FINAL PEY CO-OP REFLECTION REPORT

Name: Hetav Pandya

Discipline: Computer Engineering

Student No.: 1005729124

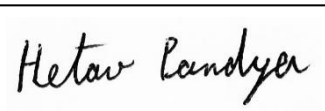
Company Name: Intel Corporation

Term start date: May 5th, 2022

Term end date: April 30th, 2023

Date: 5th August, 2023

This statement confirms that I have reviewed the report and that the information enclosed is correct and contains no confidential or proprietary information.



Introduction

During the September of 2021, I received an offer letter from Intel Corporation to join their Programmable Solutions Group (PSG) after a long recruitment process. The offer was for a 12-month PEY work term that began on May 5th, 2022. My role was that of a 'Software Engineer Intern' and I was assigned to work at the Toronto branch on 150 Bloor Street West.

A consequence to the aftermath of the COVID pandemic, my contract presented me with a hybrid model of work during my term. This allowed me to work either from home or on my assigned cubicle in the office.

This was a major milestone in my career as I was blessed with an opportunity to put the skills I have learned in university, to a real work environment. What particularly attracted me to Intel, was the combination of industry reputation and the presence of talented minds that have worked and are working in this organization.

I was eager to learn more about how multiple teams collaborate to create complicated pieces of software using the fundamental tools which we were taught in our courses. Although such a software helps simplify the lives of millions of people, many of us remain oblivious of its internal complexity.

Accordingly, much of my reflection in this report will encompass a combination of two primary skills that helped in my quest to understand the process of building complex software: Technical skills, Communication and Teamwork.

Reflection

Technical skills

I am and have been sufficiently confident on my technical skills thanks to the numerous courses that have helped me develop and test them. However, I vividly remember my first week in office. I was assigned a task to make a minor change to a workflow. Initially, this seemed like a very simple task.

I soon realized that I understood very little of the code and I was struggling to find my way through it. It struck me that working on a university project was quite different than working on an organizational project.

The key difference being that in an organization you are working on the end result of multiple programmers who have worked on it for decades. Unlike a university project, you cannot just call them and ask them to explain their work. Many of them no longer hold the same positions and some may have even switched organizations.

I raised my concern with my manager in our next weekly meeting and his advice shaped the way I view the process of building software. He agreed that the complexity of a system does increase with time and the number of people working on it. The solution he gave me was to use a concept called “Design patterns”.

These are patterns that programmers developed after years of iteration and have become close to the industry standard. Initially these patterns may seem complicated but in the long run they greatly simplify future maintenance of the code base. Understanding these patterns was the key to understand the code base!

My immediate reaction to this, was “Why did I never hear of design patterns before?” And the answer was quite obvious, I never needed it before! Much of my undergraduate journey was to build software in a team of 3-4 people, with a maximum timeline of six months. I was never put into the position where my code, would affect the people years from now. Hence, what I lacked in my technical toolkit was a vision. A vision to foresee how the changes I make today will affect the people years from now.

My key takeaway from my experience was, that it is important to have a technical foresight when you build products that will be maintained by people long after you have gone.

Communication and Teamwork

In the previous section I talked about the technical foresight I had to develop to become more efficient at my role. However, alongside it there was a second lesson that proved to be equally vital.

When I was given my first project, I immediately dived into framing a technical solution to address it. I was very enthusiastic as I had incorporated my technical learnings in my solution and was feeling fairly confident. I went to my colleague to get some feedback on the same, hoping to get a new perspective.

My colleague listened patiently and had made notes while I was explaining my solution to her on a whiteboard. At the end of my explanation, she pointed out that while my solution was logically sound, it is not ideal. I was disheartened to hear this, but what followed this conversation was very important.

She explained to me that the first step to approach a project is to identify the stakeholders, or people who will be affected by this project. A good technical solution is one that meets all objectives, and you cannot confidently meet the objectives before clarifying them with your stakeholders.

Initially I was very confident with my designs, but I soon realized that many of my objectives though logical were mere assumptions. I went forward with scheduling meetings with different stakeholders and documented my notes. Talking to various teams who would be affected by this project, I was able to formulate a list of objectives that I would then use to design my solution.

I will be honest, the idea to meet with the stakeholders did cross my mind. But I felt that it would be unnecessary to meet with them as they have already communicated their goal. I was clearly mistaken here. Formulating a solution in corporate is quite different that say solving a problem set in university. In university all the required details are provided to you, however, in corporates the first step is to formulate the right problem by communicating with the stakeholders.

My primary takeaway from this experience was that communication is a vital component of any job description. In an organization, poor communication can lead to wasted time and efforts. It might be uncomfortable and intimidating to initiate conversations with people who work in different teams or positions, but it far outweighs the inconvenience that could occur from poor communication!

Hetav Pandya

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Education

University of Toronto — Toronto, CA
Bachelor of Applied Science and Engineering, Computer Engineering *GPA: 3.97* — Sep 2019 - May 2024

Work Experience

Intel Canada - [Data Center and AI Team] — Toronto, CA
Software Engineering Intern — May 2022 - May 2023

- Developed a netlist writer for upcoming Quartus Prime releases to support a new database model.
- Developed an automated testing framework to functionally verify netlist between different stages.
- Worked alongside the router team to create a fix for a business-critical customer issue affecting our top model Agilex FPGAs.

Bell Canada - [Big Data and AI Team] — Toronto, CA
Data Scientist Intern — May 2021 - Aug 2021

- Data querying using Apache Spark, Hadoop, and Impala. Data exploration using Python.
- Converted Impala queries to Trino reducing the time taken by 60% on average.
- Developed an automated system to detect potential flaws in new version releases, reducing detection time from 3 weeks to 15 minutes. Results were shared using MicroStrategy BI.

General Motors Canada (GM) — Toronto, CA
Machine Learning Model Developer — May 2021 - July 2021

- Worked on automating data collection pipeline with data pre-processing and image augmentation.
- Deployed an object detection model using transfer learning on 'my_ssd_mobnet'.
- The model was optimized for real time detection with a mean Average Precision (mAP) of 0.7.

Faculty of Information, University of Toronto — Toronto, CA
Data Analyst Research Intern — Jan 2021 - May 2021

- Analyzed the effects of machine learning on the future path of job creation and disruption.
- Collected raw data from research conferences, package databases and via webscrapping.
- Pre-processed data and generated visualizations for further analysis.

Skills

Programming Languages:	Python, C++, C, Kotlin, JavaScript, Go
Machine Learning:	TensorFlow, PyTorch, OpenCV, Kubeflow
Hardware Design:	Verilog, ARM Assembly, Quartus Prime
Data Analysis:	Hive, Impala, Trino SQL, Power BI, MicroStrategy BI, Hadoop
Project Management:	JIRA, Confluence, Agile - SCRUM, Git, GitHub, Perforce

Extra Curriculars

UofT Engineering Society — Toronto, CA
ECE Board of Director Representative — April 2022 - April 2023

- Elected to represent 700+ students at the highest level of governance in the student-run Engineering Society.
- As a Board Member, I collaborate with other representatives to make executive decisions about the operation of the Society that offers services to 6000+ students at the University of Toronto.

GitHub Education Program — Toronto, CA
GitHub Campus Expert — September 2022 - Present

- Selected as one of the 65 new campus experts globally in the 2022 cohort.
- Part of the organizing team that hosted the first GitHub Field Day in Canada.
- Organized a workshop on transfer learning and several Open-Source workshops on campus.

UofT Machine Intelligence Student Team Toronto, CA
Co-President July 2021 - July 2022

- Managing a team of 180+ active members spread across nine departments using JIRA software.
- Driving collaboration with different clubs and organizations like the Engineering Hatchery, UCL Artificial Intelligence Society, AI@MIT, Harvard Open Data Project and many more.
- Led the team to develop two introductory ML courses: MIST101 and MIST102.

Projects

E-Motion *Python, OpenCV, Selenium* https://tinyurl.com/cyhtt8jr
A computer vision suite that enables users to play games, read e-books and listen to music using hand gestures. It secured the second place at UofT Hacks VIII

ECE-Hustler *C language, ARM Assembly, DE1-SoC board* https://tinyurl.com/d38wrur3
In this game you are an ECE student in the 2nd year at UofT trying to dodge the hurdles we faced! It is an obstacle course compiled on our custom-built ARM processor and displayed on a VGA display.

COVID-19 InfoBot *Python, Selenium, Speech Recognition* https://tinyurl.com/ub8uyavj
A voice assistant that provides users with credible and updated information regarding the COVID-19. It won the Wolfram award at the Hack_The_Virus Hackathon.

Hands2Ears *Python, OpenCV, Speech Recognition* https://tinyurl.com/65ftaddu
A neural network model that helps converting sign language (ASL) to speech in real time. It was chosen as the Bloomberg Challenge winner and second best project in NSBE Hacks 2020.

Personal Website *HTML5, CSS3, Javascript* https://pandyah5.github.io/
A more detailed and informal description of who I am. Built using raw HTML, CSS and PHP from scratch.

Magnum Opus *Python, Neural Style Transfer, OpenCV* https://tinyurl.com/8j9hs2hx
My personal journey of finding "art in mathematics" and "mathematics in art".

Awards

Microsoft Discover AI Challenge on AI Ethics - First Prize Microsoft
Recognized for the AI Ethics Pipeline built during the Hackathon. June 2021

University of Toronto Dean's Honor Award University of Toronto
Awarded for my consistent academic standing above 3.5 GPA in all semesters. May 2021

UofT Hacks VIII - Second Prize UofT Hacks
Recognized for my project E-Motion and my work on computer vision enabled remote monitoring and control. Feb 2021

Edward S. Rogers Dept. of Computer Eng. Top Student Award University of Toronto
Awarded for being amongst the top three students in the Department of Electrical and Computer Engineering. Sept 2020

Wallberg Undergraduate Scholarship Award University of Toronto
Awarded for being amongst the top four students in the Faculty of Engineering, based on academic performance. Sept 2020

Wolfram Award Hack The Virus Hackathon
Recognized for my project COVID-InfoBot based on speech controlled information system. Aug 2020

NSBE Hacks 2020 - Second Prize NSBE UofT
Recognized for my project Hands2Ears, real time ASL to speech conversion. Feb 2020

Bloomberg First Time Hack Winner Bloomberg
Recognized for my project Hands2Ears - "First Time Hack" sub-category at NSBE Hacks 2020. Feb 2020

State Topper Central Board of Secondary Education
Awarded for receiving the highest grade in the province/state of Gujarat for the Annual Grade-12 Examination in India. March 2019

University of Toronto International Scholar's Award Scholarship University of Toronto
This prestigious award is provided to students who demonstrate excellence in academics and a strong desire to learn by participating in a wide range of extracurriculars. May 2019