Anna Fariha

Kahlert School of Computing, University of Utah

♀ Warnock Engineering Building, #2851

72 Central Campus Drive, Salt Lake City, UT, 84112

Research Interests

My research focuses on three key aspects of data system democratization: *enhancing usability* of data systems for both non-experts and experts, *providing explanation frameworks* to enable understanding of system behavior, and *achieving trust and fairness* in data-driven machine learning.

- Data systems usability: query by example, data summarization, discovery, wrangling, evolution.
- Metadata management and its applications: data constraints, data drift, data cleaning.
- Systems for machine learning and AI: Large language models for data management, trusted machine learning, fair machine learning, explainable AI, personalized text summarization.
- Causal reasoning and explanation frameworks: software debugging, automatic program repair, data debugging, explaining data non-conformance, causal insights.

Education

Doctor of Philosophy in Computer Science

2021

Manning College of Information and Computer Sciences

University of Massachusetts, Amherst, MA

- Dissertation: Enhancing Usability and Explainability of Data Systems
- Advisor: Alexandra Meliou
- Committee members: Emery Berger, Peter Haas, Suman Nath
- CGPA: 4.00 out of 4.00

Master of Science in Computer Science

2020

Manning College of Information and Computer Sciences

University of Massachusetts, Amherst, MA

- CGPA: 4.00 out of 4.00

Master of Science in Computer Science and Engineering

2011

Department of Computer Science and Engineering

University of Dhaka, Bangladesh

- Thesis: A New Approach for Frequent Human Interaction Pattern Mining in Meeting Databases
- Advisor: Suraiya Pervin
- CGPA: 4.00 out of 4.00

Bachelor of Science in Computer Science and Engineering

2010

Department of Computer Science and Engineering

University of Dhaka, Bangladesh

- Thesis: An Algorithm for Graph Mining using Efficient Graph Indexing for Evolving Database
- Advisor: Chowdhury Farhan Ahmed
- CGPA: 3.83 out of 4.00

Employment History

University of Utah

7/2023 - present

Assistant Professor

Salt Lake City, UT, USA

Kahlert School of Computing

6/2021 - 5/2023

Microsoft Researcher

Redmond, WA, USA

PROSE research and engineering team for AI-assisted programming

Managers: Gustavo Soares, Sumit Gulwani

Microsoft 5/2019 – 11/2019

Research Intern

Bellevue, WA, USA

PROSE research and engineering team for AI-assisted programming

Mentor: Ashish Tiwari

Project: Conformance constraints and trusted machine learning

Microsoft Research 5/2018 – 8/2018

Research Intern Redmond, WA, USA

Data Management, Exploration and Mining (DMX)

Mentor: Suman Nath

Project: Adaptive interventional debugging for finding root causes of nondeterministic software bugs

University of Massachusetts 9/2016 – 5/2021

Research Assistant Amherst, MA, USA

Data Systems Research for Exploration, Analytics, and Modeling (DREAM) Lab

Manning College of Information and Computer Sciences

Supervisor: Alexandra Meliou

Lalmatia Women's College 1/2015 – 4/2015

Guest Lecturer Dhaka, Bangladesh

Department of Business Administration

University of Dhaka 5/2014 – 8/2016

Lecturer Dhaka, Bangladesh

Department of Computer Science and Engineering

United International University 5/2012 – 4/2014

Lecturer Dhaka, Bangladesh

Department of Computer Science and Engineering

University of Liberal Arts 10/2011 – 1/2012

Competitive Programming Trainer Dhaka, Bangladesh

Coach for competitive programming in preparation for ACM ICPC Programming Contests

Structured Data Systems Limited 9/2011 – 5/2012

Software Engineer Dhaka, Bangladesh

Android and Blackberry mobile applications

University of Asia Pacific 10/2010 – 10/2010

Competitive Programming Trainer Dhaka, Bangladesh

Coach for competitive programming in preparation for ACM ICPC Programming Contests

Honors, Awards, & Achievements

SIGMOD Distinguished PC member	2024
SIGMOD Distinguished PC member	2023
SIGMOD Distinguished PC member	2022
SIGMOD Comprehensive Reproducibility Award	2022
VLDB Best Demonstration Runner-up Award	2020
Jim Gray Scholarship, CICS, UMass Amherst	2016
Special Achievement Award: Bangladesh ICT Journalist Forum	2012
Special Achievement Award: Bangladesh Bangladesh Women in IT	2012
University Scholarship for result in Bachelors of Science, U of Dhaka	2012
Special Achievement Award for outstanding performances in programming contests, U of Dhaka	2011
Dean's Honor Award (top 1%), Faculty of Engineering, U of Dhaka	2011
Dean's Award, Faculty of Engineering, U of Dhaka	2010
Fatema-Iqbal Trust Scholarship, U of Dhaka	2008

Travel and Accommodation Scholarships

Invited Participant, CRA Career Mentoring Workshop, Washington, DC	2024
Invited Participant with Accommodation Support, Logic and Algebra for Query Evaluation	2023
 Simons Institute for the Theory of Computing, Berkeley, California 	
Invited Participant with Travel & Accommodation Support, CRA-WP Career Mentoring Workshop	2023
- Chicago, Illinois	
CRA-W Grad Cohort Workshop Travel and Accommodation Award, Washington DC	2017
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Programming Contests	
Rank 5, ACM International Collegiate Programming Contest, Dhaka (Team: DU Resonance)	2011
Rank 1, Islamic University of Technology ICT Fest Programming Contest (Team: DU Resonance)	2011
Rank 1, Dhaka University National Collegiate Programming Contest (Team: DU Resonance)	2011
Rank 1, Dhaka University National Collegiate Programming Contest [Women] (Team: DU Felicity)	2011
Rank 2, SUST National Collegiate Programming Contest (Team: DU Resonance)	2010
Rank 6, ACM International Collegiate Programming Contest, Amritapuri (Team: DU Resonance)	2010
Rank 4, ACM International Collegiate Programming Contest, Dhaka (Team: DU Resonance)	2010
Rank 3, ACM International Collegiate Programming Contest, Dhaka (Team: DU Ouranos)	2009
Rank 515, Google Code Jam, (Individual, id: chorui12)	2009
Rank 4, AUST National Collegiate Programming Contest (Team: DU Resonance)	2009

Grants

- 1. **One Utah Data Science Hub Seed Grant Award:** Explaining Data Evolution [PI]. Total award amount: \$50,000. Award duration: Mar 2024–Feb 2025.
- 2. **CIRC: ENS/Grand. NSF CNS 2346555:** *POWDER-ENS Enhancing and Sustaining the POWDER Platform* [Co-PI, PI: Jacobus Van Der Merwe, other co-PIs: Aditya Bhaskara, Eric Eide]. Total award amount: \$4,999,980. Award duration: Oct 2024—Sep 2028.
- 3. CRA-WP Distributed Research Experiences for Undergraduates (DREU): Summer support for two students. Total award amount: \$14,000. Award duration: Summer 2024.
- 4. **USHE: Computer Science Targeted Workforce Application:** *Training the Next Generation of Database Engineers: Responsible, User-Centric, and Efficient Data Management* [led by Jeff Phillips]. Teaching grant for developing a new course: *Human-centered Data Management*. Academic year: 2023–2024.
- 5. Microsoft Research Dissertation Grant. Total award amount: \$25,000. Academic year 2020–2021.

Publications

Journal and Conference Publications

- [1] Zifan Liu, Shaleen Deep, Anna Fariha, Fotis Psallidas, Ashish Tiwari, and Avrilia Floratou. Rapidash: Efficient Detection of Constraint Violations. *Proc. VLDB Endow.*, 17(8):2009–2021, 2024
- [2] Anjali Singh, Anna Fariha, Christopher Brooks, Gustavo Soares, Austin Z. Henley, Ashish Tiwari, Chethan M, Heeryung Choi, and Sumit Gulwani. Investigating Student Mistakes in Introductory Data Science Programming. In *SIGCSE*, pages 1258–1264. ACM, 2024
- [3] Rohan Bavishi, Harshit Joshi, José Cambronero, Anna Fariha, Sumit Gulwani, Vu Le, Ivan Radicek, and Ashish Tiwari. Neurosymbolic Repair for Low-code Formula Languages. *Proc. ACM Program. Lang.*, 6(OOPSLA2):1093–1122, 2022
- [4] Sainyam Galhotra, Anna Fariha, Raoni Lourenço, Juliana Freire, Alexandra Meliou, and Divesh Srivastava. DataPrism: Exposing Disconnect between Data and Systems. In *SIGMOD*, pages 217–231. ACM, 2022
- [5] Maliha Tashfia Islam, Anna Fariha, Alexandra Meliou, and Babak Salimi. Through the Data Management Lens: Experimental Analysis and Evaluation of Fair Classification. In *SIGMOD*, pages 232–246. ACM, 2022

- [6] Anna Fariha, Ashish Tiwari, Arjun Radhakrishna, Sumit Gulwani, and Alexandra Meliou. Conformance Constraint Discovery: Measuring Trust in Data-Driven Systems. In SIGMOD, pages 499–512. ACM, 2021 (Comprehensive Reproducibility Award)
- [7] Anna Fariha, Suman Nath, and Alexandra Meliou. Causality-Guided Adaptive Interventional Debugging. In *SIGMOD*, pages 431–446. ACM, 2020
- [8] Anna Fariha and Alexandra Meliou. Example-Driven Query Intent Discovery: Abductive Reasoning using Semantic Similarity. *Proc. VLDB Endow.*, 12(11):1262–1275, 2019
- [9] Anna Fariha, Chowdhury Farhan Ahmed, Carson K. Leung, Md. Samiullah, Suraiya Pervin, and Longbing Cao. A New Framework for Mining Frequent Interaction Patterns from Meeting Databases. *Eng. Appl. Artif. Intell.*, 45:103– 118, 2015
- [10] Amit Mandal, Mehedi Hasan, Anna Fariha, and Chowdhury Farhan Ahmed. GSCS Graph Stream Classification with Side Information. In *APWeb*, pages 389–400, 2015
- [11] Md. Samiullah, Chowdhury Farhan Ahmed, Anna Fariha, Md. Rafiqul Islam, and Nicolas Lachiche. Mining frequent correlated graphs with a new measure. *Expert Syst. Appl.*, 41(4):1847–1863, 2014
- [12] Shafaet Ashraf, Sheikh Muhammad Sarwar, Md. Abeed Hassan, Saifuddin Md. Tareeq, and Anna Fariha. An Efficient Method for Extracting Subtrees against Forest Query. In *IMCOM*, pages 98:1–98:7. ACM, 2015
- [13] Anna Fariha, Chowdhury Farhan Ahmed, Carson Kai-Sang Leung, S. M. Abdullah, and Longbing Cao. Mining Frequent Patterns from Human Interactions in Meetings Using Directed Acyclic Graphs. In *PAKDD*, pages 38–49, 2013
- [14] Md. Samiullah, Chowdhury Farhan Ahmed, Manziba Akanda Nishi, Anna Fariha, S. M. Abdullah, and Md. Rafiqul Islam. Correlation Mining in Graph Databases with a New Measure. In *APWeb*, pages 88–95, 2013
- [15] Shariful Islam, Anna Fariha, Chowdhury Farhan Ahmed, and Byeong-Soo Jeong. EGDIM: Evolving Graph Database Indexing Method. In *ICUIMC*, pages 56:1–56:10, 2012

Short, Demonstration, and Workshop Papers

- [16] Shiyi He, Alexandra Meliou, and Anna Fariha. ChARLES: Change-Aware Recovery of Latent Evolution Semantics in Relational Data. *SIGMOD*, 2025
- [17] Ankita Sharma, Jaykumar Tandel, Xuanmao Li, Lanjun Wang, Anna Fariha, Liang Zhang, Syed Arsalan Ahmed Naqvi, Irbaz Bin Riaz, Lei Cao, and Jia Zou. DataMorpher: Automatic Data Transformation based on Large Language Models. *ICDE*, 2025
- [18] Whanhee Cho and Anna Fariha. UTOPIA: Automatic Pivot Table Assistant. Proc. VLDB Endow., 2024
- [19] Bhavya Chopra, Anna Fariha, Sumit Gulwani, Austin Z. Henley, Daniel Perelman, Mohammad Raza, Sherry Shi, Danny Simmons, and Ashish Tiwari. CoWrangler: Recommender System for Data-Wrangling Scripts. In SIGMOD. ACM, 2023
- [20] El Kindi Rezig, Anshul Bhandari, Anna Fariha, Benjamin Price, Allan Vanterpool, Andrew Bowne, Lindsey McEvoy, and Vijay Gadepally. Examples are All You Need: Iterative Data Discovery by Example in Data Lakes. In *CIDR*, 2022
- [21] El Kindi Rezig, Anshul Bhandari, Anna Fariha, Benjamin Price, Allan Vanterpool, Vijay Gadepally, and Michael Stonebraker. DICE: Data Discovery by Example. *Proc. VLDB Endow.*, 14(12):2819–2822, 2021
- [22] Nishant Yadav, Matteo Brucato, Anna Fariha, Oscar Youngquist, Julian Killingback, Alexandra Meliou, and Peter Haas. SUBSUME: A dataset for subjective summary extraction from Wikipedia documents. In *New Frontiers in Summarization@EMNLP*, pages 131–141, 2021
- [23] Anna Fariha, Ashish Tiwari, Alexandra Meliou, Arjun Radhakrishna, and Sumit Gulwani. CoCo: Interactive Exploration of Conformance Constraints for Data Understanding and Data Cleaning. In SIGMOD, pages 2706–2710. ACM, 2021

- [24] Anna Fariha, Ashish Tiwari, Arjun Radhakrishna, and Sumit Gulwani. ExTuNe: Explaining Tuple Non-conformance. In *SIGMOD*, pages 2741–2744. ACM, 2020
- [25] Anna Fariha, Matteo Brucato, Peter J. Haas, and Alexandra Meliou. SuDocu: Summarizing Documents by Example. *Proc. VLDB Endow.*, 13(12):2861–2864, 2020 (Best Demonstration Runner Up Award)
- [26] Anna Fariha, Sheikh Muhammad Sarwar, and Alexandra Meliou. SQuID: Semantic Similarity-Aware Query Intent Discovery. In *SIGMOD*, pages 1745–1748. ACM, 2018
- [27] Quazi Marufur Rahman, Anna Fariha, Amit Mandal, Chowdhury Farhan Ahmed, and Carson K. Leung. A Sliding Window-Based Algorithm for Detecting Leaders from Social Network Action Streams. In *IEEE/WIC/ACM WI-IAT*, pages 133–136, 2015

PhD Thesis

[28] Anna Fariha. *Enhancing Usability and Explainability of Data Systems*. PhD thesis, University of Massachusetts Amherst. https://scholarworks.umass.edu/dissertations_2/2311/

Software and Educational Content

- ExDis: Explaining Disparate Trends. Link
- UTOPIA: Automatic Pivot Table Assistant. Link
- SQuID: Semantic similarity-aware Query Intent Discovery. Link
- Conformance Constraints Discovery: Measuring Trust in Data-Driven Systems (Winner of the ACM SIGMOD 2022 Most Reproducible Paper Award). Link
- SubSumE Dataset for Subjective Document Summarization. Link
- A Data Management Perspective on Fair Classification: An Experimental Analysis and Evaluation. Link
- Educational video on "Research in Computer Science (Databases/Data Management Track)". Link

Panels and Invited Talks

Reviewer – Israel Science Foundation	March, 2025
• Panelist – Northwest Database Society Annual Meeting: Panel on AI and Data Management	February, 2024
 Panelist – NSF Information and Intelligent Systems division (IIS) 	2023
• Panelist – NSF's CSGrad4US Panel: "What I wish I knew before I started graduate school"	October, 2023
Panelist – SIGMOD New Researcher Symposium	June, 2022
• Round Table Chair – VLDB: Interactive Querying and Visualization for Large Data	August, 2021
Explaining Data Evolution	_
 DELPHI Data Science Symposium, University of Utah 	November, 2024
Recent Trends in Scalable and Human-centric Data Systems	
 Research Challenges in Computing Seminar Series, University of Utah 	October, 2023
• Through the Data Management Lens: Experimental Analysis and Evaluation of Fair Classificati	ion
 Bias, Ethics and Trustworthiness in Data Science and AI event, University of Utah 	September, 2023
• Blame the data, not the system: how data constraints can help in trustworthy machine learning	and explain causes of
data-system malfunction	
 Data Science Lecture Series, University of Utah 	September, 2023
 University of Washington, Northwest Database Society 	November, 2021
• Blame the data, not the system: How data profiles can help explain causes of data-system malful	nction
 Northwest Database Society (NWDS) Annual Meeting 	May, 2023
Enhancing usability and explainability of data systems	•
 Database Seminar, University of California San Diego (virtual) 	April, 2023
- Cornell University	April, 2022
 Georgia University of Technology 	April, 2022
- University of California, Santa Barbara	March, 2022
- University of Minnesota (virtual)	March, 2022
 University of Waterloo (virtual) 	March, 2022
- University of Utah	February, 2022
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- University of Toronto (virtual)	February, 2022
 Pennsylvania State University (virtual) 	February, 2022
- EPIC meeting, University of California, Berkeley (virtual)	February, 2022
- Ohio State University (virtual)	January, 2022
 CSAIL, Massachusetts Institute of Technology (virtual) 	October, 2021
- Microsoft (virtual)	January, 2021
- Megagon Labs (virtual)	February, 2021
- University of Pennsylvania (virtual)	February, 2021
 DATA Lab, Northeastern University (virtual) 	January, 2021

Teaching

· University of Utah

- CS 6530 - Advanced Database Systems (graduate)	Fall 2025
 CS 6959/3960 - Human-Centered Data Management (graduate + undergraduate) 	Spring 2025
- CS 5353/6353 - Deep Learning (graduate + undergraduate)	Fall 2024
 CS 6959/3960 - Human-Centered Data Management (graduate + undergraduate) 	Spring 2024
- CS 5353/6353 - Deep Learning (graduate + undergraduate)	Fall 2023

• University of Dhaka, Bangladesh

- CSE 1201 - Fundamentals of Programming (undergraduate)	Spring 2014
 CSE 1211 - Fundamentals of Programming Lab (undergraduate) 	Spring 2014
 CSE 1102 - Discrete Mathematics (undergraduate) 	Fall 2014
 CSE 2101 - Data Structures and Algorithms (undergraduate) 	Spring 2015
 CSE 2111 - Data Structures and Algorithms Lab (undergraduate) 	Spring 2015
 CSE 3113 - Microprocessor and Assembly Language Lab (undergraduate) 	Fall 2015
 CSE 1111 - Fundamentals of Computer and Computing Lab (undergraduate) 	Fall 2015
 CSE 2112 - Object Oriented Programming Lab (undergraduate) 	Spring 2016
 CSE 2212 - Design and Analysis of Algorithms Lab (undergraduate) 	Spring 2016
 CSE 4111 - Artificial Intelligence Lab (undergraduate) 	Spring 2016

• United International University, Bangladesh

- CSI 219 Discrete Mathematics (undergraduate)
- CSI 121 Structured Programming Language (undergraduate)
- CSI 122 Structured Programming Language Laboratory (undergraduate)
- CSI 228 Algorithms Laboratory (undergraduate)
- CSI 233 Theory of Computing (undergraduate)
- CSI 341 Artificial Intelligence (undergraduate)
- CSI 342 Artificial Intelligence Laboratory (undergraduate)

Student Supervision

PhD Advisor: Current

Whanhee Cho	Fall 2023–present
Anirudh Kamath	Fall 2024–present
Shamit Fatin	Fall 2025–present
Aritra Mazumder	Fall 2025–present

PhD Advisor: Past

 Chetan Bajaj 	Spring 2025
Shivi He	Fall 2023–Fall 2024

Thesis Committee Member

Anirudh Kamath (MS)Kutay Eken (MS)	Spring 2025 Spring 2025
Masters & Undergraduate	
University of Utah	
 Kuangfei Long, Boston University Tal Blau, Technion - Israel Institute of Technology Shreya Raj, UMass Amherst Vijaysurya Vempati (MS) William Erignac Ziming Wang Holden Ellsworth (MS) Bhavya Chopra, University of California, Berkeley Yuqing Wang, University of Wisconsin-Madison (DREU by CRA, Project Report [29] Rania Saber, University of California-Riverside (DREU by CRA, Project Report [30]) Qiaoyi Cai 	
University of Dhaka	
 Quazi Marufur Rahman (MS) Amit Mandal Mehedi Hasan Nitish Ranjan Bhowmik Kazi Mazbah Uddin 	2015 2015 2015 2015 2015
Mentorship	
• Microsoft	
 Bhavya Chopra (Predoctoral Research Fellow) [PhD student at UC Berkeley] Yang Shi (Research Intern) [Assistant Professor at Utah State University] Chethan Mahadevaswamy (Predoctoral Research Fellow) [Data Scientist at Microsoft 	2022–2023 2022] 2021–2022
University of Massachusetts Amherst	
 Maliha Islam (PhD) [Now at Microsoft] Hasnain Heickal (PhD) Oscar Youngquist (MS) Julian Killingback (MS) Kanchi Masalia (MS) Lucy Cousins (MS) Genglin Liu (Undergrad) Armand Asnani (Undergrad) Nischal Dave (Undergrad) Zoey (Jingyi) Sun (Undergrad from Smith College) Lauren Beryl Larson (REU) (Undergrad from Wellesley College) Michael Satanovsky (High-school Intern from Hopkins School) 	2020–2021 2021–2022 2021–2022 2020 2019–2021 2020 2019–2020 2019 2018 2017 2017
Professional Service	
Internal Service	
 Member, Faculty Recruiting Committee, KSoC Graduate Admission Committee, KSoC Member, Research Support/Opportunities Committee, KSoC Panelist, Graduate Student Mentoring Panel on "How to get a job in industry?", KSoC 	2025 2025 2024 2024

 Founder and Advisor, Grad-CS Women, KSoC (gradcswomen-utah.github.io) Graduate Admission Committee, KSoC Faculty Advisor, Women in Computing (wic.utahclubs.org) Mentor of 1st Year PhD Student (Ishrat Jahan Eliza), KSoC 	2024–present 2024 2023–present 2023
• Co-founder of UtahDB Research Center (mod.cs.utah.edu)	2022–present
External Service	
Program Committee and Workshop Organization	
 ACM SIGMOD International Conference on Management of Data (research track) Workshop Chair, Data-AI Systems (DAIS), co-located with ICDE (dais-workshop-icde.github.io) IEEE International Conference on Data Engineering (ICDE) (research track) International Conference on Very Large Databases (VLDB) (demonstration track) International Conference on Very Large Databases (VLDB) (research track) ACM SIGMOD International Conference on Management of Data (demonstration track) ACM SIGMOD International Conference on Management of Data (research track) GUIDE-AI: ACM SIGMOD Workshop on Governance, Understanding, and Integration of Data for Effective and Responsible AI IEEE International Conference on Data Engineering (ICDE) (demonstration track) ACM SIGMOD International Conference on Management of Data (demonstration track) ACM SIGMOD International Conference on Management of Data (research track) IEEE International Conference on Data Engineering (ICDE) (Ph.D. Symposium) ACM SIGMOD International Conference on Management of Data (research track) International Conference on Very Large Databases (VLDB) (research track) 	2026 2025 2025 2025 2025 2025 2025 2025
 ACM SIGMOD International Conference on Management of Data (research track) International Conference on Very Large Databases (VLDB) (research track) International Conference on Extending Database Technology (EDBT) (demonstration track) ACM SIGMOD International Conference on Management of Data (research track) International Conference on Extending Database Technology (EDBT) (demonstration track) International Conference on Very Large Databases (VLDB) (demonstration track) 	2022 2022 2022 2021 2021 2021
Other Reviewing and Community Service	
 Mentor of Xuan Luo (Simon Fraser University) at New Researcher Symposium, SIGMOD Reviewer of the TKDE Journal Reviewer of the VLDB Journal Reviewer of the VLDB Journal Reviewer of User Interface Software and Technology (UIST) Session chair at International Conference on Extending Database Technology (EDBT) External reviewer of ACM CHI Conference on Human Factors in Computing Systems External reviewer of ACM SIGMOD International Conference on Management of Data 	2024 2024 2023 2021 2021 2021 2021 2018–2020
Problem Setter & Judge of Competitive Programming Contests	
 State University Bangladesh Inter-University Programming Contest, Bangladesh SAARC Programming Contest, Bangladesh University, Bangladesh Islamic University of Technology ICT Fest, Bangladesh SAARC Programming Contest, Bangladesh University, Bangladesh Bangladesh Informatics Olympiad, National Round, Bangladesh North South University Inter-University Programming Contest, Bangladesh ACM International Collegiate Programming Contest, Dhaka, Bangladesh 	2015 2014 2014 2013 2013 2013 2012