University of Moratuwa
Faculty of Information Technology

IT 3000 Industrial Training
Industrial Training Report

Submitted by
Name: H.T.M. Gamage
Reg.No: 064031F
Submission Date: 20\textsuperscript{th} of April 2009

Training Period
From 29\textsuperscript{th} November 2009 to 18\textsuperscript{th} April 2009

Training Establishment
hSenid Software International (Pvt.) Ltd.
hSenid Mobile Solutions
46/12, 1\textsuperscript{st} Floor, Sayuru Sevana,
Nawam Mawatha.
Colombo 02.
Preface

Industrial training program offered by faculty of Information Technology, University of Moratuwa is an opportunity for an undergraduate student to apply his theoretical knowledge gained during the university academic program into real world industrial based application development and experience professional software development process. The objectives of such programs are to enhance participants’ skills, and to enrich their industrial knowledge by keeping them updated with the latest technologies. This opportunity has extremely helped me to expose into an environment where I could think of as a software engineer instead of just as a software developer.

After completing the Semester 1 of Level 3 as an undergraduate student of Faculty of Information Technology, University of Moratuwa, I got the opportunity to carry out my industrial training in hSenid Software International (Pvt.) Ltd. I have worked as an undergraduate trainee in hSenid Mobile Solutions - a global company based on mobile and open source technologies in Sri Lanka, for 24 weeks starting from 29th of November 2009 which was organized by Faculty of Information Technology, University of Moratuwa in collaboration with National Apprentice and Industrial training Authority (NAITA).

This report documents the knowledge and experience I have gained through my industrial training program at hSenid Mobile Solutions. It will contain three main chapters as follows;

- **Chapter 01: Introduction to the Training Organization**
  This chapter will be an introduction the establishment where I was offered my internship and will include information such as the history of the organization, its structure, technical background and its role in IT industry and our society.

- **Chapter 02: Training Experience**
  The second chapter will focus on the experience, which I went through during my internship program, touching on topics such as the work, performed, responsibilities handled, processes and methodologies encountered and technical exposure.
Chapter 03: Conclusion
This final chapter will be a summary of my internship where I will present my experience at internship briefly and discuss how I achieved my goals during the period. I will also discuss the importance of the internship program run through the University and present any comments on program.

Throughout my industrial training program I have achieved several milestones and targets, and it has been a challenging working environment at hSenid, where I got the initial impressions on how to use IT to change my life style.
Acknowledgements

To become a professional in Information Technology industry, industrial training is the foundation for each undergraduate student. It helps students to improve their practical skills related to interpersonal, problems solving, research and reporting as well as soft skills. Also it helps the students get exposure to the industry, apply the gained knowledge throughout the academic program and learn new updated technologies. In addition, it helps students’ career development and to prepare for employment after graduation, by engaging in personal and professional development planning.

I hereby use this opportunity to thank everybody who helped me directly and indirectly of successful completion of my industrial training at hSenid.

For those who made this opportunity a reality…
First of all, I would like to thank all the staff at the National Apprentice and Industrial Training Authority (NAITA) who worked hard for running this industrial training program throughout universities.

Further I would like to thank my faculty; all academic and non academic staff made our industrial training program a success. I would like to thank Prof. Dileeka Disas; Dean, Faculty of Information Technology. And also I would like to express my utmost gratitude and sincere to Dr. Ajith Madurapperuma and Mr. Leelanga D. Senevirathne for taking initial actions in organizing this placement for me. And also I would like to thank the department heads and the entire staff members who worked hard to make this training success.

For those who were there throughout…
Next I would like to extend my thanks go to all the employees of hSenid Software International, who warmly welcomed and provided a well-planned training program for me with useful guidance ideas and encouragement. I got a very good working environment with great help for me to work in that place without any disappointment. My stay at hSenid Software was one of the most memorable times in my life thus far, and I believe a huge part of it being memorable is the people from hSenid with whom I met and interacted with throughout my stay and its culture as a hSenidian.
I would like to thank Mr. Dinesh Saparamadu; CEO of hSenid Software International, for not only making this opportunity available for our students, but also for being there with us regularly, sharing his many experiences, checking up on our progress and in general playing a very active role in our internship. I must also thank Mr. Tolga Mahlke; Senior HR Manager for his endeavors towards making our internship an all-round learning experience, as well as Mrs. Gayani Gunasekara, Ms. Nadya Thisera, Ms. Thilanka Kodithuwakku, and other members of the HR team who supported us throughout our stay.

Also our special thanks goes to the Project teams which I was involved who gave us superb guidance and support in developing my skills. The Special thanks go to Mr. Dumidu Nayanamithra; Operations Manager who closely worked with me during my internship program and Mr. Harsha Sanjeewa; Senior Technical Officer who gave several ways to self-learning and growth that improved my technical skills great deal during my internship program. Also special thanks go to the Mr. Harshana Wickramasinghe; System Administrator who helped to get most of the issues to be solved. Also special thanks go to Mr. Binuka Chandima: who has been my Project Manager for the projects I have contributed during my internship training. Finally I thank everybody who made my training a success.

For all my fellow trainees…
Last but definitely not least, I wish to thank my fellow trainees who were at hSenid Software with me for all the support and for all the friendship throughout the internship. My special thanks should go to my university friends Nirojan and Manuja who worked with me at hSenid Mobile. Initially, we were able to work as a team and we worked together to achieve our team goals together with in deadlines. We always enjoyed our industrial training program and also shared our experience with each other.

Finally my big thank should go to my parents and other family members for helping me and supporting me to succeed in this event. There are other people that I was unable to mention by their names. So I’m really grateful you for all your support and help.
Table of Contents

Preface ........................................................................................................................................ i
Acknowledgements .................................................................................................................. iii
Table of Contents .................................................................................................................... v
List of Figures ........................................................................................................................ vi
List of Tables .......................................................................................................................... vi
Chapter 01 - Introduction to Training Establishment................................................................. 1
Chapter 02 - Training Experience ............................................................................................ 15
Chapter 03 – Conclusion .......................................................................................................... 34
Appendix A – hSenid Organization Structure.......................................................................... 38
Appendix B – XPlanner, Bugzilla ............................................................................................ 39
Bibliography ............................................................................................................................. 40
Abbreviations ........................................................................................................................... 41
List of Figures

1.1 hSenidMobile organizational structure ................................................................. 7
1.2 hSenid development process .................................................................................. 10
2.1 Layers of iPhone OS ............................................................................................... 21
2.2 MVC architecture .................................................................................................... 25
2.3 XMPP iPhone client contacts / add new contacts ................................................... 27
2.4 hExpense screen shots ............................................................................................ 30
2.5 mRecharge J2ME client screen shots ....................................................................... 32

List of Tables

1.1 hSenidMobile award winning solutions ................................................................. 3
2.1 Expense Tracker database table format ................................................................. 27
Chapter 01 - Introduction to Training Establishment

1.1 INTRODUCTION TO HSENID SOFTWARE INTERNATIONAL

hSenid Software International (Pvt.) Ltd. is a software development company with offices in United States, Singapore, India and R&D centers in Sri Lanka & Malaysia. It was founded in 1997 with the aim of supplying high quality software products and services to its customers worldwide.

The first interesting thing about hSenid Software International is how it got its name. hSenid is the reverse of name D-I-N-E-S-h, the name of hSenid stands for the CEO of hSenid, the man who started it all and widely known entrepreneur, Mr. Dinesh Saparamadu.

hSenid Software International (Pvt.) Ltd; hereafter and in general in this report referred to simply as hSenid; has grown to become a leading organization in the software industry in Sri Lanka and has begun its operation globally. From its beginning it has expanded its customer base to the international level. It continues along its goal of providing quality software solutions to all its customers currently operates in five countries worldwide.

hSenid is an Application and Service provider for the Telecom, Financial and Enterprise markets. We specialize in Human Resource Applications and Mobile Applications and are also widely recognized for its reliable offshore/outsourcing capabilities.

With a staff of over 250 skilled engineers worldwide, hSenid offers the best solutions for businesses worldwide. hSenid clients include Lucent Technologies, M1(Singapore), Todo1(Florida, USA), DST (Brunei), Tigo(Sri Lanka), Sampath Bank (Sri Lanka), Valista(Ireland), major Financial Institutions, Airlines, Telecoms, and Insurance Companies.

hSenid build its culture deep rooted in hSenid Core values Quality, Accountability, Personal Growth and Discipline.
1.2 THE HSENID WAY
hSenid has its own way of being in the software industry where the vision and mission takes a big part and also the hSenid cultural values are mostly important to be there where they are now.

The Vision of hSenid
“Make life easy” by using ICT.

The Mission of hSenid
We strive to achieve our vision by being dynamic and benchmarking ourselves against the best in the world. Continues improvement through creativity and innovation is a way of life at hSenid. Our approach is to nurture and guide our employees to embrace this culture and unleash their potential as we endeavor to be leaders in our field.

Company Values
A favorite sentence of the CEO is; “One can become a hSenid Employee, but to become a hSenidian, one must follow and live up to hSenid Way” The obvious question that would then arise is who is exactly a hSenidian? hSenid proudly boasts of the ‘culture’ of the company. The hSenid culture is described in following six sentences;

- hSenidians are ACHIEVERS
- hSenidians are ACCOUNTABLE
- hSenidians are INNOVATORS
- hSenidians are CUSTOMER ORIENTED
- hSenidians are TEAM ORIENTED
- hSenidians are PASSIONATE

Once again, a strong emphasis is placed within the company to nurture these values, and as trainees, this values and their importance was a recurring theme in out induction. Even at general staff meetings, examples of people acting out these values were presented and applauded. This great value orientation in hSenid is I believe one of their greatest strengths and something that should be continued and encouraged.

1.3 HSENID DIVISIONS & THEIR FUNCTION
This section describes the main divisions of hSenid, which can be used express what hSenid means and its main functions. hSenid operates mainly under four divisions each covering a different domain. All four divisions are described shortly here, exploring what each division is all about, what functions they add to the overall organization as well taking a look at some of the major product milestones and outstanding achievements of each of them.

1.3.1 hSenid Mobile Solutions

The mobile solution functionality of hSenid is one of the youngest and successful ventures of the hSenid family. The mobile division, registered as hSenid Mobile, has become a global leader in providing mobile solutions. Earlier known as BeyondM changed its name and now registered as hSenid Mobile. Its services have been used in huge mobile service network providers and the new innovation in the mobile industries. Especially it has been awarded several times for providing world class mobile solutions.

<table>
<thead>
<tr>
<th>Solution</th>
<th>Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cosco</td>
<td>Ranked top 3 mobile application providers under Enterprise category at Ericsson International Mobile Applications Awards 2004.</td>
</tr>
<tr>
<td>hDirect</td>
<td>Won the Silver award at the National Best Quality Software Awards 2004 in the category Media and Entertainment Applications held by British Computer Society Sri Lanka.</td>
</tr>
<tr>
<td>Banco</td>
<td>Won the Bronze award at the National Best Quality Software Awards 2003 in the category Communication Application held by British Computer Society Sri Lanka.</td>
</tr>
</tbody>
</table>

My Internship at hSenid was intended to be here and I had lot of experience in this lovely office environment. I got to know some hot technologies and also started to work on them. hSenid Mobile offers mobile solutions in different functional aspects such as:

- Productivity Suite Solutions
- Enterprise & Telecommunication
- Financial Functionality
- Messaging Solutions
- Entertainment Solutions
I was selected at hSenid to work as an undergraduate trainee on hSenid Mobile, some of technologies used here are Java, spring, hibernate and Ruby on rails. The aim of changing BeyondM Pvt. Limited into hSenid Mobile was to enter the global mobile develop and go beyond the global standards in Mobile Application Development.

1.3.2 hSenid Business Solutions (HBS)
HBS is one of the main branches of hSenid which basically provides HR (Human Resource) solution to the industry. This division with their set of products is globally recognized as provider for top-quality HRM solutions catering to each and every possible HR need for any organization. These HRM solutions contain functionality to handle areas such as HR process automation, recruitment and assessment, payroll systems, time and attendance, and much more.

This HR solution functionality of hSenid has resulted in the creation of several award winning solutions by the company;
- HRM Enterprise - Solution brings together the best tools to fulfill all HR needs.
- mTimeTracker - 2nd runner up at the National Best Quality Software Awards 2002, BCS
- ePayroll 2000 - 2nd runner up at the National Best Quality Software Awards 2000, BCS
- HRM 2000 - 1st runner up award at the Best Quality Software Awards 1999, BCS

1.3.3 hSenid Outsourcing
Now a day’s one of hot topic which widely spoke is about outsourcing the development of the software development since it is being high cost of in-house software development, this is a luxury that many cannot afford. This is where the market of hSenid caters too. hSenid offers the diverse development and project skills it has under its roof to engage in different outsourcing models with customers.
- Offshore Project Model
- Onsite Project Model
- Onsite-Offshore Model

The skills which are available at hSenid allow going forward in the wide area of outsourcing. These skills include the Java Technology spectrum, MySQL platform, as well as Microsoft Technologies and RedHat practices. The outsourcing function has become a division since it has been providing quality and efficient software.

1.3.4 MITZ Studio
A division of hSenid, where takes a different aspect from the software development and service feature. It leads into 3D animation and graphic design as a new division. MITZ studio was initiated in 2003 and currently is a successful venture into providing organizations with high quality computer graphic designing and animation services. The functions that MITZ studio adds onto hSenid are: 3D Visuals, Architectural Visualization, 3D Animation and Video Editing.

1.4 HSENID TECHNOLOGIES

Since I have mentioned the company functionality along with some product details, I have pointed out that some of the technologies that hSenid utilizes in the creation of their varied products. Again I need to mention that this is not the complete set of technologies but just to give you an idea on the main technological fronts on which hSenid operates.

Operating Systems: Microsoft Windows NT/2000, Linux, UNIX.
Frameworks: Spring, JSF, Struts, Hibernate, Rails
Databases: Oracle, Mysql and Sybase
Programming Languages: Java, .Net, C++, Ruby, Objective C
Web Development Technologies: XML, JavaScript, HTML, JSP, WAP, XHTML
Web and Application servers: Apache Tomcat 5.5, Lighttpd
Mobile Development: J2ME, Windows Mobile, iPhone

1.5 THE HSENID STRUCTURE AND ITS PEOPLE

This section focuses on the structure and key players of the hSenid Mobile Division or earlier known as BeyondM Pvt. Ltd; since hSenid Mobile is really the place where my internship took place and the structure of this organization is what is relevant to me as compared with the overall view of hSenid.

First I’ll begin with a brief look at hSenid from an overall perspective and see how it is functionally structured as a whole, without going into detail of the different subsections, the people and their roles. This will be followed up with a more detailed look into how hSenid Mobile is built up.

1.5.1 The hSenid Structure
Given below is the top-level brief outline of the organizational structure of hSenid Software International from a functional perspective. The diagram is kept simple on purpose where I will not describe in deep of the structure. Below this level of management lies in general several major team based structures headed by Project Leaders and Team Leaders (this is mainly in technical divisions). It then goes on to encompass the engineering level, support staff, and of course the staff of non-technical nature such as marketing executives. (See Appendix A for more details)

**1.5.2 hSenid Mobile (HMS) Organizational Structure**

The HMS structure in abstract can be divided into six main groups which are Engineering, Support, Presales, Sales, Human Resource Branding and Communication.

All the software engineering division and the Quality Assurance division managed under the Operational Manager which is known as engineering team. There is a separate division called support division, which is responsible to system integrations, Network administration, and other support tasks related to hardware. Presale division is responsible for interact with the customer throughout the project. Normal project development team consists of Project Manager, Architect, and Pre Sales engineer, Tech Lead, Dev Lead, Developers and QA. Later stages of the project Technical writers also join to the team.

Also there is a team which brings new sales to the company which is called the sales division. Further there is another division which brands the product standards, the documents which are related to the customer and some marketing which is called the Branding and Communication division. Also there is another team who cares all for the employees are the Human Resource team.

Then the company is grouped by projects. Every project has a project manager under whom the developers, testers and quality assurance personnel work. Project manager is the responsible personnel for the software products. He is responsible for the delivery of the final product according to the negotiated time.
Figure 1.1 hSenid Mobile organizational structure
1.5.3 hSenid Mobile (HMS) Process

Before moving into details of the work that I performed and the development tasks undertaken by myself, I believe a little introduction is in order regarding the Systems development process used at HMS.

1.5.3.1 eXtreme Programming: An Introduction

hSenid operates on a development process that is closely based upon the XP (extreme programming) development process. The official introduction to XP would be that it is a discipline of software development based on values of simplicity, communication, feedback, and courage. This is based upon the principles such as the requirements of the product needing to be properly communicated to the developers, encouraging starting with the simplest solution, getting feedback from all stakeholders to ensure that everything is on track and avoiding getting stuck for long periods in designing and instead go through a quicker, more courageous code-based approach.

When I was studying the software development process of hSenid during my stay, the concept of XP lying within the process was clear as the four above mentioned values are also mentioned as part of the official SD guide for hSenid Mobile. I also saw several XP practices being deployed in the everyday project work that I went through. Examples of this are, stand up meetings daily, measuring project velocity, dividing the projects into iterations and making small releases more often.

1.5.3.2 Main Activities in the Process

Planning

- When it comes to planning out a project, it is done in different iterations.
- Releases are planned in a special meeting
- Iterations are then planned out in meetings held for each iteration
- Daily stand up meetings are held
- XPlanner is used for tracking, BugZilla for tracking bugs and SVN for version control.

Here I would like to introduce briefly several important tools that I myself have used in my project development work at hSenid;

- XPlanner – Project planning and tracking tool for eXtreme Programming (XP) teams. Some of the features of XPlanner include assigning tasks, managing and tracking the development and completion of tasks as stories, recording time spent on activities vs.
time allocated and keeping records of developer status as well as overall project status.

- BugZilla – Bugzilla is a "Defect Tracking System" or "Bug-Tracking System" available through company intranet that is used to report and keep track of bugs in a system. It allows users to login and report any bugs found through for example the testing phase of a project. It also allows easy searching of bugs and reporting functions. Throughout our job portal project, this tool was used for keeping a record of bugs in projects.

- SVN – Subversion (SVN) is the version control system that we used in the development work on the projects at hSenidMobile (this has come to replace the use of CVS). It is an invaluable tool for our needs as we had around 10 developers all working on the same project and it was very important to have this tool to control the versions and keep track of changes.

**Design**

- keep the design as simple as possible
- use Architecture and Design Patterns
- have design reviews
- re-factor the code frequently

**Coding**

- follow coding standards
- Integrate code frequently
- have collective code ownership
- do not work overtime unnecessarily

**Testing**

- have unit tests for all functionality in the system.
- When fixing bugs tests will be improved.
- Have acceptance tests
hSenid uses customized version of the “eXtreme Programming” as the development core process of the organization. Test driven developments, Collective ownership of the work, flexible hours of work, Iterative development are the main features of the core process. Along with that every project team is having stand-up meetings in every working day of the company. In a stand-up meeting, every member of the team should update the team regarding their own tasks. For tracking the progress of ongoing projects, hSenid uses an extreme programming project management tool called “XPlanner” which also helps the team members to keep their work in line.

1.6 PERFORMANCE & ACHIEVEMENTS
1.6.1 Success of hSenid

hSenid always target to provide excellent quality since from the beginning. Of course there have been many hard works along the way to come up in the software industry from the scratch towards the global market, but the team spirit has been with the company in all their work. This is the reason that they have been able to come from that simple beginning to a company with offices in 5 countries world over and an employee base of over 200. Their current success is reflected in their global customer base of leading companies, which include, Lucent Technologies, M1 from Singapore, DST from Brunei as well as Valista from Ireland. It also boasts of great success in the local market as it has a strong client base of leading companies such as Brandix Group, Tigo, Mobitel, Hilton and Holcim. The success of hSenid is clearly shown here as many of these customers in all the functional areas (e.g. mobile, outsourcing) have given success to the excellent service they have received from hSenid and the dedication towards achieving their goals. This has enabled hSenid to continue to generate more leads around the world.

1.6.2 Powered Partnerships

The next most powerful strength of hSenid is the profitable partnerships. hSenid is a company always looking to make stronger itself by partnering and gaining recognition with major companies around the world. Currently hSenid has partnership with Alcatel-Lucent Technologies, Nokia and Valista. hSenid also has established partnerships in the manner of technology with world class organizations such as MySQL (Gold Partner as well as the world’s first Outsourcing partner), Microsoft, Sun Microsystems and Oracle.

1.6.3 Award Winning Performance

Due to the quality and the efficient of the software product of the hSenid it has been awarded number of times. A brief summary of some of its achievements are as follows;

- 2004 Ericsson Mobile Application Awards finalist
- 2004 National Best Quality Software Awards - silver for Media & Entertainment
- 2003 National Best Quality Software Awards – awards in both categories of Communication Applications and Business Applications
- Similar awards in the National Best Quality Software Awards throughout the years 1999 to 2002.
hSenid main profitability was strongly depended on providing HR solution. Up to now hSenid has installed this HR solution to 70% of the Sri Lankan companies. Also there is also an Open source product of this HR solution provided by hSenid which has more than 100000 times of download and also more than 3500 customers. This product is called the OrangeHRM.

1.6.4 Milestones of hSenid
As to conclude this section let me give some milestones of hSenid in the past ten years. These are the most important milestones which are able to mention.

- February 2009 – hSenid participates in GSMA Mobile World Congress 2009 and exhibit hSenid Solutions
- November 2008 – hSenid participates in SDP Asia summit.
- May 2008 – hSenid participates in ‘I want Windows Mobile’ event at Singapore
- March 2008 – hSenid showcases their outsourcing capabilities at CeBIT, world's largest trade fair showcasing digital IT and telecommunications solutions for home and work environments
- December 2007 – hSenid begins its specialized outsourcing wing in India with the goal of providing fully functional QA services for all their business aspects.
- December – 2007 – Hemas Holdings, one of Sri Lanka’s premier organizations, joins with hSenid towards becoming a part of their HR service customer base.
- November 2007 – MySQL recognizes hSenid as a Gold Partner. This is an important step on the road to excellence for hSenid and puts them at a great advantage in the open source market.
- September 2007 – hSenid receives the highest recognition of excellence in the field from Microsoft by being taken in as a Gold Partner in view all the great work done on the Microsoft technology platforms and related services provided.
- September 2007 – MySQL recognized hSenid as the first ever Outsourcing Partner.
- March 2007 – hSenid celebrates 10 years of excellence.
1.7 STRENGTHS AND WEAKNESSES

1.7.1 Strengths

- Strong leadership. This is achieved through hard work by the CEO, GMs and project managers and all the other leaders, which brought company up to today's high standards and willing to take it further. HsenidMobile works to be one of the preferred mobile solutions providers in 2015, among all other high standard companies around the world.

- hSenid is willing to change. *It’s all about people*. Actually this was the earlier hSenid Slogan which was changed latter. So according to that hSenid has some great, talented and dynamic hSenidians.

- Focus on personal development and teamwork. As this is strength where the CEO always says put up your personal development plan and go according to that work in the year. Also team spirit has made hSenid to make all these products live.

- Strong partnerships. As shown in the many examples before in this report, hSenid puts a lot of effort into forging mutually beneficial partnerships.

- Strong customer base. As mentioned before hSenid has a big customer bay in Sri Lanka and also it has now started to catch up some global clients like in USA, Singapore, Ireland etc.

- Strong focus on quality ensures that all the solutions they provide are tip top and it ensures customer satisfaction and helps maintain a healthy customer base.

- hSenid has not just stick to a certain boundary box in technology wise where we use Microsoft products and also Open source products where we provide the least cost and time solutions.

1.7.2 Weaknesses

- High employee turnaround. In the IT industry, a higher rate of employee turnaround is common and from what I have experienced at hSenid, this is present in this company as well.

- Though there is a strong trend within the company to develop their employees (and I have personally seen the HR teams put a lot of effort into this with many staff development efforts as well as surveys to ensure that people in the organization are satisfied), the attitude towards some of these efforts is not as enthusiastic as it should be. For the most part, some employees do not take these efforts seriously and consider some of the surveys for example, as a waste of time. Of course, with my short
experience in the company, I am not fully qualified to say whether this problem is solely based on the employees attitudes or whether a part of the problem is that these HR ventures are not well followed up to a good effect.

1.8 SUGGESTION TOWARDS THE FUTURE OF THE ORGANIZATION
In this section I will present few suggestions based on my experience at hSenid Mobile that will help hSenid reach even greater standards and greater heights in their existence as well possible constraints to achieving some of these objectives.

**Objective:** Improving employee communication and attitudes with in hSenid
hSenid already has many ventures towards this point to develop their employees, but this is one area that can really make a difference. If they can generate more all-round qualified people from their employee base, it would be a huge advantage with the technical expertise that they posses. I mention this point because in my internship period, I have witnessed several occasions where a lot of problems could have been avoided and many things could have developed in less time had there been improved communication among teams and members. XP process is a good program among the development team, yet there needs to be some more frequent occasions where hSenid development team could interact with other teams like QA, Business and Sales, Support as well as guys in HBS.

**Possible Constraint:**
One possible problem towards this goal is the attitude of some people. As I mentioned earlier, something I have seen in some employees and trainees that they do not possess a great enthusiasm for such ventures into communication building, teamwork etc and instead focus more on the day to day work they have. And also the work load seems to get higher and dev team might not get opportunity to focus on other activities most of the time. If we can get more team based activities and increase events such as team outings, I believe this can make a difference.
Chapter 02 - Training Experience

2.1 INTRODUCTION – THE BEGINNING

My initial experience at hSenid was great, I got the impression that I found the right place where I could improve myself to be a professional Software Engineer and prove that I could take challenges and go beyond them. I faced an interview that included technical questions as well as logical questions. And then I was given some time to implement some code on a given application. I loved the way hSenid evaluation process and waited to get some positive feedback from hSenid. I was interviewed at hSenidMobile by Senior Project Leader Mr. Puvanendran Senthilruban and Operations Manager, Mr. Nirmal Jerome when I joined hSenid. After two days later, I received a call from hSenid confirming that I have got the opportunity to work at hSenidMobile as an undergraduate trainee. I was very excited about this chance as I would be getting a much more enriched and valuable training experience than a normal training offered as I already knew about the challenging environment that I am going to work in. I knew, from that time it would be a great preparation for me towards becoming a real experienced IT professional at the end of my internship period.

Three of us joined hSenid as undergraduate trainees from Faculty of Information Technology, University of Moratuwa. And also we met two other trainees from CSE. We all worked together in engineering division. We got access to mail accounts, intra-net and also accounts for XPlanner, BugZilla and SVN. From first day, onwards we knew that we have lot to learn and practice with few time. I will be explaining my experience in all these tools and my training experience on technologies in greater detail throughout this chapter. We have joined hSenidMobile as Software Engineer trainee. From the first day it was clear that I had made the right decision. Rapidly, I got to believe that I am working with highly talented people having dedication and motivation that I had come to admire. We were introduced to the whole engineering division as well as to sales, marketing and support divisions. We were all called by our initial names despite of our age differences. I was little bit anxious early days at hSenidMobile, since I am exposed to a complete new environment as well as having a huge target at mind to successfully finish the internship at hSenidMobile. But, soon I felt it’s much easier and interesting than I initially thought working at new environment. I would describe my training experience from here onwards in detail.
2.2 STEPPING UP FOR WORK
I have got a nice place to work with and I was given a machine installed with Fedora OS. I never had experience with the Fedora Operating System before, so from first step I had lot to learn and get familiar with. I have learnt how to use shell commands since we can do almost nothing without Linux terminal of fedora. I learnt a lot from my fellow friends around as well as I continue to read some great web articles to quickly get going with the things. I set up `yum.conf` file with my proxy IP, username and password to use yum to easily install software over the Internet in Fedora OS. I was given an introduction to what I would have to do during my internship period. Since, I already had experience in J2ME mobile application development when I joined hSenid, I was asked whether I would like to work on iPhone application development. At the time, I didn't know the power of the device or even what language I am going to work with. I simply said, 'yes' just because I love application development for mobiles. It's really interesting developing for mobiles, Once you have done with your application and it’s on your hand held mobile you could enjoy a lot than you have a desktop application on your PC or Server. I thought I got a real chance at hSenidMobile, that some undergraduate trainee would rarely get.

I started learning about iPhone and its features. I was asked to get familiar with a powerful language called Objective-C. Objective-C is the programming language used for developing applications for Mac and iPhone / iPod touch devices. There was a one Mac computer at hSenidMobile which was at our CTOs office. I have given access to the computer with an user account, I was asked to use VNC Viewer to connect to Mac computer. Therefore, I installed VNC Viewer on my Fedora OS machine using yum. Mr. Harsha Sanjeewa was my supervisor for iPhone Application development work who guided me to the right direction to become an iPhone application developer. I knew that it would be a touch ask for me to go towards this target since there was no one at hSenid currently doing iPhone application development. I read several articles, documents to get familiar with the new device and its history and specially about Apple and its history. All these things proved me that I got a great chance and I must work hard to achieve my target. Even though, I knew initial days would be really difficult to pass, I had a determination from first day towards going towards my goal. Finally, it’s all about my beginning at hSenidMobile internship period and what I would be explaining in rest of this chapter. From here onwards, I would describe my experience as a trainee software engineer at hSenidMobile.
2.3 INTRODUCTION TO HSENIIDMOBILE AND ITS DEVELOPMENTS

Despite the fact that I would mainly have to work with iPhone application development, hSenidMobile mainly focuses J2EE application development. As trainees, we all had an introduction training session to the development environment and we were informed that we need to do some assignments in first few days to get familiarized with hSenidMobile development. It’s more or less like a training program for us to give knowledge on tools and technologies mostly used. And also we got to know that each week all engineering division has to participate in technical sessions conducted by fellow Software Engineers regarding their mastered development tools. Our training process started of with some session on the tools which are being used at hSenid. The sessions were basically the tools which are used in the development process. The most interesting thing was the trainees did most of the session by self learning. So each trainee got different topics. So the first thing was to setup the working environment and getting used to the tools. So let me start with the how did I set up my development working environment and the gained knowledge in the training session.

2.3.1 Setting up the Working Environment with training program

Though I was little bit familiarized with the Linux operating system I got a machine which is using Fedora which I was not that much familiarized with that operating system. But I did lot of effort to setup my working environment for development. I installed the required software such as Apache Ant (a Java-based build tool. In theory, it is kind of like Make, but without Make's wrinkles), Java (Object Oriented Programming Language), Tomcat (Apache Tomcat is the servlet container that is used in the official Reference Implementation for the Java Servlet and Java Server Pages technologies) and IntelliJ IDEA (The most intelligent Java IDE with refactoring support). The main problem which I face is installing Java, Ant, and Tomcat. All these need to be configured in Fedora. It is basically a file which is called ‘bash_profile’. So configuring this file made my experience more in the operating system and some new thing I learnt during setting up the development environment.

Further I had training sessions on particular tools which are being used in the company. These are tools used in every project. First I had training on the XPlanner tool. XPlanner is a project planning and tracking tool for eXtreme Programming (XP) teams. It is not just only a project planning tool, but it is also to track the work being done throughout the project and...
also to make the projects to be done efficiently in future. This session was done by a Project Leader. The Next session I had was in Subversion (SVN) which is an open source tool used for version control management. This means team development coding is managed in a central repository.

Also I had session on the tools which are being used in development. The sessions were on Log4j, ANT, Core JAVA and JUNIT. The Log4j is a Java-based logging utility, which is used to enable logging at runtime without modifying the application binary. The Next tool is Ant which is used to build java based projects. Also I had a session on the tool which is used for testing the developed code. The tool was JUNIT. The tool enables to develop test based development. The next technical session which I had is the tool IVY. Ivy is a popular dependency manager focusing on flexibility and simplicity. Also we had sessions on Tomcat and Servlets. Tomcat is a web container, or application server which is used for deployment. Also I learnt the concepts of JSP (Java Server Pages (JSP) technology enables Web developers and designers to rapidly develop and easily maintain, information-rich, dynamic Web pages that leverage existing business systems) and Servelets (Servelets are Java objects that are compiled and stored persistently in the server side).

Other these technical sessions I had session like the coding conventions used in the company. The programming style used in a particular program may be derived from the coding standards or code conventions of a company or other computing organization. Also there was a session from the Quality Assurance team on a tool which is used called Bugzilla. Bugzilla is a Web-based general-purpose bug tracker tool. This tool makes managing bugs and enables software engineers and QA engineers collaboration much effective. Also we had a quite a lengthy session on MySQL, which really helped to extend our knowledge on database management systems.

The training program conducted for us in an additional hour each day at a fixed time that we were informed in previous day. The training program conducted for two weeks. The program was really helpful for my knowledge but I had to parallel learn some other new things regarding iPhone application development at the same time. I found it really challenging and exciting to work on two completely different areas at the same time.
2.3.2 Orientation Program

In addition to training program, there had been the company orientation program where I got a real Idea about the company and its department wide functioning. The orientation started of with the Human Resource Department giving us more about the rules and regulations of hSenid. Furthermore the session continued with the following Departments such as Communication and Branding, Quality Assurance, Support, Sales and Marketing. The Orientation gave us the idea about the hSenid development cycle. And finally, we all new comers had an interesting discussion with CEO, which made me think of a hSenidian rather than just another trainee software engineer.

2.4 BEGINNING IPHONE APPLICATION DEVELOPMENT

Most of my internship experience was based on this beginning, which I found really tough and hard initially. As I was informed about I will have to learn myself to become an iPhone developer, I had serious questions on my mind. But I had able to successfully answer them within my training period to myself with the help of guidance given by my supervisor. I started from learning iPhone and its features and also the history of Apple and iPhone made me think this as a great opportunity to develop applications for a very powerful device. And at the same time I started learning about Objective-C, the language used to program for Cocoa Touch devices and Mac. Here are some quick introduction to Apple, iPhone and Objective-C.

2.4.1. Apple

Apple Inc. is an American corporation which designs and manufactures consumer electronics and software products. The company's best-known hardware products include Macintosh or Mac computers, the iPod and iPhone. And apple software includes the Mac OS X operating system, the iTunes media browser, the iLife suite of multimedia and creativity software, and also some great apple software for iPhone like Weather, Stocks, Mail, Safari, Photos, etc. Apple's co-founder Steve Jobs have done a great job for the invention of these great tools Mac and iPhone. I will describe iPhone and its capabilities in the next section.

2.4.2 iPhone

In the first year of the iPhone’s existence, Apple sold 6 million of them; brought the thing to 70 countries; and inspired an industry of misbegotten iPhone lookalikes from other
companies. By the end of Year One, you could type iPhone into Google and get 229 million hits. It’s over 336 million today. Amazing how such device became popular in short time. But you wouldn't be surprised once you know how powerful this device is, its like a small multi-touch computer on your hand with 128MB of ram and 8GB or 16GB of memory and a great touch interface with support for multiple orientations and accelerometers.

Now there’s a new iPhone, the iPhone 3G. More importantly, there’s a new version of the iPhone’s software, called iPhone 2.0. And then there’s the iPhone App Store, which offers thousands of add-on programs written by individuals, software companies, and everything in between. The App Store is about to hit one billion downloads at the time I write this report, and I am sure it will pass the one billion mark within no more than few days. This is huge. Remember how mystified everyone was when Apple called its music player the iPod—instead of, say, iMusic or iSongs or something? The reason was that Apple had much bigger plans for the iPod—photos, videos, documents, and so on. Maybe they should have saved that name for the iPhone. And we will be having new iPhone 3.0 still in its beta supports

Yes, the iPhone is still an iPod. And it’s still the best Internet phone you’ve ever seen. It shows fully formatted email (with attachments, thank you) and displays entire Web pages with fonts and design intact. It’s still tricked out with a tilt sensor, proximity sensor, light sensor, Wi-Fi, Bluetooth, and that amazing multi-touch screen.

Therefore, it’s still a calendar, address book, calculator, alarm clock, stopwatch, stock tracker, traffic reporter, RSS reader, and weather forecaster. It even stands in for a flashlight and, with the screen off, a pocket mirror. But now, thanks to the App Store, the iPhone is a fast, wicked fun pocket computer. All those free or cheap programs can turn it into a medical reference, musical keyboard, time tracker, remote control, voice recorder, tip calculator, e-book reader, and so on. And whoa, those games! Hundreds of them, with smooth 3-D graphics and tilt control.

All of this sends the iPhone’s utility and power through the roof. Calling it a phone is practically an insult.

2.4.3 Objective-C

Objective-C is defined as a small but powerful set of extensions to the standard ANSI C language. The Objective-C language is a simple computer language designed to enable
sophisticated object-oriented programming. Its additions to C are mostly based on Smalltalk, one of the first object-oriented programming languages. Objective-C is designed to give C full object-oriented programming capabilities, and to do so in a simple and straightforward way. Objective-C is the programming language I need to use for program for iPhone and iPod native applications.

2.4.4 iPhone OS and iPhone SDK

iPhone OS comprises the operating system and technologies you use to create applications for iPhone and iPod touch devices. The technologies in iPhone OS provide everything you need to create advanced applications that respond to touch events and display high-quality graphics. In addition to the basic application infrastructure, iPhone OS gives you access to Multi-Touch events, the hardware accelerometers, and other device features that make it easy to create advanced and innovative applications.

The iPhone SDK includes iPhone OS, the Xcode tools, and access to the documentation, sample code, and resources you need to develop iPhone applications. Xcode provides the development environment you use to create your application code, compile it, run it, and debug it. Because Xcode is fully integrated with iPhone OS, developing iPhone applications with it is easy.

The implementation of iPhone OS can be viewed as a set of layers, which are shown in Figure 2.1. At the lower layers of the system are the fundamental services on which all applications rely, while higher-level layers contain more sophisticated services and technologies.

![Figure 2.1 Layers of iPhone OS](image)
The Cocoa Touch layer is one of the most important layers in iPhone OS. It comprises the UIKit and Foundation frameworks (UIKit.framework and Foundation.framework), which provide the basic tools and infrastructure you need to implement graphical, event-driven applications in iPhone OS. It also includes several other frameworks that provide key services for accessing device features, such as the user’s contacts. We work mostly with this layer when developing iPhone applications with Apple SDK.s

2.4.5 Learning Objective-C basics
Initially I went through several web articles on Objective-C basics, I needed to get familiar with C language also to get going with Objective-C. The Objective-C language is a computer language designed to enable sophisticated object-oriented programming. As I already familiar with Object-oriented programming, I needed to study the syntax of Objective-C application of Object-Oriented programming. It has been really difficult to move to Objective-C from Java initially, But when time passes by I gradually get familiar with the syntax a lot more while doing iPhone application development. I learnt how to define classes, protocols, methods and also how Objective-C runtime works. And also I studied about Objective-C basics sending messages to methods, power of using dynamism of Objective-C and much more before starting iPhone development. And much importantly, I was asked to study memory management in Objective-C, since objective-C does not have automatic garbage collection like java. You might end up developing programs that would crash unless you have good knowledge on Objective-C memory management.

2.4.6 Study Apple iPhone resources
After getting familiarized with the Objective-C basics and its features I have started reading Apple recommended resources for iPhone application development. 'iPhone OS Programming Guide' is the first ebook Apple recommend to start with for any new iPhone developer. I went through all the videos given at Apple iPhone developer site to improve myself and get used to words and phrases used specifically for iPhone development. Soon, I found I could learn a lot from these Apple resources as well as from mailing lists and forums dedicated for iPhone development. I continued to read other important iPhone development resources on 'ViewController programming Guide', 'Interface Builder user guide', 'iPhone Human Interface Guidelines' fully before starting the actual development with Apple Mac. All these things tightly bound to my mind soon I started to use them practically.
2.4.7 Say 'HelloWorld' to iPhone SDK

I needed to connect to the Mac computer using VNC Viewer every time I do any iPhone application development. As I have already mentioned, iPhone SDK includes iPhone OS, the Xcode tools, and access to the documentation, sample code, and resources need to develop iPhone applications. It also includes iPhone Simulator to run and see your application before installing it on device and Instruments tool for testing performance of iPhone application. Xcode is the IDE used for iPhone or Mac application development. Before I start with Xcode, I took little time to get familiar with the Apple Mac OS X operating system, which I am going to use for iPhone application development. It has a great graphics interface and Linux terminal to run your favorite shell commands, easy searching and much more features. I started Xcode and found it really confusing to use initially, I felt the same when I logged into the Mac OS X operating system. First I started looking at its menus and buttons and their tool tips to get familiar with the user interface.

Then I started to implement a 'HelloWorld' application to get things going. It took me nearly two hours but still I couldn't do completely what I really wanted, then I thought it's better running some working application to start with. So I have downloaded some Apple sample applications and went through them to learn how they have implemented. And I got to know its very important to have a sound knowledge on Interface Builder to easily create iPhone application views and link them with controller classes and interface builder methods. Interface Builder is an application that comes with iPhone SDK for designing and testing user interfaces for iPhone and iPod devices. After this work I was confident in successfully finish implementing my first iPhone application on HelloWorld. :) Then I started creating applications to see how to implement navigation controllers, tab bar controllers, how to use different iPhone user interface elements before I will be given to implement a real iPhone application. And also I implement small applications to see the auto rotation of iPhone views, to track swaps and drags on iPhone screen and much more during this stage. After this initial period my first task was to research and implement an XMPP iPhone chat client.
2.5 IPHONE APPLICATION DEVELOPMENT

If you decide that building a native iPhone application is the right approach for your project, it is important for us to understand the basic concepts that underlie iPhone development. Writing a native iPhone application is not like writing an Objective-C application. Although there are similarities between the two processes, developing for iPhone OS requires a much tighter integration with the overall system. This integration permeates everything from your basic programming practices to the technologies you use. We should have a thorough understanding of the runtime environment, application security, memory management and application structure in greater detail before starting any iPhone development. The following section will describe the application structure for any iPhone SDK application.

2.5.1 MVC Architecture

The structure of iPhone applications is based on the Model-View-Controller (MVC) design pattern because it benefits object-oriented programs in several ways. MVC-based programs tend to be more adaptable to changing requirements - in other words, they are more easily extensible than programs that do not use MVC. Furthermore, the objects in these programs tend to be more reusable and their interfaces tend to be better defined.

In the MVC design pattern, the model layer consists of objects that represent the data your application manages. The objects in this layer should be organized in the way that makes the most sense for the data. External interactions with model objects occur through a well-defined set of interfaces, whose job is to ensure the integrity of the underlying data at all times.

The view layer defines the presentation format and appearance of the application. This layer consists of your application’s windows, views, and controls. The views can be standard system views or custom views you create. You configure these views to display the data from your model objects in an appropriate way. In addition, your view objects need to generate notifications in response to events and user interactions with that data.

The controller layer acts as the bridge between the model and view layers. It receives the notifications generated by the view layer and uses them to make the corresponding changes in the data model. Similarly, if the data in the data layer changes for other reasons (perhaps because of some internal computation loop), it notifies an appropriate controller object, which then updates the views. Figure 2.1 shows the basic model-view-controller relationships.
2.5.2 XMPP iPhone Chat Client

My first target after initial learning was to implement an iPhone XMPP chat client. In order to achieve this target I have devided my tasks into several steps. My first step was to study XMPP protocol and install / configure an XMPP server to start implementing iPhone XMPP client application. I have studied about XMPP protocol and its current client server implementations. The Extensible Messaging and Presence Protocol (XMPP) is an open technology for real-time communication, which powers a wide range of applications including instant messaging, presence, multi-party chat, and much more. XMPP protocol sends XML messages to share information with client and server. Jabber and Google Talk are major IM tools that use XMPP as their instant messaging protocol. I have studied XMPP protocol reference and XML syntaxes shared among client and servers. Then I have downloaded ejabberd XMPP server and installed and configured on my Fedora PC successfully.

My next step was to do a research on existing iPhone XMPP implementations and see how others have achieved this sort of development. By the time there were not any development experience available for an iPhone XMPP client implementations. But more interestingly, I found an opensource Objective-C XMPP framework on google code written for Apple Mac. I decided to use it for my application, but I needed to make it changed and usable for iPhone development. I have got the xmppframework code and imported xmppframework core classes in to my Xcode iPhone project to use it as back-end or model for my application.
development. Then I have added iPhone specific relevant frameworks to the project and done several changes to make the code able to be compiled and linked as an iPhone application.

After these steps I started implementing view and controller layers for the iPhone XMPP chat client application. First I want to check the back-end code, there for my initial task was to implement a login screen for iPhone and use it to login to ejabberd XMPP server using iPhone Simulator. Once I have finished this, I could successfully login to an XMPP server, and after this we decided to allow users to enter their account input information at Settings screen instead of my application home screen. This required to add a settings bundle to the application. Then I have created a Roster Controller class to handle contact updates after logged in to xmpp server. The controller class has delegate methods to handle updates coming to `xmppframework` XMPPClient class. In order to display list of loaded contacts on iPhone screen it required to study about handling table views, its delegate and protocol class methods. I have designed the contacts view using Interface Builder and linked its IBOutlets and IBActions. Received IBAction methods were implemented in the Roster Controller class. XMPPClient class and RosterController class has relevant objects in InterfaceBuilder linked appropriately. All these IB stuff spread in the MainWindow XIB file, which is kind of a resource file.

At the end of this my next main task was to implement chatting for contacts. To implement chatting I have added ChatWindowManager and ChatController classes in addition to the chat view designed using Interface Builder. The IB stuff for this is separated and kept in ChatWindow.XIB file. When user taps a contact in the contacts view, it gets the reference to chat window manager common instance and creates or gives relevant chat controller instance with its view. After this, I had very few work to finish a simple XMPP Client for iPhone.

I was able to finish my work on implementing an XMPP chat client for iPhone with all basic features, including loading/adding and removing contacts, accept/reject requests, send and receive chat messages. I have implemented several features within a week after chat implementation, including adding / removing contacts, accept / reject requests, and also respond to swipe gestures and view current started chats in a tabbed view. I had to implement a custom scroll view sub class to have swipe gestures on chat views. Swipe is a fast sweeping blow on iPhone touch screen, in respond to that view should change or move accordingly. Also I have implemented a separate request controller to handle accept reject requests coming to the chat.

At the end of this application, I had pretty much confident about me to develop a high quality iPhone application to be published at Apple AppStore.
2.5.3 An Expense Tracker for iPhone - hExpense

After completing my R&D first iPhone application successfully, I have started working on a new application, an iPhone Expense Tracker App. The purpose of the App is to simply track the daily expenses of iPhone user and provide him daily, monthly reports, summaries about their expenses. The application is planned to be published at Apple App store and also it is scheduled to be finished with QA with in middle of next month. I have initially designed the UI flow for the expense tracker application as well as I already did a research about current expense tracker applications, specifically focused to iPhone. I have to consider about iPhone Human Interface Guidelines given by Apple when designing the UI flow. Then I have implemented the UI flow with dump data and controller classes within two days. After that we had a discussion on changes and scheduled the application time line.

First I have designed the database tables for profiles, expenses and expense types and also a class diagram of the application using Visual Paradigm.

Table 2.1 Expense Tracker database table format

<table>
<thead>
<tr>
<th>Profile</th>
<th>Type</th>
<th>Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>expid int PK; name varchar</td>
<td>typeid int PK; name varchar</td>
<td>expid int PK; note varchar; date real; amount real; type varchar</td>
</tr>
</tbody>
</table>
Expense tracker application allows iPhone users to note down their daily expenses under preferred profiles, further under any user defined categories/expense types. The application development includes two main modules namely, expense module and report module without implementation of user interfaces. I have started from implementing model classes for the expenses module as planned. Expense, Type and Profile are three model classes for the application with getters and setters and other methods. Properties are implemented in typical Objective-C manner as synthesized properties. And also I have implemented main UIs for the application using Interface Builder, to start with.

Then I had some tough development time, I needed the help of iPhone development forums help badly to come across some issues. I have initially designed the UI flow for the expense tracker application as well as I already did a research about current expense tracker applications, specifically focused to iPhone. Then I have implemented the UI flow with dump data and controller classes within two days. After that we had a discussion on changes and scheduled the application time line. I have started the development according to the schedule.

I did a study about SQLite, a software library that implements a transactional SQL database engine, which can be used in iPhone to store data of applications. Then I have implemented table structure as we have already planned and controller classes to deal with model to add new expenses under profiles and categories. Then I finished controller implementation for managing expenses. At the end of the expenses module, application could allow users to simply store their expenses under profiles and categories as they prefer with iPhone navigation, also allowed to manage all these expenses, modify / delete.

In order to work with reporting module – drawing charts; I have studied Quartz 2D technology, which is used to draw 2D graphs and charts in iPhone applications. Initially, I have implemented some test charts and used the code to draw a good looking pie-chart for the expenses recorded with the application; graph displays expenses in a pie-chart with categorized total. It uses total of each category and grand total queried from database to draw the content. And then I have implemented a summary view for the Expense Tracker application, which displays latest expense record, earliest record, highest & lowest expense and also grand total of expenses. I have implemented a controller class to handle the summary view, which retrieves data queried from database.

Then I worked with several application changes to Expense Tracker app, in order to improve the usability of the application. It included some button positioning and spelling checking. Then, we needed to implement a report of expenses happened in a table like format. While we were discussing implementation possibilities, we decided to use a UIWebView to display
an html table format report within our application. Therefore, I have studied about
UIWebView and how to use it with in an iPhone native application. And also I wanted to
refer documentation several times to find how a locally created html file could be viewed
within a UIWebView object. And also I needed to get familiar with iPhone web dev a little to
provide an iPhone optimized html page to the UIWebView.
After that we planned to add a budget for the Expense Tracker application and I have worked
with it for the rest of the week. I have changed the add profile controller class so that it can
additionally handle adding a budget. Then also summary had to alter to display current
available budget or exceeded amount, in addition to the user interface changes to introduce a
budget add for the application.
At the end of implementation, I started application testing with iPhone and iPod devices.
Next, I had to study and test my application with real devices. It was not easy as testing J2ME
applications. I have registered as an iPhone developer in Apple iPhone developer program. I
have joined as a team member of iPhone developer portal for hSenid Software International.
Also I have faced several issues when trying to make and install application on real devices.
In order to test iPhone SDK applications, we need to go through below high level steps.
   - Create Developer Certificate, download and install it on local key chain.
   - Add testing device ids and application ids to program portal
   - Create provisioning profile with developers, device IDs and application ID added.
   - Install provisioning profile on device and then install signed binary executable using
     organizer.
At the end of my initial testing, I have released the application for QA and updated SVN on
it. I did a knowledge transfer to QA person on iPhone common application features and
iPhone Human Interface Guidelines. Then I have learnt how to use Bugzilla to report and
update on bug fixes and its progress. I initially started with smallest bugs so that I know I
have some progress on my work and then slowly started fixing major and critical bugs.
At the end of all main development, I was asked to do several modifications to the
application, nevertheless some of them did not match with Apple iPhone Human Interface
Guidelines. Most interesting new feature I have implemented was allowing users to email the
generated report with iPhone. After the completion, we delayed the application submission to
the AppStore via iTunes Connect until we get team agent access to the account.
After getting access to the account, I have created the distribution binary and submitted the application to the Apple review. It required to complete a set of actions to be published for review. We proposed a name for the application called 'hExpense'. The application will be available to iPhone users to be downloaded from App Store with Tier 1 pricing.

Figure 2.4 hExpense Screen shots
2.6 J2ME APPLICATION DEVELOPMENT

While doing iPhone application development, I worked with some J2ME application user interface developments. Once I joined hSenidMobile, I have already had some sound knowledge on J2ME development. Our second year industrial project was to implement multi-player mobile game over Bluetooth, which had given me experience on J2ME application development. We focus on providing a common user interface that would work with all java enabled phones, which looks elegant and attractive. The best tool to provide this kind of UIs was to use J2ME Polish API. I would give a quick introduction to both of these and share my experience on UI development for J2ME devices.

2.6.1 J2ME

Java Platform, Micro Edition (Java ME) provides a robust, flexible environment for applications running on mobile and other embedded devices - mobile phones, personal digital assistants (PDAs), TV set-top boxes, and printers. Java ME includes flexible user interfaces, robust security, built-in network protocols, and support for networked and offline applications that can be downloaded dynamically. Applications based on Java ME are portable across many devices, yet leverage each device's native capabilities.

2.6.2 J2ME Polish API

J2ME Polish is a suite of tools and technologies aimed at mobile developers and companies within the mobile space.

Main features of J2ME Polish include:

- A UI toolkit that is highly flexible and that can be designed outside of the application's source code
- A toolset for porting mobile application to different handsets and different technology platforms.
- Technology for accessing server side content and communicating with remote parties.
- A persistence solution that allows loading and saving complex data with a single line of code.
- Community maintained device database.

And more importantly, its opensource, you have code with you at any time and it has a huge community working around it.
2.6.3 mRecharge and mBanking User Interface developments

mRecharge is a J2ME client for mobile recharge and mBanking is a J2ME client for mobile banking. All these J2ME applications are part of hSenidMobile's mChoice suite. My task was to implement user interface module for these two applications. Both these applications have a main focus to easy localization and common final jar file that work with large number of phones without any modification with an attractive interface. It is obvious that we would need the J2ME Polish API and its powerful styling and build framework to achieve this goal. I have studied further about J2ME polish api to come up with screens for these two applications. The mRecharge application Uis included fund transfer, check balance, check account history, and change PIN. In addition to splash screen, progress screen and main menu. The mBanking client included developing screens for all the mobile banking functionalities. The mBanking client built for English translation as well as Portuguese translation as well. And in addition to user interface development, I have finished a README file for these applications.

![mChoice Recharge](image1)

![Account History](image2)

Figure 2.5 mRecharge J2ME client screen shots

2.7 PROCEDURES & POLICIES

These are some of the other policies and procedures I have been exposed to apart from the ones mentioned along with my work in the above sections.

- Monday Morning Meetings – a meeting held every Monday for all the employees to get the updates of all the projects as well as to increase communication.
- Stand Up Meetings – an important component of the XP process, this was a manner of bringing the entire project team to the same level of understanding and to resolve any potential matters.

- Outings / Movie nights – hSenid always focuses on the informal aspect of the employment to keep the employees motivated, and therefore there were regular outings, sports days and movie nights to keep our minds off the work.

- Working Hours - Monday to Friday in one of the slots as follows: 8.00 a.m. to 5.00 P.M, 8.30 a.m. to 5.30 P.M, 9.00 a.m. to 6.00 p.m. or 9.30 a.m. to 6.30 p.m. Saturday is not an official working day for hSenid. However, Saturdays are reserved for any training programs and workshops, which we may be organizing from time to time. Sometimes, We even had to work certain weekends and beyond the timeslots to cover up deadlines.

- Security Policy – hSenid may monitor all our activities either on the computer on the network or in general to ensure that we are not wasting company resources.

- Code of Conduct and Dress Code – hSenid has its own set of ethics on how employees should behave, and this covers a wide range from being on time, using the proper dress code both for office and meetings, taking leave and meeting deadlines.
Chapter 03 – Conclusion

3.1 MY INTERNSHIP EXPERIENCE

I chose to join hSenid during the industrial placement period mainly because I really like to get involved in the development side where I can get to know more about different technologies. Also I like to get involved in Java and mobile application development that’s why I chose the hSenid Mobile division. This Branch is more interested on mobile based applications as well as J2EE development. Further the company was mostly passionate to be a SriLankan Company.

Once we joined the company as undergraduate trainees within the first two, three weeks we had training sessions on technical stuff and introduction to company departments and the process management in the company in parallel to our specific learning stuff. Here I will describe my experience briefly that I have already expressed in previous chapter in detail. I started with setting up my work environment and first two weeks were learning time for me on Objective-C and iPhone application development. I had to get familiar with these things fairly quickly to start application development. I was left alone for most of the studies and gave guidance and small targets like finish reading recommended resources with a specified day likewise. I was the only person training to do iPhone development at hSenidMobile, where they plan to release iPhone applications to Apple AppStore.

After getting familiarized with the Objective-C basics and iPhone application development standards fairly quickly, I was given a task to implement an XMPP iPhone client application. I was free to learn on how to implement it and also get familiar with iPhone application development with this application. Initially, I have studied about XMPP protocol and its current available clients and servers. Then I have successfully installed and configured eJabberd XMPP server to use as server for my client implementation. I went through jabber specifications and found there is an existing Objective-C opensource client library written for Apple Mac. After several changes to the xmppframework back-end code, it was in a form to be used as model for my XMPP client iPhone application implementation. Initially, I faced several compiling and linking issues, while changing xmppframework code to use as back-end for my iPhone implementation. After successfully able to compile it for iPhone, I have started implementing controller and view for the XMPP iPhone application. The application needed to follow MVC architecture strictly and also the iPhone Human Interface Guidelines when implementing the view. At the end of the application development, I got much
experience on iPhone application development and how to use Apple documentations and forums to get over on critical situations in development. The application is capable of giving users the ability to login to any jabber server including Google Talk, add contacts, chat with friends, and remove contacts and all basic IM client functionalities. But it did not include group chatting.

After that my goal was to develop an iPhone expense tracker application to be published at Apple AppStore. The objective of this application was to implement a comprehensive yet easy to use system built for businesses travelers, and other iPhone users to keep constant track of their business expenditure while on the move. While achieving a successful implementation of this application I was given a set of targets beforehand. I went through all these initial targets to finally come up with an iPhone application to track expenses of iPhone users. Final application included features; adding expenses under trips / projects, managing and editing expenses, generating multi-touch enabled reports, emailing generated expense reports from iPhone. The application is submitted to be published at Apple AppStore and currently its under review by Apple. It’s called 'hExpense' and will be available to download at AppStore to download by iPhone users.

In addition to iPhone application development during my internship period, I have also implemented J2ME user interface modules for a Mobile Recharge client and Mobile Banking client. All these J2ME applications are part of hSenidMobile's mChoice suite. I have studied and used J2ME polish API and its powerful build framework to implement user interface module. The modules were implemented using all powerful features in J2ME Polish API including attractive styling, localization, easy customization.

And more importantly, I got some great experience working with highly talented people around working around me and giving guidance on achieving huge goals during my internship, which sometimes I thought I would have failed if I tried them on my own. We had fun time, movie nights, parties organized by HR team to inspire us and bring us all together. The training program helped me a lot to build my confidence to become a professional in IT industry and it helped me to improve my soft skills as well as inter-personal and communication skills as well. In conclusion, I would say it had been a great time in my university life working as an undergraduate trainee at hSenidMobile staying with highly talented people around me and getting initial experience on the field we are going to be in future.
3.2 HSENI D AS A PLACE FOR TRAINING

I believe that hSenid is a great place for a student to do his/her industrial training. Some of the reasons I would put forth are;

- Great Technical Experience and Knowledge – I had a sound technical exposure to new technologies, and excellent procedures and standards at hSenid. hSenid employs some of the most skilled engineers and it is a great experience to work among them.

- Responsibility and Accountability for Your Actions – as mentioned earlier, hSenid treats its trainees in the same caliber as its skilled employees. A normal training establishment might in general be worry about giving much responsibility or the chance to work on a major component or much decision making power in their projects, but here it was very different. We were working on the actual projects that were run by the company, and personally, I had a major role to play in the shaping of the new project I was assigned to. This is the right kind of experience and responsibility needed to build up accountable, professional IT graduates.

- Training Personnel and their Enthusiasm towards trainees – the staff is always ready to help us trainees out with our work and will readily share their experience or knowledge when necessary. It is not a scenario of giving us some work and forgetting about us, instead, they had a proper plan for our training and were always working closely with us, monitoring our work and giving feedback when necessary.

- Providing an overall learning – hSenid understands that it is not only technical expertise which will make a successful IT professional and therefore they are continuously working to ensure that we get an all round learning and skill development. We had plenty of trainings and opportunities to develop our communication as well as leadership skills.

Also there is very few negative things I can mention about hSenid in terms of its training program, because honestly it is I am sure one of the best programs in the country.

- High workload – it is hard to say this is a problem with hSenid because to be honest, it is the nature of the industry we are in. During my main project work however, I have seen certain irregularities in work allocation and small issues with communication, which if solved would have made our workload and the overall project progress a lot smoother. So I am sure with time, as experience grows, these issues can be overcome effectively.
3.3 TRAINING PROGRAM ORGANIZATION BY NAITA AND UNIVERSITY

I must be thankful to NAITA for the excellent work that they have done in the organization of the industrial training program and for the excellent co-ordination with our universities in running the program smoothly. All processes were well delegated and handled, so as students we did not have to bear much of a burden in finding a placement and getting the interview and such. Also it is also important to mention about the information we were given regarding the program. Not only about how the program is run, the expected documents and their standards and such, but also regarding how we should behave professionally and get the best out of the training program.

One minor aspect I guess they could improve upon is if they themselves visited all the training places during training. This way they would get a firsthand view of things and may find ways to improve upon it. In my opinion, if this could be avoided it would be a perfect program for all undergraduate trainees for their future in industry.
Appendix A – hSenid Organization Structure

hSenid Software International - Organization Structure

- CEO - Chief Executive Officer
- GM (HTA) - General Manager Projects & Product Development
- GM (BD) - General Manager Business Development
- TTL - Technology Team Leader
- TSM - Technology Service Manager
- TL - Team Leader
- PL - Project Leader
- PS - Product Specialist
- SSE - Senior S/W Engineer
- MCS - Marketing & Communication Specialist
- SE - Sales Engineer
- SSE - S/W Engineer
- SPE - Support Engineer
- TW - Technical Writer
- GD - Graphics Designer
- HRE - Human Resource Executive
- HRM - Human Resource Manager
- AP - Analyst Programmer
- PSE - Pre Sales Engineer
- FM - Finance Manager
- AA - Account Assistant
- RCP - Receptionist
- OA - Office Assistant
- SA - System Administrator
- NTA - Network Administrator
- NA - Network Assistant
- BA - Business Analyst
- PA - Analyst Programmer
- TAP - Trainee Analyst Programmer
- IE - Implementation Engineer
- FRL - Process Lead
- CRE - Customer Relationship Executive
- SAO - Senior Administration Officer
- MS - Marketing Specialist
- SSQE - Senior QA Engineer
- SSPE - S/W Support Engineer
- DRA - Documentation Research Assistant
- ASE - Associate S/W Engineer
Appendix B – XPlanner, Bugzilla

This appendix includes screens of Project planning tool XPlanner and bug tracking tool – Bugzilla used at hSenidMobile. Both these tools are opensource tools used by most of the software engineering companies.

XPlanner

This is a screenshot of the XPlanner tool showing a project task with details such as task name, type, progress, estimated and actual hours, and priority.

Bugzilla

This is a screenshot of the Bugzilla tool showing a bug report with fields for title, description, priority, version, and status.

These screenshots illustrate the features and functionalities of XPlanner and Bugzilla, which are commonly used in software engineering projects.
Bibliography

- The official hSenid community: www.hSenid.com
  - hSenid Outsourcing Division: www.hSenid.com/outsourcing
  - hSenid Business Solutions: www.hSenid.com/hbs
- hSenid Mobile Division website: www.hSenidMobile.com
- MITZ Official website: www.mitzstudio.com
- Apple iPhone Development: developer.apple.com/iphone
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>Apple Inc.</td>
</tr>
<tr>
<td>BCS</td>
<td>British Computer Society</td>
</tr>
<tr>
<td>BeyondM</td>
<td>BeyondM Pvt. Ltd – currently known as hSenidMobile</td>
</tr>
<tr>
<td>BugZilla</td>
<td>Bug tracking software</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CVS</td>
<td>Concurrent Versions System</td>
</tr>
<tr>
<td>GM</td>
<td>General Manager</td>
</tr>
<tr>
<td>HBS</td>
<td>hSenid Business Solutions</td>
</tr>
<tr>
<td>HMS</td>
<td>hSenid Mobile Solutions</td>
</tr>
<tr>
<td>HR</td>
<td>Human Resource</td>
</tr>
<tr>
<td>HRM</td>
<td>Human Resource Management</td>
</tr>
<tr>
<td>hSenid</td>
<td>hSenid Software International (Pvt.) Ltd.</td>
</tr>
<tr>
<td>IDE</td>
<td>Integrated Development Environment</td>
</tr>
<tr>
<td>J2EE</td>
<td>Java 2 Platform Enterprise Edition</td>
</tr>
<tr>
<td>J2ME</td>
<td>Java Platform, Micro Edition</td>
</tr>
<tr>
<td>MVC</td>
<td>Model View Controller</td>
</tr>
<tr>
<td>NAITA</td>
<td>National Apprentice and Industrial Training Authority</td>
</tr>
<tr>
<td>OS</td>
<td>Operating System</td>
</tr>
<tr>
<td>QA</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>SQL</td>
<td>Structured Query Language</td>
</tr>
<tr>
<td>SVN</td>
<td>Subversion</td>
</tr>
<tr>
<td>UI</td>
<td>User Interface</td>
</tr>
<tr>
<td>XP</td>
<td>Extreme Programming</td>
</tr>
<tr>
<td>XPlanner</td>
<td>Project tracking software</td>
</tr>
</tbody>
</table>