Manoj Kumar

Second Year Undergraduate
Computer Science and Engineering Department
Indian Institute of Technology, Delhi

Email: manoj.kumar.cs518@cse.iitd.ac.in
GitHub: https://github.com/manoj2601
Mob. No.: +91-9509196171

ACADEMIC DETAILS:

YEAR	DEGREE / EXAM	INSTITUTE	CGPA / MARKS (%)
----	Dual (B. Tech + M. Tech.)	Indian Institute of Technology, Delhi	7.855(Out of 10)
2017	Class XII	Navjeevan Public School, Sikar	98.20%
2015	Class X	ABN Sr. Sec. school, Maulasar(Rajasthan)	93.50%

SCHOLASTIC ACHIEVEMENTS

- **Joint Entrance Examination(Advanced): AIR 119(OB)** among more than **1,500,000** students | *2018*
- **Joint Entrace Examination(Mains)**: **AIR 405(OB)** among more than **1,500,000** students. | *2018*
- Secured **3rd merit** in Class XII (RBSE board) among more than **2,000,00** students who appeared in the exam. | *2017*
- Awarded with a **silver medal** by **Educational Minister of Rajasthan** for performing exceptionally well in class 12th. | *2018*

ENGINEERING COURSES

- **Computer Science and Mathematics:** Programming Languages*, Computer Architecture*, Digital Logic and Systems, Data Structures and Algorithms, , Discrete Mathematical Structures, Design Practices*, Introduction to Computer Science
- **Mathematics:** Probability theory and Stochastic Process,Calculus, Linear Algebra and Differential Equations,
- **Electrical:** Signals and Systems* , Principle of Electronic Materials, Introduction to Electrical Engineering

MAJOR PROJECTS

- **K-MEDIAN IN A DIRECTED TREE** *Prof. Smruti Ranjan Sarangi | CSE Department (IIT Delhi) | January, 2020 - Present*
  - Implementation of a program which computes a k-median in a directed tree (with edges directed from child to parent) better than $O(Pk^2)$.
  - Uses a space of O(nk) complexity (better than already established O(n2k) space complexity)
  - Already implemented algorithm is NP-hard whereas dynamic programming is used here for efficiency.

  *'k' is the number of resources to be placed ,'P' is the path length of tree & 'n' is number of vertices in tree
- **SOFTWARE COMPARISON** *Prof. Smruti Ranjan Sarangi | CSE Department (IIT Delhi) | December, 2019 - January, 2020*
  - Comparison of softwares used as web browser, pdf reader, music player, mail clients, etc. based on functions.
  - Analyzing the reasons for less efficiency of a feature of one software as compared to other softwares.
  - Debugging the software features of statically linked, non-stripped version of the software using Flamegraph.
  - Replacing less efficient feature of one software with a well efficient corresponding feature in other software.
- **MIPS SIMULATOR** *Prof. Preeti Ranjan Panda, CSE Department (IIT Delhi) | January, 2020 - February, 2020*
  - Developed an general purpose VHDL module that contains the implementation of all the MIPS assembly instructions.
  - A state machine was used to implement the control for the processor. Block RAM was used to store instructions as well as memory data.
  - Demonstrated on FPGA that contains the different components ALU, Register File and Memory and executes MIPS instructions.
- **PRODUCER-CONSUMER PLATFORM** *Prof. Subodh Kumar, CSE Department | August 2019 – September 2019*
  - Implemented a platform for multiple buyers to buy and multiple sellers to sell using thread synchronization and locks in java.
  - Maintained inventory and catalogue which sells product of the most preferred seller using priorities.
  - Solved the problem of multiples threads to remain synchronized and sell the products from catalogue.
- **File upload & download system using Asynchronous Serial Receiver & Transmitter** *Prof. Anshul Kumar | Sept. 2019 – Nov, 2019*
  - Module programmed in VHDL takes in serial data at given baud rate with a higher frequency of receiver to check discrepancies and converts it to 8-bit vector for storage, which is then fed to the transmitter that generates serial data output.
  - Implemented a memory of 256 bytes to store 8-bit vectors and by a single push signal, transmitter transfer all the bit vectors to the computer (GTK terminal) serially. *GTK terminal* is used for communication.
- **SHOOTING GAME** *Prof. Anshul Kumar, CSE Department (IIT Delhi) | September, 2019 – November, 2019*
  - Module programmed a basic shooting game in the form of VHDL code of PmodOLED and constrained it to be performed on Basys-3-Board by connecting a PmodOLED in JA slot of the board with 3 difficulty levels.
  - It consists of the turn on, set brightness and set contrast command sequences of PmodOLED.
- **3D STRUCTURES USING GRAPHS** *Prof. Subodh Kumar | CSE Department (IIT Delhi) | Java | August, 2019 - November, 2019*
  - Implemented Data Structure: Graph by storing vertices and edges to form triangles and linking triangle to construct 3D structures and calculate the topological distance between two triangles, centroid, etc.
  - Implementation was based on good time efficiency of the data structures and the queries answered.

TECHNICAL SKILLS

Programming Languages	:	C, C++ and Java, Ocaml, Prolog, MATLAB, Yacc, Lex, HTML
Hardware	:	Xilinx ISE Design Suite and Vivado (VHDL and Verilog), MIPS assembly
Softwares	:	Autodesk, Android Studio, Visual Studio

EXTRA-CURRICULAR ACTIVITIES

- Certified in **Data Structures and Algorithms Programme (CCDSAP)** by *Codechef.* Codechef | 19th January, 2020
- Built a **Linux Shell** handling of **pipes**, and executing systems commands and libraries by **forking** a child and calling **execvp**. | January, 2020
- Technical Content Writer at www.geeksforgeeks.org *February 2020 - present*
- Selected for **Academic Mentor** of MCP100 for one semester on the basis of academic performance. *Prof. Naresh Datla | Aug 2019 – Dec 2019*
- Hostel Representative of **Indoor Sports Club**, IIT Delhi and regular volunteer in NSS(National Service Scheme) IIT Delhi. | April 2019 – present