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**B.Tech.**  
**Gender: Male**  
**DOB: 09-06-1999**

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2021	
Intermediate	CBSE	Sunrise Modern School	2017	93.60%
Matriculation	CBSE	Campus School	2015	10

## SCHOLASTIC ACHIEVEMENTS

- **Gold** Medal in 7<sup>th</sup> International Olympiad in Cryptography NSUCRYPTO (2020)
- Country rank **4** and world rank **25** amongst 25000 Capture The Flag teams on CTFtime.org (2021)
- Secured **2nd** position in Capture The Flag competition in 8th Inter IIT Tech Meet (2019)
- Secured institute rank **1** and overall rank **19** in HackIITK Hackathon out of 12500 participants (2020)
- Country rank **5** and world rank **367** combined across all hacking and challenge sites on **wechall.net** (2020)
- Secured All India Rank **59** in **JEE Advanced** among 200,000 students in India (2017)
- Secured All India Rank **368** in **JEE Main** among 1.2 million students across India (2017)
- Secured All India Rank **194** in Kishore Vaigyanik Protsahan Yojana (2017)
- Amongst the **National Top 1 percentile** in both **NSEP** and **NSEC** (2016)

## ROLES AND RESPONSIBILITIES

### Manager, Cybersecurity Club IITB

Summer 2020 — Present

- **Spearheaded** a team of 10 people for planning and organising sessions, talks and **CTF** contests
- Developed and maintaining active wiki and blog site about cybersecurity with **1000s** of daily visitors worldwide
- Organized intra institute two-day **Capture The Flag** competitions with active participation of 250 people

### Project Intern at BOSCH

Summer 2019

- Worked on Embedded systems, **IoT**, **LoRa** and various sensors for POC and prototype development
- Developed, theorized and programmed the required concepts and algorithms for creating a prototype product for processing on-line data and controlling the desired components on embedded system using **Arduino Mega**
- Responsible for the development of **Smart Shift** mobile application for android devices which enables communication between **embedded system** and mobile application for user via bluetooth

### Developer at goDutch Pay

Winter 2018

- Responsible for end-to-end design, development and production of commercial website and its deployment
- Implemented front end design using **React** and back end using **Firebase** for **cross-platform** compatibility

## PROJECTS

### Pyfractal

Self Project — Summer 2020

- Developed an easy to use, fully documented **Python Library** for generating brainfilling fractal curves
- Integrated intuitive **GUI** using **Tkinter** enabling understanding of fractals without mathematical background
- Packaged ready to use, **open-sourced**, multi-platform binaries for out-of-the-box working software

### Malware Detector-Classifer

Self Project — Summer 2020

- **Developed** a malware detector cum classifier based on static analysis of program ensuring **zero risk** to host
- Processed **50GB** of malware and benign files to train high accuracy and f-score ML model for certain classification
- Engineered high importance features based on practical malware analysis for **low overhead** of computation

### BotNet Detector

Self Project — Summer 2020

- Developed a network analysis tool for detection of **Peer-to-Peer** botnet infected hosts and traffic in network
- Analysed **47 Million** botnet and benign packets for anomaly based machine learning model used in detection
- Deduced network flows for transmission of botnet malware and further communications between infected hosts

### Prime and Prejudice

Self Project — Summer 2020

- Implemented **adversarial** pseudo prime generation algorithm against any base **milller-rabin** primality tests
- Generated pseudo primes of density rarer than  $2^{-80}$  to fool primality testing of in-use cryptographic libraries
- Optimized and generalized algorithm to generate arbitrary size pseudo-prime against all practically large bases

## Blockchain e-Voting

Self Project — Summer 2020

- Developed consortium blockchain based e-voting system using **Proof of Authority** consensus mechanism
- Implemented **coercion-free** and verifiable voting mechanisms to ensure liquidity of democracy
- Developed authentication servers, voting interfaces, bootnodes and leaf nodes using **Flask**

## Chip-9 Emulator

Self Project — Winter 2019

- Developed a Proof-Of-Concept hybrid Intel **8080** and Gameboy emulator with memory mapped IO for inputs
- Developed CISC supporting **220** CPU instructions and handling events on **128x64** instruction controlled screen
- Implemented CPU flags, 7 8-bit registers, 3 16-bit **hybrid** registers, serial I/O and 64kB main memory

## BASEic Steganography

Self Project — Summer 2020

- **Invented** a steganographic tool for producing base-confusing strings of standard encoding mechanisms
- Exploited base conversion algorithms to detect patterns in encoded and decoded strings of english alphabet

## COURSE PROJECTS

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### Secure Personal Cloud | Course: Software Systems

Autumn 2018

- Developed a web application and a command line linux client for a cloud based file system for multiple users
- Implemented full **client-side** encryption for web client using **SJCL** and linux client using **pyCryptodome**
- Implemented support for multiple simultaneous clients with automatic sync of files between client and server

### SAT-Solver | Course: Abstractions and Paradigms

Spring 2018

- Implemented **SAT** solver based on **DPLL** algorithm in functional programming paradigm in Racket
- Implemented recursive literal assignment and backtracing for finding satisfying assignment of formula in CNF

### OSPF Protocol for Routers | Course: Digital Logic Design

Spring 2019

- Implemented Open Shortest Path First protocol in **VHDL** for building forwarding tables on routers
- Modified the standard OSPF protocol and packets to increase the efficiency of data transfer and processing

### Art Generation with GAN | Course: Artificial Intelligence and Machine Learning

Autumn 2019

- Implemented Deep Convolutional Generative Adversarial Networks to generate art from art datasets
- Image dataset collected by scraping Google image art datasets and converted to 64X64 using bilinear interpolation

### Shell File Server Client | Course: Computer Networks

Spring 2019

- Developed a shell-based file server using **Socket programming** capable of handling multiple concurrent clients
- Implemented user authentication and multiple sockets for a user enabling simultaneous parallel downloads

### Regular Expression Parser | Course: Abstractions and Paradigms

Spring 2018

- Implemented basic level string matcher Linux-CLI utility **egrep** using functional programming in **Racket**

## TECHNICAL SKILLS

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<b>Programming</b>	Python, C, C++, bash, SageMath, Racket, javascript, java
<b>Development Tools</b>	Git, GitHub, Docker, Jekyll, AWS
<b>CTF Tools</b>	Ghidra, Wireshark, Nmap, Cutter, IDA, gdb, Z3, pwntools
<b>Software Tools</b>	Arduino, Android Studio, Unity, Matlab

## COURSES UNDERTAKEN

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<b>Electives</b>	Network Security and Cryptography, Web Mining and Information Retrieval *, Automated Reasoning *, Introduction to Blockchains and Cryptocurrencies *
<b>Coursera</b>	Google IT Automation with Python <b>Specialization</b> , AWS Fundamentals Automated Reasoning: satisfiability, Cryptography-I Stanford, Introduction to Applied Cryptography <b>Specialization</b>

\* to be completed by December 2020

## EXTRA CURRICULARS

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- Community moderator, contributor and amongst top **50** players at **cryptohack.org** (2020)
- Participation in **40+** international Capture The Flag events in 2020 and **25+** in 2021 (2020)
- Frequent blog and writeups creator for cryptographic ciphers and challenges in weekly CTF contests (2020)
- Secured **First** position in Intra Department Badminton Tournament (Mens' Doubles) (2018)
- Secured **Third** position in XLR8, Remote Controlled bot making competition at IITB freshmen year (2017)
- Secured **Third** position in Potpurri Competition in Freshiezza, a college freshman competition (2017)
- Completed a year long course under National Sports Organization (**NSO**) in Table Tennis (2017)
- School **Head Boy** at Campus School CCSHAU, Hisar (2014)