

BILKENT UNIVERSITY
ENGINEERING FACULTY
DEPARTMENT OF COMPUTER ENGINEERING

CS 299
SUMMER TRAINING
REPORT

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IPEKNET

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1. Introduction

I have done my summer internship at İpeknet. The company provides networking solutions to various companies and institutions. I wanted to gain better insight on and learn about a field as networking which I was not very familiar with. I also believed that for my first internship, it could be better to choose a smaller company which could provide a better environment for me to get familiar with the field, learn and communicate; which turned out to be an accurate assumption.

The remaining of the report consists of information about the company, the work I have done, performance and outcome review and conclusion.

2. Company Information

2.1. About the company

İpeknet has been providing network solutions since 2010. It is a small company providing network solutions to various institutions. The services the company provides include technical support for network systems, network security and logging solutions on wired and wireless networks, PMS software integration and authentication solutions for institutions like hotels. [1]

2.2. About your department

I was part of the development department of the company along with two other interns under the supervision of Metin Akinci.

2.3. About the hardware and software systems

The company's services include both hardware and software systems. The hardware was mostly Windows devices since a lot of the software developed relied on Microsoft products and platforms, namely .NET.

2.4. About your supervisor

I was most of the time under the supervision of Metin Akinci, the manager of the company and also one of the developers in many of their products and services. He has an M.S. CS from Naval Postgraduate School in Monterey, California.

3. Work Done

When I arrived my first job was to set up my work environment along with other interns, install the required software and get familiar with them. I was going to use my own Mac device. Since the company used the Windows platform so frequently, my first actual task was to set up a virtual device. This took the first

couple days since I did not have experience with virtual devices and met some problems with the device.

3.1 Learning Front End Development

Our job was on the front end development, which I was not familiar with before. I have spent the first week learning the necessary skills to develop the front end of websites and Web applications. I have learned and practiced some JavaScript, HTML and .NET skills. Although I was slightly familiar with JavaScript from my classes, most of this was quite unfamiliar for me, and therefore was very beneficial in terms of learning new skills, which was my most important goal in this internship.

In my second week of my internship, I was given the task of replicating some of the previous work the company has done as exercise. I was to build the login pages for Internet access at institutions such as Tüpraş and some hotels.

I spent some time learning how to design the login web page. After I had a working web page, I practiced checking whether the input was valid using Validation tools available for ASP.NET [4], which for example allowed to only accept integers between a certain range for inputs such as ID or room number. Although almost all of what I were to work with were login pages that took some sort of an ID and a password as input, I practiced a bit trying other forms of validation. I tried building sample sign-up pages using custom functions such as password rules that force the user to include or not include certain characters, or that do not allow for the two inputs to be the same, as in for example a user sign-

up page. I have also tried using a package that allows validating that the entered password is not one of the most commonly used ones. [6]

After I was done with this part, I tried linking it to a simple database and validating the input to allow access. Sample ID and passwords were stored in plain text for practice purposes, and since the back end of these processes was not my responsibility and was going to be handled by others. First, I was only slightly familiar with SQL, and therefore I spent some time learning and practicing simple SQL for constructing a database and using it in my code. Using my newly acquired C# and SQL knowledge I constructed a simple database, and then I used that database to check for user input in the login page. The pages also included different options for access such as SMS authentication, but that part was out of the scope of my tasks. After I was done with practicing, I was given the task of building the actual login page for Divan Hotels' and Gloria Hotels' internet access systems which were going to be redesigned. I built the login systems with instructions from my supervisors, some parts of which were coded by my fellow interns and supervisors, and then we collectively put together everything. In the process I also learned a bit about SMS authentications.

3.2 Android Programming

In my third week, my supervisor told me to get myself familiar with Android and build a simple app, with functions similar to the login system I had designed for web. This was going to be written in Java, which I was familiar with, but I was not particularly familiar with Android programming. I spent the day and the next learning basic features of Android. I wrote the code for a simple application with a login screen and a home screen. I have also learned how to include Google

Sign-In as practice. [5] Later I learned that this was not an ongoing project but an exercise for me to get familiar with the skills necessary for Android programming which I would use on another mobile application project. The project however got cancelled, therefore I could not get the chance to work on it. This was beneficial regardless, and pushed me to learn the basics of new platforms.

3.3 Programming with Arduino

Arduino programming was given to me as a side task, as my supervisor told me that it could be fun and educating. They were also using it for a current project that involved automating the operation of water storage units over a network for a private institution, which I could work on later. I spent my free time in my last two weeks practicing with Arduino, getting familiar with programming it. I have done some small projects using LEDs, motors, piezo speakers and LCD screens. Unfortunately neither the time nor my skills were sufficient for me to actually contribute to the project.

3.4 Network Maintenance

Even though I was not tasked with this, maintenance of network systems was also part of the company's job. I observed the support staff doing this work whenever I could to try and learn something about network maintenance. I have gained some knowledge about troubleshooting network problems and network configuration, and even though I did not practice any of this myself, I believe I have benefited from my observations.

4. Performance and Outcomes

4.1. Applying Knowledge and Skills Learned at Bilkent

The skill that was most important for me in this internship was the ability to teach myself that I have developed in Bilkent. I have gone through a lot of tutorials and documentation, and I have gained a significant amount of knowledge in subjects I was not very familiar with before on my own. I did get help from my supervisors, but the ability to self learn and to solve problems on my own was a fundamental aspect of everything I did. I truly realized how much I improved this ability in Bilkent.

I had a significant amount of knowledge about Java and C++, which I have both used directly and were helpful in learning new skills, such as C# programming which was very similar in terms of logic and syntax. The team work I experienced in class projects was also helpful in adjusting to a real work environment. My work also involved working with previous code written by other people, and also integrating my code with others'. My experience in Bilkent proved to be very useful for this work.

4.2. Solving Engineering Problems

Network maintenance was a big aspect of the company's work and it was mostly about dealing with various problems, both on the customer end and on our end. Observing them deal with these issues left me with a good idea on how to approach and solve problems, not just in networks but in general. I also came across problems that I had not encountered before and learned to solved them, either by myself or with the help of my supervisors.

4.3. Team Work

İpeknet is a small company, and the team included one senior engineer and three interns, including myself. We were constantly in the same work environment and there was a strong communication between us. As interns we were regularly discussing our work with each other and helping wherever we could. We also regularly met with our supervisors who checked our work, gave us exercise tasks and helped us when necessary. I also helped one of my intern friends a bit on a side project he was working on that involved a Kinect device and motion capture, and learned a bit about how the device worked in the process.

4.4. Multi-Disciplinary Work

Most of the staff were computer engineers, however one of my fellow interns was studying electrical engineering. I have asked for his help when I was working with Arduino from time to time. Other than that there was not a lot of multi-disciplinary work.

4.5. Professional and Ethical Issues

The work environment and our supervisors' behavior was very professional. I do not remember coming across any unprofessional or unethical actions during my internship. Most of the company's codes were confidential, but our supervisors were happy to provide us with what we needed to work on the project or practice learning a new skill. In turn, we of course respected the privacy of their work.

4.6. Impact of Engineering Solutions

Especially the water automation system the company was developing that I was unable to work on was quite simple in principle, yet very powerful. The workers had to walk to each water tank separated by considerable distances and check them manually, which was a waste of time and labor. With this system, all that was necessary will be checked and performed from a single station. I was impressed with the effect of such a simple solution.

4.7. Locating Sources and Self-Learning

I knew very little about C#, SQL and HTML when I started this internship. I found various tutorials on the internet, and spent a few days learning the basics so that I would be able to work on the tasks that were given to me. [2,3,7,8,9] I also learned about Android programming and what could be done with an Arduino device by myself.

4.8. Knowledge about Contemporary Issues

In this age where everything is connected to everything else in some way, networks are an incredibly important part of computer engineering. This internship gave me the opportunity to observe the importance and workings of network systems and security. I have also gained an insight on the most recent issues in computer engineering during my self learning process.

4.9. Using New Tools and Technologies

Most of the technologies I used such as ASP.NET, Android and Arduino were relatively new to me. I was not even aware of some of the capabilities of the new tools I learned to use, and it broadened my perspective a lot. I have also gained varying levels of proficiency in C#, HTML and SQL during my internship.

5. Conclusions

During my internship, I have had the opportunity to put a lot of what I had learned in Bilkent in practice. Putting my knowledge in use outside of school environment gave me a different perspective on computer engineering, and life in general. I gained experience on how a professional business environment operates, however at the same time I enjoyed working in a relaxed work environment where we could practice, ask for help whenever we needed and work on side projects. I have also practiced three new languages, and learned about a field which I was not at all familiar with before, which was my main goal in choosing a network company. Both of which I believe will be beneficial for me in the remainder of my time in Bilkent, and after. Gaining knowledge about a different field of computer engineering will definitely help me with deciding what I will do when I graduate.

All in all, my time in İpeknet was both enjoyable and beneficial for my future life as a student, and as an engineer. I have gained the experience of a workplace, contributing to an actual commercial project and gained new technical skills. I have also gained connections to people with great experience and knowledge in computer engineering and in the industry whom I can ask for support and advice in the future, which is invaluable.

References

- [1] <http://ipeknet.com.tr/>
- [2] <https://www.youtube.com/watch?v=zWFoZb6EiwU>
- [3] <https://www.tutorialspoint.com/asp.net/>
- [4] <http://www.tutorialsteacher.com/mvc/implement-validation-in-asp.net-mvc>
- [5] <https://developers.google.com/identity/sign-in/android/start-integrating>
- [6] <https://andrewlock.net/creating-a-validator-to-check-for-common-passwords-in-asp-net-core-identity/>
- [7] <https://www.tutorialspoint.com/csharp/>
- [8] <https://www.w3schools.com/html/>
- [9] <https://developer.android.com/guide/>

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Please check the items here before submitting your report. This signed checklist should be the final page of your report.

- ☐ Did you provide detailed information about the work you did?
- ☐ Is supervisor information included?
- ☐ Did you use the Report Template to prepare your report, so that it has a cover page, the 8 major sections and 13 subsections specified in the Table of Contents, and uses the required section names?
- ☐ Did you follow the style guidelines?
- ☐ Does your report look professionally written?
- ☐ Does your report include all necessary References, and proper citations to them in the body?
- ☐ Did you remove all explanations from the Report Template, which are marked with yellow color? Did you modify all text marked with green according to your case?

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