Akash Trehan
Computer Science & Engineering
Indian Institute of Technology Bombay
Specialization: Software Security

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UG Third Year (B.Tech.)
Male
DOB: 21 May 1997

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2019	9.66
Intermediate/+2	C.B.S.E.	Guru Ram Dass Public School	2015	94.80
Matriculation	I.C.S.E.	St. Joseph's Convent School	2013	96.83

Pursuing B.Tech. (Hons) in Computer Science and Engineering

Academic Achievements

- **Department Rank 3** in the Computer Science batch
- Secured **All India Rank 24** in **JEE Advanced** out of 150,000 students
- Received IIT Bombay's **Institute Academic Prize** 2015-16
- Secured **100.00 percentile** in JEE Main amongst **1.5 million** students across India
- Awarded the **Kishore Vaigyanik Protsahan Yojana** (KVPY) Fellowship by Department of Science and Technology, Govt. of India
- Awarded the **National Talent Search Examination** (NTSE) scholarship by National Council of Educational Research and Training (NCERT)

Internships and Research Projects

- **Improving Fuzzing of Javascript Engines** *(May '17 – Present)*

Guide: Prof. Giovanni Vigna and Prof. Christopher Kruegel *University of California, Santa Barbara*

  - Used instrumentation-guided **genetic algorithms** in fuzzers to trigger unexpected behaviour in JS Engines
  - Made modifications to American Fuzzy Lop (AFL) which resulted in **faster block coverage**
  - Found a bug in Apple **Safari's javascript interpreter** - JavaScriptCore
  - Generated environments for automated running of experiments using **kubernetes** and **docker**

- **Isolated Network Infrastructure for Security Experiments** *(Dec '16 – May '17)*

Guide: Prof. R.K. Shyamasundar *IIT Bombay*

  - Set up a network of VMs mimicking an infrastructure with a DNS, Mail, Proxy, Web, Log and Time server
  - Used **vagrant combined with VirtualBox** to ease the process automatic generation of Virtual Machines
  - Implemented mini-projects using the infrastructure, to demonstrate **dictionary attacks, stack smashing and Man-in-the-Middle (MITM) attacks**

Open Source Contributions

- **OWASP ZeroDay Cyber Research Shellcoder** | *Open Web Application Security Project*
  - Implemented a new **OSX x86 shellcode module** using **assembly programming** for penetration testing on OSX. This module was **successfully demoed at DEFCON 2016**
  - Made various enhancements to improve the user experience
- **SymEngine** | *Fastest Symbolic manipulation library written in C++*
  - Implemented a new Infinity class to handle calculations which could lead to infinitely large values
  - Added new mathematical functions for manipulations of symbolic polynomials and other trigonometric functions

Key Development Projects

- **EVENTual - Sharing events through QR codes** | *Institute Technical Summer Project (Jan '16 – Feb '17)*
  - Created a platform for **creating and sharing events** easily, automating the task of filling details in the calendar by creating shareable links and QR Codes
  - Implemented a **Django backend** to serve the EVENTual website and **Android app**
  - Implemented security features like generating random URLs for events to allow use of privately shared events

- **Smashing the Stack** | *Guide: Prof. R.K. Shyamasundar, Course Project* *(Apr '17 – May'17)*
  - Demonstrated techniques for **exploiting buffer overflows**, bypassing Data Execution Prevention (DEP) using **ret2libc attack** and bypassing Address Space Layout Randomization (ASLR) protection with **NOP spray**
  - Demonstrated techniques to arbitrary memory reads and writes by exploiting **format string vulnerabilities**
- **Institute Hacker News** | *Student Technical Activity Body (STAB) - IIT Bombay* *(Apr '16 – Present)*
  - Website to help students share interesting technical information they find on the internet and have discussions
  - Implemented the backend using the **Django** framework for managing database, authenticating users using Single Sign On(SSO) login and managing upvotes and comments on various shared links
- **LendIt - Book lending website** | *InOut Hackathon - NIT Surat* *(Aug '16 – Aug'16)*
  - Implemented a backend using Django for user interaction, sending notifications, searching and lending books, maintaining a user profile, a database of books lent and borrowed by each user among other features
  - Got selected among the **top 5** development projects among 50 projects and went through to the final round
- **Real-time Chat Application** | *Guide: Prof. Varsha Apte, Course Project* *(Apr '17 – May '17)*
  - Built a multithreaded chat server using **Linux socket programming** in C, with LDAP login support
  - Implemented secure salted password hashing, using **Argon2i algorithm**, for storing passwords in sqlite3 databases
  - Implemented Android and command line client application with features like friend requests, blocking, last seen and group chat
- **Checkers with AI** | *Guide: Prof. Varsha Apte, Course Project* *(Sep '15 – Oct '15)*
  - Used **Minimax** to make a one player checkers with Computer as opponent
  - Used the 'simplecpp' library, developed by Prof. Abhiram Ranade at IIT Bombay, for the graphical components

Other Projects

- **Feed'er** | *CS251 course project under Prof. Sharat Chandran* - Android app linked to a website supported by a Django backend for collecting feedback from students for various course offerings at IIT Bombay
- **Breakout** - The classic game of breaking bricks to get points made in C using Stanford Portable Library
- **Video RPG** - Video Role Playing game developed for Kandy Hackathon
- **Stopwatch with Arduino** - Fully functional stopwatch made by programming an Arduino and an LCD screen

Technical Achievements

- **Runner Up** in **Yahoo! Japan hackathon** 2017 at IIT Bombay
- **2nd Runner Up** in **Microsoft code.fun.do** 2016 at IIT Bombay
- **2nd Runner Up** in **Kandy Sugar Hackathon** 2016 organised by kandy.io and Web & Coding Club
- **1st** position in **XLR8 2015** for making a remote controlled obstacle crossing robot
- Participated in various Capture the Flag **cybersecurity competitions** under Seasons of Code initiative
- **Conducted a 4-hour hands-on workshop** in freshman year on **Arduino programming** for **50+** students

Position of Responsibility

- **Founder & Manager** | *CSE Cybersecurity Club - IIT Bombay* *(Nov '16 – Present)*
  - Organised lectures and gave talks on various topics related to hacking and upcoming trends in Cybersecurity
  - Conducted various Capture the Flag sessions focused on teaching cyber attacks to students in an engaging way
- **Web Convener** | *Student Technical Activities Body(STAB) - IIT Bombay* *(May '16 – May '17)*
  - Maintaining and adding features to all websites relating to the technical work in the institute
  - Developing new websites to promote technical awareness and sharing of technical knowledge among students
- **Volunteer** | *Web and Coding Club - IIT Bombay* *(May '16 – May '17)*
  - Coordinating events and **heading Information Security sessions**
  - **Co-mentor** of Rattlesnake, a project under the Seasons of Code initiative to teach **Python** to beginners

Programming Skills

C/C++, Python, Bash, x86-assembly, x64-assembly, JAVA, Javascript, Django framework, HTML, CSS, jQuery, Docker, Vagrant, LaTeX, Arduino, Git, Make, CMake, MATLAB