Shivansh Rai

Fourth Year Undergraduate
Mathematics and Scientific Computing
Indian Institute of Technology, Kanpur

shivansh@freebsd.org
shivansh
shivansh.github.io
+91-7755047792

EDUCATION

IIT KANPUR
Bachelor of Science in Mathematics and Scientific Computing | 2014 – Ongoing

CLASS XII	CLASS X
2014 • CBSE	2012 • CBSE

TECHNICAL SKILLS

PROGRAMMING LANGUAGES
C/C++ • Go • Shell (bash/sh)
Haskell • Python • Java

WEB DEVELOPMENT
TypeScript • Angular • Django

UTILITIES
Git • Docker • Kubernetes

OPERATING SYSTEMS
Ubuntu • FreeBSD

COURSEWORK

Operating Systems
Compiler Design
Computer Networks
Linux Kernel Programming
Functional Programming
Data-Driven Program Analysis
Data Structures and Algorithms
Theory of Computation
Computer Systems Security
Computer Organisation
Computational Methods
Fundamentals of Computing

INTERESTS

Operating Systems
Statistical Program--Analysis
Web Development
Compiler Design
Computer Networks
Functional--programming

AWARDS

- **Google Devfest** '16, IIT Kanpur: Winning team member ***(link)***
- **Capture the Flag Codefest** '16, IIT BHU: Ranked 44 among 648 participants
- **Takneek** '15, IIT Kanpur: First runner up in Web-Dev, an annual web development competition ***(link)***

WORK EXPERIENCE

GOOGLE SUMMER OF CODE '17 *github.com/shivansh/smoketestsuite*
FreeBSD | May 2017 – August 2017

- Developed an infrastructure to automate generation of tests for all the utilities in the FreeBSD base system
- Discovered and fixed a bug in the implementation of ln(1) utility in FreeBSD ***(link)***
- All code was reviewed, improved and pushed to production

GOOGLE SUMMER OF CODE '16 *github.com/shivansh/tcptestsuite*
FreeBSD | May 2016 – August 2016

- Developed test scripts for regression testing of TCP/IP stack implementation in FreeBSD using Google's packetdrill
- Discovered and reported a bug in the behavior of TCP stack implemented in FreeBSD-11.0-Release ***(link)***
- All code was reviewed, improved and pushed to production

FULL STACK DEVELOPER
New York Office, IIT Kanpur | September 2015 – Ongoing

- Worked in a team setup on a large scale polyglot web application with an extensive technology stack
- Developed features for frontend using Angular2 and features for backend using Scala

PROJECTS

A MIPS COMPILER FOR GOLANG *github.com/shivansh/gogo*
Prof. Subhajit Roy | January 2018 – Ongoing

- Implemented a compiler for a subset of the Go language using Go
- Used the gocc compiler toolkit for generating the lexer and parser, while also contributing improvements to the toolkit
- Implemented peephole optimizations and reaching definition analysis to optimize the generated MIPS assembly
- Working on implementing a mark-and-sweep garbage collector

B+ TREE BASED KEY-VALUE STORE *github.com/shivansh/kiwi*
Prof. Amey Karkare | January 2018 – April 2018

- Implemented a B+ Tree based persistent key-value store in Haskell and Go
- Analyzed and drew comparisons among the two implementations based on metrics such as performance, runtime memory requirements and difficulties encountered during implementation

STATISTICAL BUG LOCALIZATION *github.com/shivansh/bugLocate*
Prof. Subhajit Roy | September 2017 – November 2017

- Worked on the problem of localizing bugs in a given C program using statistical approaches
- Wrote an instrumentor using Rose compiler for learning correlations between all the branches in a given C program, thus helping in branch prediction