

CENG 491

Senior Design Project and Seminar

DIGIPOST



I2Technology

Innovative & Intelligent

TECHNOLOGIES

Poster in Blue

Requirements Analysis Report

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1 Introduction

Technology developments bring convenience in many areas. Mostly technological developments help our daily life both in economical and social way. Our project “Poster in Blue” is a new perspective to conventional poster publishing. According to research standard poster will cost: for 1000 Posters (594 x 841mm A1 Color: 4/0-colour Full color Paper: 150 gsm, for illustration printing) is approximately 660 USD. (<http://www.poster24.co.uk>) In addition to this delivery and work-force cost should be considered. Most irritating problem is non-dynamic structure of conventional posters. If some poster is glued on wall there is no way to change it with new poster without extra cost. The publisher should reproduce the new poster and deliver it again. Our main advantage of our product to conventional posters is ability to change and modify the displayed posters with negligible costs.

1.1 Project Goal

Our project contains mainly five parts. These goals are crucial for our project. In order to complete these goal

- Designing a thread based server.
- Implementing Bluetooth service protocols for wireless communication.
- Developing GUI for administrative purposes.
- Establishing communication between Bluetooth device and display adapter.
- Creating subroutines for display adapter.

1.2 What is in our scope?

As we searched the web for possible application areas, we have learned that , due to rapid developments in mobile technology and expanding use of wireless communication

there is an increasing demand on bluetooth based applications. And this technology is used for many purposes. Among them we are going to implement the followings:

- Information Sharing (Digital Posters, Presentations)
- Commercials (Promotions)
- Business Cards

1.3 What is not in our scope?

As we done market research due to hardware restrictions continious data transfer is not in our scope (ie. Music broadcast, video broadcast) Also broadcasting for large areas like city or country is not in our scope since the range of bluetooth is max 100mt. Lastly for ethical reasons non on demand protocols are not in our scope like forced advirtisement.

2 RESEARCH

2.1 Literature Review

When we began our project, the first thing we researched was “what a bluetooth technology is”. We have made a wide range search on bluetooth devices, how they work, their application areas, their basic technical and security properties. Since we are going to mention working principles, technical and security issues in other parts of that report, now here we are going to give some general information on what bluetooth technology is and its application areas.

2.1.1 What is Bluetooth Technology?

Bluetooth technology is basically a wireless communication technology. The basic features of bluetooth is low power consumption and low-cost transceiver microchips. It provides short-range connection and communication between fixed or portable devices as mobile phones, laptops, PCs, printers, digital cameras and video game consoles. Bluetooth devices communicate via radio communication system. With this system for devices to communicate, they do not have to be in line of sight of each other if they are in the specified range.

Class	Maximum Permitted Power (mW)	Maximum Permitted Power (dBm)	Range (approximate)
Class 1	100 mW	20 dBm	~100 meters
Class 2	2.5 mW	4 dBm	~10 meters
Class 3	1 mW	0 dBm	~1 meter

One of the main strengths of bluetooth technology is, it is global. This means a bluetooth device can connect any other bluetooth device almost everywhere in the world. 1 (master) bluetooth device can connect with other 7 (slaves) devices at the same time. These 8 devices form a "piconet". 2 or more piconets together form a scatternet. Although it is theoretically possible for a master device to communicate with slave

devices simultaneously, it is not used practically. Master device communicates with other devices by using switches between slaves device by using round robin algorithm.

2.1.3 Current Applications and Their Features

Digital posters is a new but rapid growing trend and first trials of these technology have been mostly done in UK. Throughout our internet search we have discovered different application areas and their extensions.

- First one is Channel 4 advertisements [**C4 pushes broadband documentary channel with Bluetooth poster campaign <http://www.brandrepublic.com/bulletins/>**] in London Underground which lets users download content of poster sites on their phones using Bluetooth technology. This poster network is owned by Viacom Outdoor and covers 15 six-sheet poster sites at stations in London.

These Channel 4 advertisements are not on demand applications. In other words, their ads keep bothering people who do not demand these ads. Additionally, it lacks any other aspects such as presentation and business card sending. In our implementation we are planning to implement digital advertisement posters on-demand in order to be respectful to our consumers.

- Another usage is new marketing campaign for the upcoming New Order album [**New Order uses Bluetooth posters to send music clips direct to cellphones <http://www.engadget.com>**]

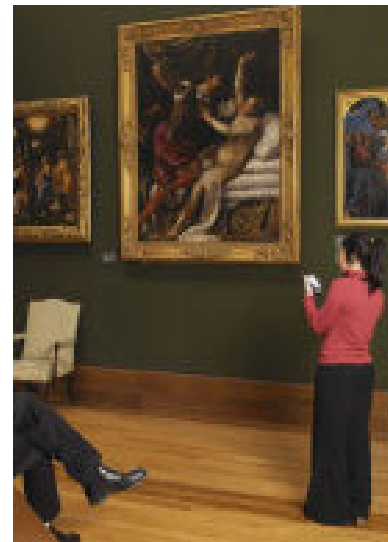
It marks an innovation in music promotion. With the development and display of digital interactive posters offering song clips, ringtones and photos that can be beamed directly to cellphones. The posters use Bluetooth to send the data directly to phones. This campaign is the first one to hand out free music clips direct to cellphones. These digital posters will be displayed in big stores in London and Manchester in England.

The above marketing campaign is again lacks the property being on-demand. Why should a person who dislikes 'New Order' or this style of music should be bothered with such an album advertisement?

At this stage we are not planning to implement such features, distributing mp3s, ringtones or music clips, in our project. But if we can finish other features before project deadline we are willing to implement such additional features.

- “As the multimedia world matures it's getting harder for brands to reach target audiences, increasing the imperative to measure the responses of marketing campaigns. Mobile phones are common and are a relevant and highly personal new media channel. Hypertag allows brands to connect with their target audiences through their mobile phones at the right place and time, and measure the results.” **[Leading the world in wireless proximity services <http://www.hypertag.com>]** To achieve these goal Hypertag company has designed ‘The Hypertag’ which is a small electronic device that stores mobile digital content and can be projected into the advertising panel or display. Then allows consumers to download branded content onto consumers' mobile phone or PDA.

Actually, these Hypertag device more or less has the same functionalites with our intended implementation. However, it can be developed in many other various ways. We will try to achieve these developments in our projet implementation. These two photos below shows scenes from real life which shows the use of digital posters.



2.2 Market Research and Ethics

2.2.1 Market Research

According to an essay [<http://digital-lifestyles.info/> **Bluetooth Billboards To Bother Bystanders**] on marketing of Digital posters in New Scientist magazine Bluetooth enabled billboards may soon be bothering passers-by with wireless advertisements blasted to mobile phones. This system, called 'BlueCasting' system, will send a message to Bluetooth enabled phones strolling within 100 meters of an advert.

However, trials conducted recently at six London railway stations in partnership with the advertising company Maiden Group, with Bluetooth-equipped posters promotional material and song clips from Coldplay's new album to passers-by, reveals that this maybe a good method of advertising. Over the space of two weeks, 87,000 Bluetooth phones were recorded ambling past and - *amazingly* - 17% of those were willing to download the clip. Additionally, the research results below show that people in US and UK are aware of Bluetooth and approximately 1 in 5 people accept the contents provided by digital adverts.

- 50% of US consumers and 88% of UK consumers are aware of Bluetooth (source: Bluetooth SIG, Jan 2006)
- 15% of US and 33% of UK consumers are accessing multimedia content through their phones
- 57% of UK 18-34 year olds interacted with a brand in Q1 2006 (source: Enpocket Mobile Media Monitor May 2006)

There is no information about people in Turkey since we did not pass to digital poster technology yet. However, our general impression accompanied with our survey results gives hope that there will be a significant demand for Bluetooth digital posters in Turkey.

Another supporting idea for our claim is that Turkey is one of the largest mobile phone market in the world.

2.2.2 Customer Researches

In order to understand customers' interest for bluetooth technologies and digital poster, business cards and data exchange we have made an online survey which can be found in Appendix C.

According to survey results we observed that 78.3 % of people have a device with bluetooth. These devices are usually cell phones and laptops. Although the 50% of people find bluetooth applications good, %45 of them said that they never use bluetooth. From that result we found out that there is some deficiency in bluetooth applications. While some of them do not mismatch their needs , some of them do not capture the attention of customers.

Another result came out from our survey is that ; the two most important properties , customers give attention in bluetooth applications are security and usage easiness. Moreover customers don not want to get all the calender events or business cards. They only prefer the ones that mismatch their interest areas.However it is a client side hardware dependent application. Therefore it is out of our project's scope. Most of the people who participated in our survey stated that they find attractive to send their company information to the clients via bluetooth.

As a conclusion this survey helped us to draw out the following results. If we can provide secure and user friendly applications to clients , their bluetooth usage will increase.

2.2.2 Ethics of this issue

From the ethics point of view we should discuss “Who should be offered to download the promotion?” One possibility is, only people who can see the billboard should be offered the promotion. Another possibility maybe everyone in the range of

Bluetooth service is offered. But in these two cases consumers won't be able to escape being bothered by requests to download material from Bluetooth adverts since there are currently no regulations restricting the use of Bluetooth adverts being sent to mobile phones.

What should be done to not to disturb passers-by with Bluetooth adverts all the time? We discuss this in our group and decide that could be done if we do not broadcast these advertisements but only show the posters in LCDs unless one person opens his Bluetooth, discovers the available services, enables the service of this poster to send content and only after that our digital poster will be able to forward the ads content.

3. PROJECT SCHEDULE

3.1 Gantt Chart

Our detailed gantt chart is in appendix A. These dates are strict since we have limited amount of time and strict milestone deadlines.

3.2 Team Organization and Ground Rules

3.2.1 Team Organization

I²Tech has a Controlled Decentralized team structure. That is there will be a permanent leader, Ferhat Ay, in the team and group members will be solving problems together. Decisions are given by all team; that will enable us to solve the problems more efficiently since every member's opinion on an issue will be taken into consideration.

3.2.2 Ground Rules

We have decided the following ground rules in our first formal meeting:

- We will be holding meetings twice a week. Those meetings will be held on Monday between 18:00 and 21:00 and on Friday between 18:00 and 19:30.
- The members who have an excuse at the meeting time will inform the project manager until 12:00 on the day of the meeting. Furthermore, if two or more project member can not attend a meeting, that meeting will be brought forward to a suitable time.
- All topics for the next meeting will be decided at the prior meeting.
- Hot topics will be considered at beginning of the meeting and in the case of necessity; they will be added to the meeting topics.
- All project members will have weekly tasks. These will be described, and assigned at the meetings by the result of the collaborative and democratic work with the maximum possible number of project members.
- All members will be responsible for checking the project's mail group and blog every day.
- All actions and tasks performed for the project by the team members will be posted to the project mail group.
- During the meetings, the recorder will take the notes of the meeting and will post these notes to the mail group. In each meeting, the recorder's duty will be done in turn.

3.3 Process Model

The process model of PosterInBlue Project is not one of the predefined process models. Since we have strict deadlines for modeling of the project, we do not have a chance to change our analysis and design model. Therefore, we are going to use waterfall model in this phase.

On the other hand, we can use incremental model for the construction phase. After implementing the first increment of the project, we can enhance our product with additional features and implement subsequent increments.

4 REQUIREMENTS

4.1. Hardware Requirements

One hardware requirement for this project is the microcontroller embedded system which will fetch posters to LCD, store posters, calendar and other necessary data and process this data. XSA-3S1000 Board mainly meets this requirement with its

- FPGA (Field Programmable Gate Array) chip
- 32 MByte SDRAM
- 2 MByte Flash memory
- 100 MHz oscillator
- Parallel Port
- 512 VGA port

. Detailed information about the board can be seen at (Xess Corporation. Programmable Logic Technologies <http://www.xess.com/prod035.php3>).

Another hardware requirement is about the bluetooth part. An embedded service management module is required by which the system handles communication with possible clients and administrators. Main concern about this requirement is the profiles that this module must support. BlueRadios BR-EVAL2.0 meets this requirement with its SDP, SPP, DUN, LAP, FTP, GAP, RFCOMM, L2CAP profile support. Detailed information about the board can be seen at <http://www.blueradios.com/evaluationkit.htm> (BlueRadios Inc. Wireless Data Communication Company)

For testing purposes a personal computer with Pentium 4 processor, 512 MB RAM and Bluetooth 2.0 USB will be used. A Bluetooth supported PDA with Intel PXA270 processor, 64 MB Rom, 64 MB RAM and a cellular phone which must support main Bluetooth services will also be used. For display purposes we need an LCD display.

4.2. Software and Development Requirements

4.2.1 Bluetooth Profiles

The profile concept is used to decrease the risk of interoperability problems between different manufacturers' products. For our project, we decided to use some of these profiles to accomplish the implementations of our user models, in other words user scenarios where Bluetooth will perform the radio transmission.

A profile can be described as a vertical slice through the protocol stack. It defines options in each protocol that are mandatory for the profile. The major profiles which will be used in the project are briefly,

- **Generic Access Profile (GAP):**

Generic procedures related to discovery of Bluetooth devices will be used in the project to find and connect any Bluetooth device even if the connected Bluetooth devices do not share any common applications

About the profile stack, the main purpose of this profile is to describe the use of the lower layers of the Bluetooth protocol stack (LC and LMP). To describe security related alternatives, also higher layers (L2CAP, RFCOMM and OBEX) are included.

- **Service Discovery Application Profile (SDAP):**

For any possible client and administrator, the service discovery profile will define the protocols and procedures that shall be used by the client and administrator application on their Bluetooth-enabled devices using the Bluetooth Service Discovery Protocol (SDP).

With regard to this profile, the service discovery application is started by for example a client's enabling his/her Bluetooth device in front of an advertisement he/she is interested in. The main purpose of this profile is to describe the use of the lower layers of the Bluetooth protocol stack (LC and LMP). To describe security related alternatives, also higher layers (L2CAP, RFCOMM and OBEX) are included.

Searching for services by service class or service attributes and service browsing are usage scenarios of SDAP. Service browsing can be used by client devices and searching by service class and attributes will be necessary for the administration tool we will develop.

About the profile stack, The service discovery user application (SrvDscApp) in a local device (LocDev) interfaces with the Bluetooth SDP client to send service inquiries and receive service inquiry responses from the SDP servers of remote devices (RemDevs).

- **Generic Object Exchange Profile (GOEP):**

Since the project requires object exchange usage models like File Transfer on OBEX protocol, this generic profile will be used in the project. Pushing data by the administration tool or pulling data by the product clients will be accomplished on this profile which at first needs an exchange session.

- **Object Push Profile (OPP):**

This profile uses its underlying Generic Object Exchange Profile (GOEP) to define the interoperability requirements for the protocols needed by applications. Typical scenarios covered by this profile are: Object Push, Business Card Pull & Business Card Exchange, all of which involve the pushing/pulling of data objects between the clients/administrators and our product.

Our product will be the server device that provides an object exchange server. Besides the interoperability capabilities of this profile, our product must comply with the interoperability requirements for the server of the GOEP.

Users (digital poster clients and product administrators) devices are devices that push and pull objects to and from the product.

- **File Transfer Profile (FTP):**

File transfer usage model is another usage model that the product will provide. This profile uses its underlying Generic Object Exchange Profile to define the interoperability requirements for the protocols needed by applications. Typical scenarios covered by the project are Bluetooth device browsing, transferring and manipulating objects on/with another Bluetooth device of client's and administrator's devices

- **Synchronization Profile (SYNC):**

The **SYNC** profile is used in conjunction with **GOEP** to enable synchronization of calendar and address information (personal information manager (PIM) items). A common application of this profile is the exchange of data between a PDA and computer. This will be useful for us to have synchronization in sending calendar events and personal information.):

4.2.2 XILINX-WebPACK

Xilinx is the development software to generate the .BIT file to download the generated bitstream file on the XSA 3S1000 board. *WebPACK* provides the tools and features along with the same easy-to-use design environment as our award winning ISE *Foundation*[™] design tools providing instant access to the ISE features and functionality at no cost. Xilinx has created a solution that allows convenient productivity by providing a design solution that is always up to date with error-free downloading and single file installation.

4.2.3 XSTOOLS

Beside from the Xilinx software, XSTOOLS will be used to load and test the generated BIT files for the XSA 3S1000 board.

Administration will be handled by an application with graphical user interface. Application will be developed under Java as programming language, Netbeans as IDE, Matisse and Java Swing library for GUI development and Java bluetooth libraries for the core capabilities that the application will serve.

4.3 Functional Requirements

By the end of the project a possible bluetooth client can receive:

- Calendar events
- Business Cards
- Presentations
- Posters

with his bluetooth device. Various bluetooth client devices like

- PDAs
- Cell phones
- Bluetooth enabled computers

will be supported by the product.

Administration will also be done over bluetooth. Main capabilities of the administration tool are insertion, deletion and update of the transfer data.

4.4. Non-Functional Requirements

One of the basic concern of most software projects is security. This is also true for this project. In Bluetooth Generic Access Profile, the Bluetooth security can be handled on service level and on the link level. Product administration will enforce one of these security levels.

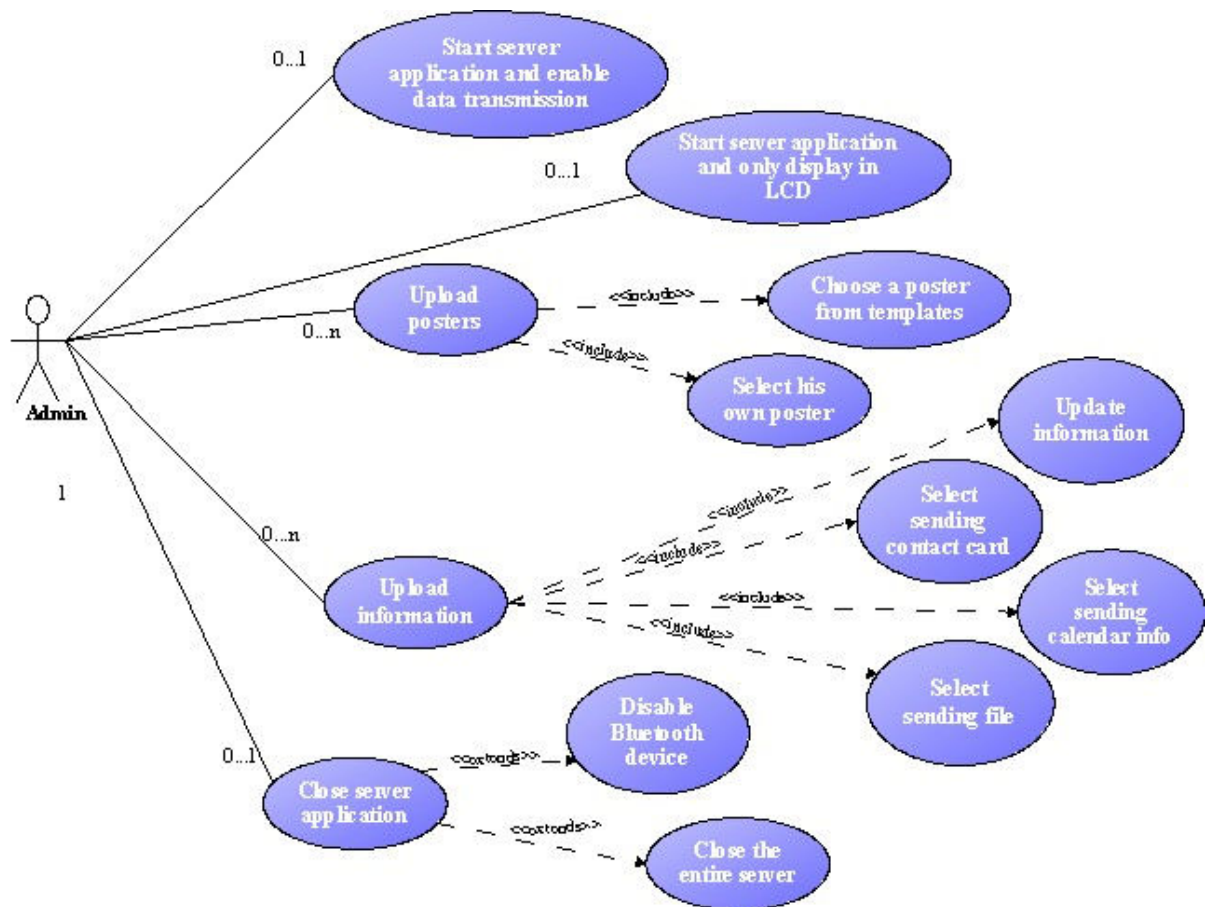
Another non-functional requirement is usability. For a possible Bluetooth client, it is really straightforward that the client either accepts or rejects incoming information that the product request to transfer. On the administration side, management is also easy with the help of administration tool's GUI. Briefly, not only the client but also the administrator does not need to know the internal of the product.

5. Data Modeling And Analysis

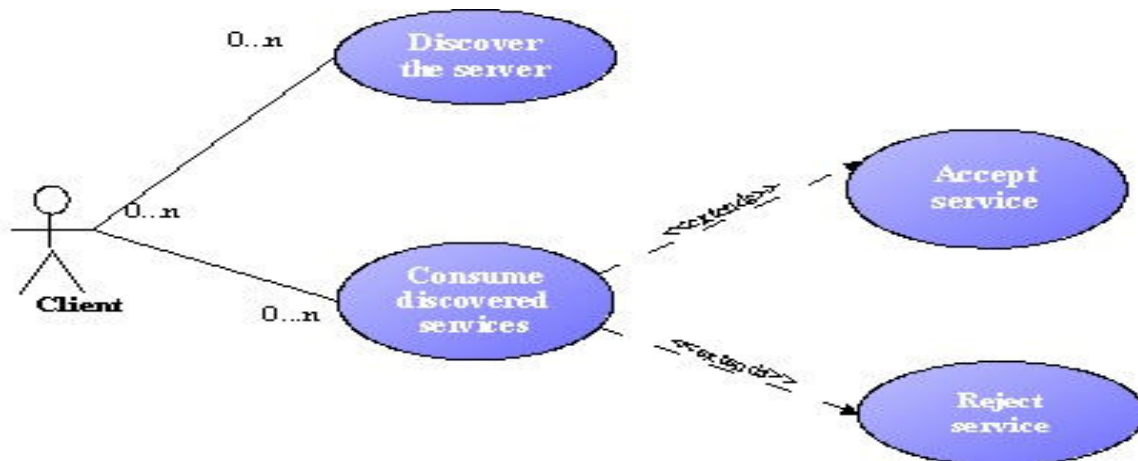
5.1 USE CASES

Basically we have three major users ; admins, server and clients.

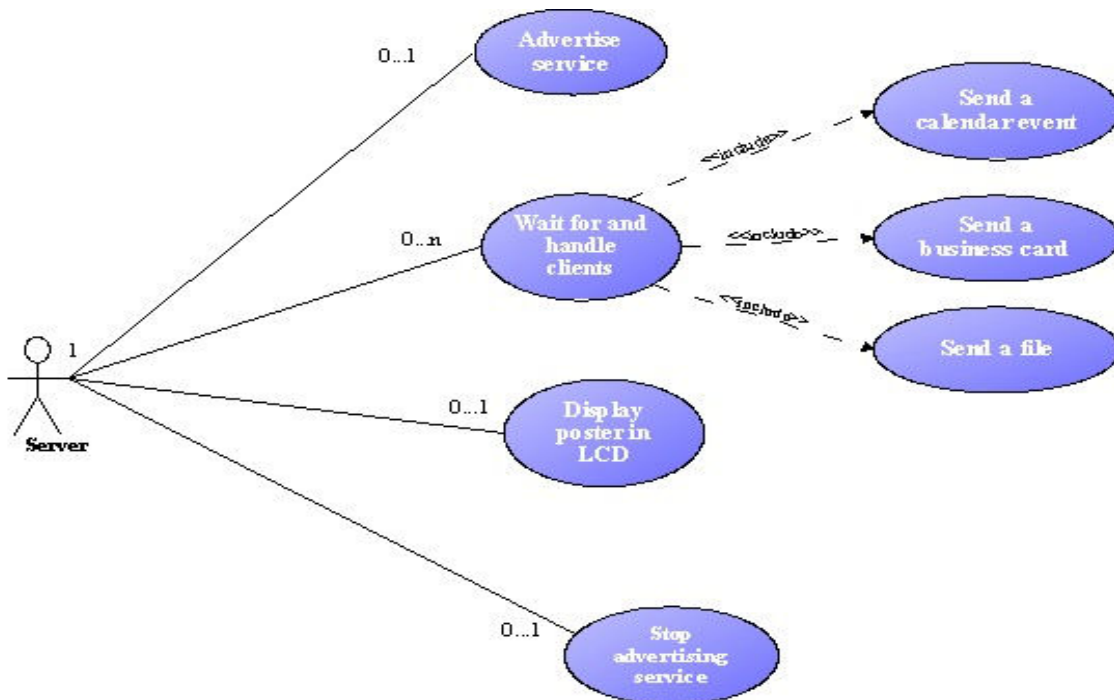
Admins are the users who buy our product and display their posters and send their information to the clients via Poster in Blue. Clients are the end users; having a bluetooth device such as cell phones, PDAs, Palms or laptops and taking the advantage of data sent via Poster in Blue by accepting the request. Finally server is the system that supplies LCD display and data transfer.



5.1.1 Admins : Firstly Admins start Poster in Blue Application to enable data transmission and LCD Display. They can upload a different poster from both the templates or his own posters, which will be displayed in the LCD. With the poster , they also upload the poster information sent via Poster in Blue Application. They finally close Poster in Blue Application in two ways.They can either close the whole application or they can only stop the bluetooth transmission. Because they may sometimes want not to send the information that is being displayed on LCD.

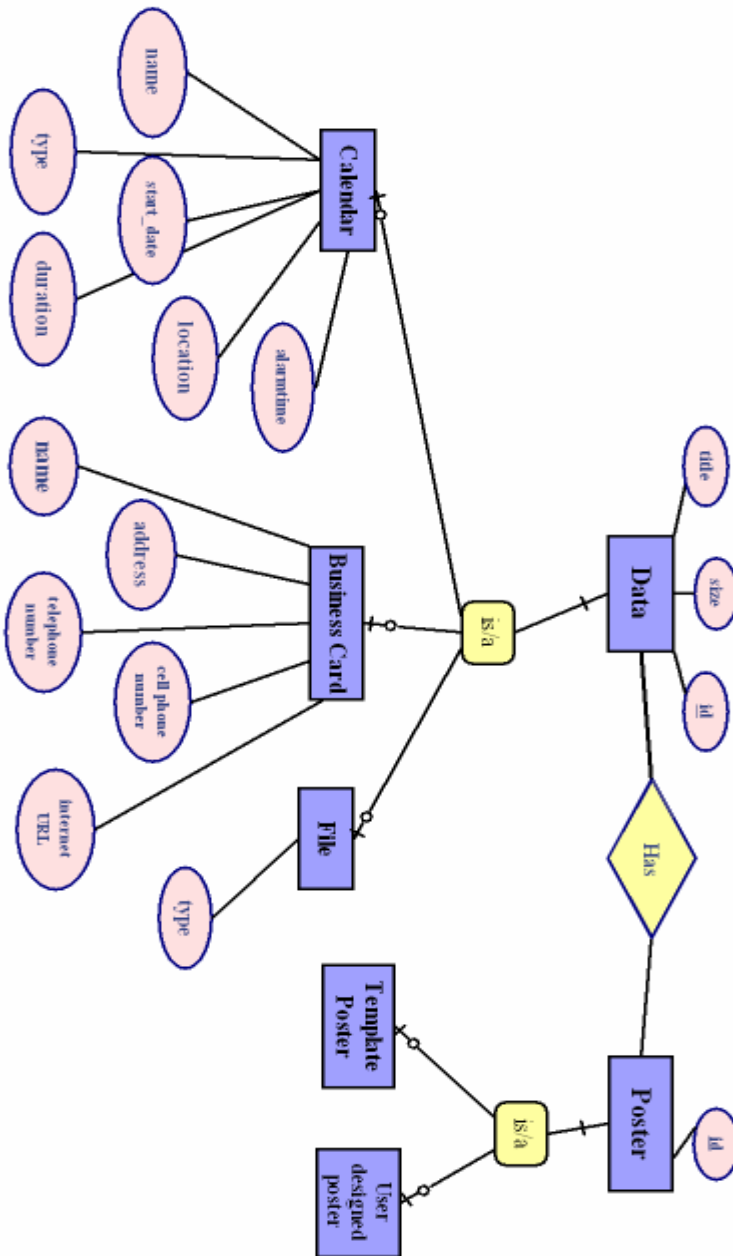


5.1.2 Clients : They accept or reject the data sent by Poster in Blue Application after discovering the servers in their range.



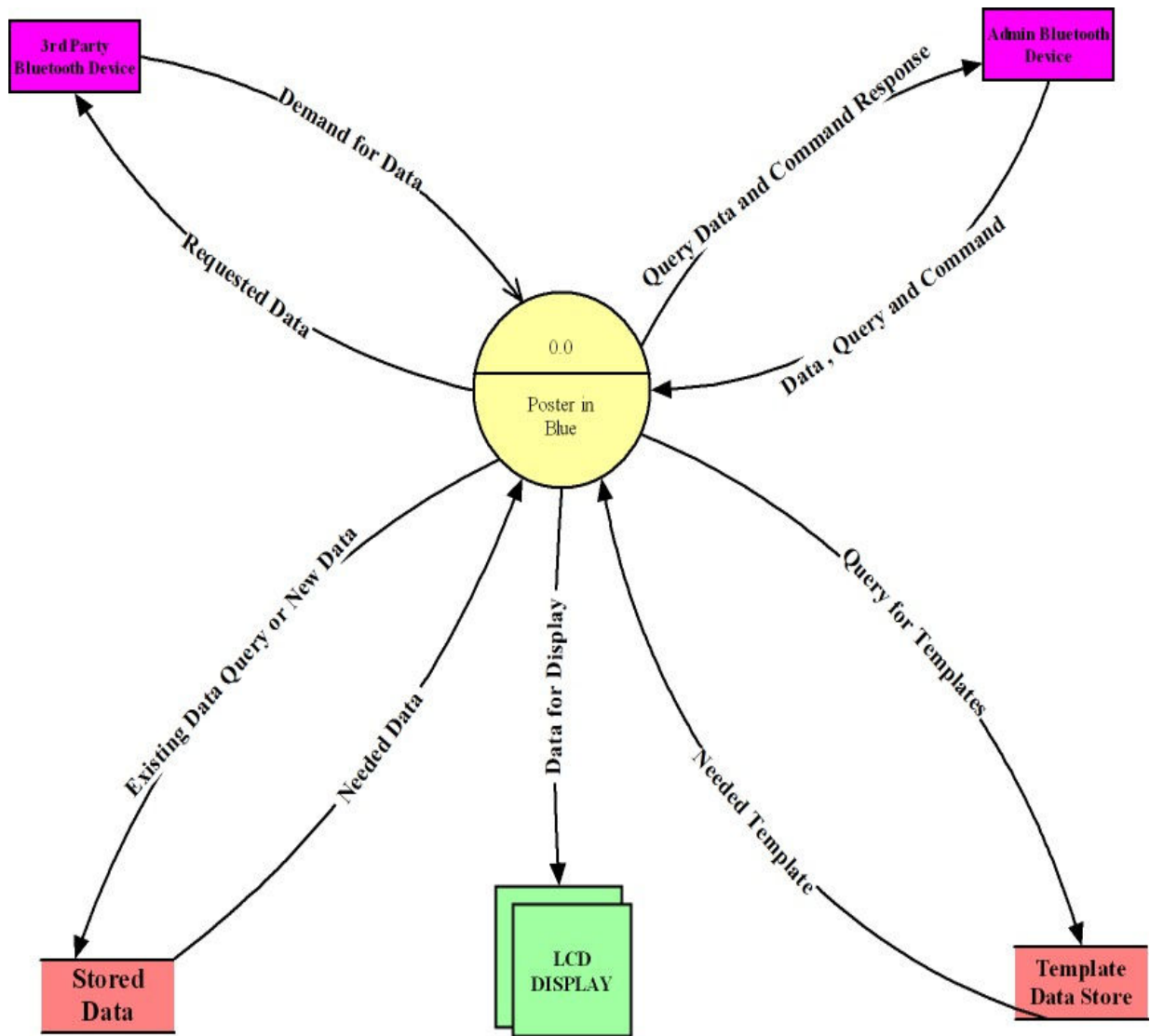
5.1.3 Server : After server is started, it is going to advertise the services that it supplies. It waits for the clients and handles their requests by sending calender event, business card or a file to the clients. It also displays the poster in the LCD.And finally it stops the advertising service.

5.2 ER Diagram



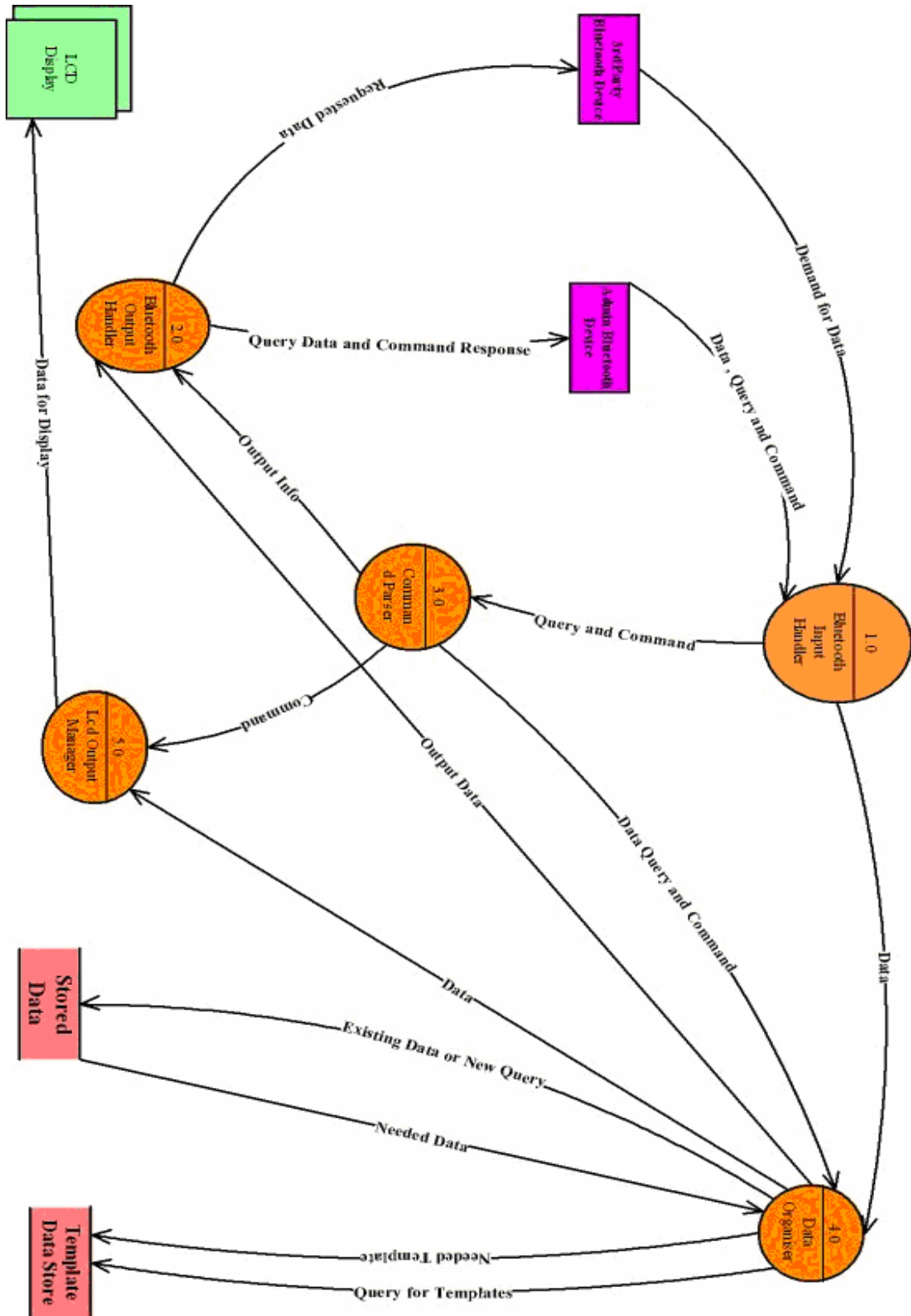
5.3 Data Flow Diagrams (DFD)

5.3.1 DFD0

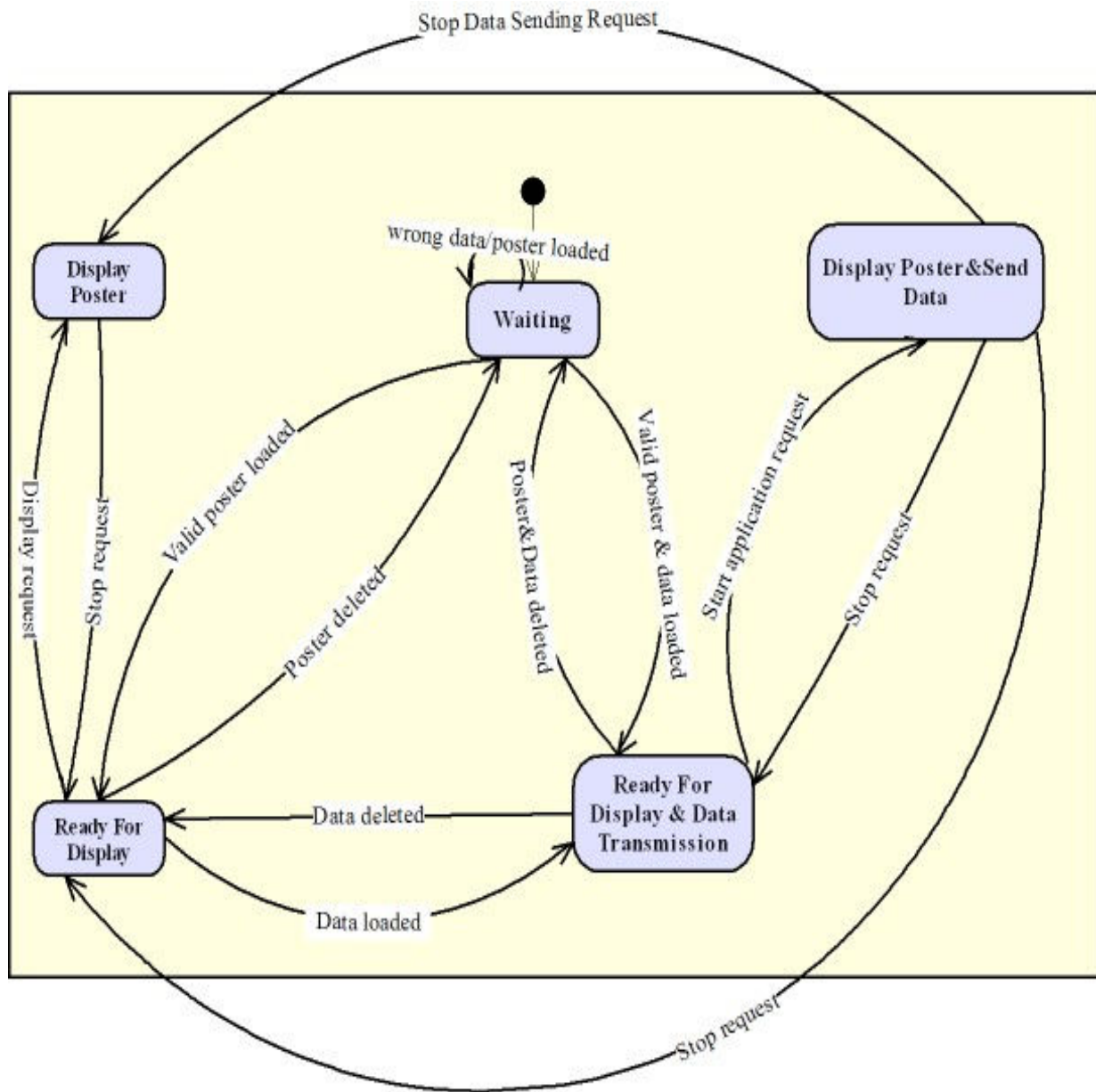


LEVEL 0 DFD

5.3.2 DFD1



5.4 State Transition Diagram



6. RISK MANAGEMENT STRATEGY

6.1 RISK MANAGEMENT

Risk management is essential for this project because of limited time. Unforeseen risks can be catastrophic for the development process due to strict deadline which is also one of the most important risks. Project team has established a detailed and standardized RMMM plan as shown below. Risk management plans due to every non-negligible risk can be found in appendix. This plans and risk table are not final documents will be updated in next versions in case of existence of new identified risks.

6.2 RISK IDENTIFICATION

Product Size:

Although the project scope is well defined, our project size may change according to the features of the product. That is, Bluetooth has many application areas and we will choose some features for implementation. Underestimation can lead the wrong estimation of time, effort, and people.

Business Impact:

There are some opponents in the market whose products are available in the market and these are industry leading multinational companies. Therefore our product must have more features. Since users might have little computer knowledge, user interface, ease of use, and extra features are major constraints that determine the popularity of the product. This popularity will make agencies buy the product. As a result business impact is an important risk that leads the software development to fail.

Customer characteristics:

Customer usually prefers attractive advertisement. Therefore, beyond being useful, our product must also enable our customers to present attractive advertisements. These advertisements may contain demonstrations and free feedback.

Process Definition:

Although the scope of the project is known, possible changes and mistakes in the design and analysis part or in the construction part can cause confusion as the project team proceeds.

Development environment:

Since the team members are not familiar with the development environment and the tools to be used, a bad choice of the development tool that is to be used by the team members can be troublesome on the time estimations and the quality of the product.

Technology to be built:

There is a possibility to have problems with our plug in components such that they can crash and this may deprive us of continuing construction of the product. Also compatibility problems between our hardware components may be a problem.

Staff size and experience:

Although programmers have good knowledge over technical aspects, they don't have enough experience over technical issues and projects. Since all developers are university students having other courses is another handicap.

6.3 RISK TABLE

A risk table provides a project manager with a simple technique for risk projection. Risk table of the project shown below:

Risks	Category	Probability	Impact	Risk ID
Temporary unavailability of a member	ST	70%	3	R1
Miscommunication among team members	ER	2%	4	R2
Problems with the development tool	DE	60%	4	R3
Poor time management	ST	50%	2	R4
Inexperienced Development team	ST	60%	3	R5
Low attendance to group work	SR	30%	3	R6
Overloaded course schedule	BI	40%	3	R7
Underestimate project complexity	PR	35%	2	R8
Difficulty in persuading the customer about the product	CC	30%	4	R9
Difficulty in Hardware Connections	DE	20%	3	R10
Difficulties in finding test devices	DE	15%	1	R11

Impact values:

- 4 catastrophic
- 3 critical
- 2 marginal
- 1 negligible

ST = Staff size and experience

DE = Development environment

SR=Schedule Risk

PR=Process Risk

ER=Employee Risk

CC=Customer Characteristic

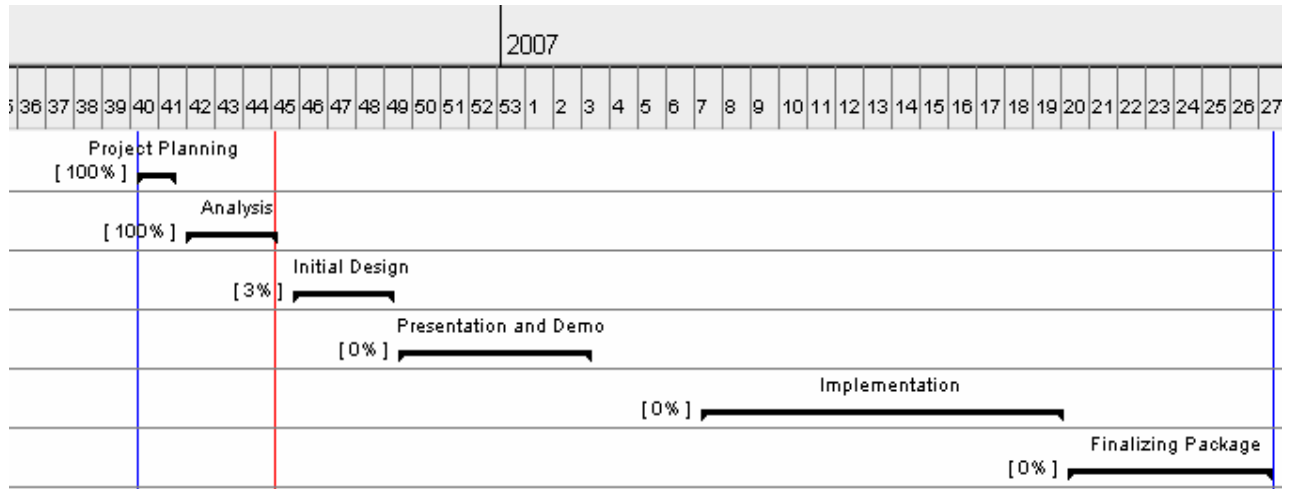
BI = Business Impact

In the columns of table possible risks are identified, each risk is categorized, the probability of the occurrence of risk and impact of the risk is assessed respectively.

Risk ID is a reference to RMMM document for every risk. Our RMMM is *Appendix B*

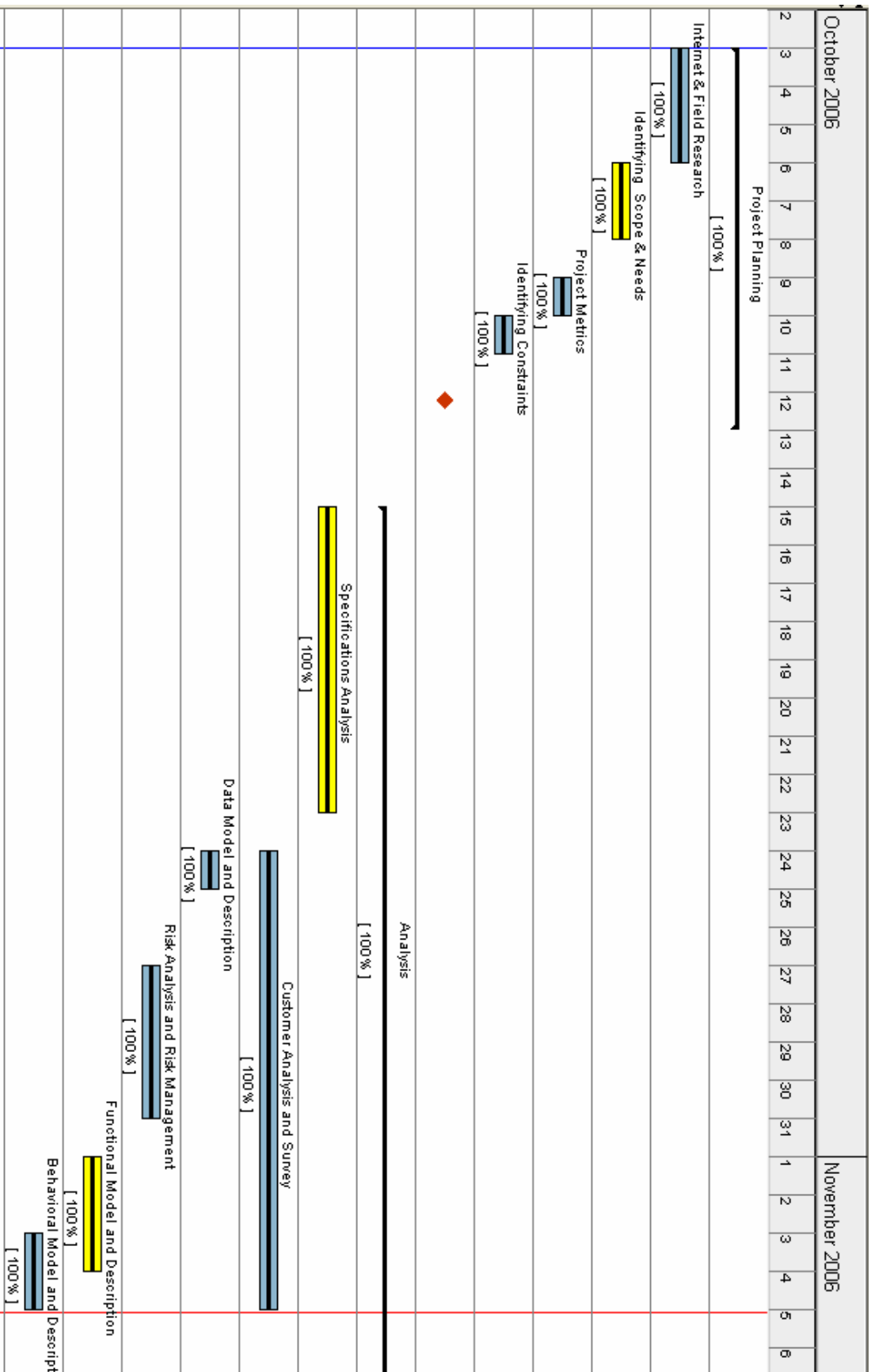
7 Appendix

7.1 Appendix A: Ganttchart



Communicate Boards with PC	11/20/06	11/22/06
Designing Admin Tool for Bluetooth	11/22/06	12/3/06
Initial Design Report is Prepared	12/5/06	12/6/06
<input type="checkbox"/> Presentation and Demo	12/7/06	1/24/07
Preparation For Team Presentation	12/7/06	12/19/06
Preparation for Demo	12/10/06	1/22/07
Final Design Report	12/15/06	12/16/06
Prototype Demo	1/23/07	1/24/07
<input type="checkbox"/> Implementation	2/20/07	5/21/07
Hardware Implementation	2/20/07	4/10/07
GUI Design	4/10/07	5/21/07
<input type="checkbox"/> Finalizing Package	5/22/07	7/12/07
Integrating Modules	5/22/07	5/25/07
Final Release Demo	6/11/07	7/12/07
Testings and Improvements	5/25/07	6/10/07

Name	Begin date	End date
Project Planning	10/3/06	10/13/06
Internet & Field Research	10/3/06	10/6/06
Identifying Scope & Needs	10/6/06	10/8/06
Project Metrics	10/9/06	10/10/06
Identifying Constraints	10/10/06	10/11/06
Proposal is Prepared	10/12/06	10/13/06
<input type="checkbox"/> Analysis	10/15/06	11/7/06
Specifications Analysis	10/15/06	10/23/06
Customer Analysis and Survey	10/24/06	11/5/06
Data Model and Description	10/24/06	10/25/06
Risk Analysis and Risk Management	10/27/06	10/31/06
Functional Model and Description	11/1/06	11/4/06
Behavioral Model and Description	11/3/06	11/5/06
Analysis Report is prepared	11/6/06	11/7/06
<input type="checkbox"/> Initial Design	11/11/06	12/6/06
Understanding and Testing Boards	11/11/06	11/15/06
Learning how to Program our Boards	11/14/06	11/20/06



2006

2007

47 48 49 50 51 52 53 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 3

Presentation and Demo

[0%]

Preparation For Team Presentation

[0%]

Preparation for Demo

[0%]

Implementation

[0%]

Hardware Implementation

[0%]

GUI Design

[0%]

Finalizing Package

[0%]

Integrating Modules

[0%]

7.2 APPENDIX B :RMMM

Risk ID	R1
Probability	%70
Impact	Critical
Description	Temporary unavailability of a member due to illness, another courses exam etc
Mitigation	Gantt chart should be drawn carefully
Monitoring	NA
Management	Modules, documents will be on net enabling others complete the task

Risk ID	R2
Probability	%2
Impact	Catastrophic
Description	Miscommunication among team members
Mitigation	More attention should be paid while choosing the team members in design step and deciding on the working conditions with team members at the beginning
Monitoring	Peer discussions
Management	More group-meetings should be held.

Risk ID	R3
Probability	%60
Impact	Catastrophic
Description	Problems with the development tool
Mitigation	Which development tool to use should be asked to more experienced people
Monitoring	NA
Management	Education about development environment during implementation

Risk ID	R4
Probability	%50
Impact	Marginal
Description	Poor time management, allocating longer or shorter periods for different process
Mitigation	More attention should be paid on deciding the milestones by considering our exams and other project deadlines
Monitoring	Checking schedule
Management	Changing the possible parts at schedule

Risk ID	R5
Probability	%60
Impact	Critical
Description	Inexperienced Development team
Mitigation	Organization of the team according to the needs of the process and the abilities of the members.
Monitoring	Peer discussions.
Management	Experienced members will help others, documents will be shared.

Risk ID	R6
Probability	%30
Impact	Critical
Description	Low attendance to group work
Mitigation	All the work that each project member will carry out should be planned at the beginning of the project.
Monitoring	Note attendance on scheduled group work
Management	Allocating time according to staff, fines(extra tasks) if needed

Risk ID	R7
Probability	%40
Impact	Critical
Description	Overloaded course schedule
Mitigation	Making strict agreements among project team.
Monitoring	Discussions about courses
Management	Helping group members about critical-common courses

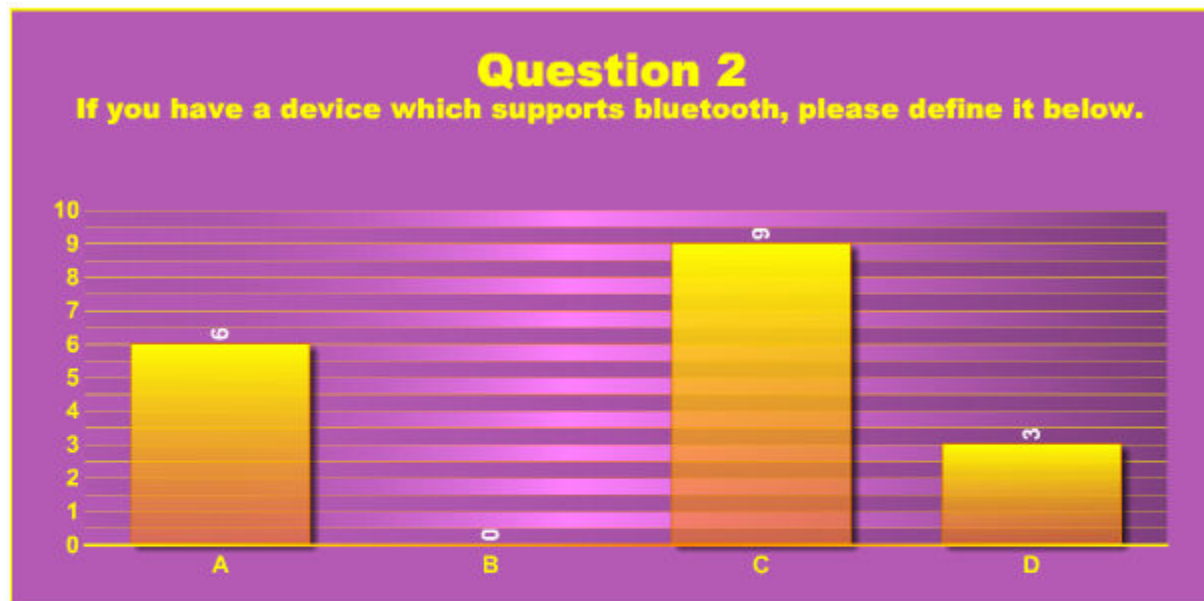
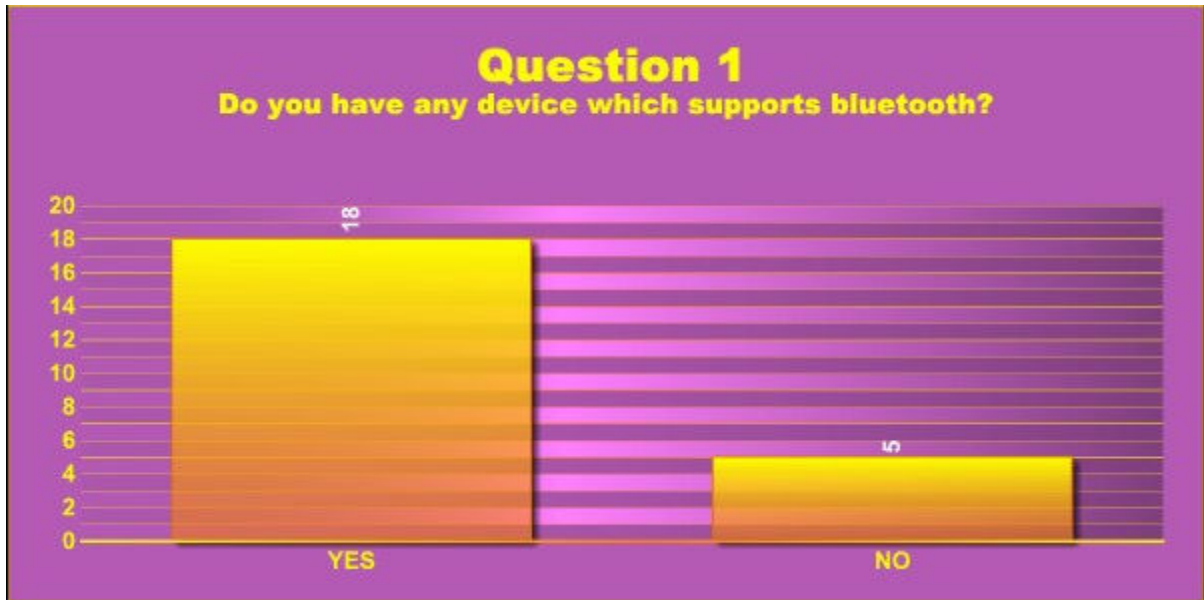
Risk ID	R8
Probability	%35
Impact	Marginal
Description	Underestimation of project complexity
Mitigation	Asking the experienced people for their advise on the scheduling.
Monitoring	Checking schedule
Management	Using SDK documentation, library tutorials, switching developer for module if needed

Risk ID	R9
Probability	%30
Impact	Catastrophic
Description	Difficulty in persuading the customer to buy the product
Mitigation	Making negotiations with the customer and learn about the features that are desired on the market.
Monitoring	Discussions with potential customers
Management	Adding new features to the product

Risk ID	R10
Probability	%20
Impact	Catastrophic
Description	Difficulty in Hardware Connections
Mitigation	Doing research on the market about the present solutions.
Monitoring	Doing Hardware Tests
Management	Changing communication type

Risk ID	R11
Probability	%15
Impact	Negligible
Description	Difficulties in finding test devices
Mitigation	Trying to learn from authorities about finding new test devices
Monitoring	Planning a good test plan
Management	Leasing or burrowing test devices.

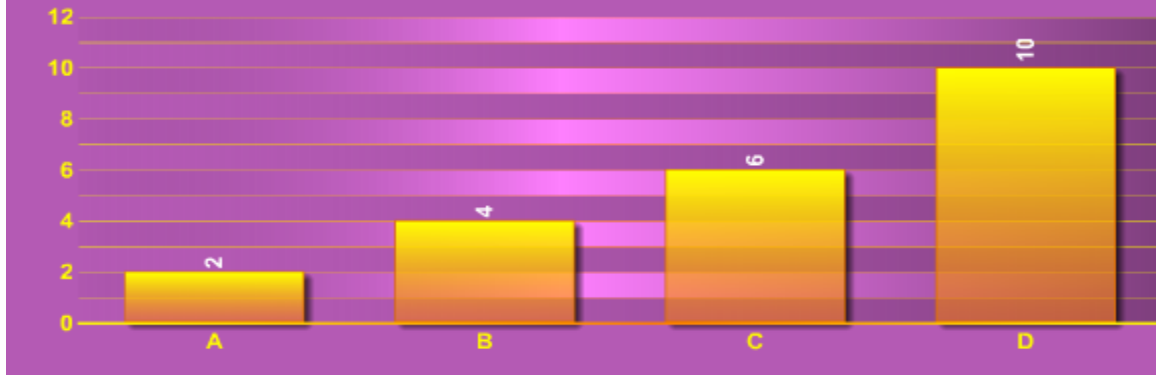
7.3 Appendix C : Survey



- A) Cell phone
- B) PDA
- C) Laptop
- D) Other

Question 3

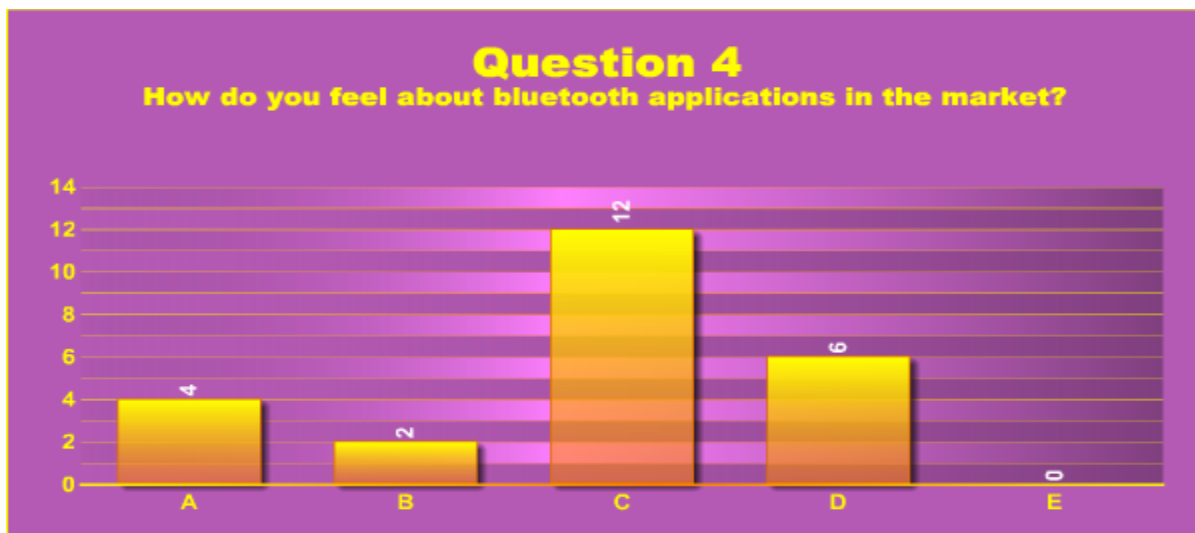
How often do you use your bluetooth device?



- A) Everyday
- B) Once a week
- C) Once a month
- D) Never

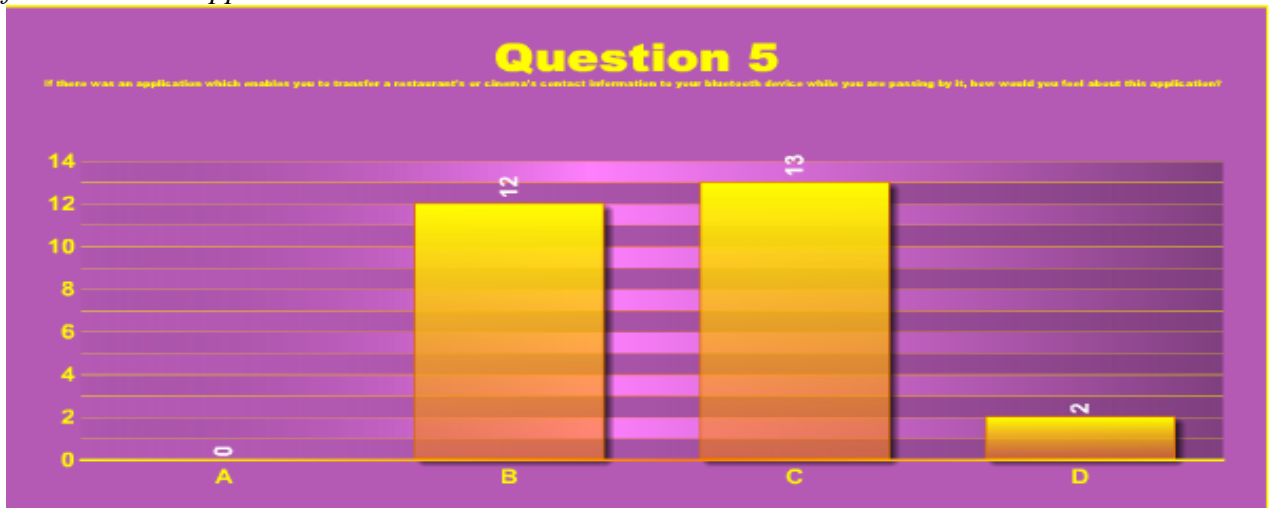
Question 4

How do you feel about bluetooth applications in the market?



- A) Not sufficient
- B) Difficult to use
- C) Good
- D) Have no idea
- E) Other

Q5) If there was an application which enables you to transfer a restaurant's or cinema's contact information to your bluetooth device while you are passing by it, how would you feel about this application?



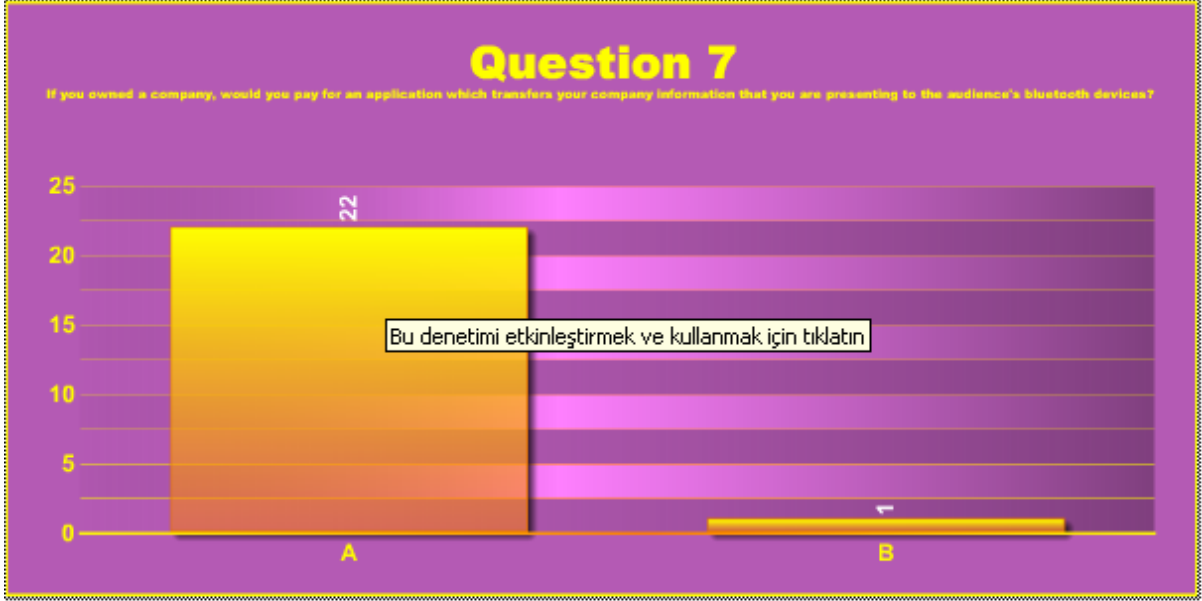
- A) Useless
- B) Good if it is easy to use
- C) Good if transfer is secure
- D) Other

6)

How would the posters we see everyday be more attractive do you think?

- They would be more attractive if they were displaying a video.
- cool
- Digital Posters
- they must be more than a picture or a writing.
- no idea
- well designed..
- Plain like the design of google and colorful
- They may be more attractive by more creativity. They should arouse interest that people want to spare the time for them. And of course, they must be concerned with our interests.
- Animating posters would be interesting like the advertisements surround the football fields.
- If it uses graphic, audio and video application, they become more attractive.

Q7) If you owned a company, would you pay for an application which transfers your company information that you are presenting to the audience's bluetooth devices?



- A) Yes
- B) No