



Ashutosh Kumar Verma  
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UG Third Year (B.Tech.)  
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Examination	University	Institute	Year	CGPA / %
Graduation	IIT Bombay	IIT Bombay	2018	7.91
Intermediate/+2	ISC	City Montessori Inter College, Lucknow	2016	94.17
Matriculation	ICSE	City Montessori Inter College, Lucknow	2014	95.67

## RESEARCH INTERNSHIP

### Automatic Repair of SonarQube Bugs in Java Projects

Guide: Prof. Martin Monperrus

[May-July'18]  
KTH Royal Institute of Technology, Sweden

- Used INRIA's Spoon library to create a system to automatically repair SonarQube bugs in java code
- Implemented automatic repair and test cases for 5 different Sonar-Java bugs
- The System repaired 102 Sonar violations and merged 6 pull requests in Spoon's master branch
- Contributed to development of Sniper Mode of Spoon for clean source-to-source transformation
- Found and reported several inconsistencies in source position of spoon elements

## INTERESTS

- Software Engineering, Program Repair, Data Structures & Algorithms, Competitive Programming

## TEACHING EXPERIENCE

### Teaching Assistant: Data Structures & Algorithms Lab

TA for Prof. R.K. Shyamasundar

[Autumn'18]  
IIT Bombay

- Responsible for setting algorithmic problems, evaluation and helping students in the lab

## TECHNICAL PROJECTS

### Railway Controller using VHDL

Course Project | Guide: Prof. Supratik Chakraborty

[January-April'18]  
IIT Bombay

- Designed and implemented a railway signaling controller on a FPGA board using VHDL
- Used FPGALink library for communication with a computer running backend written in C
- Implemented UART communication to connect boards directly to exchange information

### Courspace

Course Project | Guide: Prof. Kavi Arya

[September-October'17]  
IIT Bombay

- Developed a Web app supported by a Django backend to provide a method for interaction between students and professors
- The web app serves as interface for students and teachers to discuss about the course. Provides options for homework assignments submission and further remarks on it from the teachers

### Compiler for C-like Language

Course Project | Guide: Prof. Uday Khedkar

[January-April'19]  
IIT Bombay

- Developed a compiler for a C-like language. Used Lex and Yacc for tokenising and parsing, to create Abstract Syntax Trees, symbol tables and later translate to MIPS assembly code
- Supported functionalities like function calls, if-else statements, loops and arithmetic expressions

## 2D - Gravity Simulator

Course Project | Guide: Prof. Amitabha Sanyal

[February-March'17]

IIT Bombay

- Implemented a N body gravity simulator using functional programming in Racket
- Achieved  $O(N \log(N))$  upper bound for each time step using divide and conquer strategy adapted from a research paper by Andrew W.Appel titled “An Efficient Program For Many-Body Simulation”

## Minesweeper Game using Racket

[January-April'17]

Course Project | Guide: Prof. Amitabha Sanyal

IIT Bombay

- Used functional programming language Racket to develop the classical game of Minesweeper with randomized positions of mines, timer and ability to flag mines
- Used Racket Graphical Interface Toolkit to make the game look attractive and user friendly

## Other Projects

- **Rule based Syntactic Parser** (Course Project | Guide: Prof. Amitabha Sanyal): Implemented a syntactic parser for a small rule-based language given its grammatical rules [March-April'16]
- Designed a **Tele-Communication System**(Course Proect | Guide: Prof. Bhaskaran Raman) which transmitted bitstreams using color detection and with error correction. [January-February'18]
- **XLR8** (Electronics Club, IIT Bombay): Designed a manually controlled bot capable of negotiating obstacles in its path in stipulated amount of time for XLR8 competition [September'16]

## ACADEMIC ACHIEVEMENTS AND SCHOLARSHIPS

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- Secured All India Rank 14 in **KVPY SA** Stream out of 60,000 candidates [2014]
- Achieved 25th place among 255 teams and **Honourabe Mention** in **ACM International Collegiate Programming Contest**, Amritapuri Regionals 2017-2018 [2017]
- Secured All India Rank 221 in **JEE Advanced 2016** among 200,000 candidates [2016]
- Awarded **Advanced Performer's (AP)** grade in **Multivariable Calculus** at IIT Bombay [2016]
- Awarded the **National Talent Search Examination (NTSE)** scholarship by National Council of Educational Research and Training (NCERT), Government of India [2014]

## TECHNICAL SKILLS

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**Programming:** Proficient : Java, C/C++

Moderate : Python, Bash, Scheme, Prolog, Assembly, Javascript, VHDL, SQL

**Softwares :** Spoon, Matlab, L<sup>A</sup>T<sub>E</sub>X, Git, Make, AutoCAD, SolidWorks, Gnuplot, Linux

## KEY COURSES UNDERTAKEN

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**Computer Science:** Data Structures & Algorithms(+ Lab), Software Systems Lab, Operating Systems(+ Lab)\*, Database(+ Lab)\*, Compilers(+ Lab)\*\*, Computer Architecture(+ Lab)\*, Discrete Structures, Automata Theory\*\*, Artificial Intelligence\*\*, Abstractions and Paradigms for Programming(+ Lab), Logic for Computer Science, Digital Logic Design(+ Lab), Cryptography

**Mathematics** Real Analysis, Multivariable Calculus, Linear Algebra, Differential Equations

\* To be completed by November'18

\*\* To be completed by April'19

## EXTRA-CURRICULARS

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- Won the 1st position in **Logic General Championship** conducted by MnP Club, IIT Bombay
- Won **Gold medal** in Inter-Hostel **Chess General Championship** [2016]
- Became a buddy for exchange students from other countries, to help them adjust to campus life
- Awarded **Hostel Color** for excellent contribution to technical activities in Hostel 2
- Solved more than **500 algorithmic problems** on competitive programming websites like Codeforces, Sphere Online Judge, Timus Judge, PKU JudgeOnline, Atcoder, Project Euler, etc