

# AMATYA SHARMA

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Department Of Computer Science and Engineering

Indian Institute of Technology, Kharagpur

## EDUCATION

**Indian Institute of Technology (IIT), Kharagpur**  
5<sup>th</sup> Year Dual Degree (B.Tech + M.Tech)  
Computer Science and Engineering Department

*August 2017 - Present*  
GPA 9.61/10  
Rank 5

## WORK EXPERIENCE

**Computer Science Department, IIT Delhi | Summer Research Intern**

Apr 2021 - present

**ExaCC, Oracle R&D | Summer Intern**

May - Jul 2021

**Computer Science and Automation, IISc Bangalore | Winter Research Intern**

Dec 2019

**Computer Science and Automation, IISc Bangalore | Summer Research Intern**

May - Jul 2019

## PUBLICATIONS & RESEARCH

**On Guillotine Separable Packings for the Two-dimensional Geometric Knapsack Problem**

*Published at SoCG'21*

*May 2019 - March 2020*

*Contributed Talk by me at HALG'21*

*Coauthors: Arindam Khan (IISc), Arnab Maiti (IIT Kgp), Andreas Wiese (U of Chile)*

- Designed an Approximation Algorithm (PPTAS) for a of 2-Dimensional Guillotine Geometric Knapsack.
- Improved previous best approximation factor for both weighted and cardinality cases of the problem.

**On Parameterized Complexity of Liquid Democracy**

*July 2019 - December 2019*

*Published at CALDAM'21*

*Coauthors: Palash Dey (IIT Kgp), Arnab Maiti (IIT Kgp)*

- Devised Parameterized Algorithms for Computational Social Choice Theory problem of Liquid Democracy.
- Established results on para-NP-Hardness, FPT Algorithms and LP formulation w.r.t different parameters.

**Weighted k-server problem**

*May 2021 - Present*

*Mentor: Prof. Ashish Chiplunkar (IIT Delhi)*

- Formulated online randomized algorithm for a variant of weighted k-server problem.
- Mitigated the gap between established upper bound and lower bound complexities.

**The Art Gallery Problem : A Survey**

*July 2020 - January 2021*

*Submitted to ACM Computing Surveys Journal*

- Studied NP-hardness,  $\exists R - Completeness$  and bounds on AGT problem
- Analyzed numerous approximation and parameterized algorithms for AGT.

**Parameterized Complexity of Margin of Victory**

*Jan 2020 - Jun 2020*

*Mentor: Dr. Palash Dey (IIT Kharagpur)*

- Formulated algorithms for Game Theoretic problem of computing Margin of Victory for tournament solutions.
- Contrived parameterized algorithms with parameters including tree-width for the NP-Hard problem.

## SOFTWARE PROJECTS

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### HTTP Authentication

*May 2021 - July 2021*

- Implemented Java Library for secure HTTP Authentication using Java Cryptography Architecture.
- Summer intern Project at Oracle ExaCC team.

### Shoten

*Jan 2019 - July 2019*

- Web Application serving as Online Book Store and Print Shop
- Implemented a website to serve as an e-book store and print request portal on institute level
- GitHub Repository Link: <https://github.com/aaysharma/Shoten>

### TinyC Compiler

*July 2019 - Nov 2019*

- Compiler for language TinyC, a subset of C with a reduced subset of functionalities.
- Implemented parser and lexer with output as non-optimized machine level assembly language instructions.
- Code Bases and Languages employed: Yacc, BISON, FLEX, C, C++
- GitHub Repository Link: <https://github.com/aaysharma/TinyC-Compiler>

### RISC Processor

*July 2019 - Nov 2019*

- Developed Reduced Instruction Set Computer Processor and simulated on FPGA Spartan 3 boards.
- Designed a single cycle executable processor using Verilog for a subset of MIPS instructions.
- GitHub Repository Link: <https://github.com/aaysharma/RISC-Fuggit>

## SKILLS AND COURSE WORK

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<b>Algorithms</b>	Approximation and Online Algorithms, Algorithmic Game Theory, Advanced Graph Theory, Parameterized and Randomized Algorithms, Computational Geometry
<b>Other Courses</b>	Deep Learning, Advanced Machine Learning, Natural Language Processing,
<b>Software &amp; Tools</b>	MySQL, Java Cryptography Architecture, Matlab, HTML, CSS, JSP, Python, C++, C, GIT.
<b>Other Relevant Courses</b>	Linear Algebra, Discrete Mathematics, Algorithms, Operating Systems, Computer Networks, Software Engineering.
<b>Languages</b>	English, French, Hindi.

## ACADEMIC ACHIEVEMENTS

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<b>Department Rank</b>	Currently holding Department Rank 5 in the Computer Science Department.
<b>Department Change'19</b>	Changed Department to CS (first year) with rank among top 10 at IIT Kharagpur.
<b>JEE Advanced'17</b>	Attained an All India Rank of 1464 among 1.7 lakh students in JEE Advanced 2017.
<b>SJVN Merit Scholar'17</b>	Awardee of SJVN Merit Scholarship for performance in Senior Secondary Examination.
<b>NTSE'15</b>	Recipient of National Talent Search Examination (NTSE) Scholarship (State Rank 1).
<b>RIMC'13</b>	Secured National Rank in top 60, State Rank 1 in Rashtriya Indian Military College Exam.

## EXTRA CURRICULAR

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Co-Founder Annapurna, an initiative working against global poverty, hunger and wastage of food resources.