



Manish Kumawat
Computer Science & Engineering
Indian Institute of Technology Bombay

200050071
B.Tech.
Gender: Male
DOB: 16/10/2002

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2024	
Intermediate	CBSE	Tagore Public School	2020	96.60%
Matriculation	CBSE	Tagore Public School	2018	93.60%

SCHOLASTIC ACHIEVEMENTS

- Achieved **All India Rank 343** in JEE-Advanced out of over 0.15 million candidates (2020)
- Secured **All India Rank 194** in JEE-Main among 0.86 million other candidates (2020)
- Secured the **KVPY** fellowship, with All India Rank of **602**, based on a written exam & interview (2020)
- Qualified for **INChO** (Indian National Chemistry Olympiad), among 802 other students (2020)

INTERNSHIP EXPERIENCE

Web Development Intern Summer 2023

Verifyr AI

- Developed the **1st iteration** of an automated model verification site using **React** and **Flask** frameworks
- Connected backend to **PostgreSQL** database using **SQLAlchemy** ORM for secure and optimized queries
- Used **Axios** for implementing GET and POST requests, **ChartJS** library for displaying graphs and **Material UI** to implement tabular components with **Asynchronous** display of large datasets

KEY PROJECTS

Compiler for a C-like Language Spring 2023
Guide: Prof. Amitabha Sanyal | Course Project IIT Bombay

- Developed a compiler with support for **C** features such as **static arrays, pointers, structs and functions**
- Implemented a **lexical analyzer** for the grammar of the language using **Flex** lexical analyzer generator
- Implemented a **parser** for the language by writing **Syntax Directed Translation Schemes** in **Bison**
- Performed **Semantic Analysis** and **Type Checking** for assignments expressions and function calls
- Generated **X86 Assembly** code directly from **Abstract Syntax Trees** and **Symbol Tables** using **Sethi-Ullman** algorithm for **register allocation and management**

Ray Tracing Summer 2022
Self Project

- Developed a **Multi-threaded Ray Tracer** in **C++** with support for multiple **object** and **material** types
- Implemented multiple **mesh** types with surface materials like **Diffuse, Metal** and **Dielectric**
- Added a positionable camera, **Anti-aliasing** for edge-sharpening and **Motion Blur** for moving objects
- Implemented surface textures and **Image Texture Mapping** for mapping images onto sphere surface
- Implemented **Bounding Volume Hierarchies** to accelerate ray-world intersection, **rotation & translation**

Skribbl.io Autumn 2021
Guide: Prof. Amitabha Sanyal | Course Project IIT Bombay

- Developed an **online multiplayer game** wherein players take turns to draw and guess a picture
- Implemented public and private lobbies for **text chat communication** using **Socket.io**
- Implemented a **Canvas** board using which players can draw onto the screen using **HTML5** and **Javascript**
- Worked on a **voice call and video call** functionality by integrating **Socket.io** and **Simple-peer** libraries

OTHER PROJECTS

Rush Hour Game

Guide: Prof. Ashutosh Gupta | Course Project

Spring 2022

IIT Bombay

- Implemented a solution to **Rush Hour** board game with multiples cars and mines using **Z3Py SAT Solver**
- Devised a **Bounded Model-checking** based strategy with **SAT** encoding for states and state transitions

P2P Cryptocurrency Network Simulator

Guide: Prof. Vinay Riberio | Course Project

Spring 2023

IIT Bombay

- Implemented a **Discrete Event Blockchain Simulator** in C++ with a **random** connected network
- Simulated **Selfish & Stubborn Mining Attacks** with various values of adversary mining power

Tetris

Autumn 2021

Self Project

- Developed a fully functional version of the classic **Tetris** game using **Godot** game engine
- Utilized an **occupancy array** to implement the linear **movements** and **rotations** of the blocks

Peer-to-Peer File Exchange System

Spring 2022

Guide: Prof. Kameswari Chebrolu | Course Project

IIT Bombay

- Implemented a simple **P2P** file exchange network between multiple clients using **C Socket Programming**
- Developed an exchange system allowing **request and download** of files from atmost 2-hop neighbors

Modelling in OpenGL

Autumn 2022

Guide: Prof. Parag Chaudhuri | Course Project

IIT Bombay

- Developed a **Cuboid-based** modeller with **movable camera** and **state persistence** using **OpenGL API**
- Implemented a **humanoid and bike** model capable of **physical movements** using Hierarchical Modelling

To-do List App

Summer 2021

Learner's Space

Web and Coding Club, IIT Bombay

- Developed a **To-do List** app using **Firebase** authentication and **Firestore** for storing task information
- Designed and implemented various features and interfaces of the app using **Dart** and **Flutter** framework

TECHNICAL SKILLS

Programming C++, Python, Bash, AWK, Sed, Dart, NumPy, Pandas, OpenGL, PyTorch

Web Development HTML, CSS, JavaScript, Django, React, Node.js, Flask, SQLAlchemy

Software Git, L^AT_EX, Android Studio, Godot, MATLAB, Unity

COURSES UNDERTAKEN

Systems Computer Networks, Operating Systems, Implementation of Programming Languages, Database and Information Systems, Software Systems Lab, Digital Logic Design, Computer Architecture, Topics in Virtualization and Cloud Computing, Introduction to Blockchains, Cryptocurrencies and Smart Contracts, Computer Graphics

Computer Science Abstractions and Paradigms in Programming, Computer Programming and Utilization, Data Structures and Algorithms, Data Analysis and Interpretation, Discrete Structures, Design and Analysis of Algorithms, Logic for Computer Science, Automata Theory, Game Theory

Machine Learning Medical Image Processing, Machine Learning and Artificial Intelligence

EXTRACURRICULARS

- Completed courses on **Python and its Applications** and **Intro to App Development** conducted by **Web and Coding Club, IIT Bombay** (2021)
- Successfully completed an year-long course in **Yoga** under the **National Sports Organization** (2021)