

Statement of Purpose

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I am writing to you today to express my interest in the Penn State Graduate School of Computer Science and Engineering, which sounds like an amazing opportunity and learning experience. Currently, I am working for the Korea Securities Depository (KSD), a company that acts like the Depository Trust & Clearing Corporation (DTCC) in the United States and serves as a back office for stock trading, where I have been employed for over a decade. As a reward for my remarkable achievement, KSD recently agreed to fully sponsor me for my MS degree in the upcoming school year. If selected for this program, I would love to improve upon my software security knowledge and related skills. Especially, I want to focus on applications of information protection in web service and mobile application environment. Since there is a large amount of personal information circulating within KSD, any slight error can result in a devastating breach of security and trust. Moreover, KSD is sure to increase its web services in the future, and they will surely need an expert on information security. I believe that I would be a perfect candidate for this MS program. Because my educational background and work experience have given me the qualities I need to meet the rigors of this demanding course. I bring along with me a strong grasp of fundamentals in computer science, along with a desire to learn, and a zest for challenges.

I was introduced to my very first computer back in elementary school, and, ever since that moment, I was sure that I wanted to pursue a path in computer applications and programming. During middle school, I had already begun assembling computers for my peers. In high school, I discovered that I was interested in the computer programming language C, so I taught myself. I also began to study and how to edit hexa code in files in order to change the characters' abilities in computer games. Though this is common now, back in the early 1990s, this was an incredibly rare skill. Ultimately, my interest in computers led me to the Computer Science program at Pohang University of Science and Technology (or POSTECH), which is one of the best universities in Korea.

During my undergraduate study at POSTECH, I developed a solid background in programming. I believed that strong computer programming skills were essential to my future endeavors, so my coursework primarily focused on the various programming languages, such as C/C++ and JAVA as well as data structures and algorithms. I joined KSD company directly after graduating. Over the 13 years that I have spent there, I have gained an abundance of experience as a developer and a project leader.

Immediately after joining the company, there were many aspects that took me by surprise. First of all, there were many repetitive, manual tasks, which did not seem to be very time effective. Second, there was an excessive amount of redundant and unused sources. Finally, there was too much personal information kept within KSD. For instance, we had access to Samsung Electronics' shareholder information in 2020 is over 2.5 million. However, there was no external service provided by KSD, so technology of information security has not developed much since. For KSD, I initially focused on assisting with what I was familiar with first. I did not know much about security, but I was familiar with their optimization and reusable programs, so I made several services to assist KSD system, which is called E-SAFE. I implemented repetitive manual tasks into batch programs, and I also created a system that enabled users to call the batch programs on demand. This improvement significantly reduced the workload of E-SAFE. Lastly, I also drafted a proposal to create a process that regularly removes source redundancy and unused programs, which was later adopted. My ideas greatly improved the stability and maintenance of the program.

After eight years of joining the company, I became a project leader in the development of an electronic securities program called E-SAFE in recognition of my ability. Building an electronic securities system is a huge task that converts existing real securities into digital ones, and it took a period of 3 years to fully analyze and develop. Since KSD is the only institution in charge of issuing securities in Korea, high reliability was an essential requirement. To achieve this, I changed the design and the structure of the system. I created a new design to have

decreased functional dependency by separating it as simple domain units, but with low abstraction. Because of this design, developers could independently and simultaneously develop each service page, which consequently shortened the development time. The changed system structure increased modifiability so that enabled operators could easily change the service page functions without fully understanding the system for maintenance. It's been two years since E-SAFE opened and it's been working perfectly.

KSD plans to increase public service and wants to foster internal employees as information protection experts. That's why KSD supports all expenses for my master's degree in Penn State Graduate School. Currently, KSD provides two services to the public: E-VOTE, Internet shareholder voting service, and CrowdNet, a public funding system. While KSD is experienced in building such public services, the company is also planning to strengthen its mobile sector. I am eager to work with professor Dr. Patrick Daniel, who is very well known in the security field for his contributions. His research on 'Smartphone application security' could be applied to many of KSD's future mobile services that are under development. I hope to gain more recent and applicable skills to continue expanding KSD's services; Penn State Graduate School would be the place where I progress in my studies to become more professionally and academically adept.

In recognition of my contribution so far, I was selected as a fully funded employee to earn a master's degree at Penn State Graduate School. KSD hopes that I can become an expert in information security and contribute to the company after attending graduate school abroad. With my solid background and work experiences in industry, I strongly believe that I am a well-prepared candidate for my MS degree and will proceed with motivation and dedication. After I successfully receive my MS at the Penn State Graduate School, I will return to KSD to help establish the company's security policy and operate within the public service sector with enhanced information protection.

Thank you very much for your time and consideration.