COMMUNITY MOBILE SERVICES

(FYP PROJECT FOR 2 SEMESTERS)

By

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FINAL PROJECT REPORT

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Information & Communication Technology Programme
Universiti Teknologi PETRONAS
in partial fulfillment of the requirement for the
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(Information & Communication Technology)

Approved

_____

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Project Supervisor

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK

July 2008

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

NADIRAH BINTI MOHD IDRUS (7090)

ABSTRACT

Property development has seen many changes in recent years. Customers are more cautious then before, making comparison between properties before investing in one. For a property developer to gain an edge over a competitor, they need to create new and innovative product, while serving the customers with satisfying support service. One of the methods that an organization can use is to provide Community Mobile Services to township resident or community. With mobile application, buyers can communicate with property developers more easily, while at the same time have access to a collection of mobile Web 2.0 services for mobile users (residents & visitors) with contextual content related to the community/township that the user is in. Developers will have a place where user's feedbacks are categorized and reviewed for discussion and further action. For a customer to adopt such technology, studies on Human Computer Interaction (HCI) must be done to maximize usability of a mobile device. No user will like the pain and complexities of a mobile device that has very limited input and output facilities. Also push and pull technology need to be used depending on the situation, so that users are able to receive information without hassles.

ACKNOWLEDGEMENT

Bismillah walhamdulillah,

First and foremost, I would like to express my gratitude to Allah the Almighty for giving me time, energy, and perseverance in completing my final year project. It is only because Allah allows it that I am able to research and develop my final year project.

Effort into doing this project has started since early 2008, yet obstacles made sure the project does not flow smoothly. With patience and support, this project was able manifest based on the effort, knowledge and experience of that 1-year hardship.

I would also like to extend my gratitude to my UTP supervisor, Assoc Prof Dr. Abas B Md Said, who put his time and effort to guide and supervise me. Your commitment and guidance are truly priceless. Thank you for being patient with my shortcoming. I truly appreciate your understanding and guidance.

Finally, I would like to thank my family and friends whose patient enabled me to complete this work. They gave a support to push me forward and lend a shoulder to cry on so I would not give up. Thank you again for being there for me.

Thank you,

NADIRAH BINTI MOHD IDRUS

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INTRODUCTION

1.1 Background Study

Property development has seen many changes in recent years. Nowadays, more people can afford to buy houses and land, not just the locals, but also for foreign investment. Customer's expectations has increases; they demand more features with lower cost to go with their purchases, forcing developers to create and developer new and innovative idea to cater for these demands. Customers are more cautious then before, making comparison between properties before investing in one. There is no lack of property in the country, and buyers are spoilt for choices. Due to stiff competitions, developers are constantly trying to develop innovative product that exceeds customer's expectation. However, this is not as easy as it seems, since individual buyers has different preference. An organization needs to take into consideration this individual needs, while creating projects that cater to every single buyers as a whole.

This research project focuses on mobile application development that offers possible solutions to this problem. With mobile application, buyers can communicate with property developers more easily, allowing better exchange of data and information between the two. Developers can use these data and feedbacks to further improve their product offering, and reputation.

This project also focuses on researching human computer interaction (HCI) between the users and mobile applications. Factors such as how many line of text to be displayed on the display screen and other research topic will be included.

This research project also focuses on incorporating mobile Web 2.0 services into the application. The aim is to try and make the application more interactive by facilitating creativity collaboration and sharing among users.

Finally, this research project study on the use of pull and push technology. The aim is to find which technology will benefit both the user and developer in a win-win situation, without compromising privacy and profit to both parties.

1.2 Problem Statement

Property developers are looking for new ways to sell their product. Nowadays it is harder to attract potential buyers as their expectation has increases and there are many competitors in the market. Buyers are hesitant to invest in new property due to the risks involved, such as products not finished in time or stalled development. Customers also have problems communicating with developers, as there are limited communication channels available. This leads to confusion, as developers are unable to convey the latest and important information to the customers. Relationship between developers and buyers are only short term, until the buyers receive their product, which does not improve the developer's reputations.

1.3 Objectives

The objective of the project is to develop a mobile application that incorporates features and tools to:-

- To create a mobile devices with access to local content
- To allow users to receive news feeds on their mobile devices

For that, the objective of the research project also includes;

- To find the best method to increase usability on mobile devices (HCI study)
- To find the best method to serve information to customer/users (push-pull technology)

1.4 Project Scope and Limitations

The primary focus of the project is on development of an application that can be used on various wireless and mobile devices. The studies also focus on applying Web 2.0 services, integrating social-networking into the application. Another focus is the study of HCI on mobile device will also be included in the project.

There are limitations in the project in that time constraint plays a major role. With only 2 semesters given, there is not enough time to research and develop all of the project's features. Thus, this research project will only incorporate 2 or 3 functions that is deem more feasible to develop within the time limit.

Also, another problem faced while developing mobile application is the lack of resource pertaining the subject. There are not many books and tutorials that teach the fundamentals of mobile application, thus, problems occur during development due to lack of experience and reference. Also self-study consumes a large amount of time.

1.5 Project Relevance

The project areas of study are human computer interaction and wireless software and multimedia application development for mobile devices, which has limited resources.

1.6 Project Feasibility

The project will take 1 year, or 2 semesters to be develop. The 1st semesters will focus on planning and researching, while the 2nd semester is where the designing and development starts. The project will only focus in creating an application for township residents, unlike an online social-networking website, where the users are vast.

Also the mobile applications will only incorporate few features that are deemed important and necessary by property developers. The project is not developed on a large scale, thus making it feasible to develop and complete within the specified time. As mentioned in the previous section, due to the time constraint, only few of the functions mentioned will be incorporated into the project.

CHAPTER 2
LITERATURE REVIEW

2.1 Overview

The main idea of this project is to allow property developers to communicate with their buyers using mobile applications running on a wireless device. The discussion is divided into several sections, such as mobile web, existing examples, and HCI research. These topics are used for analytical, critical and objectives reviews on the chosen topic and area.

2.2 Mobile Web

Mobile web refers to accessing the World Wide Web (WWW) or internet through mobile devices, such as mobile phone, PDAs (Personal Digital Assistants) and other portable device connected to a public network. It does not require a desktop computer for access.

2.2.1 Advantages and Limitations of Mobile Web and Devices

The advantages of mobile web is that it allows users to have access to the internet '*on the go*' via their portable gadgets. This eliminates the restriction imposed when using desktop computers, where users are tied down to the terminal. Information served on the World Wide Web is also available to mobile users. Mobile web also allows users to obtain information in real-time; an example is by Maxis 3G services.

According to Maxis Chairman Tan Sri Dato' Megat Zaharuddin bin Megat Mohd Nor (2005)

> We see a great opportunity to make the upcoming World Cup in Germany come alive on 3G. As the main broadcast sponsor, we want Malaysian customers to enjoy the World Cup as if they were there - through real-time goal alerts and match highlights via video streaming, and instant access to the latest results and team information.

However, several limitations exist when using mobile web. As the devices need to be portable, most of the mobile devices have small screen size, making it difficult for users to see text or graphics. The ability to open several windows on desktop computers to support multi-tasking are absent in mobile devices, which only allows 1 window or web page to be displayed at 1 time. Navigation on mobile devices can only be done through a simple up and down scrolling function, thereby limiting the flexibility in navigation. Speed is also an issue on mobile devices, as the speed service is slow, often slower than a dial-up internet access.

2.3 Web 2.0

Web 2.0 refers to the 2nd generation of web-hosted communities and hosted services such as social networking site and online journal or blogs. The aim is to facilitate creativity, collaboration and sharing among users. Web 2.0 does not represent a new World Wide Web, and the meaning can be different to different people.

2.3.1 Social Networking

Social Networking services aims to build communities who share interest similar interests and activities, or are interested in exploring the interests and activities of others, and which necessitates the use of software or application programs. These social programs and services has seen tremendous increase of usage, as people are interested in joining communities, staying connected to friends and meeting new people.

Social networking sites make it easier for people to stay connected. Nowadays, people want to stay on top of current news, wanting to know what their friends are doing, and are more open with their personal life. This can be shown with the increase usage of online journals, also know as a weblogs or blogs for short, where authors pen down their opinions or daily activities and publish it on the World Wide Web.

With social networking, users are able to interact and keep in touch with families and friends. Social networking sites also make it easier for people to find other people with the same interest, encouraging friendship and discussions. Various social networking sites are freely available on the World Wide Web. Examples are Facebook and MySpace.

Figure 1 Screen shot of Facebook social site

Facebook is a social networking site popular with students and working adults alike. The sites main feature is allowing applications developers to create small programs that can be inserted into a user's profile. These applications range from simple message board to games that can be played together with friends. With the inclusion of application, users are free to customize their Facebook profile and share their interest and opinion with their families, friends and the rest of the world.

2.3.2 Mobile Social Services

With the advancement of technology, mobile devices are becoming key outlet for social software (Scott, Henri and Ian, 2006, p.1703). Now users can do social computing while being in a social environment, and not restricted to a desktop computer. People can share their experience and opinion while moving around from 1 location to another, while still stay connected with families and friends on the other side of the world.

The social networking site Facebook also has mobile services that can be used on mobile devices that support mobile web page access, such as Apple Inc.'s

iPhone and iPod Touch. This allows Facebook user's to stay connected with other users while '*on the go*'.

From these examples, the community mobile services project aims to allow community residents to socialize and networking with other residents within the township community, while not being restricted to their home residents, allowing portability.

Figure 2 Facebook user profile on an iPhone

2.4 Community Mobile Services

The objective of the Community Mobile Services is to serve various services that will improve the life of community resident. It is a collection of mobile Web 2.0 services for mobile user (residents & visitors) with contextual content related to the community/township that the user is in. Some of the services content that may or may not be included, but has possible potential, in the Community Mobile Services are:

- Maps and directions,
- Friend Finder,
- Business Directory,
- Customer Support Services,
- And many other.

There already exist several mobile community services around the world. One of the applications is Hasselt City-Live application by i-City in Belgium.

2.4.1 i-City Project

i-City is the largest research lab for mobile application in the world. IT-companies and users work together in building mobile application for the future. In Belgium, Hasselt and Leuven has been turned into 1 big lab, or a 'Living Labs', so that organizations can develop applications on a large scale, and test them in lifelike situation.

Basically, i-City is a project relating to any wireless application's plans and dreams, and integrating it into real life scheme. Because the system is integrated in a city or town, organizations are able to implement and distribute services to local residents, allowing them to have access to various information networks, while contributing to the future of wireless application.

From the i-City's official website (2004), their mission is to reinforce local communities by collaborating in the development of a research laboratory which

will create innovating mobile and ICT-solutions that will be tested against local social needs, as technology needs to be served to the people.

i-City has a host of applications that are very location-specifics. The Community Mobile Services aims to follow parts of what the i-City has succeed in doing, mainly giving technology related services to the community via their mobile devices.

2.4.2 Living Lab Project

While i-City focus on developing wireless mobile applications, the Living Lab project focus on the people or users that will use these applications. "Living Labs" is a new concept for Research & Development (R&D) innovation to boost strategy for jobs and growth in Europe. Their vision is to using user-centric involvement and its potential for development new ICT-based services and products.

According to Belgian Living Lab coordinator Guido van der Mullen (2007), the process runs like this:

1) thematic working groups (e.g. on healthcare, mobility or culture and tourism) come together to develop ideas for possible applications or industry partners deliver these ideas directly,

2) a team of software developers then develop an alpha version of the application software,

3) this gets tested with all or a section of the users in the Living Lab,

4) input from the user testing is fed into the development of the beta version of the software,

5) this gets tested again,

6) after which the final version of the software gets developed.

All test users are given a mobile device, all expense paid wireless broadband connectivity, and they get to use the i-City platform. In return, users will inform the IT-companies about the wants and needs of future's consumers. Questions such as usability and speed are answered by the participated test users.

The Living Lab Project allows i-City to develop applications on a rapid phase, as there are many users testing their product and services. I-City can also develop products and services that is closer to real-life situations, as participated test users do not follow a pre-determine sets of task, allowing i-City to record these results dynamically.

2.4.3 Location-Specifics Applications

Location-specifics applications refer to applications that make use geographical coordinates and locations; the data and information served to the users are specific to that locations only. Though the area might be small, it is much more detailed. An example is comparing a globe and a local map directory. From the globe, we can see the scale of the earth and every country on the map, but we can't see the many cities and towns within a country. The local map directory may be small, but it specifies every legend, and objects and roads in the area to guide users to pinpoint their location of interest within that area.

The i-City project has created and launched several applications that are location specifics. According to an Italy-based experience design company Experientia employee, Mark Vanderbeeken (2007):

> The nice thing is of course that they are highly location specific and entirely free for the end-user (as the signal comes from a series of wifi hotspots): an application to locate your friends in real time on a map, a tool to upload news items on a local citizen-generated news service, an application to alert the city government via a photo tool about possible problems with roads, rubbish or public furniture, etcetera.

These applications can be accessed using a standard mobile phone, PDA's or any other wireless gadgets that supports such technology.

Figure 3 Hasselt i-City applications interface on a PDA

2.5 Human Computer Interaction

Human Computer Interaction (HCI) is the study of interaction of people, who are users, and computers. The basic goal of HCI is to make computers more usable and receptive to the user's needs, improving the interactions between the users and computers.

2.5.1 HCI on Mobile Devices

After the booming of the internet, the world is focusing on putting the information network into the palm of our hands or inside our pockets, via portable and wireless gadgets and devices. However, the interaction between users and mobile devices are different compared to a computer. Several conversions need to be made to serve information on a device with limited resource, output and input capability. Luca Chittaro (2004) stressed that: "Mobile services will not be successful if we do not understand mobile users and design for their contexts, which are very different from the ones traditionally studied in HCI" (p.69).

2.5.2 Usability Method and Evaluation

To design a mobile applications and services that can be used on small mobile devices, usability test needs to be conducted. There are many methods to evaluate usability. These methods can be categorized into four main areas, namely:

- Heuristic evaluations,
- Cognitive walkthroughs,
- Usability testing, and
- Comparison against guidelines.

Each of these methods has its strengths and weakness, and the most suitable usability test for specific project or work can only be decided by taking into consideration these pros and cons.

One of the common usability tests is acquiring test participants and makes them predefined set of task while data on their performance and reactions are recorded (Dumas, 1999). However, "Research indicates some drawbacks in usability testing methods" (Henry, Gerald and Vivian, 2006, p.182). These tests does not stimulate real life situation, limiting its ability to evaluate critical conditions (LTA, 2004). From here we can conclude that relying solely on a single test is not reliable. Measures must be taken to make the test more reliable and the results more valid. Depending on the situation, other type of test should also be taken into consideration. Should the opportunity arise, more than 1 test should be conducted to improve the results gained, which will be used in developing applications and services.

2.5.3 Usability on Mobile Devices

There are many issues regarding usability on mobile devices and their interactions in dynamic environment. Gorlenko and Merrick (2003, p.639-651) investigated this issues and found out that mobility requires users to apply more cognitive abilities. Also, because mobile computing device's key features are mobility, existing ergonomic usability design principles cannot be applied as it will constraints the portable features of the computing devices.

Since mobile device manufacturer has to design and create a portable devices that only has limited capabilities and resources, mobile application developers need to create new, creative and innovative product and services that can be use on these mobile devices. Various usability tests must be made to make sure people (users) will adopt mobile computing devices. This can only be realized if the pain and complexities of mobile devices interacting through very limited input and output facilities.

2.6 User-Interface

According to Wikipedia, a user interface is the aggregate of means by which people, the users, interact with the system, a particular machine, device, computer program or other complex tools. The user interface provides means of:

- Input, allowing the users to manipulate a system
- Output, allowing the system to produce the effects of the users' manipulation.

2.6.1 Design for Mobile Interface

Due to the small size of mobile devices, the user interface needs to be simple and easy to use for the user. Users should only go through limited steps to make a process/transaction/etc. Some consideration that needs to be taken;

- Design must be consistent
- Does not burden users with content formats, formatting and packaging of content
- Makes redundancy useful

2.6.2 Screen Size and Text Consideration

There are many mobile devices, each with different screen size. Over the years the relative screen size difference has increased. The difference between the smallest (128×128) and the largest (800×480) is now a factor of 23. That means the largest screen is 23 times bigger than the smallest one (Morten Hjerde. 2008). The difference in these resolutions will affect how many line of text will appear on the mobile devices.

2.6.3 Consistency

Peter Odum (2008) stressed that consistent UI (user interface) behavior and appearance should be the rule among related devices. Even so, designers need to understand key differences between devices and accommodate those aspects unique to a given device or function. For example, when playing MP3s on a mobile phone, it is more important that the controls work intuitively than that they overlap functionally or visually with the controls for watching a video. A

consistent UI will make it easier for user to learn, use and navigate trough an application, since they only need to memorize the same methods to do different process.

2.6.4 Useful Redundancy

Redundancy is not always bad and it does not always burden the user. According to Peter Odum (2008) in his article posted on the internet:

> Devices should provide users with more than one means to achieve a goal. This allows users to find their own way, and to form their own mental map of the device. This doesn't mean all possible avenues must be built: judicious user research and testing can suggest the 2-3 most expected means to an end. If there are three ways for a user to get to their favorite song, the chances are greater that they will get there quickly and happily. There's nothing wrong with that kind of redundancy.

Alternatives means can be provided, but most users tend to use the same methods to achieve their goal. For that, simple process that has 2-3 variances is acceptable, as long as the users can get it quickly and without fuss.

2.7 Push-Pull Technology

According to Wikiepdia, 'Push' technology on the Internet refers to a style of communication protocol where the request for a given transaction originates with the publisher, or central server. It is contrasted with pull technology, where the request for the transmission of information originates with the receiver, or client.'

2.7.1 Dynamic Data

With the increase of internet usage, there is also an increase in information exchange around the world. Recent studies have shown that an increasing fraction of the data on the World Wide Web changes frequently (Pavan, Amol, Ankur, Krithi and Prashant, 2001, p.265). Depending on the data item, coherency requirement and user tolerance may vary. For example, a user may be willing to receive sports and news information that may be out-of-sync by a few minutes with respect to the server, but not for data items such as stock prices.

The problem with dynamic data is how to maintain temporal coherency on the web. There may be data items that the users wish to automatically download or receive, such as emails, or data item that they will request manually, such as a webpage. As such, different services need to cater to different user in different ways. Like the example given before, though a user may be willing to receive sports and news information a bit later, there are companies promoting to serve the applications or services in real time, such as video footage of a football player scoring a goal. Such example shows that there is a need to balance between push and pull services to cater to certain data items.

2.7.2 Push-Pull Technology on Mobile Devices

Unlike 'Pull' technology where user request for data items, 'Push' technology pushes those data items to the user, cutting down on time as the users does not need to request and wait; the data item is already available for them.

Although 'Push' technology seems beneficial to the user, having everything pushed to them would end up with copies of entire Internet sites eating up

valuable storage space (Spivack, 1997). Using a Post-it Note to illustrate, having one note on the desk gets your attention. But too much information pushed to your desktop would be the equivalent of finding a thousand sticky yellow notes on your desk. This poses a major problem to mobile devices that has limited storage capacity.

To tackle such problem, dynamic data item should be given the user using dynamic approach that is flexible to the user. According to Kate Gerwig (1997), the ultimate answer doesn't have to be one way or the other. Getting users the information they need probably will benefit from a hybrid approach-combining push and pull technology to keep both networks and users from being overloaded. As such, users should be allowed to choose how they wish to receive the data, either by constant update, daily update or trough manual request.

CHAPTER 3
METHODOLOGY

3.1 Designing Methodology

Methodology plays an important role in completing a project. The purpose is to maintain and ensure system development life cycle consistency. This methodology applied in developing systems to ensure that their expectations in term of functionality, cost or delivery schedule. There are several models of methodology that is usually implemented in developing system such as water fall model, parallel development-based, prototyping and re-used based development.

For this project, the methodology that is used is the modification of the prototyping model. This methodology is the most suitable to be used, due to its key features to immediately begins on a system prototype, that provides minimal amount of features.

3.2 Project Activities

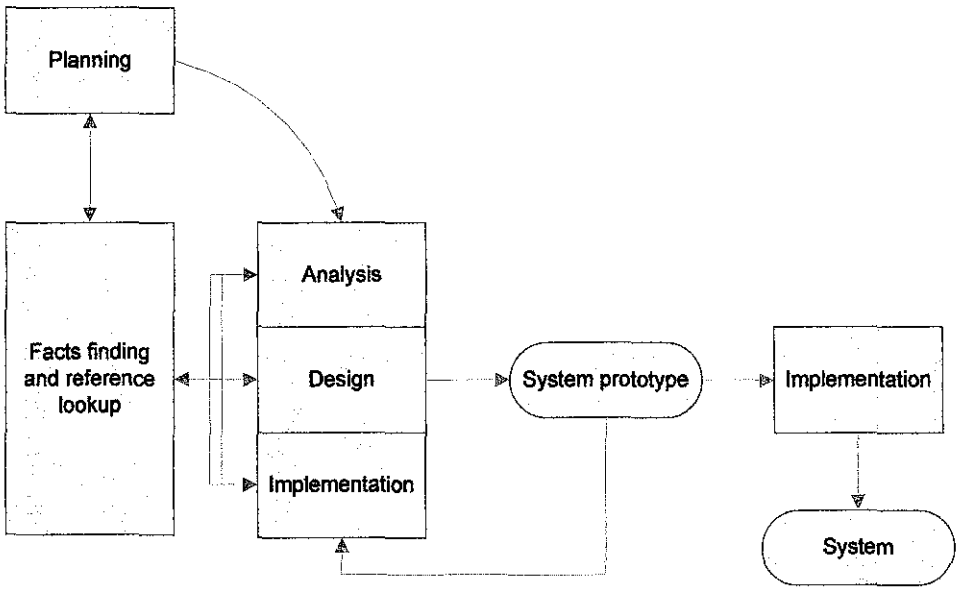

Figure 4 Modified prototyping methodologies

As shown in Figure 4, this project will go through 8 phases of development, with 2 Implementation phases.

3.2.1 Planning

Planning is the fundamental process of understanding why and information system should be built and determining how the project team will go about building it. During this phase, the system's business value to an organization is identified. This part of the development process is important to make sure that the project is feasible to be developed.

After receiving the project approval, the project management is initiated. This is where work plan are put in places to help control and direct the project throughout the entire system development life cycle.

3.2.2 Analysis

The analysis phase answers the questions who will use the system, what the system will do, and where and when it will be used. Investigations are conducted on any current system(s) (if available), identify improvement opportunities, and develop a concept for the new system.

3.2.3 Design

The design phase decide how the system will operate, in terms of hardware, software, and network infrastructure; the user interface, forms and reports; and the specific programs, databases, and files that will be needed.

3.2.4 Facts Finding and Reference Lookup

This is a continuous phase that needs to be done during the whole project development. Findings are done on the topic of mobile applications, social networking and human computer interaction that is applied to the project development. Mostly, research is done through finding from the internet, research paper and journals.

3.2.5 Implementation

The final phase is the implementation phase, during which the system is actually built. This is also the longest and most expensive single part of the development process. Because the methodology is used are prototyping, there are 2 implementations phases. The 1st phases is the part where 'quick and dirty' of the system or applications are created, with minimum features. This will then be given to the users to be used, and feedbacks will be recorded to further improve the project. The 2nd and last implementation phase is where the final version of the system will be created.

3.2.6 Gantt Chart

A Gantt chart is a type of bar chart that illustrates a project schedule. Figure 5 shows the timeline of developing this project.

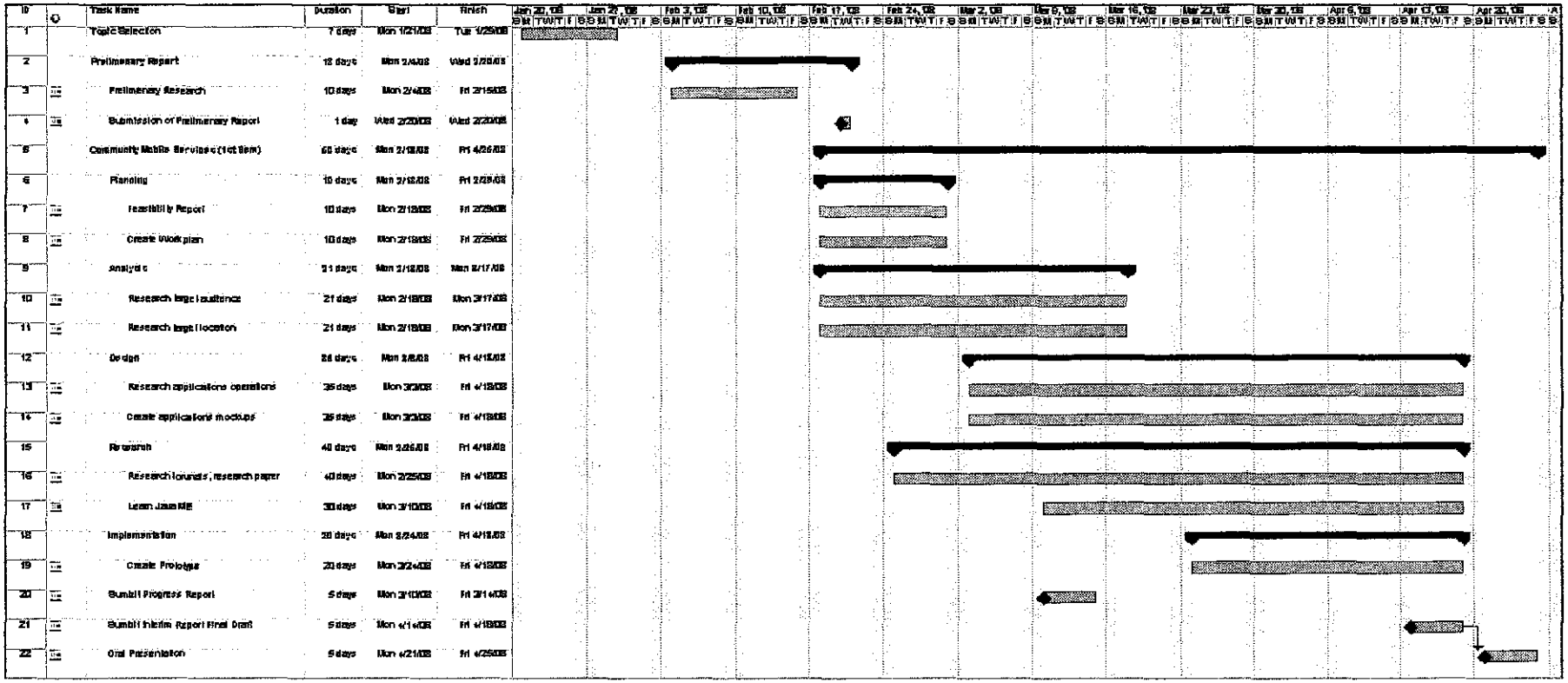

Figure 5 Project Gantt Chart

3.2.7 Work Done

- ❒ Designing the Mobile Community Applications mockups
- ❒ Storyboard and prototype
- ❒ Install Sun Java Wireless Toolkit for emulating program
- ❒ Setting up GlassVish V2 server
- ❒ Login test on the emulator
- ❒ Create an application flow
- ❒ Final version of the application

3.3 Tools and Requirements

In order to be able to develop the application project, various tools and know ledges are needed.

3.3.1 Programming

For the whole project, this is the most crucial part. Programming requires most of time and it needs full attention. Work must be done to carefully monitor development, to ensure the intended end-product is developing successfully. The applications will be program using Java ME (Micro Edition) that is used on small, resource-constraint mobile devices.

3.3.2 Software

i. Windows XP
ii. Microsoft Office 2003
iii. Adobe Photoshop & Illustrator CS
iv. Java SDK (Software Development Kit)
v. Net beans 6.1
vi. Sun Wireless Toolkit

3.2.3 Hardware

i. Desktop Computer with Intel Pentium® 4 3.0 GHz, 1Gb of Ram, and 80G of hard disk drive
ii. Microsoft Windows XP Professional Service Pack 2 operating system
iii. Nokia N78 mobile phone
iv. Digital Camera

3.4 Storyboard

Storyboards are graphic organizers consist of a series of illustrations or images displayed in sequence for the purpose of visualizing a motion graphic or interactive media sequence, including website and device interactivity. A storyboard allows a developer to arrange and view scenes that will be created.

3.4.1 Initial Screen Scene 1

The first scene appears when the user starts the application. It shows a splash screen that either welcomes the users or shows a picture logo.

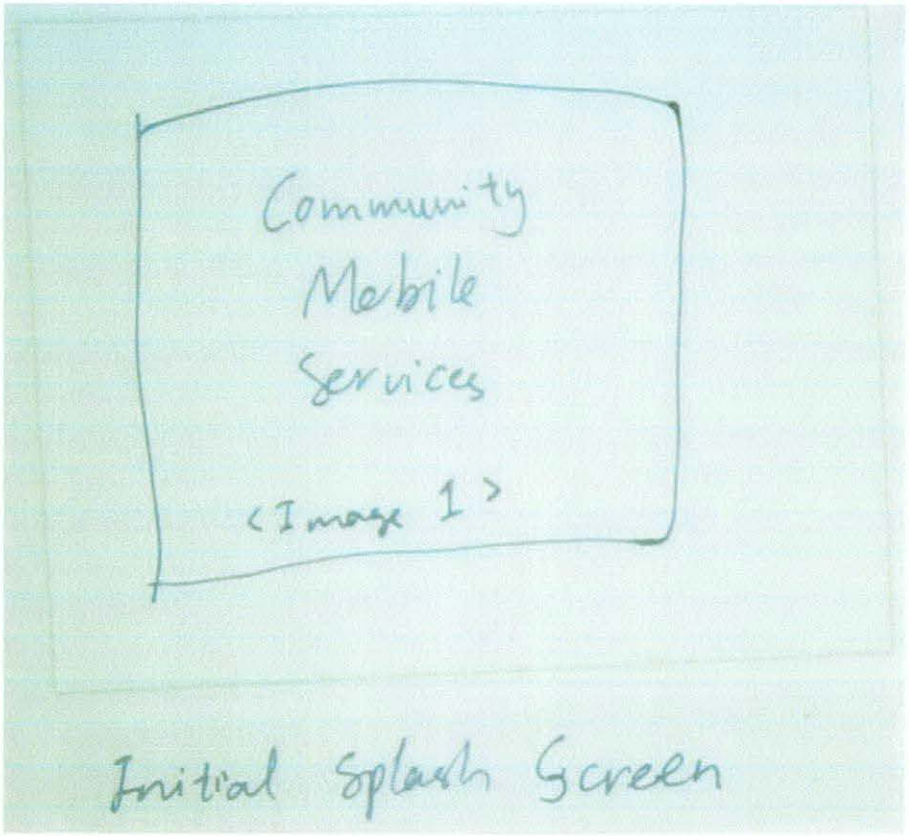

Figure 6 Storyboard Initial Scene

3.4.2 Scene 1

Scene 1 appears right after the splash screen. It shows the menu available to the user.

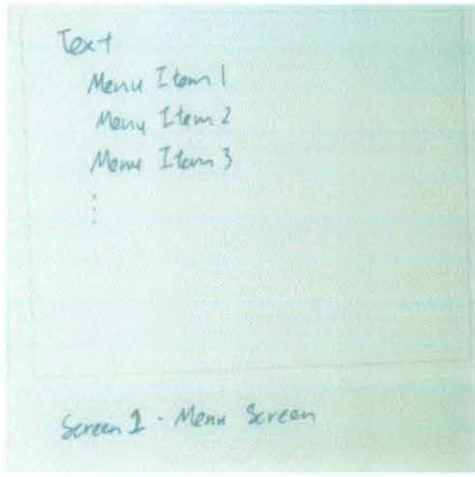

Figure 7 Storyboard Scenes 1

3.4.3 Scene 2

Scene 3 appears if user choose the menu item that will bring them to Scene 3. This scene is the news reader screen, where the users can read the latest news.

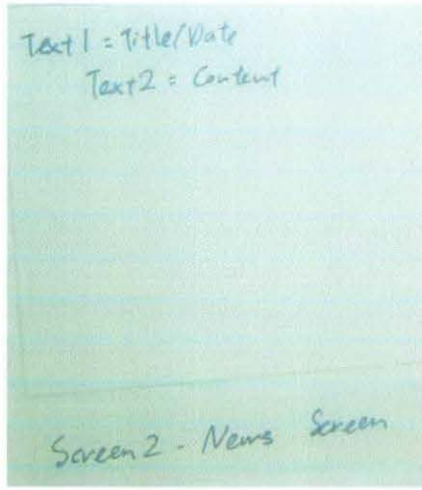

Figure 8 Storyboard Scenes 2

3.4.4 Scene 3

Scene 4 appears if user choose the menu item that will bring them to Scene 4, which is the directory scene. There is a drop down box that allow users to choose the location they wish to view.

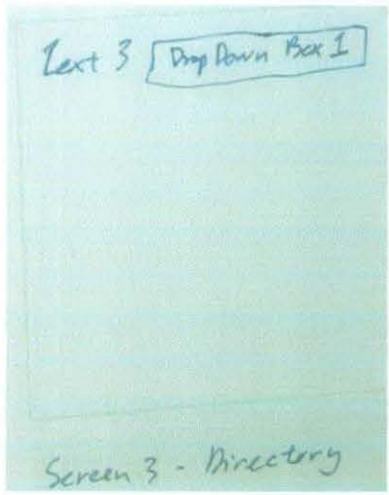

Figure 9 Storyboard Scenes 3

3.4.5 Scene 4

When users choose their location, an image of that location will appear.

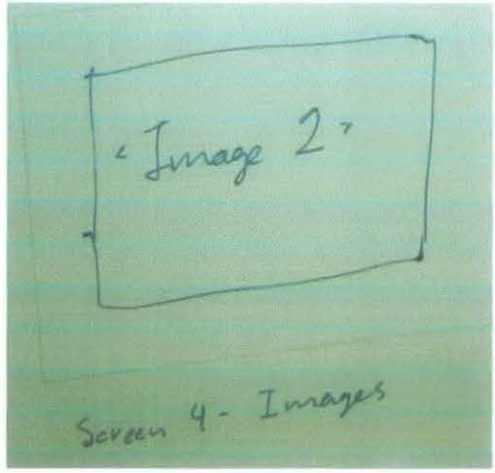

Figure 10 Storyboard Scenes 4

3.5 Application Flow

Netbean 6.1 includes a function that allow mobile applications developers an easy drag-&-drop interface. It is similar to a flowchart and UML diagram. *Figure 11* shows an application flow created using Netbean 6.1.

Figure 11 Application Flow

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Treatment

Treatment is the way of how the information or content should be delivered. In this application, the most important is text where it gives an explanation of the subject and to make it more readable and not too wordy. Other element such as pictures and audio will be used sparingly, as to not burden the mobile devices.

4.1.1 Text

Text input to allow user to enter strings of text, such as address, message and many others. Text inputs are not tied down to devices, so any devices that enable text input will be able to use this method. The applications will mostly use text, to cut down on file size and save space.

Figure 12 Text Input

In a mobile application, 2 types of text element are available, which is the String Item and Text Item. Difference between the 2 is that String Item cannot be edited, while Text Item can.

4.1.2 Choice Group

Choice group allow users to create a list of items already populated for them. A common choice group's users are used to include, radio buttons, checkboxes and drop-down menu box. Choice group allow users to choose multiple choices or a single choice. Such elements are used when users are required to input a predetermined input.

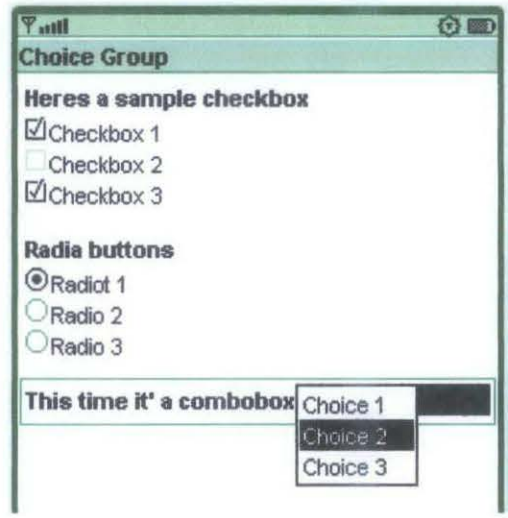

Figure 13 Choice Group

4.1.3 Images

Due to the limited resource on mobile devices, images are only has a small role in the mobile application. Nevertheless, image is an important treatment in any application, as they say; "*a picture paints a thousand words*". Image adds aesthetic in any application when used properly, is easier to look at than to read a block of text, and for some people, is easier to remember.

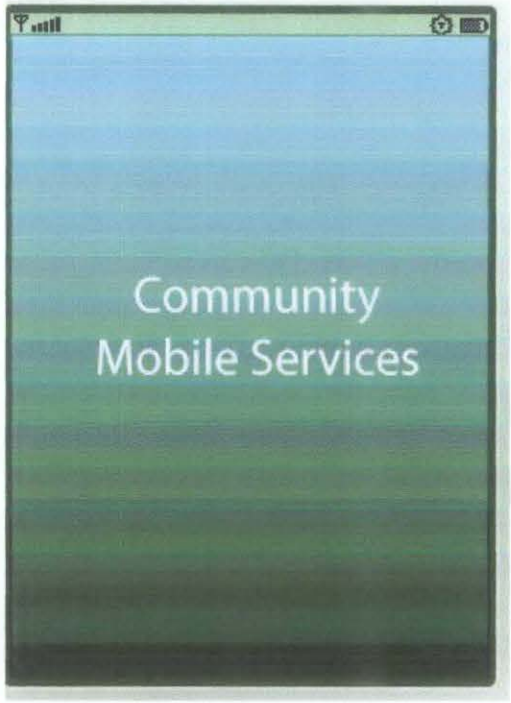

Figure 14 A splash screens using an image

4.2 Deliverables

Screen shot were either taken using a desktop screen-capture utility or using a digital camera while running on a mobile phone.

4.2.1 Initial Prototype

The application was successfully installed and run on a mobile phone running the Symbian S60 operating system. This phone comes preinstalled with Java support, and is able to run MIDP 2.0 applications, which is used by this mobile application.

There are actually 2 separate applications; the first, Community Mobile Devices, is the main project. The second application, the HCI Study application, was developed to test how self-developed Java application will look like while running on the mobile phone.

The Community Mobile Services application consists of a splash screen, a menu screen and another scene corresponding to that menu screen.

Figure 15 The CMS application showing recent news

The HCI Study application has almost the same design flow as the CMS application. Running the application will first show the splash screen followed by the next scene where users can make their choices.

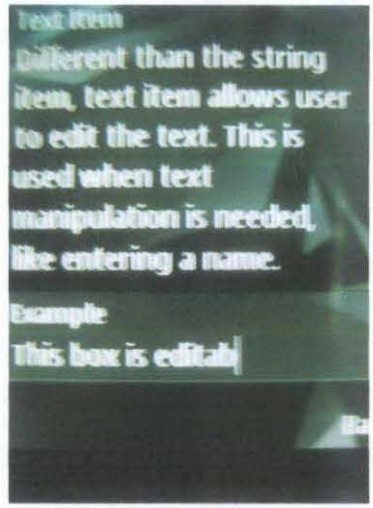

Figure 16 Editing text box

Figure 16 shows the HCI application editing a text box, which is an example of the text element. Other demo shown is the string item and choice group.

4.2.2 Final Version

The final release of the application is a small Java ME application with a size of 56kB (kilobytes). The program was installed and run on a Nokia N78 mobile phone, which came preinstalled with Java and MIDP 2.0 support.

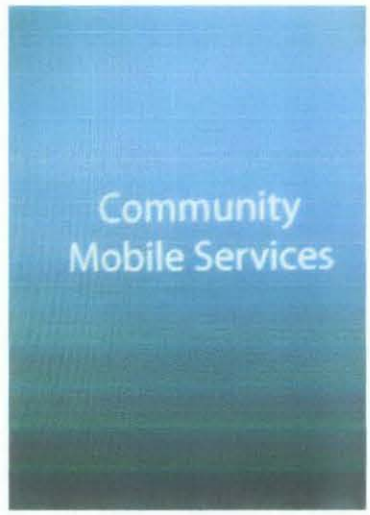

Figure 17 Splash screen

When starting up the program, it will first show a splash screen, just like what is shown in *Figure 17*.

Figure 18 Login Screen

The program will then take users to the login screen. Users will need to enter their username and password to have access to their account information.

Figure 19 Connecting to the Internet

The program will then connect to the internet using the mobile phone's wireless connection. In this demo, the mobile phone connects to the internet using Maxis 3G connections.

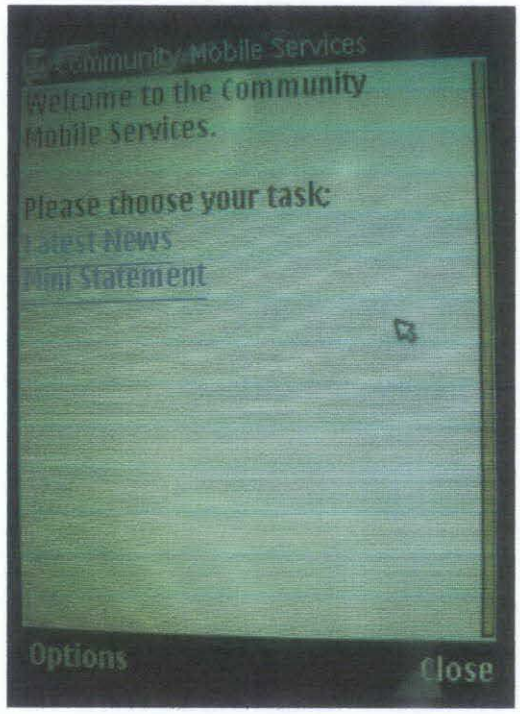

Figure 20 Web page

If the user authentication process is successful, the mobile phone's web browser will kick in and bring the users to the main web page. This web page can only be opened if user has been authenticated by the Java program.

The web page is where the main menu is located. Users can access their account information, check their statement, check message, and do other activities here. The way this application works is similar to CIMB Clicks mobile application, in which users are authenticate first using a Java ME application and which, when pass authentication, opens the web browser.

In the demo, only 2 functions are added; the *Latest News* function and the *Mini Statement* function. The 1st function allows users to check for latest news that has

been posted by an admin. Users can check for any important announcement, promotion or news here.

Figure 21 Latest News

The 2nd function allows users easy access to their account information or statement. Due to the size of the mobile devices, a mini statement instead of a full-fledge statement is used, to minimize the resources used and to fit inside a small display screen. Users can check any overdue money they still own, how much credit they still have and others.

Because this is a web page, account information can be pulled directly from the database uses by the company to store information about their customers.

Figure 21 Mini Statement

4.2.3 Technical Issues and Problem Encountered

Several issues and problems made the development of this project difficult. The first problem was to get and IDE (software development system) that support development of mobile Java application. Due to the nature and limitation imposed by Universiti Teknologi PETRONAS (UTP)'s network administrator, it was impossible to download the free application from the internet. The only solution was to go to the computer lab and download it. Unfortunately, due to the size of the program, it took a day for the computer to finish download.

Initially during the progress of the project, I was using and old Nokia mobile phone that did not support Java and MIDP 2.0. This means I could only test my program on an emulator. The emulator used was Sun Java Wireless Toolkit 2.5. The problem was soon resolved I have manage to obtain a new phone that support the Java framework.

The next problem encountered was the issues of finding a hosting server. Because the application needs to be authenticated on a remote server, a server

was needed to host all the pages, data and information used for this project. Due to the time constraint and cost to buy a host server, a free web host is used instead. The free web host chosen was Site Booth, which provides web page, MySQL database and other services for free.

The most important problem encountered was the lack of resources and references in developing mobile application. There were not many books on how to develop mobile application, not even in the university's information resource centre (IRC). Lack of experience in developing a mobile application also hampered the development of the project. Nevertheless, the project was continued, and self-study becomes an important aspect in developing the project.

CHAPTER 5
CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

As a conclusion, this project, a mobile community application, offers the user to interact and use mobile applications that allows them to access local-area content. The first step is to create an application that not only can be used on limited-resource mobile devices, but also to develop an application that a user will want to use, which does not burden them. Information can be served to the users when needed, wherever they are. By taking into consideration the need of the user and the limitations of mobile devices, a developer can create applications that suit the environment and achieve the objectives. The study of HCI also improves how applications and information can better be served to users and customers.

5.2 Recommandations

For further enhancement to the project, more features needs to be implemented, Features such as mobile payment, mobile shopping, and multimedia content download can be provided to offer more variety to the service. Different user interface for unique mobile devices, such as Apple's iPhone, can be created to allow users of such devices a much more familiar navigation options. Mobile devices with built-in GPS system should be exploited and used to its maximum capability to allow a more intuitive application.

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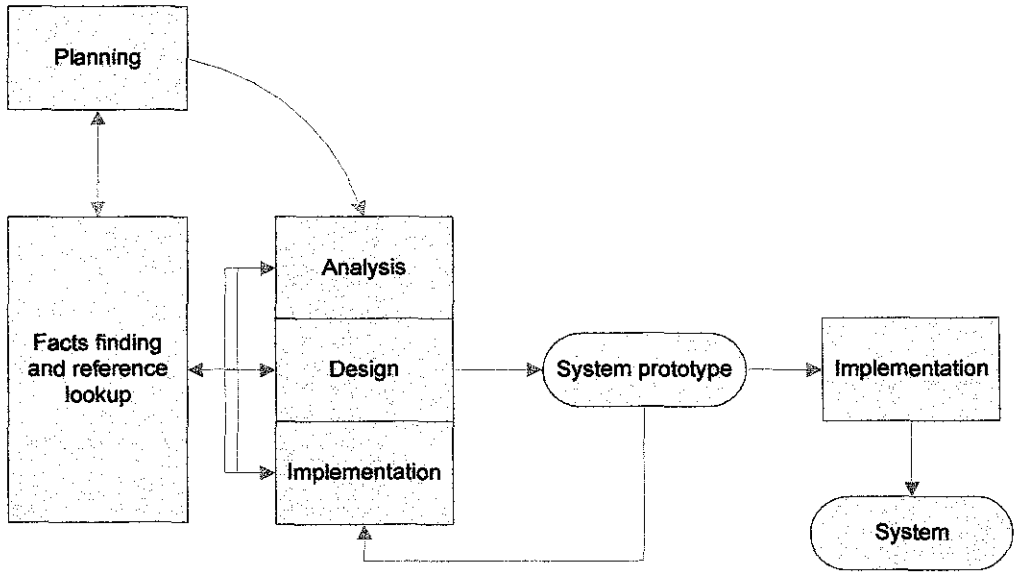
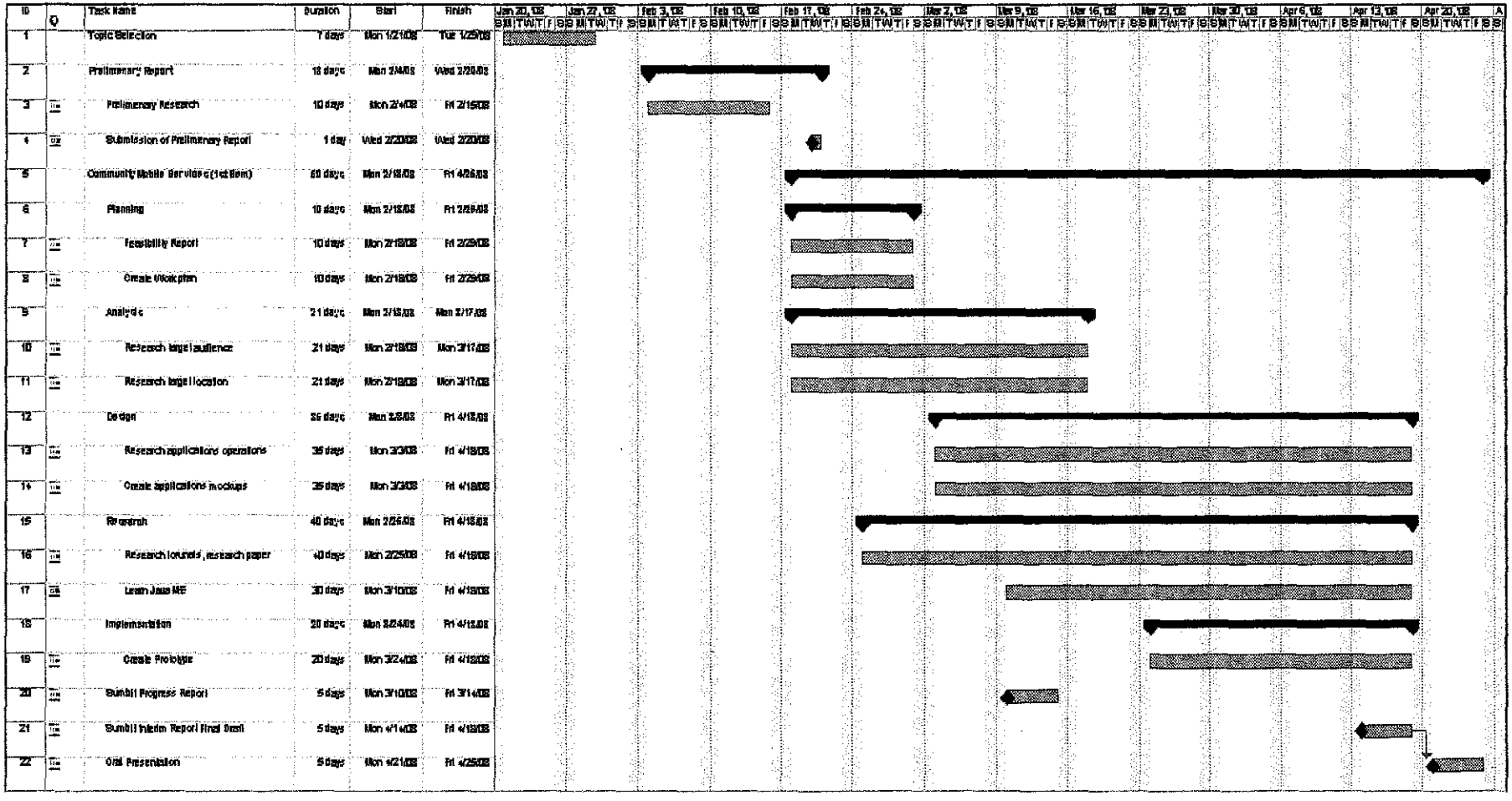
Little Spring Design. Retrieve from <http://patterns.littlespringsdesign.com/~newlsdpatterns/index.php/Main_Page>.

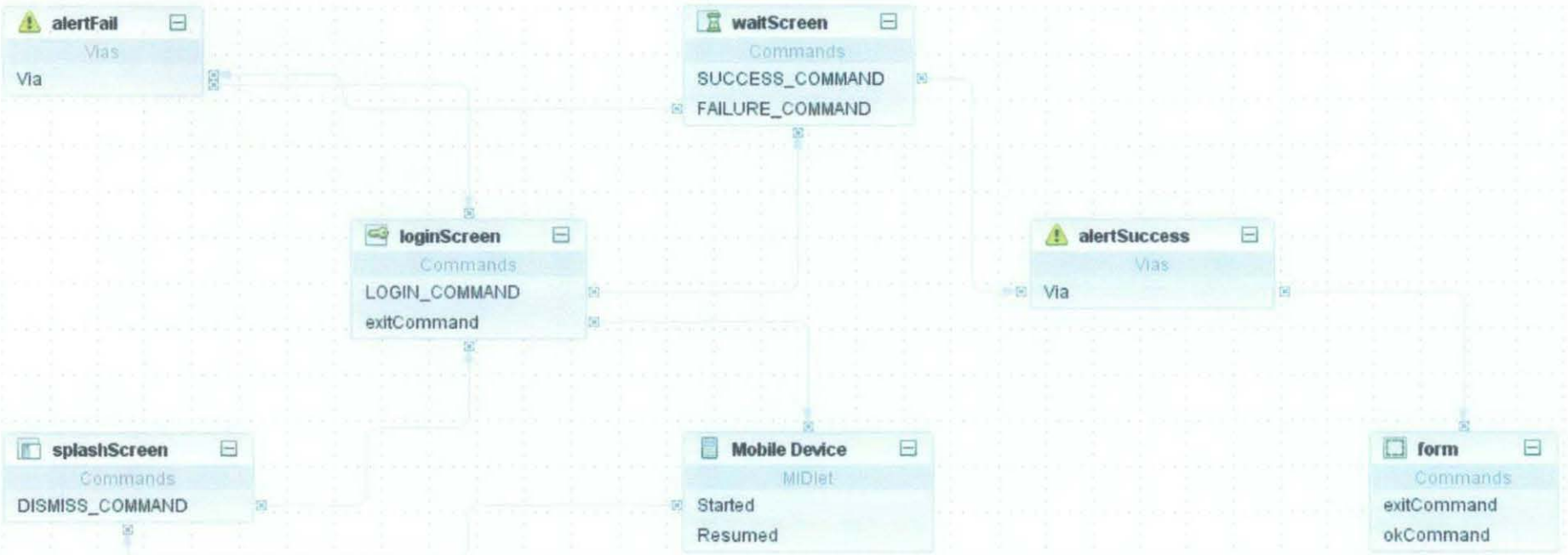
Appendix 1: Modified Prototyping Methodologies



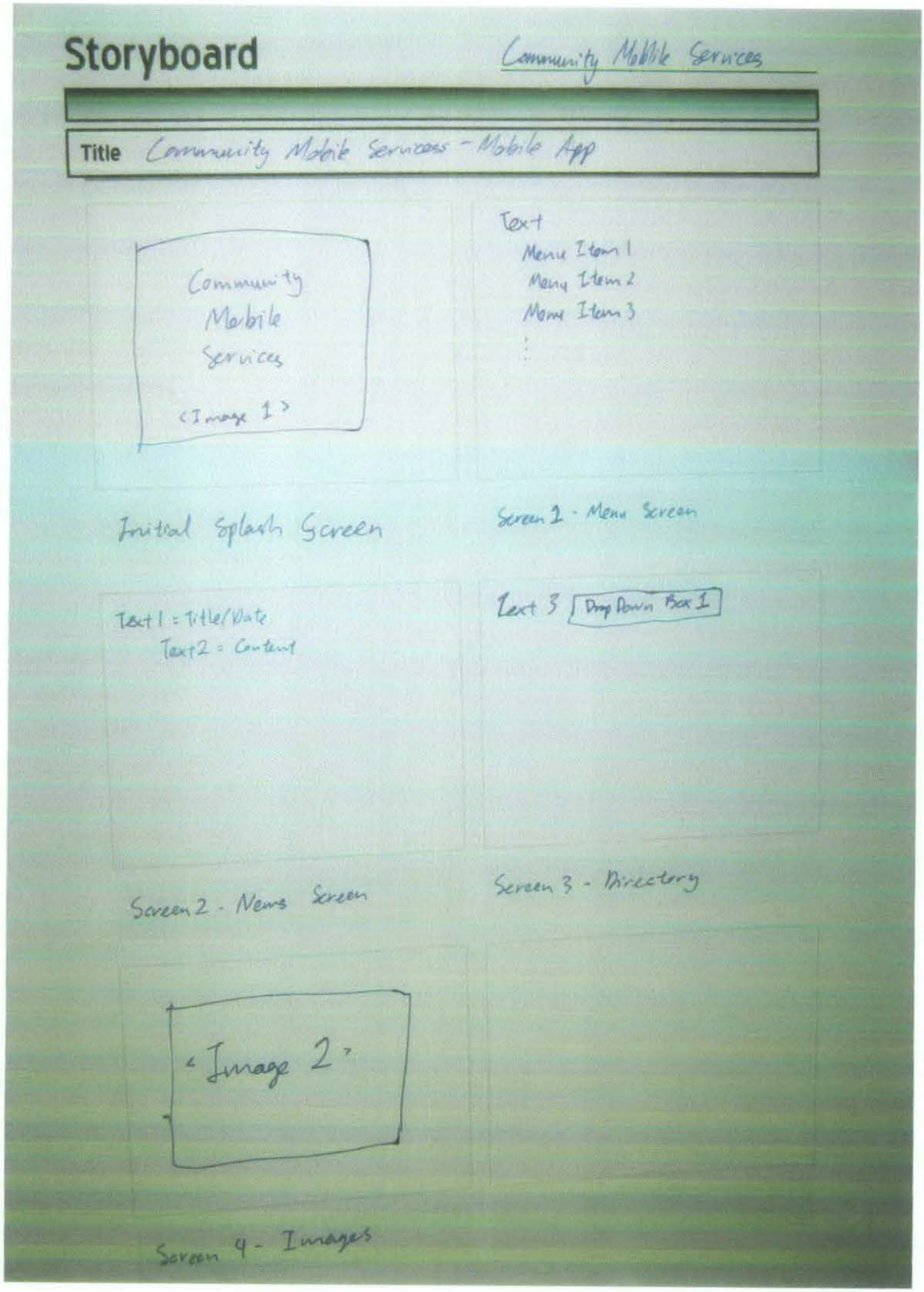
Appendix 2: Gantt Chart



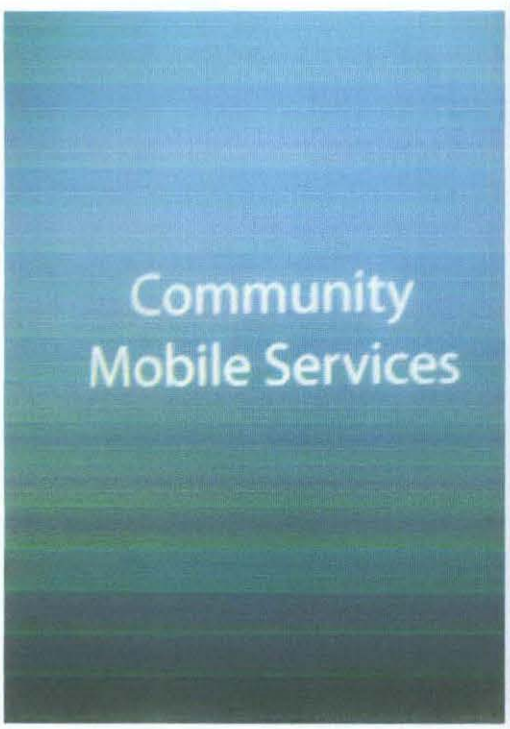
Appendix 3: Mobile Application Flow

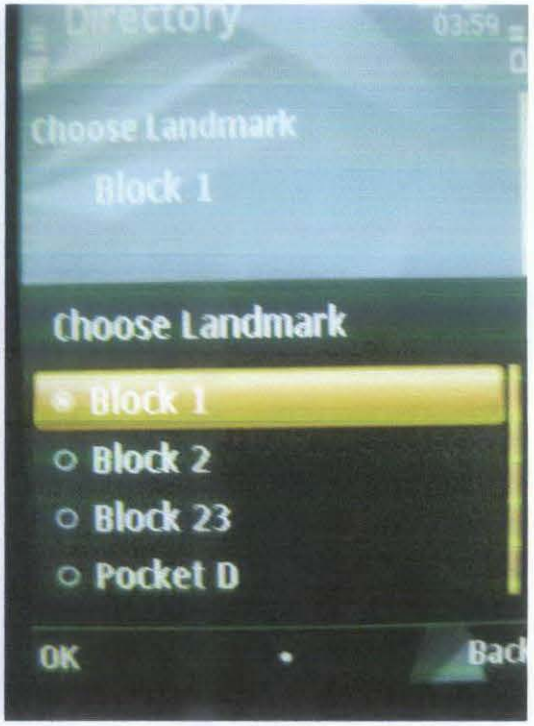

alertFail
Vias
Via
waitScreen
Commands
SUCCESS_COMMAND
FAILURE_COMMAND
loginScreen
Commands
LOGIN_COMMAND
exitCommand
alertSuccess
Vias
Via
splashScreen
Commands
DISMISS_COMMAND
Mobile Device
MIDlet
Started
Resumed
form
Commands
exitCommand
okCommand

Appendix 4: Storyboard



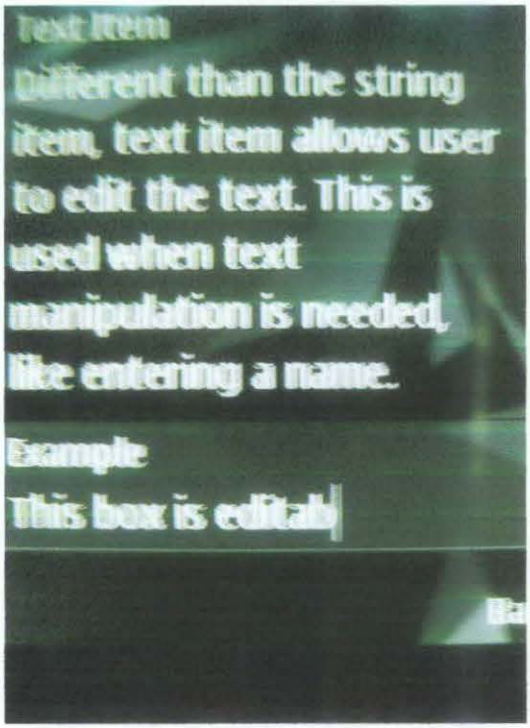
Appendix 5: Project Deliverables – Initial Prototype



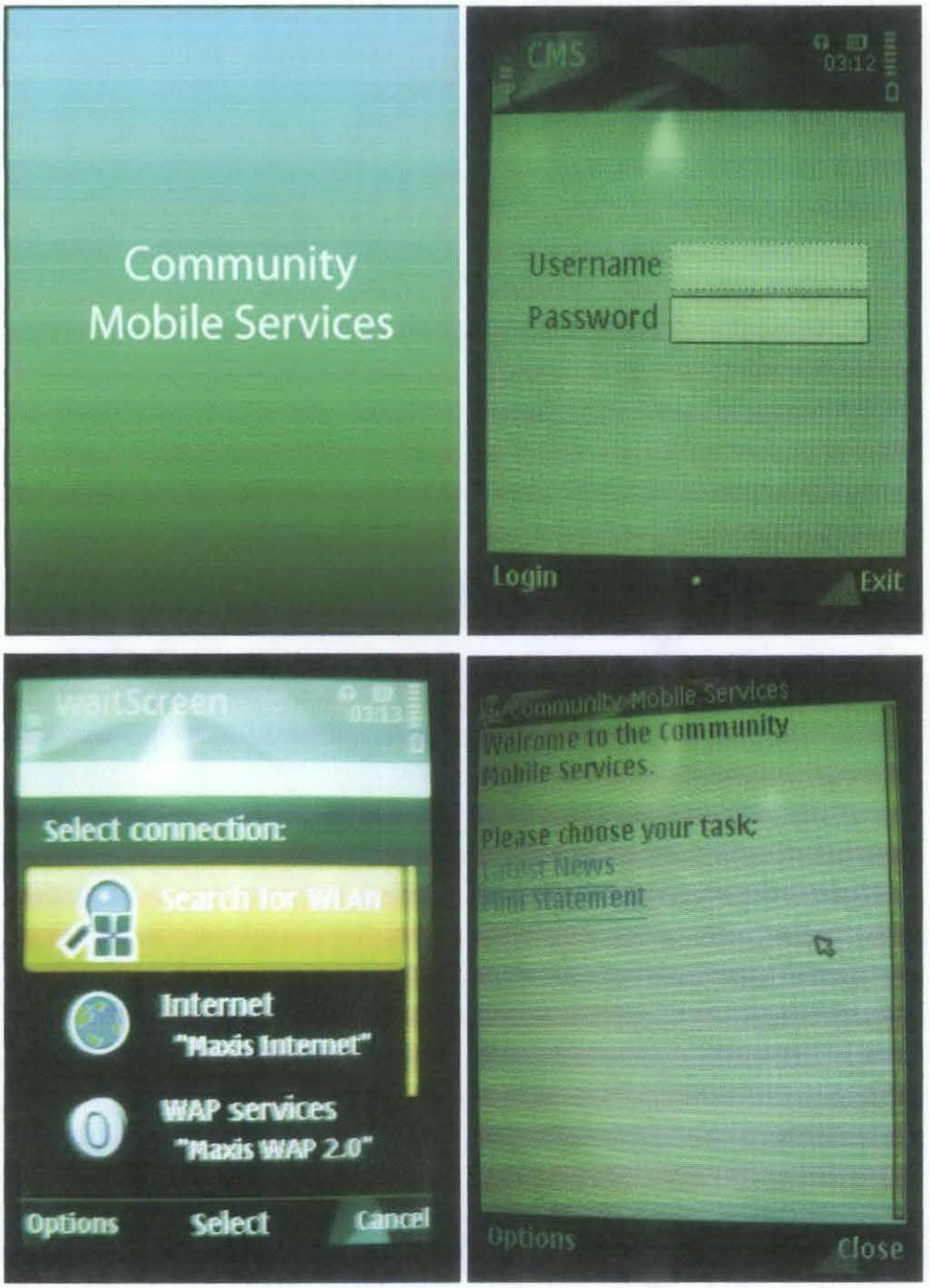


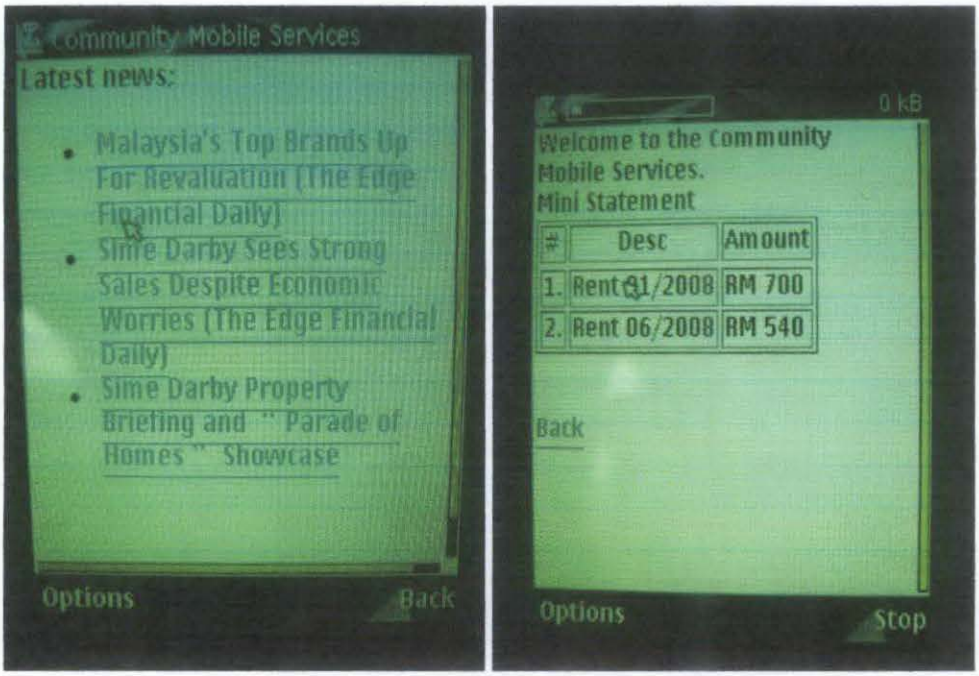

HCI
STUDY


form
03:59
Welcome!
To the HCI study application. This simple program will show various treatment and elements used in a mobile application. It is a simple demo to show the
Ok
Exit


Text Item
Different than the string item, text item allows user to edit the text. This is used when text manipulation is needed, like entering a name..
Example
This box is editab

Appendix 6: Project Deliverables – Final Version




Community Mobile Services
Latest news:
Malaysia's Top Brands Up For Revaluation (The Edge Financial Daily)
Sime Darby Sees Strong Sales Despite Economic Worries (The Edge Financial Daily)
Sime Darby Property Briefing and "Parade of Homes" Showcase
Options
Back
0 kB
Welcome to the Community Mobile Services.
Mini Statement
Desc Amount
1. Rent 01/2008 RM 700
2. Rent 06/2008 RM 540
Back
Options
Stop

Appendix 7: Part of Coding from the CMS Application

```
1       // authenticate and connectthe user
2       private void login() throws IOException {
3           //URL
4           String url = "http://kuryani23.sitebooth.com/LoginDemo.php?" + "name=" +
    getLoginScreen().getUsername() + "&password=" + getLoginScreen().getPassword();
5           //Clean up alertSuccess
6           getAlertSuccess().setString("");
7           getAlertFail().setString("");
8
9           //Connect to the server
10          StringBuffer b = new StringBuffer("");
11          HttpConnection hc = null;
12          InputStream in = null;
13          String result;
14          try{
15              hc = (HttpConnection)Connector.open(url);
16              in = hc.openInputStream();
17              int ch;
18              while((ch = in.read()) != -1) {
19                  b.append((char) ch);
20              }
21          }catch(Exception e){
22              e.printStackTrace();
23          }
24
25          try {
26              if(in != null) {
27                  in.close();
28              }
29              if(hc != null) {
30                  hc.close();
31              }
32          } catch (IOException e) {
33              e.printStackTrace();
34          }
35
36          result = b.toString().trim(); // echo result
37
38          //Authentication
39  //      if (hc.getResponseCode() == HttpConnection.HTTP_OK) {
40          if (result.equals("OK")) {
41              login = true;
42          } else {
43              login = false;
44          }
45  //      }
```