

# SWAPNENDU SANYAL

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## EDUCATION

### Carnegie Mellon University

B.S. in Computer Science

Minor: Mathematical Sciences

**GPA: 3.95/4.0**

#### Key Courses:

- Artificial Intelligence
- Machine Learning
- Computer Security
- Distributed Systems
- Algorithm Design & Analysis
- Embedded Systems
- Parallel & Sequential Data Structures & Algorithms

## TECHNICAL STRENGTHS

### Computer Languages:

C, C++, Python, SML, Java

### Software & Tools:

HTML, Excel, [STRIPS](#), [PDDL](#),  
[NumPy](#), [scikit-learn](#)

## EXTRACURRICULAR

### Awards & Honors:

- University Honors
- [ICPC Boot Camp, Muscat 2019](#)  
Awarded 2nd place
- Qatar University Mathematics Championship '18, '20  
Awarded 3rd place
- Phi Kappa Phi
- [CMU Best Coder Trophy '19, '20](#)
- Outstanding Course Assistant Award (nomination) (thrice)
- CMU Qatar Campus Scholar (nomination)

### Leadership:

- Member - Academic Review Board
- Member - University Disciplinary Committee
- Executive Member - Computer Science Club
- Member - Student Academic Council

### Academic Trip

'Identifying the Drivers of Entrepreneurial Success at its Source' – San Francisco, USA

### Interests:

Competitive Coding, Music, table-tennis, swimming, history

## EXPERIENCE

### Software Development Intern | [Rimads](#) | Dec 2019 - present

*Interactive Differential Diagnosis System using Artificial Intelligence*

- Worked with a diverse team of biologists, medical doctors, and software engineers in a dynamic startup environment.
- Innovated and experimented with algorithms based on the relationship between diseases, and their symptoms and etiologies to effectively diagnose patients.

### Research Assistant | CMU Computer Science Department | May '19 – July '19

*Multi-tiered System for Efficient & Effective Information Retrieval*

- Critically reviewed existing literature to identify scopes of improvement.
- Carried out experiments to determine the possibility of efficiency gains in a multi-tiered inverted index.
- Modified maxscore algorithm for 2 tiers and ran experiments to predict efficiency gains.

### Course Assistant | CMU Computer Science Department | Sep '18 – Apr '20

*Courses: Introduction to Computer Systems | Great Theoretical Ideas in Computer Science | Imperative Computation | Parallel & Sequential Data Structures & Algorithms*

- Helped students understand course concepts and debug programming assignments during meetings and group discussions.
- Graded theoretical homework assignments, quizzes, and coding style.

### Software Development Intern | JSW Steel | Dec '16 – Jan '17

- Used C++ to develop an [automated process](#) that determined alloy requirements for different grades of steel.
- Added capability of prioritizing ferro-alloys based on their cost and composition.

## PROJECTS

### [Distributed File System](#) | Java

- Designed and implemented a DFS with a naming server and multiple storage servers.
- Developed a Remote Method Invocation (RMI) library over TCP to handle communication.
- Added synchronization techniques and intelligent replication strategies for load balancing and performance.

### Machine Learning using *Message Passing Interface (MPI)* and *Map-Reduce* | C & Java

- Implemented the k-means clustering algorithm on 2D points and DNA strands.
- Experimentally compared efficiency between sequential, MPI, and MapReduce implementations over 4 machines.

### [Remote Control Car with Automatic Collision Prevention](#) | C | [Video](#)

- Utilized TIVA C Series Microcontroller to control the car and sensors.
- Used IR sensors to detect remote signals and distance sensors to detect obstacles.
- Worked with different timer modules to synchronize the motors, analog distance sensors, and IR receivers.

### Malloc Implementation | C

- Implemented large parts of the malloc library including malloc, calloc, free, and realloc.

### [Ludo: A Board Game](#) | Python | [Video](#)

- Developed a game that replicated Ludo (dice-based board game) that can be played by 2 or 4 players (with AI features).

### [Classifying Alien DNA](#) | Python | NumPy | [scikit-learn](#)

- Experimented and explored various data exploration, feature engineering and data classification techniques to classify alien DNAs into corresponding galaxies.