Shubham Goel
Computer Science & Engineering
Indian Institute of Technology Bombay

140050086
UG Third Year (B.Tech.)
Male
DOB: 02 Sep 1996

Examination	University	Institute	Year	CPI / %
Graduation	IIT Bombay	IIT Bombay	2017	9.75
Intermediate/+2	CBSE	SGGSCPS	2014	96.80
Matriculation	CBSE	Bhavan Vidyalava	2012	10.00

Pursuing **Honors** in Computer Science and Engineering

Scholastic Achievements

· Currently **ranked 5$^{\mathbf{th}}$** in the Computer Science Department, IIT Bombay
· Secured **All India Rank 6** in IIT JEE Advanced 2014 *2014*
· Secured **All India Rank 50** in IIT JEE Mains 2014 among over 1.3 million candidates *2014*
· Awarded **AP Grade** for exceptional performance in Logic for CS and Digital Logic Design *2015-16*
· Recieved the **Institute Academic Award**, IIT Bombay for exceptional academic performance *2014-15*
· Among the 35 students to attend NIUS 12.1 camp, a program for initiating and guiding students over an extended period of proto-research and promoting undergraduate research *2014*

Olympiads & Scholarships
· **Silver Medalist** at the 46^{th} International Chemistry Olympiad (IChO), Hanoi, Vietnam *2014*
· **Best Theorist and Experimentalist** at the OCSC (Orientation cum Selection Camp) for the 46^{th} IChO *2014*
· Awarded by the MHRD, CBSE, Govt. of Harayana and Infosys Foundation for the 46^{th} IChO *2014*
· Received the Izhar Hussain **Best Solution Award** at the OCSC for the **54$^{\mathbf{th}}$ IMO**, Colombia *2013*
· Amongst top 1% in National Standard Examinations in Physics amongst 37000 candidates *2014*
· Awarded the **KVPY** (Kishore Vaigyanik Protsahan Yojna) Fellowship by Govt. of India *2013*
· Awarded the **NTSE** (National Talent Search Examination) Scholarship by N.C.E.R.T. New Delhi *2010*

Key Projects

Forwarding Schemes in Switched Networks with Probabilistic Faults *Summer 2016*
Guide: Thomas Henzinger *IST Austria*

· Explored different ways of quantifying 'goodness' of a forwarding scheme by assigning them scores
· Designed and implemented a reduction of the scoring problem to SAT counting
· Implemented different iterative and stastical approaches for scoring forwarding schemes
· Proved #P-completeness of the scoring problem, started working on complexity of approximate scoring algorithms
· Gave a talk at IST Austria regarding the same

tusSAT: A FPGA based SAT solver *Spring 2016*

· Designed a VHDL package for representation of atomic variables, clauses and expressions
· Implemented a modification of the DPLL algorithm alongside heuristics for variables selection
· Testing suite built from DIMACS Implementation Challenge: Satisfiability
· Featured among other SAT Solvers on satlive.org

Nodal Domains of Eigenfunctions of Quantum Billiards *Summer 2015*
Guide: Dr Sudhir Jain *BARC*

· Made analytical attempts for solving the Helmholtz equation for the 60°-120° rhombus
· Numerically solved for eigenfunctions of the 60°-120° rhombus using the Method of Fundamental Solutions (MFS)
· Developed a modification to the Hoshen-Kopelman Algorithm for counting nodal domains

Django Webapp: Branch Allocation *Autumn 2015*

· Reduced branch allocation to a modification of the stable matching problem
· Implemented the branch allocation backend using specifications mentioned in the IIT Bombay rulebook
· Created interactive user and admin portals for viewing and changing data

Sustenance: An environmental life game *Summer 2015*
Event: code.fun.do Finalists Forum *Microsoft Academia Accelerator*

· Simulated a Food Web in a Windows 8.1 Universal App highlighting the roles of different species in the environment
· Modelled the trophic dynamics of the Food Web using differential equations and implemented the same
· Finished in the top 5 winners in Microsoft's code.fun.do Finalists Forum from amongst 53 teams across 15 colleges

Movie Recommendation Engine *Spring 2016*

· Developed a movie recommendation engine in Python using popular collaborative filtering techniques
· Primarily based on the research done on Single Value Decomposition method during the Netflix Prize competition
· Implemented and tested other machine learning techniques like Baseline predictor and k-Nearest Neighbor Model

Digital Image Processor *Autumn 2014*

· Created a Bitmap Image Editor using a C++ backend and Gtk based Graphical User Interface
· Implemented popular image processing algorithms from scratch, without using any libraries

Other Projects

· **Distributed Hash Breaker**: A client-server load distributing application using socket libraries in C++ that dynamically handles clients and uses brute force to crack passwords
· **YodaAwakens**: A Windows 8.1 Universal App developed in HTML/Javascript for physics tutoring that offers collections of problems based on difficulty levels
· **Rube Goldberg Machine**: A simulation developed in C++ using the Box2D Physics Engine that simulates a complex sequence of pulleys, springs, pendulums and perpetual machines
· **SuBa Dots**: A Cairo-Tiled pentagonal version of the classic Dots game that is developed as a Windows 8.1 Universal App in C Sharp and XAML
· **Arduino Physical Layer**: A demonstration of low level reliable data transfer of the physical layer in the TCP/IP stack using bit manipulation, built on Arduino

Technical Skills

Programming Languages :	C/C++, Python, Bash, Java, VHDL
Software Skills :	Git, MATLAB, GNU Octave, AutoCAD, Mathematica, LaTeX, CMake
Web Development :	HTML, CSS, JavaScript, PHP, Laravel (PHP), Django, MySQL, PostgreSQL

Positions of Responsibility

Web Convener *2015-16*
Student Technical Activity Body, IIT Bombay
· Developed Portals for documentation and registration of participants of STAB events
· Responsible for maintaining the STAB website, modifying content and improving functionality

Teaching Assistant *Autumn 2015*
MA 105 - Calculus
· Mentored 46 1^{st} year students under Prof. V.D. Sharma (Mathematics Department, IIT Bombay)
· Responsible for **teaching** and **evaluating** them, providing feedback to the Instructor-incharge

Academic Resource Person *Summer 2015*
International Physics Olympiad
· Responsible for **grading the theory papers** of participants from 87 Countries across the world
· Responsible for **moderation of marks** with Leaders from participating countries

Batch Representative *2014-15*
B.Tech 1^{st} Year, Computer Science and Engineering
· Represented my batch in the **Department UG Council** and Intra Department events.
· Responsible for Communicating with Professors, Rescheduling Classes, Organising Extra Sessions

Extracurricular Activities

· Won **Bronze** medal in Table Tennis General Championship, IIT Bombay *2015*
· Secured **4**th position in **Line Follower Competition**, a one week autonomous line-follower bot making event organised by Electronics Club, IIT Bombay *2014*
· Successfully completed a 1 year course under the **National Service Scheme** (NSS) IIT Bombay, involving ideation and implementation of solutions to Social Problems *2014-15*
· Attended **Vijyoshi National Science** Camp organised by Indian Institute of Science, Bangalore *2013*
· Represented District Hisar at the **State Level Championship** in **Inline Roller Skating** *2007,2008*