Yukio Rivera
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## Apple Analysis and Software Engineering

Software Engineering is the process of developing code to be efficient, reliable, and up-to-date. Companies across the globe, in every industry, use software to improve user experience, manage data, increase efficiency, and automate tasks that don't require human interaction. Engineers analyze user requirements and then design, build, test, and implement software that will satisfy those requirements. Software engineering jobs will increase by 22% from 2020 - 2030. (*Bureau of Labor Statistics*, 2021)

There are countless software engineering companies, with new firms created every year, but a few stand above the rest. Each company creates new hardware, services, and the software required for each product. Amazon, Apple, Microsoft, Google, and Tesla are just a few of these innovative firms. These software giants have built the foundation of modern software development and set the standard for software engineers.

## Apple Inc.

Apple has created an ecosystem that provides the user with the power to manage all their devices, data, and services from anywhere with any of their devices. Apple is a corporation known for the development of its own products and software. Apple's many products can be integrated into users' everyday lives and all of it can be managed through Apple's cloud service, iCloud. iCloud provides storage for personal files, pictures, and videos. They develop and manage the software that is used to edit, improve, and manage those files. The user can see the same information from their phone, computer, tablet and, on a smaller scale, watch. The Apple

ecosystem wasn't created for a single product or service but developed over decades of work by its dedicated software engineers.

Apple was established on April 1, 1976 by Steve Wozniak, Steve Jobs, Ronald Wayne. The three met while they all were working at Atari. Wozniak and Jobs owned 45 percent of Apple and Ronald owned 10.  Jobs and Wazniak wanted Ronald to be the tie breaker when they could not agree on something. He was only part of the company for twelve days then decided to sell his shares back to them for eight hundred dollars because he was worried that the financial burden of the company would fall on him since he was the only one who owned assets. Jobs and Wozniak started out building the Apple I in Jobs' garage but sold them without a monitor, keyboard, or casing. They added these peripherals in 1977. The Apple II revolutionized the computer industry with the introduction of the first-ever color graphics, which boosted sales from $7.8 million in 1978 to $117 million in 1980, the same year Apple went public (*Apple's Biggest Milestones*, 2019). In 1985 Jobs was forced out of Apple after a power struggle between him and the company's board of directors. During that time Apple's CEO, Gil Amelio, oversaw the worst financial quarter ever and was at the brink of going bankrupt (*When Microsoft saved Apple*, 2020). In July 1997 Jobs was brought back into Apple and quickly began working on bringing the company back to life. Jobs called Bill Gates and convinced him to invest one hundred and fifty million dollars to Apple, thus saving the company.

Apple continued to create new products every year, making better computers, new peripherals, and improving the processing power of each machine. In 1998 Apple released the iMac which was their first computer to not have a built-in floppy disk drive. Jobs believed that the world would move to CDs, internet downloads, and move away from floppy disks. With the

success Apple was having in the world of computing they began to branch into the music industry. In January 2001 they released iTunes, an easy way to manage music. In October of the same year, they released their first music player, iPod which quickly became one of the most popular music players in the world in combination with iTunes. In January 2007 the iPhone debuted during MacWorld Expo in San Francisco marking the beginning of Apple's yearly release of new iphones. The iPhone has become Apple's main source of revenue and has sold over 2 billion phones since 2007 (*Apple Statistics (2021)*, 2021). In the same year Apple also released Apple TV and changed the company's name from Apple Computers Inc to Apple Inc. As their sales increased, they continued to develop new technologies to introduce into the Apple Lineup. In April 2010 Jobs unveiled the iPad, paving the way for tablets to become a mainstream computing product.

On June 6, 2011 Jobs presented iCloud, a breakthrough set of cloud services that work seamlessly with applications onApple devices to automatically and wirelessly store user content. When anything changes on one device, all of that user's devices are wirelessly updated almost instantly (*Apple*, 2021). This would be Steve Jobs' final keynote presentation before he resigned as the CEO of the company on August 24, 2011 due to medical issues, leaving Tim Cook as CEO. Jobs continued to act as board chairman until he passed away on October 5, 2011. Apple continued to develop products, such as Apple Watch in September 2014 and Airpods in September 2016. However, in March 2019 the company announced that it would begin to focus on services, including Apple TV subscription, Apple news, and ApplePay. The company started off as a computer company but through adapting and evolving with technology it has become a

technology company with ties in phones, computers, entertainment, finances, and software development.

## Major Players

Apple headquarters is located in Cupertino, California with branch locations all over the world called "Apple Stores." Apple employs around 147,000 full-time employees across the world. (*Statista*, 2021) At these locations employees sell and showcase all of Apple's newest products and services. Arthur D. Levinson has been chairman since November 15, 2011 after replacing Steve Jobs. He received his bachelors from University of Washington in 1972 and PhD from Princeton University in 1977. He has received numerous recognitions for his work in biotechnology and management, and much of his work has been published. His executive experience includes Google, Calico, Genentech, and Apple.

Tim Cook is Apple's current CEO, having succeeded Steve Jobs. Before being named CEO, Tim was working at Apple as the chief operating officer, leading the company's worldwide sales and operations. He got his bachelors from Auburn University in 1982 and MBA from Duke University in 1988. Prior to working at Apple, Tim spent 12 years at IBM as the director of North American fulfillment.

Jeff Williams is Apple's current COO, he received his bachelors from North Carolina and MBA from Duke University. Prior to Apple, he worked at IMB from 1985 to 1998 in several operations and engineering roles. He joined Apple in 1998 as head of Worldwide Procurement and became Apple's COO on December 17, 2015.

Luca Maestri is Apple's CFO and was appointed on May 29, 2014. He received his bachelors from LUISS University and masters from Boston university. Prior to working at

Apple, he spent 25 years working in finance as Xerox, Nokia, and GM's CFO.

## Reputation

Apple's fanbase and customers play a huge role in the success of the company. When the company releases a new product, long lines of fans wait for days to be first to purchase the new item. Apple stores are created to provide a positive customer experience. They focus on customer relationships and providing solutions for customers (*The Apple Store Guide to Insanely Great Customer Service*, 2016). However, as great as their customer service is, Apple has had some issues with software throttling.  Apple settled on a $113 million investigation brought by nearly three dozen states regarding its practice of slowing customers' old iPhones (Romm, 2020). It was seen by the general public as an attempt to get users to upgrade their phones by making the older versions unusable.

Apple sets some of the highest standards for its employees in the industry. Employees will work long hours of hard work and it can become a stressful place. Based on hundreds of reviews on Glassdoor written by former employees, however, Apple treats its employees extremely well (*Apple Employees Reveal the 19 Best Things about Working for the World's Most Valuable Company*, 2016). Employees report that the company provides events every few months, resources to continue their education, and transportation from all over the Bay Area to help them get to work. While the average software engineer makes about $77,000 per year (*PayScale*, 2021), Apple's engineers can start with as much as $100,000 per year (*Apple Employees Reveal the 19 Best Things about Working for the World's Most Valuable Company*, 2016). The company demands much of their employees, but most seem to agree that the work is worth the benefits.

**Industry Trends**

Apple continues to grow in revenue, employees, and active users. In 2020 alone, Apple

generated 274 billion revenue-- fifty percent came from iPhone sales alone (*Apple Statistics*

*(2021)*, 2021). Apple's revenue primarily comes from iPhones, but services, wearables, home,

and accessories revenues have been increasing as well. Apple's active users and new users have

shown an upward trend in the last few years. They plan to get into different branches of

technology such as self-driving cars and VR headsets (*Apple Statistics (2021)*, 2021). As

technology evolves, Apple will no doubt develop their own version of each development while

maintaining their current products to modern standards. Apple will release more services and

product lines, and they will require more engineers to manage and maintain the software for the

products.

**My Plan and Preparation**

Apple's growth, innovations, and benefits are why I am interested in being one of their

software engineers for supply chain systems and devops. I am excited about these positions

because they use Python, my preferred programming language. My plan to get into the company

starts with earning my bachelors in computer science through CSUMB's online program. Once I

graduate, I plan to continue earning certificates and taking other classes to continue my

education outside of school. The CSUMB online degree has both core classes and elective

classes. The core classes will teach me the foundations of programming and how to code

effectively. Classes such as CST 370, Design and Analysis of Algorithms, and CST 438,

Software Engineering, will teach me the principles and techniques for developing efficient code

for large scale software development. The program will also teach me operating systems, CST

334, which primarily focuses on Linux. Linux is such a widely used operating system that it's important to know the basics. Not all coursework for this degree is technical. Classes such as CST 462S: Race, Gender, and Class in the Digital World, will contextualize my role in the tech world, broaden my perspective, and inform how I interact with my peers respectfully/mindfully. CST 499: Computer Science Capstone will provide real-world experience in developing a plan to solve a problem and creating a product to solve it. Elective classes such as CST 329: Reasoning with Logic will teach me new skills that can be used to supplement what I learned in core classes . This course will teach me how to analyze and break down an argument and reason out an answer.

While working through the program I will prepare for my career in software engineering by networking with classmates, looking for entry level jobs or internships, creating a portfolio, working on projects to grow my portfolio, and reaching out to people who are working in the positions that I am striving for. I will also research the companies that I am interested in and tailor my portfolio to emphasize my most relevant skills.

Networking and communication are just as important as learning to code because relationships can be bridges to jobs, learning new skills, and sharing resources. Software companies want people who can work with others, get jobs done on time, and who are able to present their work to other people. Soft skills, such as collaboration are critical due to the large scale on which companies like Apple operate. "Without collaboration, it's hard to track progress of development tasks/projects. You have to personally ask every developer for updates; you can't just log on to a tool and see the status of every task there" (Willert, 2020). Verbal and written

communication are important to discuss and convey information to other team members, clients, or employers.

Companies can look amazing from the outside, but the best way to gain insight about how they are on the inside is to ask current employees and former employees about their experiences. They can reveal the company's values, management practices, and internal culture. This information will help me to better determine if the company is a good fit for me.

Software engineering will continue to grow and evolve, and software engineers must evolve with it. Education will be an ongoing process that will continue both inside and outside of work. Researching Apple has provided insight into how far Apple has come and the expectations it has for all its current and prospective employees. I am confident that the skills that I will learn at CSUMB and through my own work will provide the foundation I need to enter the software industry, and I am excited to begin my career.

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