TABLE OF CONTENTS

TABLE OF CONTENTS 5
FIGURES OF CONTENTS 6
1 Introduction 7
2 Internship Organization 8
2.1 Products and Services 10
2.2 Software Development 11
2.3 Web Development 12
2.4 IT Maintenance 12
3 Description of Work 13
3.1 Computer Maintenance Technician 13
3.1.1 Trainings 13
3.1.2 Product Service 14
3.2 Software Development 15
4 Learning Outcome 20
4.1 Learning Outcome 1 20
4.2 Learning Outcome 2 21
4.3 Learning Outcome 3 22
4.4 Learning Outcome 4 25
5 Conclusion 27
6 References 28

FIGURES OF CONTENTS

FIGURE 1 FRONT VIEW OF ENGINEERING SDN BHD 8
FIGURE 2 INTERIOR OF ZUMA ENGINEERING SDN BHD 13
FIGURE 3: P&L FORMAT ENTRY IN DOS 16
FIGURE 4: P&L FORMAT ENTRY IN JAVA 16
FIGURE 5: MONTHLY COSTING ENTRY IN DOS 17
FIGURE 6: MONTHLY COSTING ENTRY IN JAVA 17
FIGURE 7: FIRST AID KIT 24
FIGURE 8: INTERIOR FIRST AID KIT 24

Introduction

In order to fulfil the requirements of the degree regulations to complete the Institute of Professional Engineers (IPENZ) requirements for Engineering Technologist membership of the Institute, I have undergone an Industrial training offered by Zuma Engineering Sdn Bhd (Zuma). I'm currently in my third year, pursuing a Bachelor's degree in Engineering of Computer and Mobile System at Auckland University of Technology (AUT) in New Zealand. I was just finished my second year when I did this internship. I have completed a total of 68 days (7 working hours per day) giving a total of 476 working hours of approved engineering work experience with Zuma undertaken during my summer vacation from 25th November 2013 to 22th February 2014. It was a great experience and opportunity for me to have an internship for three months in Malaysia with Zuma. I chose to do my internship back in my home country because I wanted to learn, improve and develop different new sets of skills which were very different from what I have learnt from AUT. Moreover, I would like to spend more time with my family in Malaysia.

The objective of the program is to gain experience and knowledge of the practice of engineering and to acquire skills and communication, which will be useful for my future study and also employment. The training is definitely a great chance to expose myself to the real world of engineering career.

- to gain experience working in engineering environment
- to understand the technical communicating with customers
- to gain better understanding about software and hardware

This report contains my activities that I have contributed to achieve a number of my stated goals. The report contains the description of the company "how it works" "what services", follow by my work details that I have contributed.

Internship Organization

Figure 1 Front view of Engineering Sdn Bhd

Zuma is an Information Technology company located in the east of Malaysia; Sabah. The company was established in 1979 in Kota Kinabalu which is currently the Headquarters of Zuma Engineering Sdn Bhd (Zuma Engineering Sdn. Bhd, 2014a). Since then, the company expanded throughout Sabah and have three successful branches setup in Sandakan, Tawau and Labuan with over 70 and still rising number of employees in the company. To date, the company has evolved into the area of providing high-end and vertical market together with their respective business partners within Malaysia and Overseas investors. They offer solutions such as Structured Network Cabling, Firewall and Ant-Virus Security, Property Development and Management Applications, Corporate Financial, Executive Information System, Multimedia solution, Document Management system, Internet and Intranet application development and implementation and Remote Sensing on Lands Information (Zuma Engineering Sdn. Bhd, 2014a).

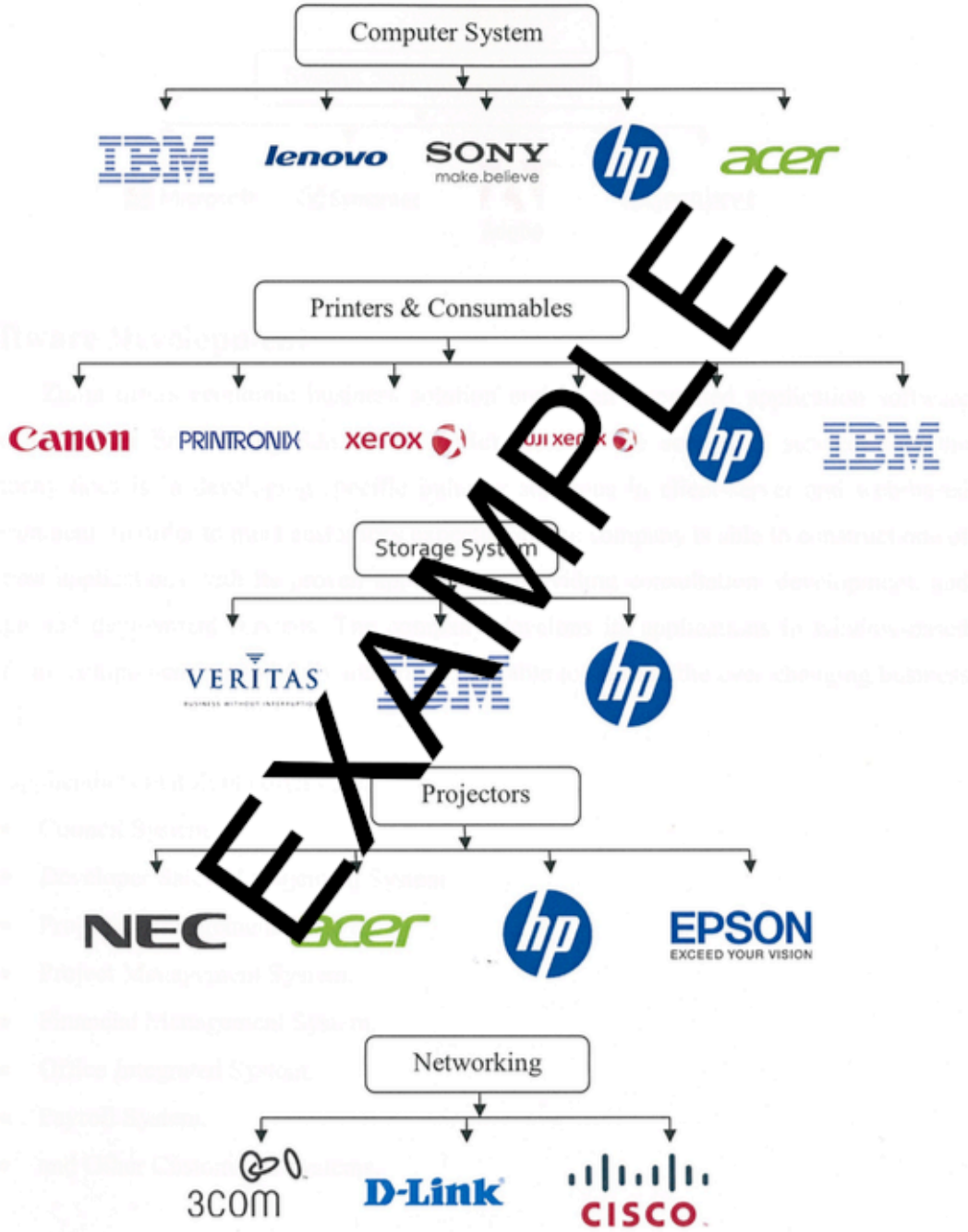
The company's emphasis and strength are in the area of supplying and implementing the state-of-art computer PC and servers, networking and security and relational databases. Other services including but not limited to the maintenance of computer hardware, Training and Rental of IT related products, Software development and Internet applications hosting.

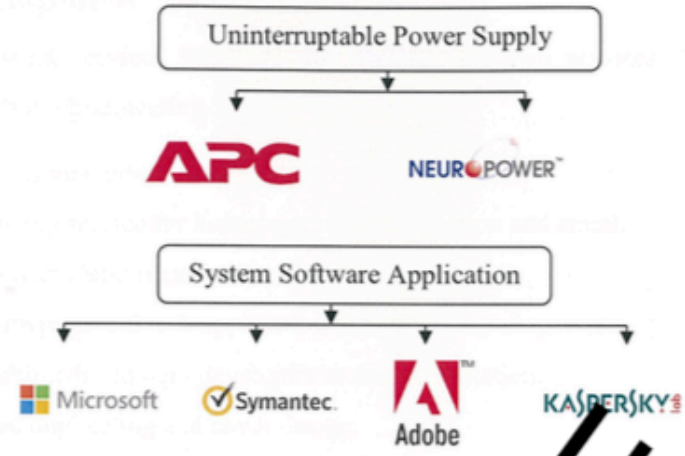
Their installation and support services cover all districts of Sabah, including areas where transportation and electricity are of a major concern.

Zuma company organization consists of four different departments. The four departments are as such technical, software, admin and customer service. Software department plays the main role for the company. Fellow software engineers design, development, testing, problem solving, evaluation of the systems and software, and as a sales engineer. Technical department provide a wide range of IT support services which include installing, repairing and delivery. Customer service department have basic understanding on IT maintenance to handle customer inquiries and payments. Admin provides letters and manage human resources. The work breakdown structure below indicates the organization of the company.

Products and Services

Zuma offers a range of products and services (Zuma Engineering Sdn. Bhd, 2014b) which are summarised in the following:





Software Development

Zuma offers economic business solution and is an integrated application software provider (Zuma Engineering Sdn. Bhd, 2014c). One of the scopes of services that the company does is in developing specific industry solutions in client-server and web-based environment. In order to meet customer's expectation, the company is able to construct one of the best applications with its proven approach in providing consultation, development, and design and deployment services. The company develops its applications in window-based platform, comprehensive and fully integrated, scalable to address the ever-changing business world.

The applications that Zuma offers are:

- Council System.
- Developer Sales Management System.
- Property Management System.
- Project Management System.
- Financial Management System.
- Office Integrated System.
- Payroll System.
- and Other Customised Systems.

Web Development

Web development services in Zuma are divided into two services; Web Services and Technology (Zuma Engineering Sdn. Bhd, 2014d).

Web Services includes:

- Hosting service for homepage, web application and email.
- Domain name registration, transfer and hosting.
- Homepage and web application design and development.
- Multimedia content development and presentation.
- Disc duplicating and cover design.
- Corporate company profile and product catalog design.
- Magazine content design and layout.

Technology Services include:

- Web application development in Cold Fusion and ASP environment.
- Microsoft Access, Microsoft SQL, MySQL and Oracle database engines.
- Homepage and web application development using Adobe Flash and Dreamweaver.
- Multimedia content development and presentation using Adobe Flash and Microsoft PowerPoint.

IT Maintenance

Zuma also offers all types of IT Maintenance plans covering individual on calls to contract-based maintenance services including (Zuma Engineering Sdn. Bhd, 2014e):

- Installing, upgrading and repairing computer hardware and peripherals.
- Providing on call or contract base maintenance service.
- Providing system and software installation, diagnostic and update.
- Eradicating system worms, Trojans, rootkits and viruses if required.
- Restore PCs and laptops to factory default settings.

Description of Work

Figure 2 Interior of Zuma Engineering Sdn Bhd

When I first started working in Zuma, I was assigned to work as a trainee under the supervision of Mr. Melvin Lam Si Yuen, a Senior Programmer in the company. I was only able to learn by observing Mr Melvin working. He would explain and guide me during the process of his work. As Mr Melvin takes a lot of pride in the standard of his work, he would teach me and observe me closely to make sure that I completely understood my tasks, before leaving me to continue by myself. He gave me a lot of opportunities to gain experience by working on multiple tasks.

Computer Maintenance Technician

Trainings

My tasks as a trainee in Zuma also included as a junior IT maintenance technician. My daily job was to format computers, installing updates or software, and testing computer peripherals. When I first started my internship, I was required to participate into workshop trainings where they taught me the proper skills to handle equipment and devices. These trainings were also including with the trainings with other customers. I was able to learn quickly as I had learned some skills from my AUT studies.

During my fifth weeks of training at Zuma, I was required to be familiar with hardware components in the computer. I was taught on how to disassemble the computer components, cleaning components and assemble components on the computer. Then on the software side, I was taught to install and format different kind of operating system operating systems such as IOS, Windows and Linux. This also includes configuring Basic Input Output System (BIOS), WAN / LAN connection and computer peripherals. I was also required to learn proper equipment handling and some safety procedures. After mastering these trainings, I assisted Zuma's clients in installing new software and assemble hardware. This position has pushed me to work outside of comfort zone and adopted new skills such as customer services and communication skills.

Product Service

Zuma, provide services such as ordering, delivery and installing computers peripherals (Zuma Engineering Sdn. Bhd, 2014). When these services are needed by the clients, with a phone call, the company will provide the services at a standard charge. As a technician one of my tasks was to deal with customers that needed installing or repairing services.

Zuma seldom offer services to walk-in customer or individual. Most of the clients of Zuma are range of companies, supermarkets and even several public schools and colleges within the Sabah district. When a client wants to order products, customer service will be the one that serve them. Once order has been made and delivered to the client. The client may request Zuma to install the products or applications for them with charges. Moreover if the client has any device technical issues, they could give Zuma a ring for repairing services. Technicians will be the one that is responsible for installing and repairing devices. Technicians use their own vehicle to travel to client's place and they can claim the vehicle petrol from Zuma. Zuma also provide tool kits for computer hardware and software maintenance such as a roll of cat5 cable (network cables) with length of 30meters, a box of first aid kit and computer peripherals for testing.

The toolkits for computer hardware and software maintenance includes but not limited to

- Antistatic wrist band which it will discharge electrostatics on the body to prevent damage on the computer hardware.

- Magnetic screwdrivers and computer screws, they come in different type and size.
- Network cable crimper pliers for making network cables where it conjoint cat5 cable and Ethernet crystal head. The pliers also have a cutter.
- Network cable tester for testing the electrical connection in the cable.
- Software and System CDs such as window edition, antivirus, media tools and etc.

When the customer service received a technical problem call, they will forward the job to the admin department. Then admin department will then appoint the job to any available technician. Mr Melvin would be the one that arrange the schedule while I was on-standby duty. Mr Melvin drove his own vehicle and I'll ride along. If the work is not completed on that day, we leave them there and continue them the next day but before we leave, we need to clean up the place and bring back any Zuma property such as toolbox. Once we finished the work (installing/repairing) devices/machines, we will show it to the client for their acceptance and check whether the device is properly installed and fully functional. The client would need to sign the acceptance agreement to confirm that the Client has acknowledged and accepted the device is in good condition. This document will be given to admin department to show we have done our job and they can file it for proper record.

Software Development

During the last month of my internship in Zuma, I was given a great opportunity to take part on a project. This project involved converting an existing payroll program from the fourth generation language into the Java language for a company, Thien Hock Sdn Bhd. They have been using fourth generation language (4GL) software since the day the company started in the early 90's. Fourth generation language is a programming language designed late back in 1970s - 1990. It runs using disk operating system (DOS) or Pick-OS. The main reason in this conversion is because the company wanted wider functionalities and better system of the software. As window based program has better functionalities and is widely commonly used these days. There are several advantages for Window based over DOS such as graphical user interface, memory control, multitasking capabilities and multimedia feature.

Thien Hock Sdn Bhd is a noodle production factory/company in Kota Kinabalu, Sabah, Malaysia and one of the main distributor of noodles in East Malaysia. Due to the vast amount of paperwork, documents and storage control, the Company requires a computer software to help manage and control the system more efficiently The software manage the

Company's inventory, financial/accounting needs, customer relationship management, and much more.

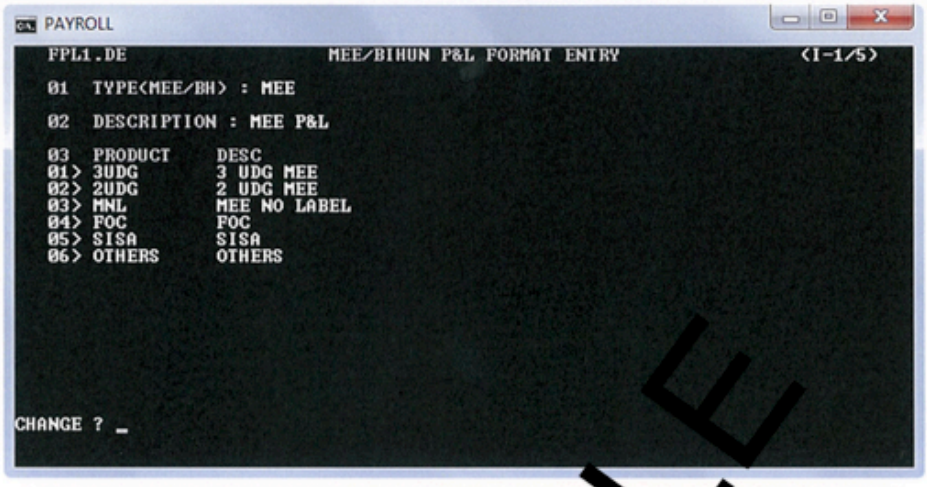


Figure 3: P&L Format Entry in DOS

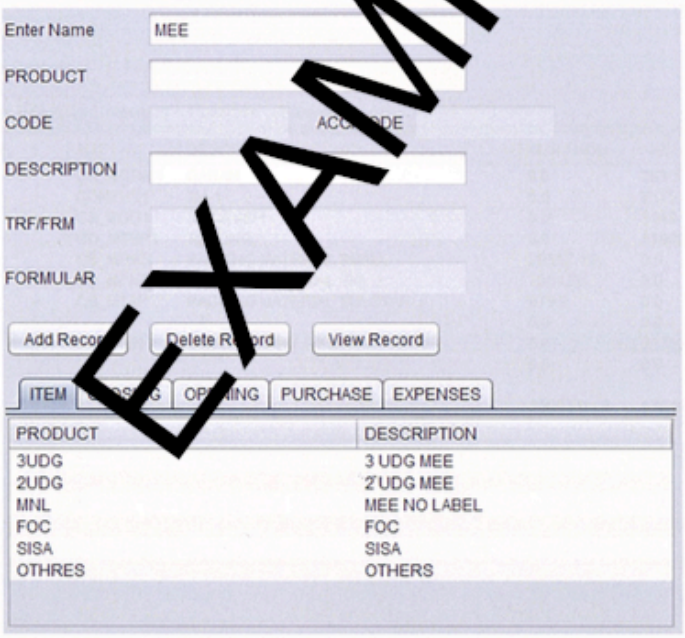


Figure 4: P&L Format Entry in Java

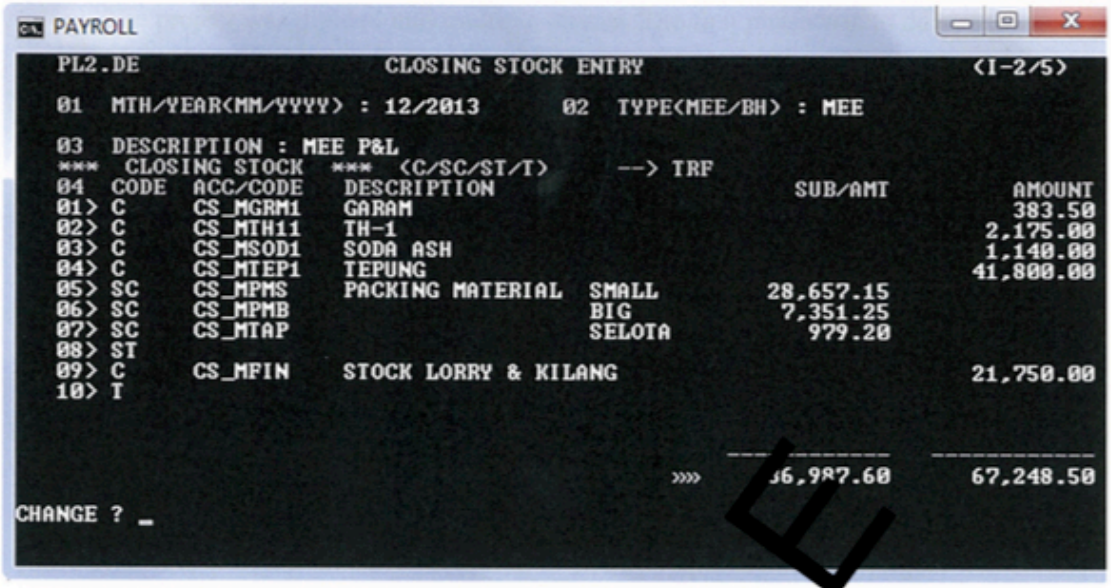


Figure 5: Monthly Costing Entry in DOS

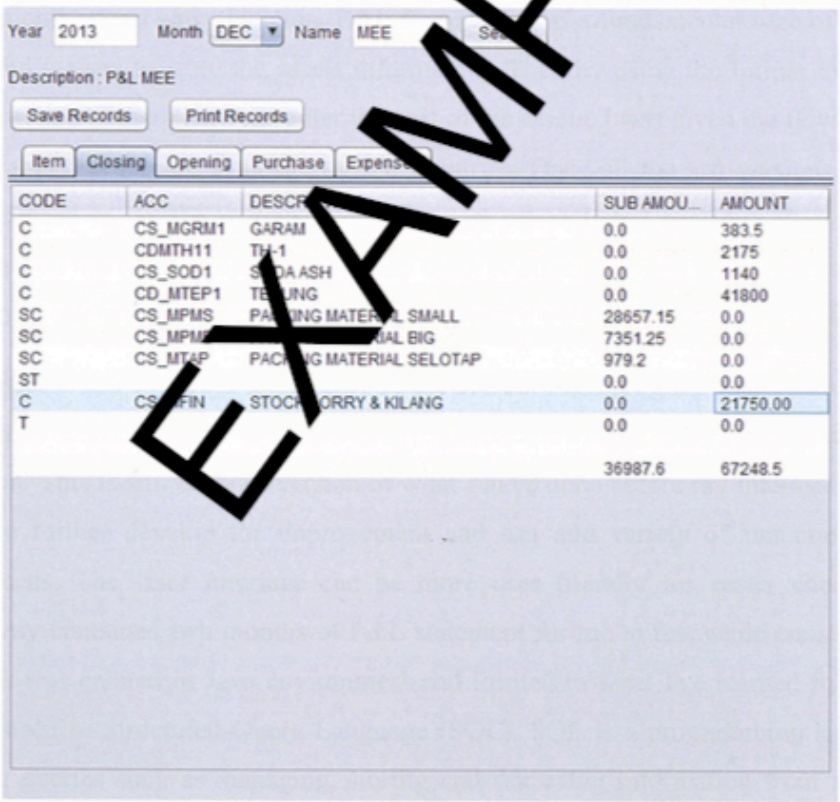


Figure 6: Monthly Costing Entry in Java

The project was divided into multiple phases. The first phase was to do system study, where we, the software development team will study and understand their DOS software. Then the next phase, we are required to design flowcharts and class diagrams for the new software that we are going to develop. A flowchart is a visual representation of the flow of data or process and a class diagram describes the attributes and operations of a Java class and also the constraints imposed on the system. We had regular meetings with the client to understand their needs and demands for the software which will help us on plotting the flowcharts and class diagrams. Once the flowcharts and class diagrams have been drawn we have to submit them to our team supervisor for confirmation. The last phase was to design and build the software. During the last phase, there will also be System Integration Test. The function of a System Integration Test is to provide an overall system testing to ensure the entire system is working properly according to client's requirement. The project was divided among the members.

My task of the project was to create a test version of P&L (Profit and Loss) format entry and monthly cost entry function. P&L format entry is a fundamental base of the format for P&L and is used to store the assets information. Then by using the format to create the monthly cost entry where user can enter the cost of the assets. I was given the flow charts and class diagrams that require to create the P&L entries. Once all the test versions have been created we need to do the system integration test on each test version. Then if the test versions passed the test, we need to combine them and make it as a draft for final product. Some features might be added or changed as well before we deliver the final product.

Figure 3 and **Figure 5** is the GUI of the current P&L program that Thien Hock was using. **Figure 4** and **Figure 6** is the newly improved version which is currently under construction. This is still on draft version of what I have done before my internship ends and this can be further develop for improvement and can add variety of functions that suit Client's needs. The User Interface can be more user friendly for easier checking. The software only contained two months of P&L statement for me to test while constructing the software. It was created in Java environment and limited to what I've learned from AUT. I was introduced to Structured Query Language (SQL). SQL is a programming language for performing queries such as managing, storing and retrieving information from a database. This software requires SQL to interact with the database and the database is sitting in one of the main computer in Thien Hock.

I was very fortunate to be able to be part on this project. However, I have completed my internship before I could complete the software with the team. Mr Jamil, a junior computer system analyst who is in the team took over my remaining tasks of the project.

Learning Outcome

As Zuma comprised of different departments in different professions. Most employees are susceptible to follow the company's policy handbook. However, engineers in the company are susceptible to obey both the company's policy and code of ethics/regulations set by Board of Engineers Malaysia (BEM).

BEM is a statutory body constituted under the Registration of Engineers Act 1967 with perpetual succession and a common seal, which may sue and be sued (Board of Engineers Malaysia, 2014). The primary role of BEM includes to facilitate the registration of engineers and regulate the professional conduct and practice of registered engineers in order to safeguard the safety and interest of the public (Board of Engineers Malaysia, 2014).

A mandatory course offered by BEM on Engineering Management Practice requires every registered engineer to attend in order to practice in Malaysia. The programme is designed to educate engineers on the art of managing engineering companies in financial knowledge, project management, the needs of information technology in preparation for the challenges and so forth. Zuma subsidized this mandatory course to any full time engineer employees in the organization in exchange for a full year service bonds.

Learning Outcome 1

Zuma has a high expectation on their fellow workers. Every staff is given a company policy handbook as a reference. Everyone is expected to show professional attitude toward both customers and colleagues. Every department must have full confidence in themselves and produce the best quality of work. Without being able to do that, customers will lose their trust on Zuma. Employees treat each other with respect and kindness. Our professional on skills is the best evidence to customer that we can be relied on. Being honest, avoid bribery and corruption also help the company to build a good image. Zuma staff members are expected to be punctual to work and maintain proper attire to represent the good image of the company.

There is no limit on improving our skills and time provides opportunity for improvement. A technician is expected to learn and to fully understand or familiarized before encourage to use machinery and tools. The company provides services to train client's employee regarding the use of any machinery, tools or software. However external charges

are applied. Technicians will try their very best to teach or train customers on handling any requested equipment or machines within the six months. This actually creates a conflict against the company's commercial interests as every company looks for more income or revenue for after sale service.

Every staff member must consult their direct supervisor, management, or legal officer if encounter any conflict or harassment with/from colleagues or other parties. Moreover staff members must consult supervisor if anything bad happens instead of being a whistle-blowing. Zuma has a strict policy on anti-bully and anti-sexual harassment in workplace.

All engineers are expected to uphold the integrity of the profession by behaving in a manner expected of him in the Code of Conduct of Engineers:

- An engineer must be conversant with the Code of Conduct for Engineers (Board of Engineers Malaysia, 2005).
- An engineer must understand the need for responsibility and liability as stipulated in the Code of Conduct (Board of Engineers Malaysia, 2005).
- An engineer must respond promptly to complaints and enquiries by clients/authorities (Board of Engineers Malaysia, 2005).

Learning Outcome 2

Zuma have in-house developed software system to cater their daily operation transaction. This database software system will captured every transaction that take place right from the start until the end. This system is used by all the departments in the company. However the usage of this software is limited according to individual department's work allocations or nature of duties. Technical department staffs are unable to access to the file of cost and selling price of a good. These are managed by customer service and admin departments.

When goods are requested from store, Zuma will issue purchase order which indicate the type of goods, quantities and agreed price per unit. Every purchase order clearly stated with a serial number and date of the purchase order, name and address of the vendor. Purchase order information will be entered and save into the software system representing opening stage record of every flow of good in and out of Zuma. It will also print out three copies, and one of the copies is distributed to the vendor, to the customer service department

and one copy for filing. Once confirmed, Zuma will issued an invoice to the clients. The goods will then be shipped from headquarters office in Kuala Lumpur, Malaysia and usually takes around 6 to 8 weeks to arrive. Once goods have arrived to Kota Kinabalu, they will be declared and delivered to Zuma office through a local forwarding agent. After confirming goods are received in good condition with accurate number of supplies, delivery order and some consignment documents will be hand over to customer service department to be sign and stamp. Vendor will be informed through email or phone call on the acceptance of goods. All goods will only be shipped to clients if full payment were made.

As for projects that are designed by engineers. The supervision of works designed by the Submitting Engineer is a requirement under the Uniform Building By-Law 5 (UBBL5) (Board of Engineers Malaysia, 2005). This law stated that supervision must be provided by the Submitting Engineer to ensure that the works carried out as intended design. Delegation of supervision is permitted but the responsibility of this supervision still rest with the Submitting Engineer.

- An engineer who is the Submitting Person should be responsible for the project regardless of whether it is self-supervised and/or delegated supervision (Board of Engineers Malaysia, 2004, 2005).
- An engineer must be meticulously proper and correct in certification of works (Board of Engineers Malaysia, 2005).
- An engineer must be familiar with and knowledgeable in the work he is to supervise (Board of Engineers Malaysia, 2005).
- An engineer supervising a project shall keep proper records of all documents and correspondence pertaining to the project (Board of Engineers Malaysia, 2005).
- An engineer must be conversant with time and cost implications in the issuance of any instruction (Board of Engineers Malaysia, 2005).

Learning Outcome 3

Occupational health and safety is one of the prime importance of the company to ensure all employees are able to carry out their duties in a safe manner that has no negative effect on their health and wellbeing. With strict regulations, the organization is able to reduce risks and improves the working environment superior to others and making it a competitive

aspect when recruiting staff. Health and safety regulations in Zuma Engineering Sdn Bhd. is specially designed to protect not only the health and safety of the employees, but also the visitors and general public who may be affected by the workplace activities. These regulations are compatible with the Occupational Safety and health Act 1994 (Act 514) enacted by Malaysia Parliament (Ministry of Human Resources, 2014).

To ensure safety of technicians, every technician is required to undergo safety workshop during their three months' probation. The training provides proper skills and knowledge about handling specific machines and tools, as well as provides procedure when there is any injury.

Some of the safety guides is listed below:

- Proper dressing must be worn either working in office and on site.
- Wash hands frequently to avoid any case of Influenza H1N1 infection.
- Always maintain cleanliness throughout the production.
- Always turn off the power for any unused machine.
- Make sure tools are properly placed at the designated area after each use.

On the contrary, an in house first aid training courses is conducted every year to all employees.

All engineers registered with the Board of Engineers Malaysia must be familiar with the requirements of the Registration of Engineers Act 1967 (Act 138) and its subsequent amendments (Board of Engineers Malaysia, 2007). Ignorance of the ACT is no defence in the Courts of Law in Malaysia.

- An engineer should notify the relevant authorities (within reasonable/statutory time limit) on changes in designs or withdrawal of services (Board of Engineers Malaysia, 2005)
- An engineer should submit completed forms in time for inspection and approval for Certificate of Fitness / Certificate of Completion and Compliance (Board of Engineers Malaysia, 2004, 2005, 2007).
- An engineer should be aware of environmental, health and safety matters during and after construction (Board of Engineers Malaysia, 2004, 2005).
- An engineer ensure that environmental, health and safety measures are implemented as per drawings and specifications if any (Board of Engineers Malaysia, 2004, 2005).

Learning Outcome 4

The department I worked in consisted of two teams and I was in team one. Executive director outlooks the entire operations of both teams. Team leader is assigned to each team who are responsible to manage projects, clients and workflow. Discipline head will then be responsible to assigned duties and projects to seniors and juniors. Juniors and trainees are under the supervisions of the seniors. Every month, each team leader will conduct a meeting with the discipline head, seniors, juniors and trainee. Each team's projects will be reviewed to monitor progression and discuss problems if any. Meeting minutes will be recorded by junior staff or trainee in an excel worksheet and a hardcopy is printed and filed. Any reviewed issues will be followed up in the next meeting. Discipline head will also conduct a meeting with the seniors, juniors and trainees every two weeks to monitor progression for each project.

- An engineer should be transparent and receptive to peer review or checking of his work if requested by the client/authorities (Board of Engineers Malaysia, 2005).
- An engineer should undertake continuing professional development to enhance his knowledge and capability (Board of Engineers Malaysia, 2005).
- An engineer should report unethical practice to BEM (Board of Engineers Malaysia, 2004, 2005).

- An engineer who is submitting person must ensure the accuracy of and be responsible for all works delegated to others by him (Board of Engineers Malaysia, 2004, 2005).
- An engineer should make optimum use of manpower materials and money (Board of Engineers Malaysia, 2004).
- An engineer should be aware of Government requirement to use local materials, wherever possible (Board of Engineers Malaysia, 2004).

Conclusion

This internship had given a lot more than what is studied in the university. It allows my goals to be achieved. It provides even larger point of view of working experience in a professional engineering field. Apart from engineering field, this internship also provides a good training on communication skill dealing with different people in various companies. In addition, this internship has given a wide understanding about working as salesperson as well. As a result, in order to become a successful engineer, one has to acquire knowledge of practical engineering and to be brilliant in overcoming problems encountered. In conclusion, this training has certainly done well in preparing to be a real engineer in the future.