# Rohan Bavishi

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## CONTACT & PROFILES

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## RESEARCH INTERESTS

Program Analysis & Verification **Program Synthesis** Compiler Optimizations

## RESEARCH-RELEVANT SKILLS

Source Code Knowledge:

Expert: CBMC • Intermediate: Z3

API Knowledge:

Proficient: MathSAT | MiniSAT

# RFI FVANT COURSEWORK

**Fundamentals of Computing** Data Structures & Algorithms Discrete Mathematics Introduction to Electronics Mathematics - Calculus Mathematics - Linear Algebra Logic for Computer Science Abstract Algebra **Computer Organisation Operating Systems** Theory of Computation Advanced Algorithms

## PROGRAMMING SKILLS

C • C++ • Python • ŁTFX• Bash HTML • Verilog

# **COMPETITIVE PROGRAMMING**

**SPOJ** 

SOLVED: 145 | WORLD RANK: 964

**Project Euler** SOLVED: 234/502

INDIA RANK: 12 | WORLD: 895

## **FDUCATION**

B.Tech | Computer Science | INDIAN INSTITUTE OF TECHNOLOGY, KANPUR Expected July 2013 - Aug 2017 | GPA: 9.6/10.0 (Overall)

HSC | Class 12 | SHIVAJI SCIENCE COLLEGE, NAGPUR

May 2013 | Aggregate: 90.16%

AISSCE | Class 10 | MODERN SCHOOL, NAGPUR

May 2011 | Aggregate : 96.4%

# **RESEARCH PROJECTS**

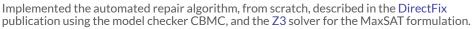
# Fault localization using Craig Interpolants

July 2015 - Ongoing | Under Prof. Subhajit Roy | (Source will be released after publication) Ongoing research project in fault localization, using the CBMC model checker, coupled with interpolation procedures from the MathSAT 5 solver.

- Modified major sections of CBMC to accomodate trace formula generation for test-cases.
- Added significant number of modules in CBMC for efficient interaction with the MathSAT interpolation engine.
- Developed a working version of the state-of-the-art fault localization tool BugAssist for comparision. Quality of our tool's fault localization results is higher as compared to BugAssist.

# **DirectFix Implementation in CBMC**

May 2015 - July 2015 | Under Prof. Subhajit Roy | Tode



 Added multiple modules in CBMC to use the trace formula to generate the component based encoding (CBE) to be passed as an SMT-Lib formula to Z3.

# ACADEMIC PROJECTS

## Median Algorithms for Disk-Resident Data

Aug 2014 - Nov 2014 (Second Year) | Under Prof. Surender Baswana | Aug 2014 - Nov 2014 (Second Year) Independently developed a 2-pass deterministic and a 2-pass randomized algorithm to find median of large data-sets (1 Terabyte) with performance tests.

- Deterministic algorithm similar to the original paper by Munro-Paterson(1980) An  $\epsilon$ -approximate median is calculated in the first pass, followed by the exact median value in the second pass.
- Randomized algorithm employed basic random-sampling techniques using Mersenne-Twister PRNG. Success probability close to 0.6 achieved for medium-sized data-sets (10-50 GB)

## Peer-to-Peer Dropbox

Aug 2013 - Nov 2013 (First Year) | Under Prof. Subhajit Roy | P2P Dropbox

A Linux application for back-up and syncing of files between two or more peers

- Users have a shared folder across different machines, with local copies, in which any changes made are synced across all devices
- Linux inotify API used to track changes in the shared folder and rsync used to sync the modifications to ensure efficient transfer
- Multithreading with mutexes used to parallelize syncing and file-monitoring operations

#### AWARDS & ACHIEVEMENTS

- Academic Excellence Award 2013-2014
- Secured an All-India-Rank of 202 in JEE Advanced 2013 amongst 150,000 candidates
- Secured an All-India-Rank of 175 in JEE Mains 2013 amongst 20,00,000 candidates
- Secured an All-India-Rank of 33 in AMTI Mathematics Olympiad 2013
- Best Overall Student (2011-2013) Shivaji Science College, Nagpur