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Akash Garg

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Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2017	9.57
Intermediate/+2	C.B.S.E.	De'Saint Public School	2013	92.20
Matriculation	C.B.S.E.	S.G.R.R Public School	2011	10.00

Academic Achievements

- Currently **ranked 5th** out of 96 students in the Computer Science and Engineering department
- Awarded the **Undergraduate Research Award** for R & D project by Dean Academic Programmes, IIT Bombay and was the only freshman to receive the same in 2013-14
- All India Rank **97** (*Zone Rank 5*) among 0.15 million participants in *JEE-Advanced 2013*
- Scored **99.98 percentile** in *JEE Mains 2013* among 1.2 million participants
- Awarded **AP** Grade (awarded to at most **1%** of the class for exceptional performance) in Operating Systems course
- Pursuing **Honors** in Computer Science and Engineering and minor in Management at IIT Bombay

Internships

OCF rule engine and Service Integration

Samsung Electronics, Korea Summer 2016

Received a **Pre-Placement Offer** based on performance and interviews

- Designed an efficient rule execution model for **IoT system** and implemented it on Tizen
- Developed a **service framework** for integrating service apps into the Tizen IoT system
- Implemented tweeting features in an **app plugin** for Tizen using Twitter rest api which can be integrated at runtime into the framework

Modelling E-voting Protocols

Guide: Dr. Steve Kremer, Inria, France Summer 2015

- Studied refinement types and sub-typing system in **Fstar** and modelled **Helios** e-voting protocol in Fstar
- Studied **Civitas** e-voting protocol, modelled it in Fstar and proved its security properties
- Designed new method of implementing Civitas with changes in cryptography and Zero Knowledge Proofs which **improved the time complexity** from n^2 to $nlogn$

Research and Technical Projects

Automated Security Analysis of Java Libraries

Guide: Prof. Amitabh Sanyal, Prof. Amey Karkare Ongoing

- Aim to autmate the detection of security loopholes in java libraries
- Develop formal rules for context insensitive flow sensitive heap analysis
- Implement the rules in datalog and generate facts using logicblox for performing analysis in doop framework
- Scale the analysis for millions of lines of code using souffle and suite tools.

SVM for multi-level converter

Guide: Prof. A. Shukla Spring 2014

Presented a **Research Paper in IEEE Conference**

- Studied SVM algorithm for controlling pulse width modulation in multilevel converter
- Designed new SVM based algorithm for multilevel converters reducing runtime calculation load on converter
- Simulated the behaviour of converter with new algorithm in Matlab

Key Academic Projects

Compiler for C-Like Language

Guide: Prof. Amitabha Sanyal Spring 2016

- Created a compiler for a subset of the C language, for MIPS instruction set
- Implemented optimization such as short-circuit evaluation of boolean expressions
- Used Flexc++ and bison for lexical analysis and parsing of source code

Gotweet

Guide: Prof. N L Sarda Autumn 2015

- Developed a prototype of twitter with features like tweeting, following/unfollowing people, personal messaging, likes, comments etc
- Implemented the database features in relational database with front-end in bootstrap

Othello

Guide: Prof. Siva Kumar G Autumn 2015

- Developed an online one and two player version of board game othello using javascript and HTML5
- Developed bots for multiple difficulty levels based of different heuristics.

Shell based Client for File Server

Guide: Prof. Mythili Vutukuru Spring 2016

- Used socket programming libraries of C to design a file server that can handle multiple clients concurrently
- Programmed a shell based client for file server to support various commands for file downloading with features like signal handling, foreground and background processes.

Buffer Management Strategies

Guide: Prof. N L Sarda Autumn 2015

- Implemented Buffer Replacement Algorithms such as MRU, MFU, LRU and RR and simulated them in ToyDB
- Analysed their performance on different buffer requests and compared them with ideal Belady's Algorithm

Unit Canonicalization and Country Identification Module

Guide: Prof. Ganesh Ramakrishnan Autumn 2014

- Statistically analysed a given sentence and identified the relation being described in it by making use of existing knowledge base
- Used known distributions and processed sentences to assign a confidence score to the country-number pair

Django Web Application

Guide: Prof. S. Chandran Autumn 2014

- Studied Gale Shapely algorithm for finding stable matching and implemented it in java
- Developed a **django based web application** to allow students to fill seat preferences and used the Gale Shapely algorithm implementation for allocating seats

Simulation of Rube Goldberg Machine

Guide: Prof. S. Chandran Autumn 2014

- Created a **2D simulation** for a Rube Goldberg Machine in C++
- Used **Box2D library** to implement real world physical properties of objects

Technical Achievements

- Avid **competitive coder**, with over 500 solved problems on Codechef, Hackerearth, SPOJ
- Currently at **99.9 percentile** on Hackerearth

Positions of Responsibility

Teaching Assistant

Computer Programming and Utilization, Discrete Structures One Semester Each

- Responsibilities included solving doubts in class, preparing problems, grading exams, handling logistics

Interests

Databases, Internet of Things, Algorithms, Software Engineering, Backend Development