

Pursuing a minor in **Computer Science and Engineering** from the Department of CSE, IIT Bombay

## SCHOLASTIC ACHIEVEMENTS

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- Secured **All India Rank 25** out of 150K+ students in **JEE Advanced 2020** (2020)
- Secured **All India Rank 207** out of 1.02M+ students in **JEE Mains 2020** (2020)
- Qualified to appear for **INPHO**(Indian National Physics Olympiad) among 400 students (2020)
- Qualified to appear for **INCHO**(Indian National Chemistry Olympiad) among 600 students (2020)
- Obtained a score of **402 out of 450** in BITS Admission Test (**BITSAT**) (2020)
- Awarded the prestigious **Kishore Vaigyanic Protsahan Yojana** (KVPY) fellowship conducted by **Govt. of India** by securing **All India Rank 225** among 50K+ enrolled candidates (2019)
- Awarded the **National Talent Search Examination (NTSE)** scholarship by NCERT, Govt, of India (2018)

## PROFESSIONAL EXPERIENCE

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### Research Intern

**AI/ML Accelerator for AJIT Processor**

Guide: Dr. Madhav Desai | E-Yantra, IIT Bombay

(June 2022 - July 2022)

- Developed a **vectorized convolution subroutine** in SPARC V8 assembly to accelerate **2D convolution** for the **AJIT** processor, the first Made in India Processor developed at IIT Bombay
- Achieved a speed up of more than **3** times over a **Naive C Convolution** and more than **2.5** times over **Tiled Convolution** when tested for a **224x224 image** with single threaded implementation of the function
- Implemented **dual threaded** convolution and explored advantages of multithreading with SIMD instructions

### DRDO, Bangalore

Shri Paramananda Jena | Scientist F | LRDE, DRDO

(December 2021)

- Reviewed various **technical advancements** and got exposed to various **radar applications** like **GPR** (Ground Penetrating Radar), **TWIR** (Through Wall Imaging Radar), **BFSR**(Battle Field Surveillance Radar) and **RF testing facility** at Electronics and Radar Development Establishment (LRDE), DRDO
- Explored **Kalman Filter For Target Tracking** and concepts such as **QR decomposition**, **Given's Rotation**, **CORDIC Algorithm**, **Back-Substitution** and **Matrix Multiplication in FPGA**

## PROJECTS

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### Reduced Instruction Set Architecture

Course Project | EE309: Microprocessors

(April 2022)

- Designed a **16 bit computer system** with **8 registers** to execute **17 different instructions**
- Implemented a **multi-cycle processor**, **IITB-RISC-22** using the provided ISA
- Designed the **flowcharts** ,**control logic** and **datapath** and implemented the entire **processor** in **VHDL**
- Facilitated in the designing of the **Pipeline based Implementation** of the processor for better performance

### Microprocessor Laboratory

Course Project | Microprocessor Laboratory

(Spring 2021)

- Programmed **Pt-51 micro-controller** using **embedded C** to simulate an **ATM** with an interfaced **LCD** display
- Established serial communication using a **USB-UART** module and successfully executed **ATM query** algorithm
- Developed a **Temperature Monitor** by interfacing **LM35** sensor using **ADC MCP3008** and **SPI** with Pt-51 board to obtain real time temperature readings

# Digital Design Using VHDL

Course Projects | Digital Circuits Lab

(Autumn 2021)

- Implemented a **Mealy** type Finite State Machine(**FSM**) which acts as a **string recognizer** and tested it to find occurrence of letters of a given word in a **random string**
- Designed a 2-bit control, **4-bit ALU** capable of performing Concatenation, Addition, left shift and XOR operation
- Designed a simplified functional model of **ATM** that calculated the number of different denominations required to sum up any given value entered by the user giving priority to higher denomination
- Implemented and tested all designs, using a testbench, on the **CPLD** from Altera MAX V family with Quartus

## Spanning Tree Protocol

Course Project | CS224: Computer Networks | Guide: Prof. Varsha Apte

(October 2021)

- Modelled **Spanning Tree Protocol** on a network of LAN and Bridges through a python program
- Given a topology, each bridge would establish the status of each of its port as **root**, **designated** and **null port**.
- Studied **communication mechanism** between various **layer-2** structures of computer network by printing the flow of messages sent and received by each bridge till the spanning tree is established during simulation

## TECHNICAL SKILLS

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<b>Languages</b>	C++, Python, HTML, CSS, VHDL, MATLAB
<b>Other softwares</b>	Quartus, MS Office, L <sup>A</sup> T <sub>E</sub> X, Git, Keil, Ngspice. Arduino, Wireshark

## POSITION OF RESPONSIBILITY

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**Department Academic Mentor** | Electrical Engineering Department, IITB (June 2022- Present)

- Selected to be a part of a team of **46** mentors out of **100+** applicants via a rigorous procedure consisting of SoP, extensive peer reviews and rigorous interview process
- Co-mentoring 9 sophomores on a one to one basis and inspiring them for academic and co-curricular endeavors
- Compiling necessary academic resources to ensure smooth journey for sophomores throughout the year

**Teaching Assistant** | **Mathematics Department, IITB** (January 2022- March 2022)

Under: Prof Saurav Bhaumik, Prof. B.K Das | MA-111: Integral Calculus

- Among the **39** students selected for teaching a batch of **45** UG freshmen in their course of Integral Calculus
- Conducted weekly problem solving sessions and ensured personal interaction to cater any conceptual doubts

## KEY COURSES UNDERTAKEN

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<b>Electrical Engineering</b>	Analog Circuits, Digital Systems, Signal Processing, Probability and Random Processes, Power Engineering, Microprocessors, Electronic Devices, Control Systems, Communication Systems*, EM Waves*
<b>Computer Science and Mathematics</b>	Design and Analysis of Algorithms*, Data Structures and Algorithms, Computer Networks, Computer Programming and Utilization, Calculus, Linear Algebra, Differential Equations, Complex Analysis
<b>Other Courses</b>	Economics, Basics of Electricity and Magnetism, Quantum Physics, Biology, Engineering Graphics & Drawing

\* To be Completed by November 2022

## EXTRACURRICULARS

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- Completed a year-long training as **Cadet** at **NCC, IIT Bombay**
  - Participated in **Battle of companies** and took part in a **photography competition**, **fitness challenge** and **map reading competition** during the training at NCC
  - Participated across 4 racquet sports in Rackethlon, a team sports competition at IIT Bombay
  - Attended a **Python Workshop** conducted by seniors of IITB learning various packages
  - Participated in **Treasure Hunt**, a group puzzle solving event organised by E-Cell, IIT Bombay
  - Active member of the **Ethics Club** at **DPS, Rourkela** for one year
  - Completed five out of eight levels of **Abacus**