality in 1994 when the School of Engineering was opened in an obscure village, Ettimadai, at the foothills Bouluvanpatty ranges of Western Ghats in the Coimbatore District of Tamil Nadu. It was indeed a modest beginning with just 120 students and 13 faculty members. In less than two decades, Amrita Vishwa Vidyapeetham has blossomed into a multi-disciplinary, multi-campus centre that offers over 150 undergraduate, postgraduate and doctoral programmes in Engineering, Business, Medicine, Dentistry, Pharmacy, Nursing, Journalism, Biotechnology, Information Technology, Arts and Sciences, Health Sciences, Education, Microbiology, Hospital

Management, Visual Media Studies, Communication, Social Work and Nanosciences and Ayurveda.

Satguru Sri Mata Amritanandamayi Devi (AMMA), one of the foremost humanitarian leaders in the world today, is the Chancellor of the University.

Amrita University was the youngest university to be awarded with an 'A' grade by the National Assessment and Accreditation Council (NAAC), an autonomous body established in 1994 by the University Grants Commission (UGC) of India to assess and accredit institutions of higher education in the country.

Ministry of Human Resources Development listed Amrita in the top category of all Indian universities.

The report, prepared by a high power committee constituted by the Ministry of Human Resources Development, as per the directives of the Supreme Court of India, was based on a thorough survey of all 130 deemed-to-be universities in India.

Amrita Vishwa Vidyapeetham, together with 37 other institutions in the nation, was placed in the top category. Other universities in the same category included IISc Bangalore, TIFR Mumbai, IIFT New Delhi, BITS Pilani and IIIT Hyderabad.

Amritapuri Campus

Nestled in the picturesque village of Vallikavu, across the beautiful and famed backwaters of Kerala, is Amrita Vishwa Vidyapeetham's Amritapuri campus, blending into the natural setting of the environment with its endless stretches of coconut palm groves. The Arabian Sea that borders Kerala on the west is only a few hundred meters from the campus.

Located close to the international headquarters of the Mata Amritanandamayi Math, the campus provides a learning environment that harmoniously blends science and spirituality. Students have a unique opportunity to nurture values and self-discipline. Over 90% of the students reside in hostels on campus.

Attracted by its pristine beauty and the campus's emphasis on technical excellence, students are drawn from just around the corner as well as from far across the globe. Eminent academicians and corporate professionals from share their knowledge and experiences with the students and help them apply their theoretical knowledge to real-life projects. Academic counselors mentor the students, acting as their friend, philosopher and guide.

Although located in a remote village blessed with panoramic backwater expanses and tiny glistening brooks on the one side and the mighty sea on the other side, all modern amenities which go to make campus life memorable, are provided. There is a well-stocked library, cafeterias and sports facilities. A culture of enthusiastically celebrating festivals and other events makes life on campus stimulating. Spread over 80 acres of land, the campus has over a million square feet of built-up area comprising of academic blocks, student hostels and other amenities.

Coimbatore Campus

The beginnings of Amrita University can be traced to 1994 when a School of Engineering was started in an obscure village named Ettimadai, at the foothills of Bouluvanpatty ranges of the Western Ghats in the Coimbatore district of Tamil Nadu.

At that time there were 120 students and 13 faculty members. Today, Amrita Vishwa Vidyapeetham has five campuses in three different states of India. There is a student population of over 12,000 and faculty strength of nearly 1500. Over 120 UG, PG and doctoral programs are offered.

When Amrita became a university in January 2003, it was the youngest group of institutions to be conferred this status. As Amrita's first campus, Coimbatore is home to the administrative headquarters of Amrita University.

Schools of Engineering and Business in addition to Departments of Social Work and Communication are located on located on this campus. Research centers include AMBE, CEN, CES and Cybersecurity. The campus has nearly 3500 students and about 600 faculty and staff members.

This sprawling 400-acre campus is often likened to an oasis in a desert. Massive tree-planting and forestation activities undertaken over the past decade have converted the once-barren land into a lush green and beautiful place.

A lot of emphasis is placed on eco-friendly and conservation practices. Waste water from the hostels and faculty and staff quarters is treated using EM; no chemicals are used in the process. Organic fertilizers are made using vermi-compost, pesticides have been avoided since the very beginning. The tranquil surroundings, away from the pollution and the bustle of city life, are home to several exotic birds, including parrots and peacocks.

Sponsors:

IBM Primary Sponsor

IBM's sponsorship commitment to the ACM International Collegiate Programming Contest is part of a companywide effort to advance the next generation of technology leaders and problem solvers who have combined skills of computing science and business management. For more information, visit http://www.ibm.com/university. With the Smarter Planet initiative, IBM believes intelligence allows for the growth and innovation of human life, including the way people live, work, and govern themselves; the way services are ordered and delivered; and the way the environment is protected.

The world is already connected economically, technologically and socially. However, being connected alone is not sufficient. The world needs new generations of talent, leaders and problem solvers to infuse intelligence into our daily lives.

IBM is the world's largest information technology and service provider. Over the last decade, IBM has driven a significant transformation of its business model as the company shifts to higher value areas and improve efficiency of the business. IBM has been building these capabilities to round out the portfolio to address the needs of clients and the society.

IBM has 35,000 software engineers in more than 90 research and development laboratories around the globe, who focus on solving real-world business issues for clients in more than 170 countries. IBM invests in high business values and strategic markets such as Cloud Computing; Business Analytics; Mobile Computing; Smarter Commerce and Social Business. For more information, visit http://www.ibm.com/software.

Infosys Platinum Sponsor

Directi Gold Sponsor

About Directi
- Established in 1998
- Valued at 300+ million dollars
- 1000+ employees
- 25+ Internet Software Products for a Global audience
- 1,000,000+ Customers and 50,000+ channel partners (growing at >120% p.a.)

Directi (http://www.directi.com) is a $300+ million group of Businesses, that develops innovative mass-market Web Products for millions of Customers worldwide.

Directi has actively involved itself in various Educational Initiatives. Some of these include:
- Directi Go for Gold Project – Aims to turn the best programmers in India into the best programmers in the world.
- Directi Case Study Competition
- Courses on Online Marketing in B-Schools
- Conducting workshops on competitive programming for school kids in India.

- **CodeChef** – Aimed at nurturing the programming talent in India, CodeChef is India's Largest Programming Platform. Since it's inception, CodeChef has evolved as a global community for budding programmers to meet, discuss and compete with fellow programmers from across the globe. The monthly contests organized by CodeChef see participation by thousands of young programmers from various institutes across the world, along with professionals from different

leading firms. CodeChef intends to better the programming culture across the nation and has been taking necessary steps in that direction.

- **CodeChef for Schools** - As an attempt to nurture the aspiring programmers from an early age, Directi has extended its reach to schools through their CodeChef For School program. With it, Directi intends to take computer programming to schools, to incorporate a programming culture among the students early in their career. Still in its early days, CodeChef For School has been getting great support from the programming fraternity by means of senior programmers and professors joining hands with CodeChef volunteers for the initiative and others helping in their various other ways.

Facebook Silver Sponsor

Founded in 2004, Facebook's mission is to give people the power to share and make the world more open and connected. People use Facebook to stay connected with friends and family, to discover what's going on in the world, and to share and express what matters to them.

Facebook is defined by our hacker culture - an environment that rewards creative problem solving and rapid decision making. We encourage people to be bold. Our open culture keeps everyone informed and allows people to move around and solve the problems they care about most. We work in small teams and move fast to develop new products, constantly iterating and improving. The phrase "this journey is 1% finished" is posted on our walls, reminding us that we've only begun to fulfill our mission to make the world more open and connected.
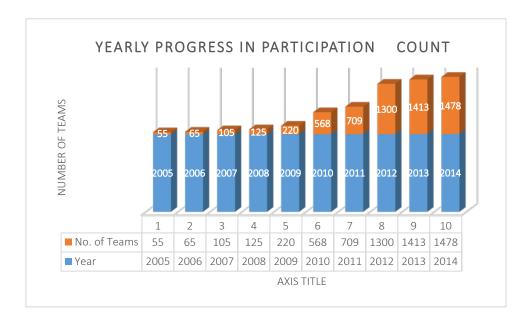
ICPC & Amrita

The ACM International Collegiate Programming Contest (ICPC) is the premiere global programming competition conducted by and for the world's universities. The competition operates under the auspices of ACM, is sponsored by IBM, and is headquartered at Baylor University. For nearly four decades, the ICPC has grown to be a game changing global competitive educational program that has raised aspirations and performance of generations of the world's problem solvers in the computing sciences and engineering.

Teams of three students represent their universities in multiple levels of regional competition. Volunteer coaches prepare their teams with intense training and instruction in algorithms, programming, and teamwork strategy.

Several ICPC universities and ICPC volunteers provide online judging systems to all free of charge. Top teams from regional competition advance to the final round.

Amrita has been spearheading the competitive programming activities in India to improve the student participation in ICPC. In collaboration with Infosys, Amrita has been hosting the Infosys CampusConnect Aspirations 2020 programming competition for the past two years.   Participation from more than 500 engineering colleges across India has helped in creating coding interest among the students. This has drawn lot of teams towards ICPC by increasing the number of teams to 1530 in 2014 from 60 in 2008. From 2010 onwards Amrita started Multisite Contest – expanding the sites to Coimbatore and Bangalore, other than Amritapuri. ICPC at Amrita started with less than 60 teams participating in 2005 and 2006, organized at Coimbatore campus. This year, the contest is organized in Amritapuri and Coimbatore campuses. Around 140 teams are participating at Amritapuri and 130 at Coimbatore. Both put together, it becomes a pool of talented brilliant young minds hailing from top-notch institutions in India.

YEARLY PROGRESS IN PARTICIPATION   COUNT

NUMBER OF TEAMS

	1	2	3	4	5	6	7	8	9	10
No. of Teams	55	65	105	125	220	568	709	1300	1413	1478
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014

AXIS TITLE

Who is Who

Associate Site Director: Br. Anand Shenoi; anand@am.amrita.edu; Phone: +91 94464 05100.

Deputy Regional Contest Director: Mr. Binu P K binu@am.amrita.edu; Phone: +91 96456 76453.

Committee	Amritapuri (@am.amrita.edu)	Coimbatore (@cb.amrita.edu)
Registration	Bri. Remya ☏ remya ☎ + +9194961 32500	Mrs. Bindu KR ☏ j_bindu ☎ +91-9489921989
Transportation	Mr. Midhun P K ☏ midhunpk ☎ +91 98468 85088	Mr. Arun Kumar C. ☏ c_arunkumar ☎ +91-9965055500
Accommodation	Br. Ashish Mohan: ☏ ashishm ☎ +91 94961 30900	Mr. Sabarish B A ☏ ba_sabarish ☎ +91-9442283167
Inaugural & Award Ceremonies	Dr. Jyothisha J Nair ☏ jyothishaj ☎ +91 94472 05116	Mrs. S. Padmavathi ☏ s_padmavathi ☎ +91 9842830011
Contest Arena	Mr. Jayakumr Pai ☏ jayakumarp ☎	Mr. M. Sreevalsan ☏ sree ☎ +91-9443384465
Contest Management	Mr. Karthik V ☏ karthikv ☎ +91 9447590901	Mr. M. Sreevalsan ☏ sree ☎ +91-9443384465)
Excursion	Mr. P K Binu ☏ binu ☎ +91 9645676453	Mr. Arun Kumar C. ☏ c_arunkumar ☎ +91-9965055500
Food & Hospitality	Mr. Praveen K P ☏ praveenkp ☎ +91 94464 09200	Mrs. Hema Menon ☏ p_hema ☎ +91-9486234070)

Contest Schedule

December 14th
02:00 – 07:00 PM: Early Registration
07:30 – 09:00 PM: Dinner

December 15th
07:30 – 09:00 AM: Breakfast
08:00 – 10:00 AM: Late Registration (At least one of the team members shall register the team by this time).
10:30 – 11:30 AM: Inaugural Ceremony
12:30 – 02:00 PM: Lunch
02:30 – 04:00 PM: Practice Session (Mandatory for all the teams to check, verify the contest software & requirements)
04:30 – 06:30 PM: Visit to the international headquarters of M A Math
07:30 – 09:00 PM: Banquet Dinner

December 16th
07:00 – 08:30 AM: Breakfast
08:30 – Teams assemble outside the Contest Arena to identify the seating position
08:40 – Teams enter the Contest Arena
08:50 – 08:55 AM: Important Announcements by the Chief Judge
09:00 AM – 02:00 PM: ACM ICPC Asia Amritapuri Onsite Regional Contest
02:00 – 03:00 PM: Lunch
03:00 – 05:00 PM: DARSHAN – a unique experience in meeting with the Mata Amritanandamayi Devi, Chancellor, Amrita University. (Only at Amritapuri)
05:30 – 06:30 PM: Awards Ceremony
07:00 – 09:00 PM Dinner
09:30 – Departure to Munnar for those who have registered for the excursion on 17th.

December 17th
Teams vacate their rooms / excursion.

Local Arrangements

Transportation

Amritapuri [How to reach Amritapuri](): Free transportation is arranged for those who arrive at Kayamkulam / Karunagappally Railway stations. University Buses will ply at specific timing from these stations. Those who arrive at Thiruvananthapuram (also called as Trivandrum) or Kochi (also called as Cochin) are requested to take a pre-paid taxi from the airport. If you need paid pickup to be arranged by the University, please contact the Transportation Chair in the above contacts.

Ettimadai: [How to reach Ettimadai](): Free transportation is arranged from Coimbatore Railway station to university campus. Those who arrive at Coimbatore Airport may take a pre-paid taxi to the university campus.

Accommodation

Accommodation for all the participants is arranged in the student hostels located inside the campus. While one team is allotted a room, two coaches will share one room. Mattresses and bed sheets are provided along with the basic amenities in the hostel rooms. Because of the winter season, contestants may please bring sweater / warm clothes.

Food

ICPC Food is served from 14th afternoon, till 16th night.

Wi-Fi

Participants are eligible for free Wi-Fi access in the campus during the contest days. For this, they need to register their device at the IT Desk.

Contest Guidelines / Instructions

1) Teams may use 25 pages (or 12.5 double-sided sheets) of their own reference materials in the contest arena. Print out of this material will be kept near the team workstation during the main contest. Teams are allowed to bring dictionaries to the contest arena, but that should be submitted during Onsite Registration.

2) The team shall be present in the Contest Arena before the contest begins (08:45 AM).

3) Contestants **are not** allowed to bring any machine-readable versions of software or data to the Contest Arena. Contestants are not allowed to bring any type of gadgets / electronic claim of ambiguity or error in a problem statement by submitting a clarification request to a judge. If the judges agree that an ambiguity or error exists, a clarification will be issued to all contestants. Any needs or queries related to contest arena may be asked of the lab volunteers *(Interaction with the volunteers must be minimum)*. When the Jury responds to the clarification request, the team receives its **"Clarification Request"** with the answer. If the clarification request is incorrect or the answer is clear from the problem description, the Jury answers **"No comments".** If the Jury agrees that there is an ambiguity or error in the problem statement, a clarification is issued to all teams. During the contest, teams solve the posed problems. A solution is a program *(single source file, not executable)* on one of the allowed programming languages. Different problems may be solved using different programming languages.

4) Keep all discussions within the team. Communication between teams is **NOT** permitted during the contest. Only one member from team is permitted to go out of the contest arena at any given time.

5) Documentation for STL and Java is provided online at the workstation.

6) While the contest is scheduled for five hours, the Jury has the authority to alter the length of the contest in the event of unforeseen difficulties. Should the contest duration be altered, every attempt will be made to notify contestants in a timely and uniform manner.

7) A team may be disqualified by the Regional Contest Director for any activity that jeopardizes the contest such as dislodging extension cords, unauthorized modification of contest materials, or distracting behaviour.

8) Contest duration is for 5 hours.

9) Solutions are submitted for judging during the contest using the contest software. Solutions to problems that were submitted for judging are called runs. Immediately after submission of any run, the team may continue to work on other problems. **A minimum time of 2 minutes between submission runs will be enforced.**

10) **Runs are NOT allowed to:** o access the network;
    o *work with any files except those explicitly specified in the problem statement;*
    o *attack system security;*
    o *execute other programs and create new processes;*
    o *change file system permissions;*
    o *work with sub directories;*
    o *create or manipulate any GUI items (windows, dialog boxes, etc);*
    o *work with external devices (sound, printer, etc);*
    o *do anything else that can stir up the evaluating process and the contest.*

1. All submissions are open to scrutiny by anyone – in fact, we may publish all submissions on our website, where anyone may access them.

2. The solutions are run against multiple test cases and the first non-accepted verdict is displayed.

3. **Run Evaluation:** Each run is judged as accepted or rejected. o The run is evaluated by executing it on a secret set of tests, common for all teams. A run is accepted, only if it gives correct answers to all tests.

4. Evaluation is performed automatically, that is why a program should respect formats of input and output files described in the problem statement. If not explicitly stated otherwise, all input data are considered to be correct and satisfying all restrictions from the problem statement.

5. The time limit is the maximum execution time for the set of test.

6. Judging is automated, however, there is a chance that the judges may change the verdict and notified to the contestants.

7. The memory limit is the maximum amount of memory that a run may utilize.

8. Compile time error is not classified as error. It won't be penalized also.

9. The possible outcomes in the table are listed in their order of priority. For example, if run time error has occurred, then output is not checked.

Special Note: An invalid function is generated if main does not return 0, and this is considered an error. Invalid function may also be generated by contest software on other rare occasions as a catchall error when it does not quite know how to classify a submission with error.

Practice Contest
1. Practice contest aims to make contestant familiar with the contest software. This is not a contest to check the skill of contestants.

2. You can submit the solution more than once to learn more about the error status generated by the contest software.

3. Teams are provided with preinstalled set of Editors, debuggers, profiling tools that are uniform across all the workstations. The contestants should verify this during the practice contest. If the contestants needs any new editors or profiling tool they should inform the Contest Arena team after the practice contest, if it is possible to provide the new tool it will be provided during the main contest. Check if all the software (Editor, debugger etc) that may be used during the contest is available in the computer allotted for the team.

4. Use the feedback form available to report about the changes required or issues faced.

5. Any data left on the workstation will be cleared after practice contest

ICPC Ranking Rules
1. The problem is considered solved by the team, if it is accepted by the contest software, not rejected by the Jury.

2. The time consumed for a solved problem is the time elapsed from the beginning of the contest to the submission of the first accepted run for this problem (in minutes) plus 20 minutes for every other run for this problem before the accepted one. For an unsolved problem no time consumed is computed.

3. The total time is the sum of the time consumed for each problem solved.

4. Teams are ranked according to the number of solved problems. Teams that solve the same number of problems are ranked by the least total time and, if need be, by the earliest time of submittal of the last accepted run.

5. Contestants and observers will see preliminary results of all teams during the contest. Contestants may see the results on their computers, observers - on the monitor outside the competition area.

6. According to the traditions of the competition, to encourage interest in the award ceremony, updating of the current information on results will be stopped 45 minutes before the end of the contest.

Complaints, Appeals, and Remedies

1. Judges' decisions are final.

2. The Jury is solely responsible for determining the correctness of runs. Its decisions are final and may not be appealed.

3. If irregularities or misconduct are observed during the contest, team members or coaches should bring them to the attention of the contest officials so that action may be taken as soon as possible.