



# SECURE ONLINE PAYMENT SYSTEM FOR INTERNATIONAL CONFERENCE ORGANIZER

by

Ms. Sunisa Narupakorn

A Final Report of the Three - Credit Course  
CE 6998 Project

Submitted in Partial Fulfillment  
of the Requirements for the Degree of  
Master of Science  
in Computer and Engineering Management  
Assumption University



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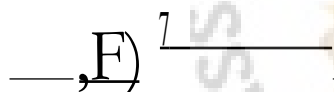
November 2000


Project Title	Secure Online Payment System for International Conference Organizer
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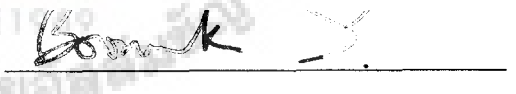
The Graduate School of Assumption University has approved this final report of the three-credit course, CE 6998 PROJECT, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer and Engineering Management.


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## ABSTRACT

This project examines the design and implementation of the office of Visible Image Company Limited in the payment system in organizing the international conference in Financial & Accountings Section and for the future. The existing information system is manual based system. The study emphasized on the reduction of time consumption in duplicated, complicated and difficult activities and also on the increase of security over the payment operations. The objective of this project is to improve the quality of payment, security and efficiency within the payment system.

The gathering of information is the first process in this project. The information gathered in this project includes current form, working procedure, problems and requirements. After gathering all the information, the new system is designed to match the requirements. This will decrease all the confusion within the payment system of Visible Image. Besides, the most important point in this project is to improve the payment security. The report generator is important for supporting management for improving the quality of service within the company. Moreover, it helps the staffs to be able to give more accurate, security and up-to-dated information to the Managing Director and teamwork with less time that helps to create more project satisfaction. The report will include list of requests from individuals and the entire statistic that can be used for decision support.

This project also includes hardware and the cost of implement the project is for 5 years. The result shows that break-even point is 1 year 8 months. Therefore, the Visible Image should implement this computer system to improve efficiency and quality of services.

## ACKNOWLEDGEMENTS

This system development project requires the cooperation of several persons. The writer would like to express the gratitude to all of those who have sacrificed their valuable time in order to provide the information needed for the system.

I am very grateful to Dr. Ketchayong Skowratananont, my advisor, for his exceptional comments as well as suggestion of my research. I, indeed, have a great appreciation for his valuable assistance in contributing useful insights based on his experiences in Electronic Commerce.

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# **I. INTRODUCTION**

## **1.1 Introduction**

Market, economical, societal and technological factors are creating a highly competitive business environment in which customers are the focal point. Furthermore, these factors can change quickly, sometimes in an unpredictable manner.

Therefore, companies need to react frequently and quickly to both the problems and the opportunities resulting from this new business environment. Because the pace of change and the degree of uncertainty in tomorrow's competitive environment are expected to accelerate, organizations will be operating under increasing pressures to produce more and faster, using fewer resources.

Electronic commerce is the answer. It was started in the early 1970s, with such innovations as "electronic fund transfers (EFT)" that was limited to large corporations, financial firms. It has adopted and adapted to electronic commerce with the commercialization of the Internet in the early 1990s and has rapidly grown to millions of potential customers nowadays.

## **1.2 Background of the Project**

In the present day, there is no boundary, everything is Network which most people know that it is connection via electronic. My company is concerned about this, we implemented a computerized system, especially for Internet System last year. We used only for e-mail service and web surfing. After that our company is working in the role of organizer who organizes and arranges the international conferences & exhibitions. Then I was assigned to hold this entire project since February till November 2000. Therefore, I established this conference web site [www.seagig.org](http://www.seagig.org) which

provides all information and registration of this conference. After operating for a while, I found some problems about the payment issue such as registration confirmation, payment tracking and transferring. So, I have decided to use an electronic payment system to solve this issue. This is the beginning of this project.

### **1.3 Objectives of the Project**

The objectives of this project are:

- (a) To study and analyze the implementation of e-commerce technology especially electronic payment subsystem.
- (b) To study and analyze the process of electronic payment for integrated to conference registration over the Internet.
- (c) To study, analyze, compare and evaluate the implementation of electronic payment technology for The Visible Image Company Limited.
- (d) To study the possibility of electronic payment technology for Visible Image Company Limited.
- (e) To design electronic payment to make Visible Image Company Limited meet the following objectives:
  - (1) Security of data
  - (2) Accuracy of data
  - (3) Decrease of steps of registration & payment over the Internet
  - (4) Ease of use

### **1.4 Scope of the Project**

This project focuses on the implementation of electronic payment technology from the site reference of The Visible Image Company Limited in the process of seminar registration. The project includes:

- (a) Defining information problem within the Visible Image Company Limited.
- (b) Taking the economic figures to consider project feasibility
- (c) Designing a new e-commerce security system to reduce the problems of The Visible Image Company Limited.

### **1.5 Project Plan**

The project plan outline is as follows:

- (1) Problem Definition is the process that includes the interview of the staff to define the current problems in the Visible Image Company Limited.
- (2) Evaluate electronic payment product is the process that compares each product to the need of the company.
- (3) Design new electronic payment integrated with current system.
- (4) Feasibility Analysis includes designing computer system to estimate all the cost that must be used in this project compared with the benefit that we will get from implementing this project



## II. LITERATURE REVIEW

The Internet is a global network of linked computers. Ten years ago it was unlikely you'd have heard of it, now it's almost impossible to get away from. The Internet offers fast and free exchange of information from all over the world. Because of this disregard for distance, using the Internet is going to play an important part in the future global success of Worldwide business. The most accessible feature of the Internet is the World Wide Web. This allows 'pages' of information held on individual computers to be used at other connected computers. The pages can use pictures and sound, and offer links between one page and another. It's these links that enable people to 'surf' from one page to the next. The World Wide Web offers exciting possibilities for retailers to reach many more people and provide the widest possible range of products.

Until now there have been concerns about credit card security when shopping on the Internet, but Visa, IBM, Microsoft, MasterCard and others have pioneered a standard for payments which takes the anxiety out of electronic shopping. This site explains how it works, and how you can shop with confidence from your computer.

Basically there are three potential problem areas:

- (1) Your credit card number could be intercepted as it travels on the Internet.
- (2) The card number could be misused or not kept secure once it reaches the destination.
- (3) Because it's easy for anyone to set up a shopfront on the Internet, the retailer may not be genuine.

## 2.1 Security Options

There are two types of reliable security technologies currently available for online purchases. Both technologies involve the encryption, or scrambling, data before it is sent over the Internet.

### (a) SSL

Secure Sockets Layer (SSL) provides sound privacy protection by encrypting the channel between the consumer and the merchant. Because the data sent over the channel is secure, SSL is sufficient security when doing business with merchants you know and trust.

### (b) SET

Until now, most security systems in use have concentrated on sending the card number in code from your computer to the retailer. While this is clearly a way of preventing problems while the number is in transit, it does nothing to address the other problem areas.

## 2.2 How SSL Works

### 2.2.1 An Introduction to Key Cryptography

RSA public key cryptography is widely used for authentication and encryption in the computer industry. Netscape has licensed RSA public key cryptography from RSA Data Security Inc. for use in its products, specifically for authentication.

Public key encryption is a technique that uses a pair of asymmetric keys for encryption and decryption. Each pair of keys consists of a public key and a private key. The public key is made public by distributing it widely. The private key is never distributed; it is always kept secret.

Data that is encrypted with the public key can be decrypted only with the private key. Conversely, data encrypted with the private key can be decrypted only with the

public key. This asymmetry is the property that makes public key cryptography so useful.

### 2.2.2 Using Public Key Cryptography for Authentication

Authentication is the process of verifying identity so that one entity can be sure that another entity is who it claims to be. In the following example involving Alice and Bob, public key cryptography is easily used to verify identity. The notation something key means that something has been encrypted or decrypted using key.

Suppose Alice wants to authenticate Bob. Bob has a pair of keys, one public and one private. Bob discloses to Alice his public key (the way he does this is discussed later). Alice then generates a random message and sends it to Bob:

A->B        { random-message }

Bob uses his private key to encrypt the message and returns the encrypted version to Alice:

B->A        {random-message} bobs-private-key

Alice receives this message and decrypts it by using Bob's previously published public key. She compares the decrypted message with the one she originally sent to Bob; if they match, she knows she's talking to Bob. An imposter presumably wouldn't know Bob's private key and would, therefore, be unable to properly encrypt the random message for Alice to check.

Unless you know exactly what you are encrypting, it is never a good idea to encrypt something with your private key and then send it to somebody else. This is because the encrypted value can be used against you (remember, only you could have done the encryption because only you have the private key).

So, instead of encrypting the original message sent by Alice, Bob constructs a message digest and encrypts that. A message digest is derived from the random message in a way that has the following useful properties:

The digest is difficult to reverse. Someone trying to impersonate Bob couldn't get the original message back from the digest.

An impersonator would have a hard time finding a different message that computed to the same digest value.

By using a digest, Bob can protect himself. He computes the digest of the random message sent by Alice and then encrypts the result. He sends the encrypted digest back to Alice. Alice can compute the same digest and authenticate Bob by decrypting Bob's message and comparing values.

### 2.2.3 Getting Closer

The technique just described is known as a digital signature. Bob has signed a message generated by Alice, and in doing so he has taken a step that is just about as dangerous as encrypting a random value originated by Alice. Consequently, our authentication protocol needs one more twist: some (or all) of the data needs to be originated by Bob.

A->B      hello, are you bob?

B->A      Alice, This Is bob { digest[Alice, This Is Bob] } bobs-private-key

When he uses this protocol, Bob knows what message he is sending to Alice, and he doesn't mind signing it. He sends the unencrypted version of the message first, "Alice, This Is Bob." Then he sends the digested-encrypted version second. Alice can easily verify that Bob is Bob, and Bob hasn't signed anything he doesn't want to.



## 2.2.4 Handling Out Public Keys

How does Bob hand out his public key in a trustworthy way? Let's say the authentication protocol looks like this:

A->B      hello

B->A      Hi, I'm Bob, bobs-public-key

A->B      prove it

B->A      Alice, This Is bob { digest[Alice, This Is Bob] } bobs-private-key

With this protocol, anybody can be Bob. All you need is a public and private key. You lie to Alice and say you are Bob, and then you provide your public key instead of Bob's. Then you prove it by encrypting something with the private key you have, and Alice can't tell you're not Bob.

To solve this problem, the standards community has invented an object called a certificate. A certificate has the following content:

- (a) The certificate issuer's name
- (b) The entity for whom the certificate is being issued (aka the subject)
- (c) The public key of the subject
- (d) Some time stamps

The certificate is signed using the certificate issuer's private key. Everybody knows the certificate issuer's public key (that is, the certificate issuer has a certificate, and so on...). Certificates are a standard way of binding a public key to a name.

By using this certificate technology, everybody can examine Bob's certificate to see whether it's been forged. Assuming that Bob keeps tight control of his private key and that it really is Bob who gets the certificate, then all is well. Here is the amended protocol:

A->B      hello

B->A      Hi, I'm Bob, bobs-certificate

A->B      prove it

B->A      Alice, This Is bob{ digest[Alice, This Is Bob] } bobs-private-key

Now when Alice receives Bob's first message, she can examine the certificate, check the signature (as above, using a digest and public key decryption), and then check the subject (that is, Bob's name) and see that it is indeed Bob. She can then trust that the public key is Bob's public key and request Bob to prove his identity. Bob goes through the same process as before, making a message digest of his design and then responding to Alice with a signed version of it. Alice can verify Bob's message digest by using the public key taken from the certificate and checking the result.

A bad guy - let's call him Mallet - can do the following:

A->M      hello

M->A      Hi, I'm Bob, bobs-certificate

A->M      prove it

M->A      ?????

But Mallet can't satisfy Alice in the final message. Mallet doesn't have Bob's private key, so he can't construct a message that Alice will believe came from Bob.

#### 2.2.5 Exchanging a Secret

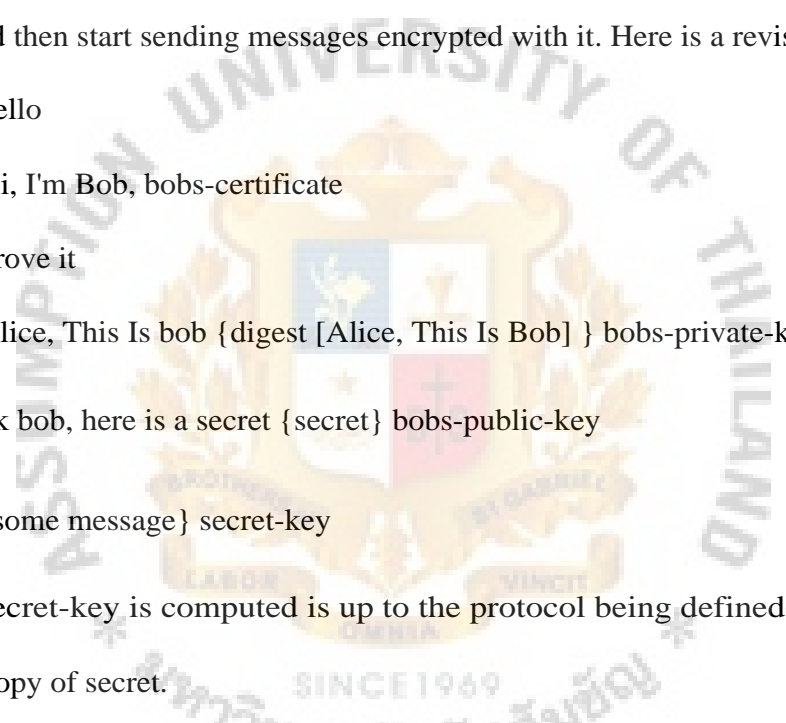
Once Alice has authenticated Bob, she can do another thing - she can send Bob a message that only Bob can decode:

A->B      { secret } bobs-public-key

The only way to find the secret is by decrypting the above message with Bob's private key. Exchanging a secret is another powerful way of using public key

cryptography. Even if the communication between Alice and Bob is being observed, nobody but Bob can get the secret.

This technique strengthens Internet security by using the secret as another key, but this time it's a key to a symmetric cryptographic algorithm (such as DES, RC4, or IDEA). Alice knows the secret because she generated it before sending it to Bob. Bob knows the secret because Bob has the private key and can decrypt Alice's message. Because they both know the secret, they can both initialize a symmetric cipher algorithm and then start sending messages encrypted with it. Here is a revised protocol:



A->B      hello

B->A      Hi, I'm Bob, bobs-certificate

A->B      prove it

B->A      Alice, This Is bob { digest [Alice, This Is Bob] } bobs-private-key

A->B      ok bob, here is a secret {secret} bobs-public-key

B->A      {some message} secret-key

How secret-key is computed is up to the protocol being defined, but it could simply be a copy of secret.

Mallet's bag contains a few more tricks. Although Mallet can't discover the secret that Alice and Bob have exchanged, he can interfere in their conversation by damaging it. For example, if Mallet is sitting between Alice and Bob, he can choose to pass most information back and forth unchanged but mangle certain messages (easy for him to do because he knows the protocol that Alice and Bob are speaking):

A->M      hello

M->B      hello

B->M      Hi, I'm Bob, bobs-certificate

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M->A      Hi, I'm Bob, bobs-certificate

A->M      prove it

M->B      prove it

B->M      Alice, This Is bob{ digest[Alice, This Is Bob] } bobs-private-key

M->A      Alice, This Is bob{ digest[Alice, This Is Bob] } bobs-private-key

A->M      ok bob, here is a secret {secret} bobs-public-key

M->B      ok bob, here is a secret {secret} bobs-public-key

B->M      {some message} secret-key

M->A      Garble [{some message} secret-key]

Mallet passes the data through without modification until Alice and Bob share a secret. Then Mallet gets in the way by garbling Bob's message to Alice. By this point Alice trusts Bob, so she may believe the garbled message and try to act on it. Note that Mallet doesn't know the secret - all he can do is damage the data encrypted with the secret key. Depending on the protocol, Mallet may not produce a valid message. Then again, he may get lucky.

To prevent this kind of damage, Alice and Bob can introduce a message authentication code (MAC) into their protocol. A MAC is a piece of data that is computed by using a secret and some transmitted data. The digest algorithm described above has just the right properties for building a MAC function that can defend against Mallet:

MAC: = Digest [some message, secret]

Because Mallet doesn't know the secret, he can't compute the right value for the digest. Even if Mallet randomly garbles messages, his chance of success is small if the digest data is large. For example, by using MD5 (a good cryptographic digest algorithm invented by RSA), Alice and Bob can send 128-bit MAC values with their messages.



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The odds of Mallet's guessing the right MAC are approximately 1 in 18,446,744,073,709,551,616 for all practical purposes, never.

Here is the sample protocol, revised yet again:

A->B      hello

B->A      Hi, I'm Bob, bobs-certificate

A->B      prove it

B->A      Alice, This Is bob

            { digest[Alice, This Is Bob] } bobs-private-key

            ok bob, here is a secret {secret} bobs-public-key

            { some message,MAC} secret-key

Mallet is in trouble now. He can garble messages all he wants, but the MAC computations will reveal him for the fraud he is. Alice or Bob can discover the bogus MAC value and stop talking. Mallet can no longer put words in Bob's mouth.

## 2.3 How SET Works

SET is a technical specification for securing payment card transactions over open networks such as the Internet. The specification is intended as a common, global standard - it is open and free to anyone who wishes to use it to develop SET-compliant software. SET software for buying or selling on the Internet can be found at [www.setco.org](http://www.setco.org)

The specification was first published in February 1996 and has been further developed after inputs from industry participants worldwide. The first production version of the specification SET 1.0 was released in May 1997. The SET specification incorporates the use of highly-advanced public key cryptography from RSA to protect the privacy of personal and financial information over any open network. It calls for special coded software to reside in the cardholder's personal computer (or in a

microchip on the card) and in the merchant's computer, as well as at the banks and the authentication authority such as Visa.

In providing a secure purchasing system, SET - Secure Electronic Transaction from Visa encodes the information you send out, makes sure a fraudulent retailer cannot misuse your card number or reveal it to anyone else, and offers confirmation that the retailer you're dealing with, is who they say they are.

SET maintains the confidentiality of messages, ensures that unauthorised people do not amend messages, and authenticates the parties involved in a transaction so that both cardholders and merchants are assured that the other is genuine.

There are five components to SET:

- (a) A certificate authority that issues digital certificates of authenticity to cardholders and merchants. Visa's member financial institutions can either establish their own authority or use Visa services.
- (b) Cardholder software, kept in each individual's PC. This will store and maintain the digital certificate and encrypt messages. It will be incorporated into Internet browsers and will be accessed via simple point-and-click technology. It is likely that users will see a wallet on screen and simply need to take their Visa card out of the wallet to use it.
- (c) Merchant software, which will manage their certificates and the interface with their acquiring bank.
- (d) A payment gateway utilized by acquiring financial institutions to process and decrypt the transaction when it arrives from the merchant and re-encrypt information returned to the merchant.

(e) The payment gateway then passes the transaction to a payment system such as VisaNet, to pass through to the issuing and acquiring financial institutions.

SET<sup>TM</sup> offers a very high level of security. In principle, what happens when you use SET to make a payment is very simple. Your order is sent to the retailer, and your request to make a payment is sent to the retailer's credit card processor. Behind the scenes, both your identity and that of the retailer are confirmed, and you are issued with a receipt, while the retailer gets a payment authorization. The retailer never sees your credit card number, and the payment authorization they receive is for a single transaction and can't be used again for anything else.

The technology involved in the process is pretty complex. It involves exchanging coded information between you, the retailer, a Payment Gateway (which handles the exchange), and both your card issuer and the card processing institution.

The information is coded using what are called public and private 'keys'. Using these keys means that a message can be coded (using a public key) so that only the holder of the appropriate private key can decode it. Similarly, a message decoded with the public key can only have been coded using the private key. The effect of this coding is the identity of each party can be verified. These keys are provided to you with a 'digital certificate'. Your card issuer through a Certificate Authority issues this to you. For you, this means you can identify yourself when making a transaction and confirm the identity of the retailer, who is also issued with a digital certificate. This is because the retailer will need to have an agreement with a payment processing financial institution to offer SET, and also be able to process the resulting authorization rather than credit card numbers. You'll be passed this verified identity before confirming your purchase.

In effect, using SET Secure Electronic Transaction™ is like having someone you trust gives a reference before you buy. It gives you certainty you're dealing with a verified retailer, and it gives the retailer confirmation you're a legitimate cardholder.

Another advantage of all this coded information is that instead of being passed your credit card number to process, a retailer is given an electronic authorization that allows the retailer to charge only the amount you've agreed. Because your card number isn't revealed there are no concerns about it being misused or stolen from the retailer and because the transaction is good for just the amount agreed, it can't be used again either by mistake or on purpose.

To use SET Secure Electronic Transaction™ you'll need an electronic 'wallet' on your computer, to store your digital certificate.

An electronic wallet is a computer software program which keeps your credit card information on the computer protected with a password. A wallet can store details of a range of cards, so when shopping you can choose which one you want to use. If more than one person uses your computer, you can have a separate, password protected area, within the wallet for each user. An electronic wallet can also store your address, which can save typing it each time, and also a record of your transactions.

Along with the electronic wallet you'll need a digital certificate for each different card you want to use. These certificates are linked to the public and private keys you'll need to use - in effect the private key creates your digital signature when you're buying things on the Internet.

There will be a range of options for getting started. Your first step is to contact your Visa card issuer. You may be able to perform the whole process on the Internet, downloading the electronic wallet program you need, and then the digital certificate. Or you may be sent a CD ROM with an electronic wallet program to install on your



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computer. It'll have other programs, for connecting to, and using, the Internet. Once you've installed the electronic wallet on your computer (following the instructions which come with the CD ROM), the certificate can be obtained from your card issuer's Visa Certificate Authority website. You'll be asked questions to confirm your identity and the certificate will then be issued in a coded form. The electronic wallet will automatically install it, and you're ready to go.

### 2.4 CyberCash

CyberCash's Secure Internet Credit Card Service delivers a safe, real-time solution for merchant processing of credit card payments over the Internet. The Credit Card Service lets any consumers with a valid credit card buy from any CyberCash enabled merchant. Designed to integrate fully with existing transaction processing systems used by banks and other financial institutions, the service provides automated and instantaneous authentication, enabling order processing to traverse the Internet 24 hours a day, 7 days a week.

#### Consumers Benefits:

- (a) Safe, private and easy to use. Protected by the highest allowed levels of Internet encryption with assured authentication.
- (b) Use existing Visa, MasterCard, American Express or Discover. No special credit cards are necessary.
- (c) Complete on-line payments

#### Merchant Benefits:

- (a) Real-time authorization and settlement
- (b) Receive payments instantly and secure
- (c) No need to maintain expensive phone or fax operations
- (d) Open 24 hours a day

### CyberCash Cash Register (Merchant Administration Server):

- (a) Along with enabling secure on-line payments, the CyberCash Cashregister provides all the functions and tools necessary for managing transactions.

### Features:

- (a) **Wallet Works with Multiple Platforms:** the consumer CyberCash wallet runs on Windows and Macintosh
- (b) **Supports Major Credit Cards:** customers can shop with MasterCard, Visa, American Express and Discover cards issued world wide
- (c) **Available at thousands of Banks:** CyberCash currently provides service to credit card processors - such as FDC, GPS, NOVA, Checkfree and Wells - which can provide service to any merchant and its bank
- (d) **Strong Encryption:** 1024-bit RSA and 56-bit DES provide the strongest protection legally available.

### Benefits:

- (a) **Real-Time, automatic sales 24 hours a day:** all processes are carried out from your web site without manual intervention. Transactions occur within 15 to 20 seconds. Consumers have more payment options, so sales are increased
- (b) **Inexpensive to integrate:** because the CyberCash Credit Card Service works with over 80% of existing merchant banks, most merchants can continue their established banking and order-processing procedures.
- (c) **A Complete Solution:** to those who have a multiple order sources and need a single source for payment processing, CyberCash offers flexibility. The software reliably handles purchases, returns, credits, voids and other administrative functions.

- (d) **Protects Against Fraudulent Use:** Strong encryption consumer authentication and merchant authentication keep unauthorized individuals from obtaining credit information.

#### Transaction Logging and Reporting:

To support balancing, reporting and other back-office functions, the Cashregister software automatically logs every transaction in a powerful database. All critical payment information remains in encrypted form. An easy to use, web based reporting feature provides password-protected visibility into this transaction level information. To zero in on a problem a merchant can:

- (a) Select all or single card types (MasterCard, Visa, American Express or Discover)
- (b) Select all or specific transactions to be included (up to 200)
- (c) Search the entire log or select a specific date range
- (d) Search for a specific dollar amount or an amount range

#### Remote Management:

Because third parties such as PickNET maintain many Internet storefronts, the CyberCash Cashregister provides merchants with a web based remote access to its many management features, including:

- (a) Remote queries against transaction logs
- (b) Merchant-initiated transaction entry (sales, credits, voids etc.)
- (c) End of day balancing for both terminal and host-based systems.

#### 2.4.1 The CyberCash Setup Process

According to the following URL from the CyberCash web site, there are 6 steps required to complete the entire CyberCash Credit Card Merchant setup.

(a) Step One

"Financial Institutions". This step is performed by you or the webmaster of your domain. Notify your bank that you are interested in accepting credit cards using CyberCash. If your bank does not set up merchant credit card accounts for CyberCash, you can e-mail CyberCash: [bank@cybercash.com](mailto:bank@cybercash.com) to request CyberCash to speak with your bank on your behalf. You can also refer to the following URL of the CyberCash domain for a list of CyberCash Partner Financial Institutions.

(b) Step Two

"Credit Card Agreement". This step is performed by you or the webmaster of your domain. You will need to submit a "Credit Service Agreement", complete the online registration form to register for the CyberCash credit card service. Please refer to the following URL of the CyberCash domain for the "Credit Service Agreement"

(c) Step Three

"Download Cash Register". The Merchant Administration Server account is where you will perform your various merchant tasks such as process Orders, Voids and Returns. You can also review any Order Status as well as enter Direct Credit Card Input for manual order taking. Please refer to the following URL of the CyberCash domain for the complete on-line Merchant Administration Server users guide.

(d) Step Four

"Public Key Exchange". You will generate your public encryption key. Contact CyberCash, who will create your private encryption key on

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their servers. Please refer to the bottom of this page for the information that you must provide for the creation of your encryption key.

After this step is completed, you will receive three e-mail messages from Technical Support. The first e-mail will contain your user id and password for your Merchant Administration Server account on our CyberCash server (see step three above). The other e-mails will contain two CyberCash Perl scripts, `invoice.cgi` and `pay-to.cgi`. These scripts are provided by CyberCash and are to be used in the creation of your html store front

### (e) Step Five

"Merchant Support Area". This step is performed by you or the webmaster of your domain. This involves the creation of your html store front and the integration of your CyberCash scripts that you place into your `/cgi-local` directory. You will need to use Perl scripts to communicate between the html store front on your domain and your Merchant Administration Server account on our CyberCash server. The integration of the CyberCash scripts into your html store front will require additional Perl programming. Once you have your html store front completed, you will need to perform some "test" transactions to make sure that everything is functioning correctly.

Please refer to the following URL of the CyberCash domain for additional information concerning the use of CyberCash with your html store front and to download additional CyberCash Perl scripts.

(f) Step Six

"Announce Yourself". You or the Webmaster of your domain performs this step. This involves "going live" with your store. When your testing procedure is complete, CyberCash will contact you via e-mail stating that your test transactions were received correctly. You would then send an e-mail confirmation to CyberCash with a 25 word description of your site. You will then receive a final e-mail from CyberCash that states to switch your Merchant Administration Server account from "Debug" mode to "Live" mode.

2.4.2 Required Information:

To start the CyberCash installation process we require the following information:

- (1) Domain name
- (2) UserID
- (3) Processor:
  - (a) American Express
  - (b) CheckFree Corporation
  - (c) First Data Corporation
  - (d) First USA/Paymentech, Inc
  - (e) Global Payment Systems
  - (f) National Processing Company
  - (g) NOVA Information Systems, Inc.
  - (h) SLIGOS
  - (i) Vital Processing Services



#### (4) AuthType:

##### (a) AuthCapture (FDC does NOT support AuthCapture for CyberCash)

- (1) It will automatically check the credit card for authorization at the time of transaction
- (2) It will automatically process the transfer of funds from the credit card holder at the time of transaction
- (3) Best suited for use by a store front that is offering non-tangible items, for example on-line information or on-line access.

##### (b) AuthOnly

- (1) It will check the credit card for authorization during the ordering process
- (2) It will not automatically process the transfer of funds from the credit card holder at the time of transaction
- (3) The orders are batched for manual processing. All batched orders that are not manually processed within 24 hours will become void
- (4) Best suited for use by a storefront that is offering tangible items that must be delivered. This eliminates the need to void transactions when items are out of stock.

#### 2.4.3 Web Authorize

Web Authorize offers merchants superior performance and support for all types of payment transactions, including virtual and physical selling locations, telephone order and mail order, that can be sent over the Internet to bank networks and processors

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## (a) A Revolutionary Solution

Web Authorize has revolutionized the payment transaction process, offering merchants high performance and a choice of dialup, leased line or Internet based connections to bank networks. Web Authorize is a highly robust, multi-threaded system that can securely send over 720 transactions per minute on a dedicated leased line - resulting in a high performance payment server for enterprises. Web Authorize uses the Internet to securely transport payment transactions directly to payment processors and is touted for rapid response times and high volume transaction processing capacity.

Web Authorize supports the latest requirements from VISA to properly designate transactions entered through an Internet browser with a special "e-commerce indicator". This ensures that merchants using Web Authorize will not be unduly liable for the significant penalties charged for failure to utilize these indicators.

## (b) Support for CVV2/CVC2

Web Authorize also supports the latest requirements from VISA and MasterCard to capture additional credit card information for all transactions where the card is not physically present.

## (c) Integration Is Simple and Seamless

Integration with Web Authorize is made simple through a wide range of programming interfaces, including an Active X Control, Sockets interface, JAVA API, C++ API, import and export capabilities and a simple file request and response interface. The Developer's Toolkit has simple programmatic interfaces for seamless integration with the customer's payment applications. Web Authorize is fully integrated with Microsoft Site

Server, Commerce Edition, and the SAP R/3 enterprise application for e-commerce.

(d) Robust Architecture

Web Authorize delivers high performance results to customers because of the breadth and depth of its architecture. The product has been benchmarked in field production to achieve 720 transactions a minute over the FDMS Nashville (formerly Envoy) network, for example.

(f) Extensive Security Features

All credit card transactions and storage of credit card information are encrypted, including transactions from merchant to payment processors, from payment clients to Web Authorize and the credit card information within the transaction database.

(g) Centralized Payment Applications

Web Authorize can integrate all payment applications - including your e-commerce site, call center, interactive response system and physical stores within an enterprise into a single payment server. By pooling all payment transactions into a single banking relationship, customers can receive a better discount rate from the bank. In addition:

- (1) Reconciliation is simple with a centralized transaction database.
- (2) All payment transaction traffic can be sent over the company's local area network.
- (3) Individual modem phone lines to the bank can be eliminated.

(h) Improve Your Bottom Line with Web Authorize

With Web Authorize, enterprise merchants can improve cash flow, increase their negotiation power for a better discount rate from their banks,

centralize their transaction databases and financial reporting, and reduce telecommunication cost.

(i) Web Authorize Product Features

Support for large number of certified networks:

- (1) Full authorization and settlement functionality including sale, credit, void, authorize only, and post authorize for all major card types including American Express, Visa, MasterCard, Diners Club, Carte Blanche, Discover, and JCB
- (2) Purchase card functionality, including the ability to collect and pass Visa and MasterCard purchase card level II data
- (3) Automatic data archiving, the ability to store indefinitely all transaction information including the ability to search that information for charge backs, etc.
- (4) Multi-merchant capability, the ability to provide separate processing and reporting for multiple merchant numbers from the same program
- (5) Full support for Retail and MOTO business types, including Address Verification
- (6) Online and batch processing capability
- (7) File import/export of all information required to process transactions utilizing standard, comma delimited, file formats
- (8) Receipt printing using common printer types including page printers and 40-column roll paper printers
- (9) Support for a wide variety of modems with easy modem setup capability

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- (10) Support for keyboard wedge card readers for input of track 1 and 2 data
- (11) Fully year 2000 compliant
- (12) Compliant with latest card association regulations. The product will ensure that merchants are qualified for the best interchange rates for the transactions performed
- (13) Support for American Express and Discover split dial Check processing, support for Telecheck and Telecredit
- (14) Context sensitive Help
- (15) Client/server architecture, multiple users on a LAN can access a single server, which has the modem connection to the bank network
- (16) Transaction log file
- (17) Support for request and response file integration
- (18) Support of programmatic interfaces, such as Active X Control, JAVA, C++, etc.
- (19) Support for leased line connections (additional cost)
- (20) Support for sending transactions to payment processors over the Secured Sockets Layer (SSL) protocol (additional cost)
- (21) Encryption of credit card numbers and track 2 data during transmission between client and server
- (22) Support for Visa e-commerce indicator Logon and password protection on a merchant basis

## **2.5 Electronic Commerce Policy of Thailand (October 2000)**

In order to develop Electronic Commerce of Thailand for ready, identity, and clarify direction, the Government should define the direction of developing electronic commerce following 5 aspects as follows:

- (1) Electronic commerce is most important for National Trade Strategy of Thailand, which must be declared in National Society and Economic Development Plan, level 9 and 10. There must also be a national plan in order to develop electronic commerce in Thailand from the middle of development Plan level 8 and on. In order to be capable to adjust flexibility related to suitable situation, the Government also sets an electronic commerce plan by chain in order to support export, service industry and domestic consumption.
- (2) Government will support and arrange many items to support private electronic commerce activities and consumers who set the objective for entrepreneur who is able to increase capability of competitiveness in Globalization by including trust and confidence in both parts of entrepreneurs and consumers in both domestic and overseas markets. Government will give priority for legal infrastructure and security in electronic commerce by following up the resource arrangement which is essential for supporting of developing process sufficiency and on time.
- (3) Government will decrease and avoid the regulation which restricts the development of electronic commerce. At the moment, the government will follow up in order to create competition fairness and consumer protection in order to optimize advantage in economic process of country totally.

- (4) Government will improve government process by using electronic media and information system in order to create E-Government that has proved to be efficient in government administration, and can provide service to people. It will create the electronic commerce market for private sector in the part of business connection between business sector and government sector. In addition, the government sector will support facilitation for electronic commerce activities between business sector and electronic commerce for entrepreneurs and consumers.
- (5) Private sector will arrange data base and study policy and electronic commerce development direction in order to keep the benefit of the country in the part of negotiation in the business sector with cooperation of world trade, regional trade and also other level of competitive business level.

#### 2.5.1 Safety Limitation

From the survey about electronic commerce in many sources including the survey by electronic commerce development center, it has been found that the major important item that has obstructed electronic commerce development is the safety of using and arrangement of electronic commerce. Safety generally covers:

- (a) Physical security as asset or other devices
- (b) Information security

We mainly point at the data security because database is the main part of business arrangement, easily hacked. It is because electronic commerce means sending or exchanging data on network and data beings in every part of electronic commerce business; for example, data searching, advertisement, purchasing, cash payment, and delivery/services.



The examples of hacking are as follows:

- (a) Hacking through network system by unauthorized person
- (b) Hacking in order to destroy, distort, modify, fabricate data
- (c) Disclose data by unauthorized person
- (d) Interruption
- (e) Irresponsible for any business activities

If the data is related to financial data such as credit card number, corporate secret, proprietary information, there will be great disaster.

#### 2.5.2 Data Security Methodology

- (a) Authentication & Authorization is the method to identify a specific contact person including his authentication. In other words, a person must have formal identification card with the photo or the locking system would be for those who have a key.
- (b) Confidentiality is the method of keeping data for security or transfer the data by protecting unauthorized person, comparably with example, enclosing envelopes, non-transparency envelope, etc.
- (c) Integrity is the method of protecting data from fabrication without examination. For example, Hologram is used on the credit card.
- (d) Non-repudiation is the method of delivering confirmation or receiving data from related section. In addition, protection from imitation as received data or sending data, we can use mail registration instead.

#### 2.5.3 Technology for Security System

In electronic commerce, any data sending through or keeping with is categorized as electronic data. These data is easily changed and quickly transferred without evidence. That is the reason we need high technology for security system according to

the mentioned methodology. There are mainly two kinds of data security systems, which are transaction security and network securities. Technologies for security system for business sectors are cryptography.

Cryptography is how to encrypt data sending through network or Encryption. This method can keep secret for only specific person who has code for decryption. This method can help keeping Confidentiality and Authentication/Authorization. Encryption refers to the complication of mathematical method as using the key in the form of given parameter. This key has the length as bit. The more bit, the more security. It is because hacker must take more time to hack. In the part of encryption and decryption, we can separate into two kinds: Symmetric Key Cryptography or Secret Key, and Asymmetric Key Cryptography or Public Key Cryptography.

(a) Symmetric Key Cryptography

It is the encryption and decryption by using the same secret key. Mr. Deng is sending the message "My name is Dam". The receiver is Mrs. Deng. Mr. Dam encrypts the message "My name is Dam." with secret key. This message would be changed to be Cipher Text "k\ad-#)+pf, then the message is sent to Mrs. Deng. Mrs. Deng would use the same secret key to decrypt the message. This method will be effective only when the sender and receiver use the same secret key.

(b) Asymmetric Key Cryptography

It is the encryption and decryption by using the different secret keys. Mr. Dam is sending message " My name is Dam." in the form on encrypted message "mt\*a)sp@d\*" with public key of receiver as Mrs. Deng. Mr. Dam must request the public key from the central organization where all keys are kept. The message, which is sent to Mrs. Deng, would be decrypted by Mrs.

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Deng' s private key. This method emphasizes on the receiver, as there is only one person who can decrypt the message by private key.

## 2.5.4 The Pros and Cons of Symmetric Key and Asymmetric Key

### (a) Symmetric Key

Pros:

- (1) Speedy due to less complicated calculation
- (2) Friendly using by hardware

Cons:

- (1) Difficulty in managing the symmetric key

### (b) Asymmetric Key

Pros:

- (1) Less difficulty in managing key because keys are different
- (2) Able to identify user by using digital signature

Cons:

- (1) Take time in encryption and decryption.

### III. THE EXISTING SYSTEM

#### 3.1 Background of the Organization

Visible Image was established in 1991 with only one owner Mrs. Prapaisri Devahastin Na Ayudhya as a professional creative, innovative organization providing a full range of Integrated Marketing Communications Consultancy and Services for business, environment and convention. The Services consist of:

- (a) Public Relations - Advertising Consultants
- (b) Creative Multi - Media Presentation (TV program, Interactive CD-ROM, Web site Design)
- (c) Marketing Consultants (Marketing Research)
- (d) Printed Materials
- (e) Video (Presentation)

The company employs 12 workers whose office is located on Phahonyothin Road. The company's philosophy is to satisfy customers' needs not only in marketing field but also in advertising or any other related fields. So, communication is a major factor in managing all projects in the company.

In the last two years, the company was expanded to the international business, the company realized that the present manual payment systems are poor and fall behind the security & time consumption. So the company needs to be changed and to have some development in the payment system.

The company is divided into 3 sections as follows:

##### (a) Marketing & Customer Services Section

This section's responsibility is to contact with the customers or the persons who are interested in any services of the company. The company

works by using a teamwork strategy, which consists of marketing & strategic planner, media planner & buyer, budget planner, account executive (A.E.), coordinate staffs, also creative and graphic designer who come from the production section.

(b) Financial & Accountings Section

This section has to work in both financial and accounting function at the same time. In the part of financial, the section has to control the amount of money that the company has and how well it is organized e.g. setting up annual budget for office purchase or any other payments and making decision on customer creditworthiness. As for the aspect of accounting function, the section keeps detailed records of the amount of money the company receives and spends. It has to pay suppliers for the materials, equipment or services and collect customer payments.

(c) Production Section

This section will create and design the approval project proposal to be used in real on paper, not to the real production. It consists of creative and graphic designers. They will be create and design as for which materials must be used and how or way to work with and so on.

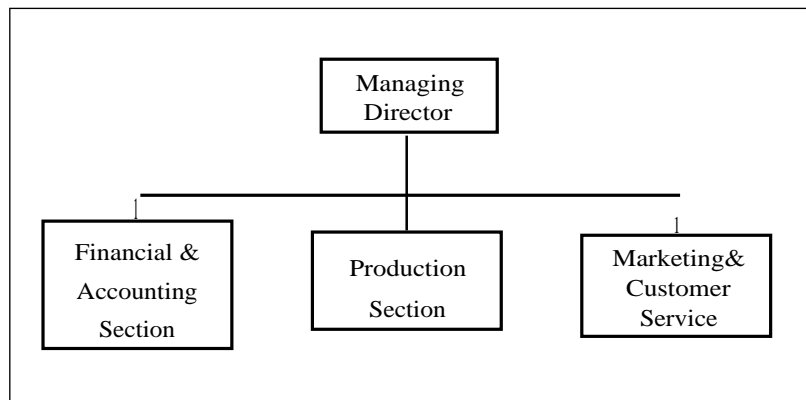


Figure 3.1. The Organization Chart of Visible Image Company Limited.

### 3.2 Existing Business Function

After receiving customers' orders or briefing, then the marketing team will be received the contact report from AE. and then brainstorming. This marketing team consists of marketing or strategic planner, media planner & buyer, budget planner and also account executive (AE.) that has direct responsibility to contact and take care of the customers. After accomplishing the project proposal in any concepts and details which the customers' needs and get approval from the managing director, then they will hold a meeting with the production team to approve, design and make some examples only in the paper to make a better and clearer understanding. This can be done at the same time of contacting with another production teams who are the suppliers and will support in real production. This meeting will focus on all information and any details about the project and will include all related costs use in calculating the budget of the entire project. After the entire project proposal is completed, AE. will have a meeting with the customers in presenting all of the details of the project proposal step by step. If everything can satisfy the customers' needs and get approved from the customers, the further process belongs to the production section and the marketing team that must

make it real by controlling the suppliers who work for them and also under control of the customers. After getting approval from the customers the accounting & financial section will send the invoices to the customers. The payment of any projects must be paid twice, 50% at the first payment after signing the contract and 50% after project completion which has 45 days credit term. And also at the same time, the company must pay any payments to the suppliers, the payment policies depending on each company.

### 3.3 Existing Computer System

At the beginning, the operation of the company is mainly based on manual system. Every document, after having passed the process, is kept in folders. Creating, Updating is based on paper-and pencil technology. But it created more problems such as, time consumption and paper or files loss. So, the computer system in this company will be developed to use for making paper works and collecting data from any works with Microsoft Office 95, which consists of Window 95 and Microsoft Excel for Window 95 and PowerPoint. This can be improved for reducing time consumption and some working processes. But the manual system is still used to collect back up files when the computer system fails. When computer system becomes popular in any business, the company will use PowerPoint for presenting projects to the customers in order to make them understand more clearly and it is more attractive. The computer system can support better direction for the company, even though it can cause some confusions and complexities in using the programs. However, the company also needs the new techniques or programs of computer system to be improved and developed for competing with other competitors within the same businesses.

At present, the company has been assigned to organize the first international conference in the field of medical — Glaucoma section which will be held in Bangkok during November 26 — 29, 2000. This conference is the "Glaucoma: An Asian Theme &



Inaugural Scientific Meeting of the Southeast Asian Glaucoma Interest Group (SEAGIG), which will provide a forum whereby participants from Asian countries and nearby regions can present and discuss topics of particular interest in the field of glaucoma. The responsibility is to be running all of the program which must be held in this conference not only for arranging everything on the conference day but also preparing and controlling everything and any other things related to the conference, for example, accomplishing the first announcement, second announcement and the final program, making list of delegates' names & invited speakers in the full detail or information of them and so on. The conference also decided to open the web site to make everybody more convenient, comfortable and save more time in getting information and all details of this conference. This web site "www.seagig.org" also allows all delegates or anyone interested in this conference to register on the web site. They can register not only in participating in the conference but also for the hotel accommodation and tours. The company realized that the web site can reduce some costs and also can save more time in registration process. After receiving the registration, hotel accommodation & tours and any other related information and details of the delegates that will be collected to the database, then the marketing & customer services section will check, analyze and classify into different groups used for organizing further process in the conference. Within the payment system, the company was denied to set the online payment system, which is called "E-commerce payment system" that is very familiar and widely used within any businesses nowadays. With the reasons that the company doesn't have any good knowledge and skill about this program such as which program will be appropriate for the company, how it works and also about the security system, so the company allows delegates to pay money by Banker draft and Bank Transfer. The payment will be checked with the Banks and also

be confirmed of the payment by financial & accountings section and also re-checked by the marketing & customer services section after approving the payment from the financial & accounting section. After that the marketing & customer services will send the confirmation document to the delegates.

### **3.4 Current Problems and Areas for Improvement**

#### **3.4.1 Current Problems**

The existing manual system of the payment system causes many problems:

(a) **Inaccurate Data Information of the Payment**

The actual amount of the payment data from delegates sometimes is unequal to the recorded document of the bank. There are many ways to explain that the staffs forget to daily update the number and amount of delegates' payment that is paid by transferring money to the bank or making recording, but there can be a mistake: eg; a slip loss. Worse, delegates have filling incorrect data in the form of registration and hotel accommodation & tours. These can create many mistakes in the other related processes that will create another problems, such as high costs, delay of document and communication, and so on.

(b) **Time Consumption**

Because time is the major factor that most people will be concerned with and it is the important method that will be used in competing with the others in any businesses, we should be more concerned about time consumption. Some processes will waste more time such as duration for waiting for the payment from delegates, the process for checking the payment with the banks and so on. Working on payment area without the payment system is really time consuming for staffs. They might have to

spend quite a long time to get delegates' payment, check data with the bank to make sure the amount of payment and all information are recorded correctly. If the bank denied the payment of banker draft, it will waste more time to contact on that delegate and wait for another payment again.

(c) Management Problem

It is quite difficult and takes more time to make a final report to use in organizing the further process. Without the correct report, management cannot control and estimate the budget spent in the conference.

(d) Inconvenience for the Delegates

At present, people are looking for more convenience and comfort on products and services. So Internet is the answer for their requirement. Looking for any other things from web site is the most popular choice for this generation. Online payment is another thing that people are concerned with because they don't want to waste their time to going the bank or post office. They would like to receive the confirmation document as soon as possible after their payment.

(e) Duplicated in Working Process

Marketing & customer services section is working at the same process with the financial & accountings section in checking the payment with the banks and all information from the delegates. It also creates another problems especially in time consumption. And also if the banker daft does not pass or is accepted by the bank, the staffs must be repeat all of the process again. The duration will be more and more, and then the further process will be also delayed.

(f) Document Problems

Under the current system, payment will have to deal with the important documents e.g. bank's slip, banker draft and bank statement. To gain some information, the staffs waste time to find each related document. All documents need storage space. Kept improperly, several numbers of data are redundant and lost. Worse, the high workload can cause mistakes and delay in working among the sections. If some documents are lost, it may cause many mistakes in several reports which management use in the further process for organizing the conference.

(g) Difficulty of Bank Statement

The process in checking the payment must the bank's statement with the document from the delegates. This problem is not occurring with the banker draft, but it creates problem in transferring money. It is because statement is very difficult to classify the amount of the money belonging to whose account. Because the statement will only list the daily amounts of the money transferred to the bank, so the staffs may be confused and also take more times in finding it correctly.

(h) Insecurity of the Payment

In the current payment system, the company allows to be paid by sending banker draft or transferring money to the bank. The staffs have to deal with unexpected and uncontrolled situations of losing the mail of the banker draft or losing the copies of bank's slip. And also there are some mistakes with the bank system or the data.

## 3.4.2 Areas for Improvement

From all problems, we just mentioned that we would raise areas for improvement on the payment system. The new system will be implemented for three sections, all of which are management, payment system control and security and time consumption.

### (a) Management

There should be a new system that enables staffs to provide the accurate information or data in payment system. The staffs also reduce some processes duplicated with the others and can be generated within a better communication connection.

### (b) Payment System Control and Security

The improvement area on the payment system control and security will make delegates and staffs, life easier. Online payment offers convenience and comfort. It will reduce any problems that might occur in this system such as insecurity of the payment, complex and difficulty in checking payment with the Banks (Bank statement), and so on.

### (c) Time Consumption

After using a new system, the staffs can save more time in the payment system. It can reduce the time in any processes such as, the duration of delegates' confirmation after receiving all documents, the duration of receiving the delegates' payment. And also in management time to organize the conference (Number of the delegates, amount of the money that will be used for the conference, etc.), and so on.

## **IV. THE PROPOSED SYSTEM**

### **4.1 User Requirement**

The user requirements are very important for developing the system, as a source of the project. They are the activities or improvements that the new system must provide after interviewing with the users who are working on the project management. We discuss the requirements for the new system which are those features or details that are needed. the issue with all related staffs in payment system, manager and the owner. The simple question we ask them is how they expect a proposed system to serve them.

The staffs need the proposed system to improve their work on payment system. The proposed system will automate some parts of the payment tasks that are now operating manually. The followings represent the user requirements of the new system.

- (1) The proposed system should assist the teamwork to manage and monitor the conference more rapidly.
- (2) The proposed system should assist the staff in keeping up to date and accurate information of payment more easily which are for management decision, estimating and budget preparation and plan.
- (3) The proposed system should be a solution for all document problems that staffs suffer, for example, data loss, data redundancy and data storage.
- (4) The proposed system should allow delegates to be paid all payment more easily and conveniently.
- (5) The proposed system should reduce time consumption and duplicated tasks.
- (6) The proposed system must be easy to use.
- (7) The proposed system should be operating consistently and reliably.

- (8) The proposed system should reduce operational cost especially in payment system.

## 4.2 System Design

In this section, we focus on the logical, implementation-independent aspects of a system. System design is the evaluation of alternative solutions and the specification of a detailed computer-based solution.

### 4.2.1 Candidate Solutions

From the business requirements established in the definition phase of system analysis, I must identify alternative candidate solutions. Design ideas and options will pose some candidate solutions from system owner and users. Other may come from various sources including; system analysts, system designers, technical consultants and other IS professionals. It simply defines possible candidates solutions to be considered.

#### (1) Candidate Solution 1

In this solution, we would like to replace existing system by using Visual Basic to create application using Client/Server model. Microsoft Access is used to collect the data from customer. There is one server which installs Microsoft Access as a centralized database. All the web page in this project created using Visual Basic Script including SSL Technology to make data have more security along the way customer send to us.

#### (2) Candidate Solution 2

The candidate solution uses Developer 2000 Programming. All the application created using Developer 2000 including database, web page and report generator. In this solution we use Oracle 8i as Relational Database Management System because we can use Developer 2000 with oracle 8i to generate web page easily from Client/Server application. So we can create



application and web page more flexibly than using Visual Basic and Microsoft Access. The application also implements SSL Technology to make data more secure.

### (3) Candidate Solution 3

In this solution, I want to bring package solution to support back office and registration on the Internet. The package solution is a proved solution that can be implemented in the organization faster than creating a new program specific for each organization. The package software such as CyberCash is a product that is suitable for this organization. CyberCash will be used as a part of Electronic Payment but application in the organization also uses Java based to create 3-tiers application. All the application run under web page, this will make benefit to organization to work anytime and anywhere using Web Browser and Internet.

#### 4.2.2 Candidate System Matrix

A matrix is a useful tool for effectively capturing, organizing and communicating the characteristics for candidate solutions. The characteristics of candidate system matrix consists of Portion of System Computerized, Benefits, Servers and Workstations, Software Tools needed, Application Software, method of Data processing, Output Devices and Implications, Input Devices and Implications and Storage Devices and Implications.

Table 4.1. Candidate System Matrix.

Characteristics	Candidate 1	Candidate 2	Candidate 3
Portion of System Computerized	Custom Solution helps user easily process project activities	Custom Solution can create application and web page more easily	Package Software can implement fastest
Benefits	This solutions can be implemented quickly and reduce complex process in organization	This solutions can be implemented quickly and reduce complex process in organization	This solution can fully support user requirement. All the process is
Servers and Worksataions	Pentium III 733 MHz, Windows 2000 Server and Pentium III 633, Windows 2000 Professional (Client)	Same as Candidate 1	Same as Candidate 1
Software Tools Need	MS Access for database, Microsoft Visual Basic for application development and SSL for e-payment security	Oracle 8i for database, Oracle Developer for application development and SSL for e-payment	Java Language for software development, Web browser
Application Software	Custom Solution helps user easily process project activities	Same as Candidate 1	CyberCash
Method of Data Processing	Client/Server	Same as Candidate 1	3-tier Application
Output Devices and Implications	Dot Matrix LQ-21801 HP LaserJet 4050	Same as Candidate 1	Same as candidate 1
Input Devices and Implications	Keyboard & Mouse	Same as Candidate 1	Same as candidate 1
Storage Devices and Implications	MS Access	Oracle 8i	Same as candidate 1

## St. Gabriel's Libras

After I understand the business requirement of the user, I find the way to support the requirement of the user for the secure online payment system. I have three possible candidate solutions. I have to compare the difference of each candidate solution in term of portion of system computerized, benefits, servers and workstations, software tools needed, application software, method of data processing, output devices and implications.

First candidate solution would help user to easily process all the activities and reduce time spent in each process. It uses Pentium III 733 MHz computer running Microsoft Access and workstation computer system running application created with Microsoft Visual Basic for method of data processing. This candidate solution uses custom solution for application software. For method of data processing, it uses computer network (Client/Server) to serve the online registration on the Internet.

Second candidate solution is a little bit different from candidate solution 1 because this candidate solution uses Oracle Software Solution instead of Microsoft Solution. It uses Oracle 8i to store the entire database running on Microsoft Windows 2000 Server. All clients running application developed with Oracle Developer 2000 using Microsoft Windows 2000 Professional as Operating System. For method of data processing, it uses computer network (Client/Server) to serve the online registration on the Internet.

Third candidate solution is using JAVA Language to develop application. All the application is using 3-tiers application. Officer can use this application anywhere, anytime through the Internet. This candidate use CyberCash to improve the security of electronic payment over the Internet.

#### 4.2.3 Feasibility Analysis of Candidate Solution

During the system selection and procurement phase of system design; the system analyst identifies candidate system solutions and then analyses those solutions for feasibility. I evaluate these three candidate solution using user's criteria that can greatly enhance the comparison and contract candidate system solutions. Once alternative candidate design solutions have been identified, each candidate must be analyzed for feasibility. Feasibility analysis should not be limited to cost and benefits. There are four sets of criteria: technical feasibility, operational feasibility, economic feasibility and schedule feasibility.



Table 4.2. Feasibility Analysis Matrix.

Feasibility Criteria	Weight	Candidate 1	Candidate 2	Candidate 3
Operational Feasibility	30%	Support basic requirement of users Score : 80	Support basic requirement of users Score : 82	Fully Support basic requirement of users Score : 85
Technical Feasibility - Technology	30%	This technology must use an expertise to develop the software that uses SSL Technology. A System Analysis and develop new software must take long time. Company may lose the opportunity to compete with other company.	This solution can implement easier than Candidate 1 because Oracle solution can help us to develop application easier and fully integrate to Oracle Database Management Server	This solution is a package solution that can implement in the organization easier than Candidate 1 and 2. All the technology in this Candidate is proved. All the security technology is complied to standardized
- Expertise		Must use Software Expertise to develop the software including SSL Module  Score : 80	Same as Candidate 1 but develop software easier than Candidate 1  Score : 82	The vendor will implement the software for us, don't need to take time to develop software  Score : 85
Economic Feasibility - Cost of Develop	30%	Approximately 375,000 Baht	Approximately 650,000 Baht	Approximately 1,550,000 Baht
- Payback period (discounted)		Approximately 2 years and 4 months	Approximately 3 years	Approximately 4 years and 10 months
- Net Present Value:		Approximately 1,410,377 Baht	Approximately 1,135,377 Baht	Approximately 235,377 Baht
- Detailed calculations		See Appendix A Score : 95	See Appendix A Score : 85	See Appendix A Score : 70
Schedule Feasibility	10%	6 months  Score : 80	4 months  Score : 85	Less than 3 months Score : 90
Ranking	100%	84.5	83.2	81

## St. Gabriel's Library

After making a feasibility analysis matrix to find the best solution among the three candidates, we choose Candidate Solution 1 as a proposed project because it showed us the highest ranking and how it is worth investing.

### 4.2.4 Data Flow Diagrams

For better understanding of the logical movement of the data throughout the system, the system analyst draws data flow diagrams (DFDs) in Appendix C. Data flow diagrams are structured analysis and designed tools that allow the analyst to comprehend the system and subsystems visually as a set of interrelated data flows.

The new logical data flow diagram will indicate the flow of the requirement and the data type to develop the program to support the new system. By DFD, the analyst can design the file to match the requirement of the users and support the report design of the system.

The details of system analysis and design on the Project Management Information System have been presented in form of graphical presentation that included:

- (a) Context Diagram
- (b) Level 0 to Level 1 Data Flow Diagram

The details are presented in Appendix B and Appendix C.

### 4.2.5 Structure Chart

In the software design process, we are concerned with how the programming specifications are presented to the computer programmer for implementation. Software design consists of modular design and packaging. Modular design is a decomposition of a program into modules. Packaging is the assembly of DATA, PROCESS, INTERFACE and GEOGRAPHY design specifications for each module.

The popular strategy for determining an optimal modular design for programs is called structured design. The primary tool used in the structured design is the structure

chart. Structure charts are used to graphically depict a modular design of a program. They do not only show how the program has been partitioned into smaller, more manageable modules, but also the hierarchy and organization of those modules, as well as the communication interfaces between modules. Appendix D shows the structure chart of project management information system.

#### 4.3 Database Design

In the process of database designing, we must recognize that the design process must produce both a database and a set of programs that can be used to access this database in a way needed by user applications. Therefore, relational model has been chosen to design the database of Project Management Information System because Relational Database Management System (RDBMS) is being increasingly used to develop computer-based information system. A relational database is a database that is perceived by its users as a collection of relations or tables. All values in a relation are atomic or scalar (there are no repeating groups).

Appendix H shows the database structures of Visible Image Company's DBF files. Each database file is listed separately and it includes its associated index files, database structure and special notes. It represents NIAM notation.

#### 4.4 Hardware and Software Requirements

The proposed system requires the following hardware components (Figure 4.1):

##### (a) File Server 1 Set

- (1) CPU Intel Pentium III 733 MHz
- (2) 128 MB RAM
- (3) 20 GB Ultra-Wide SCSI Hard Disk
- (4) 2 Serial Port
- (5) 1 Parallel Port



- (6) 2 USB Port
- (7) 17" Monitor
- (8) Keyboard and Mouse
- (9) 10/100 Mbps NIC
- (10) Windows 2000 Server with 5 CAL

(b) Personal Computer 1 Set

- (1) CPU Intel Pentium III 733 MHz
- (2) 64 MB RAM
- (3) 15 GB IDE Hard Disk
- (4) 2 Serial Port
- (5) 1 Parallel Port
- (6) 2 USB Port
- (7) 15" Monitor
- (8) Keyboard and Mouse
- (9) 10/100 Mbps NIC
- (10) Windows 2000 Professional

(c) Laser Printer 1 Set

- (1) Speed up to 16 ppm
- (2) Resolution up to 1200 dpi
- (3) Able to print on A4, A5, Letter, Legal size
- (4) Duty cycle up to 65000 pages per month
- (5) One Parallel Port and Ethernet Port
- (6) 16 MB Ram, Able to expand to 200 MB

(d) Dot Matrix Printer 1 Set

- (1) Impact dot matrix 24 pins

## St. Gabriel's Library

- (2) Speed up to 500 cps
- (3) Able to print 1 original and 5 copies
- (4) One Parallel Port

### (e) UPS 700 VA 1 Set

- (1) Rated Power 700 VA
- (2) Waveform type Sinewave
- (3) Typical backup time at half load not less than 18.2 minutes
- (4) Battery type is Maintenance-free sealed Lead-Acid battery
- (5) Typical recharge time not greater than 3 hours

### (f) Dual Speed Hub 1 Set

- (1) At least 8 port 10/100BaseT Ethernet
- (2) Capable of Autosensing
- (3) All Connectors must be RJ-45

### (g) Software

- (1) Microsoft Access 2000
- (2) Microsoft Visual Basic Enterprise Version

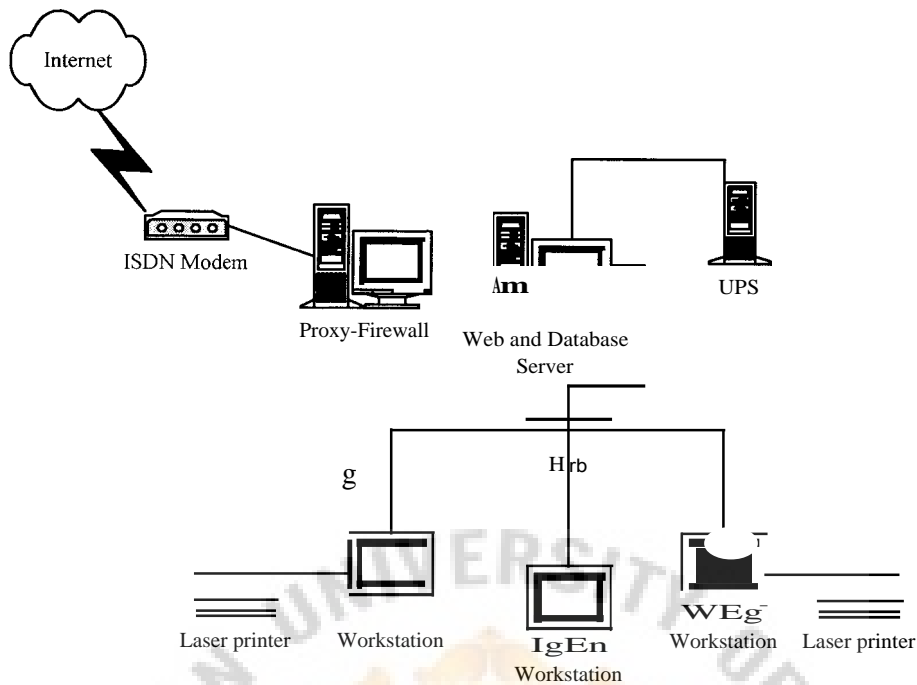


Figure 4.1. Hardware Configuration of the Proposed System.

#### 4.5 System Security and Controls

In this project we choose Candidate 1 to be implemented in Visible Image Company because SSL Security and Visual Basic are easily implemented in the organization. It can help company organization implement this project faster than using JAVA or CyberCash which is too complex. SSL Security is enough for application in this company.

Secure Sockets Layer (SSL) provides sound privacy protection by encrypting the channel between the consumer and the merchant. Because the data sent over the channel is secure, SSL offers sufficient security when doing business with merchants you know and trust.

The primary goal of the SSL Protocol is to provide privacy and reliability between two communicating applications. The protocol is composed of two layers. At the lowest

level, layered on top of some reliable transport protocol (e.g., TCP), is the SSL Record Protocol. The SSL Record Protocol is used for encapsulation of various higher-level protocols. One such encapsulated protocol, the SSL Handshake Protocol, allows the server and client to authenticate each other and to negotiate an encryption algorithm and cryptographic keys before the application protocol transmits or receives its first byte of data. One advantage of SSL is that it is application protocol independent. A higher-level protocol can layer on top of the SSL Protocol transparently.

The SSL protocol provides connection security that has three basic properties:

- (a) The connection is private. Encryption is used after an initial handshake to define a secret key. Symmetric cryptography is used for data encryption (e.g., DES, RC4, etc.).
- (b) The peer's identity can be authenticated using asymmetric, or public key, cryptography (e.g., RSA, DSS, etc.).
- (c) The connection is reliable. Message transport includes a message integrity check using a keyed MAC. Secure hash functions (e.g., SHA, MD5, etc.) are used for MAC computations.

## 4.6 Cost and Benefit Analysis

### 4.6.1 Cost Analysis

Cost analysis is very important, as it will indicate whether the benefits of the new payment system are worth investment. Cost comparison between the existing system and the new system should be made. For the proposed system, cost is divided into two categories. There are costs associated with development cost and there are costs associated with operating a system. Development cost is a kind of fixed cost, which incurred only once during the development phase. It can be classified as fixed. Development Cost consists of Hardware, Software and Development Costs. Unlike system development cost, operating costs tend to recur throughout the lifetime of the system. The cost of operating a system can be classified as fixed and variable. Here below are estimated costs of both new system and the existing system.

Table 4.3. Cost Estimated.

Annual Operation Cost				
Item	Description	Quantity	Unit Price	Total Price
1	Consumable equipment			
	10.1 Laser Ink	3	2,500.00	7,500.00
	10.2 Dot Matrix Ink	2	800	1,600.00
	10.3 Diskette	4	150	600.00
	10.4 Paper	50	80	4,000.00
2	Maintenance	1	15,000.00	15,000.00
Grand Total Annual Operation Cost				15,000.00
Grand Total				884,200.00

Table 4.3. Cost Estimated. (Continued)

Hardware				
Item	Description	Quantity	Unit Price	Total Price
1	Database Server	1	215,200.00	215,200.00
	- 1 CPU 733 MHz			
	- 128 MB Main Memory			
	- 20 GB Internal Disk			
	- 17" Monitor			
	- 12-24GB 4mm DDS-3 Internal			
	- Windows 2000 Server 5 CAL			
2	Personal Computer	3	45,000.00	135,000.00
	- 1 CPU 733 MHz			
	- 64 MB Main Memory			
	- 15 GB Internal Disk			
	- 15" Monitor			
	- Windows 2000 Professional			
3	Laser Printer	1	59,000.00	59,000.00
4	Dot matrix	1	27,500.00	27,500.00
	SUPS 700 VA	1	11,500.00	11,500.00
6	Hub 8 Port 10/100 Mbps	2	6,500.00	13,000.00
7	Cabling	5	3,000.00	15,000.00
8	Computer Table	4	3,000.00	12,000.00
9	Peripheral Table	2	1,500.00	3,000.00
10	Tape Backup	2	1,500.00	3,000.00
Grand Total Hardware Cost				494,200.00
Software				
Item	Description	Quantity	Unit Price	Total Price
1	Application Development	1	250,000.00	250,000.00
2	Database Management System	1	60,000.00	60,000.00
3	Application Development Tools	1	65,000.00	65,000.00
Grand Total Software Cost				375,000.00

4.6.2 Benefit Analysis

The proposed system provides both tangible and intangible benefits as in the Table below:

Table 4.4. Benefit Estimated.

Item	Description	Quantity	Estimated Benefit	Total
<b>Tangible Benefit</b>				
1	Saving Salary of Officer	2	180,000.00	360,000.00
2	Reducing Massive Equipment	1	200,000.00	200,000.00
3	Reducing Utility Cost	1	96,000.00	96,000.00
4	Reducing Miscellaneous Cost	1	40,000.00	40,000.00
5	Increasing in Sales Volume	1	1,896,000.00	1,896,000.00
				2,592,000.00
<b>Tangible Benefit</b>				
1	Smoothing of operation flows			
	Reduce volume of paper to produced and handled			
3	Improved data security			
4	Information is updated, accurate			

(a) Saving Salary of Officer

Due to the reduction from 4 temporary staffs to 2 staffs, the yearly salary cost saving is around 360,000 bahts.

(b) Reducing Massive Equipment

This system will reduce the paper, equipment concerned with document work around 200,000 bahts per year. (66%)

(c) Reducing Utility Cost

This system will reduce the expences of the telephone to recomfum information, and other utility costs around 96,000 bahts. (53%)

(d) Reducing Miscellaneous Cost

It can reduce the miscellaneous cost that we do not expect around 40,000 bahts. (33%)

(e) Increasing in Sales Volume

After using the new system, we expect to increase sales volume because of the comfort and convenience in payment system. So we expect it to increase within 10% from 1,580,000 bahts per year to 1,896,000 bahts per year.

#### 4.6.3 Payback Period Analysis

This analysis tells us how long it will take to earn back the money we spend on the computerized project. Further, the Payback Period gives us a rough measure of the liquidity of the investment — how soon the company can get cash flow from our investment.

Payback Analysis is shown in Appendix A. The result of the payback period is at the point between the first year and the second year. So we use interpolation technique to find the exact date. We sum the number of the year where the cost difference is still negative with the fraction of year lying between cost differences:

$$1 \text{ year} + \frac{371,640}{371,640 - (-194,020)} = 1 \text{ year} + 0.65$$

Payback Period of the Proposal System = 1 year 8 months

Generally, a payback of two years or less is preferred in this company. So, our project is acceptable since it takes only one year and eight months to get our investment back. Our project with such a short payback is liquid, and thus less risky. We can reinvest the money elsewhere. Moreover, with such a short payback period, there's less



of a chance that marketing conditions, interest rates, the economy or other factors affecting our project will drastically change.

#### 4.6.4 Calculations of Break-even Year

It is reasonable to apply the concept of break — even analysis to compare between the current system and the proposed system. In this case, the cost of the new system is compared with the cost of the current system to determine whether the new system costs the same as the old one.



Table 4.5. Cost Comparison between the Existing System and the Purposed System.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Cost of Manual System						
Operating Cost:						
Personnel:						
Executives (1 person)		600,000	660,000	726,000	798,600	878,460
Supervisor (3 persons)		720,000	792,000	871,200	958,320	1,054,152
Temporary staffs (4 persons)		600,000	660,000	726,000	798,600	878,460
Office Supplies Costs:						
Office Supply Cost		300,000	330,000	363,000	399,300	439,230
Utility Cost		180,000	198,000	217,800	239,580	263,538
Miscellaneous		120,000	132,000	145,200	159,720	175,692
Total		2,520,000	2,772,000	3,049,200	3,354,120	3,689,532
Accumulated Cost of existing system		2,520,000	5,292,000	8,341,200	11,695,320	15,384,852
Cost of Computrized System						
Development Cost:	869,200					
Operating Cost:						
Personnel:						
Executives (1 person)		600,000	660,000	726,000	798,600	878,460
Supervisor (3 persons)		720,000	792,000	871,200	958,320	1,054,152
Staffs (2 persons)		240,000	264,000	290,400	319,440	351,384
Office Supplies & Miscellaneous Cost:						
Office Supply Cost		100,000	110,000	121,000	133,100	146,410
Maintenance Cost		15,000	16,500	18,150	19,965	21,962
Utility Cost		84,000	92,400	101,640	111,804	122,984
Internet Monthly Service		9,600	9,600	9,600	9,600	9,600
Miscellaneous		80,000	88,000	96,800	106,480	117,128
Depreciation Cost:		173,840	173,840	173,840	173,840	173,840
Total	869,200	2,022,440	2,206,340	2,408,630	2,631,149	2,875,920
Accumulated Cost of Proposed system		2,891,640	5,097,980	7,506,610	10,137,759	13,013,679
COST DIFFERENCE			-194,020	-834,590	-1,557,561	-2,371,173

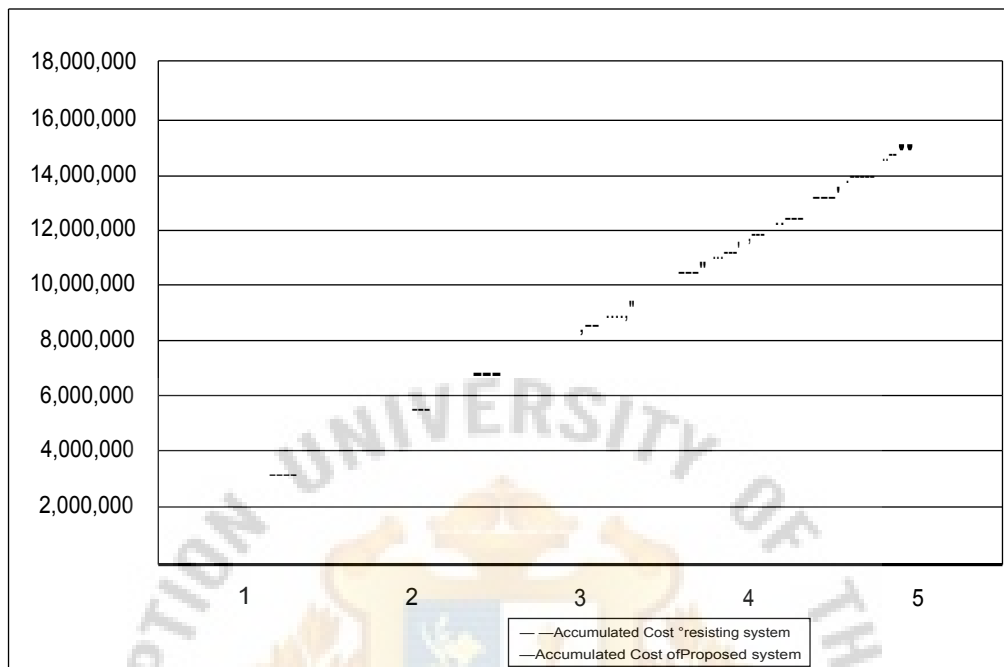


Figure 4.2. Break-Even Chart 1.

## **V. PROJECT IMPLEMENTATION**

### **5.1 Implementation Plan**

The implementation of the project is all the steps that are used to construct the new system and to replace the existing system. After the approval of the technical design statement and prototypes, the project comes to implementation. All steps of implementation must be carefully performed to make sure the proposed system will not miss any business and user requirement. The plan includes all activities that are converted from the existing system to the proposed system. The proposed system is a new system, replacing and adding the old or the existing system. There are several aspects of implementation as follows:

#### **5.1.1 Training**

Training involves system operators and users who will use the new system either by providing data, receiving information, or actually operating the equipment. The training period can be divided into three phrases.

- (1) Training and giving knowledge to the users so that the users can run the system without any usage problem.
- (2) Giving the users practice with sample data and watching their learning process.
- (3) Starting to use the new system in full-scaled run.
- (4) Checking feedback and evaluating the effectiveness of the training.

#### **5.1.2 Conversion**

The process of changing from an old system to a new one must also be carefully planned and executed. The conversion plan describes all the activities that must occur to implement the new system and put it into operation. The conversion plan should also

anticipate the most common problems, such as missing documents, incorrect data formats and lost data. This approach is applied to make sure that all problems in the new system will be solved before the old system is replaced.

#### 5.1.3 Review of Implementation

The review should be conducted to determine whether the system is meeting expectations and where improvements are needed. If the system still can not cover them all and needs any improvement, we will come back to revise the implementation.

### 5.2 Test Plan

The testing system is the final step before the new system will be on production. It is very important for the development phase and also gives an opportunity for the programmer to find hidden failure, bug, error and any further requirements that he happens to miss out. There are the following topics of testing that we would like to perform:

#### 5.2.2 Hardware Testing

- (1) Server, PC, Printer and Network equipment
- (2) Test hardware compatible to each other
- (3) Test hardware working under normal event and peak workload to estimate their highest capacities

#### 5.2.3 Individual Software Testing and Networking Performance

The operating system and the client/server software on the server and PC should perform the test and the network performance between the server and the client.

#### 5.2.4 Database Software

- (1) Database server software on the server testing, database client software on the PC testing
- (2) Database transaction between client/server testing

### 5.2.5 Security and Control Testing

- (1) User logging and system authentication
- (2) User groups profiles and access level testing
- (3) Test backup and recovery control

### 5.2.6 Facility Testing

- (1) UPS maintenance testing
- (2) Air conditioning testing



## VI. CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Conclusions

It has been found that in the current situation, the processing of payment system such as registration confirmation, payment tracking and transferring cause many problems for example, time consumption, delayed and duplicated work and so on. It is because of the manual system.

After interviewing the people involved in this system, the requirements of the new system are stated. The user would like a better system with more systematic filing system. It is difficult to replace the manual system with the computerized system. So the user-friendly-interface concept has been taken into consideration.

To implement the computerized system, it requires a high budget, which can guarantee effectiveness and efficiency. Due to its speed and accuracy, the center can reduce both financial as well as time cost. The proposed system also provides more security of the payment system.

Table 6.1 shows the time spent on each process of the Proposed System compared with the Existing System. It shows that each process of the Proposed System takes less time than each process of the Existing System, which has to pass the manual work steps. This can explain why the Proposed System is more efficient and effective than the Existing System.

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Table 6.1. Degree of Achievement of the Proposed System.

Process	Existing System	Proposed System
Verify Registration Information Process	15 minutes	10 minutes
Registration Process	20 minutes	5 minutes
Verify Payment Information Process	1 hour	5 minutes
Contact for Reservation Process	30 minutes	5 minutes
Payment to Vender Process	30 minutes	5 minutes
Total	2 hours 35 minutes	35 minutes

## 6.2 Recommendations

In order to make the proposed system more beneficial in the future, it is recommended that:

- (1) The management of a payment system is an important aspect of the overall development effort. If the system is delivered late or if steps are not taken by analyst and director to ensure that the system is of high quality, the users will surely be disappointed. The system may even fail.
- (2) There must be some new information of online payment that is necessary for the project to be kept in the future. So the system developer should refine the program to support the new information of online payment requirement.
- (3) There may be new technologies in the future. These new technologies should also be applied to the system, which will, undoubtedly, attract more users.
- (4) For the future, the company should use the online payment system in overall projects within the company, not only in the international conference.





## APPENDIX A

### PAYBACK ANALYSIS

Payback Period Analysis for Candidate 1.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development Cost:	- 880,000					
Annual Operating Cost:		- 2,022,440	- 2,022,440	- 2,022,440	- 2,022,440	- 2,875,920
Discount factors for 12%		0.893	0.797	0.712	0.636	0.568
Time-adjusted costs		- 783,872	- 1,614,280	- 1,444,888	- 1,285,856	- 1,621,226
(adjusted to present value):						
Cumulative time-adjusted costs over lifetime:	- 880,000	- 1,663,872	- 3,278,152	- 4,723,040	- 6,008,896	- 7,630,122
Benefits derived from operation of new system:						
Discount factors for 12%		0.893	0.797	0.712	0.636	0.568
Time-adjusted benefits (adjusted to present value):		1,000,000	800,000	700,000	600,000	500,000
Cumulative time-adjusted benefits over lifetime:		1,000,000	1,800,000	2,500,000	3,100,000	3,600,000
Cumulative lifetime-adjusted costs + benefits:	- 880,000	- 663,872	- 1,478,152	- 2,223,040	- 2,908,896	- 4,030,122

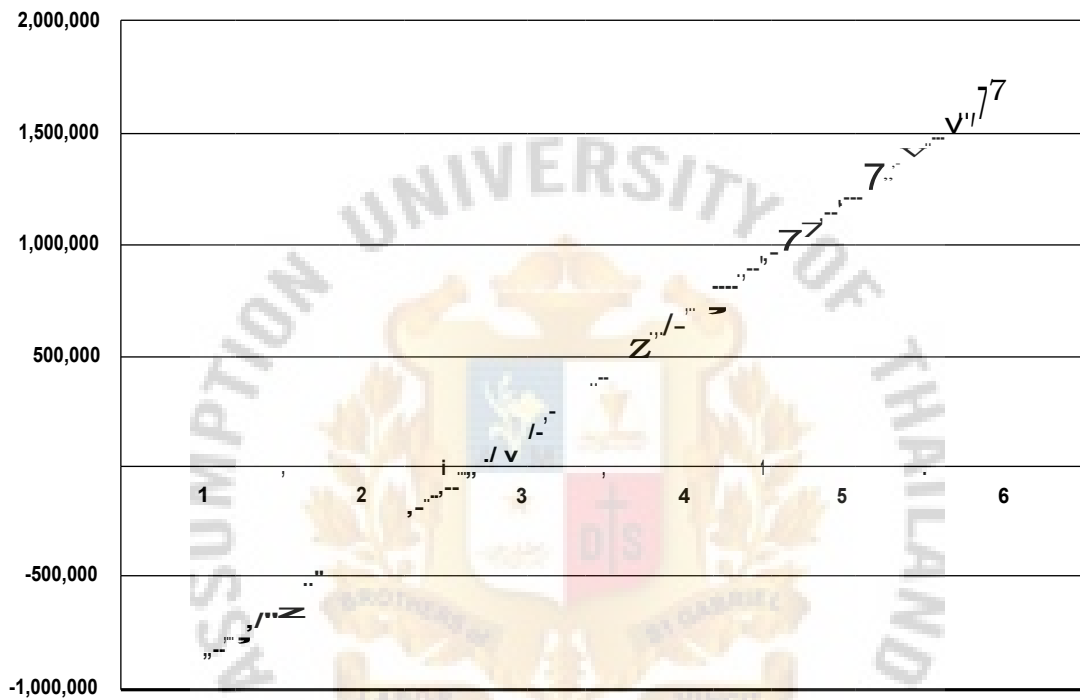


Figure A.1. Payback Analysis Graph for Candidate 1.

Payback Period Analysis for Candidate 2.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development Cost:	1,740,000					
Annual Operating Cost:		2,022,440	2,022,440	2,022,440	2,022,440	2,022,440
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.568
Time-adjusted costs (adjusted to present value):		1,823,888	1,614,888	1,438,888	1,284,888	1,149,888
Cumulative time-adjusted costs over lifetime:	1,740,000	3,563,888	5,178,776	6,617,664	7,902,552	9,052,440
Benefits derived from operation of new system:						
Discount factors for 12%:	0.000	0.893	0.797	0.712	0.636	0.568
Time-adjusted benefits (adjusted to present value):		1,823,888	1,614,888	1,438,888	1,284,888	1,149,888
Cumulative time-adjusted benefits over lifetime:	0	1,823,888	3,438,776	5,053,664	6,338,552	7,488,440
Cumulative lifetime-adjusted costs + benefits:	-1,144,200	634,779	1,200,337	1,814,776	2,453,664	3,138,552

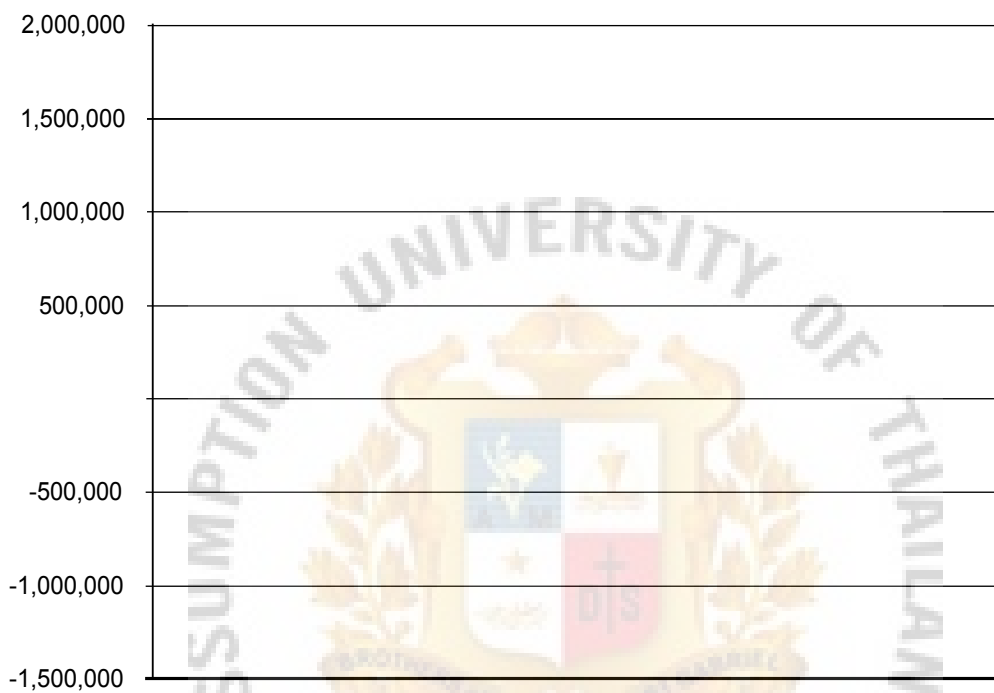


Figure A.2. Payback Analysis Graph for Candidate 2.

### Payback Period Analysis for Candidate 3.

Cost Items	Year 0	Year 1	Year 2 I Year 3		
			Year 2	Year 3	
Development Cost:	2,07,280				
Annual Operating Cost:					
Discount factors for 12%		0.893	0.797	0.712	2.402,630
Time-adjusted costs (adjusted to present value):	0	1,86,069	1,68,048	1,51,111	0.005
Cumulative time-adjusted costs over <u>lifetime</u> :	2,07,280	3,93,137	5,61,185	7,12,296	1,630,647
Benefits derived from operation of new system:	0	2,44,280	2,16,199	1,92,100	10,627,694
Discount factors for 12%		0.893	0.797	0.712	3,796,265
Time-adjusted benefits (adjusted to present value):	0	2,18,199	1,72,100	1,36,111	0.567
Cumulative time-adjusted benefits over <u>lifetime</u> :	0	2,18,199	3,90,299	5,26,410	2,22,280
Cumulative lifetime-adjusted costs + benefits:	- 2,044,200 -	1,534,779	4,588,655	9,017,422	20,374

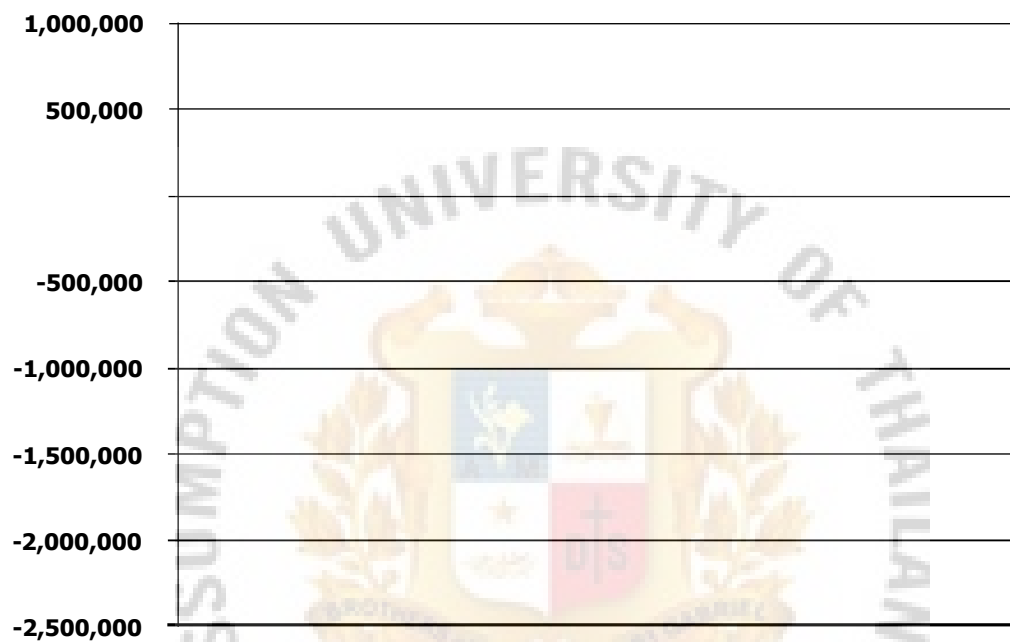
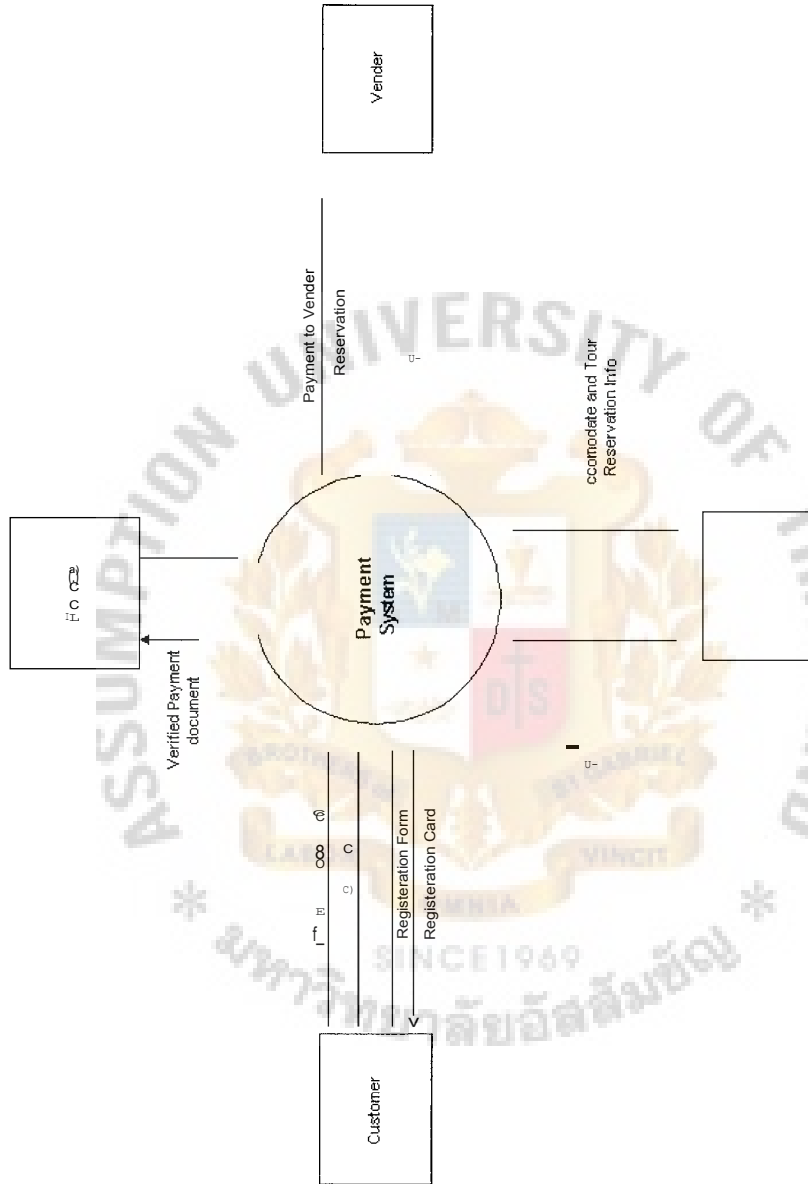


Figure A.3. Payback Analysis Graph for Candidate 3.





Context Diagram (Old System)



Context Diagram of Old System.

### Context Diagram (New System)

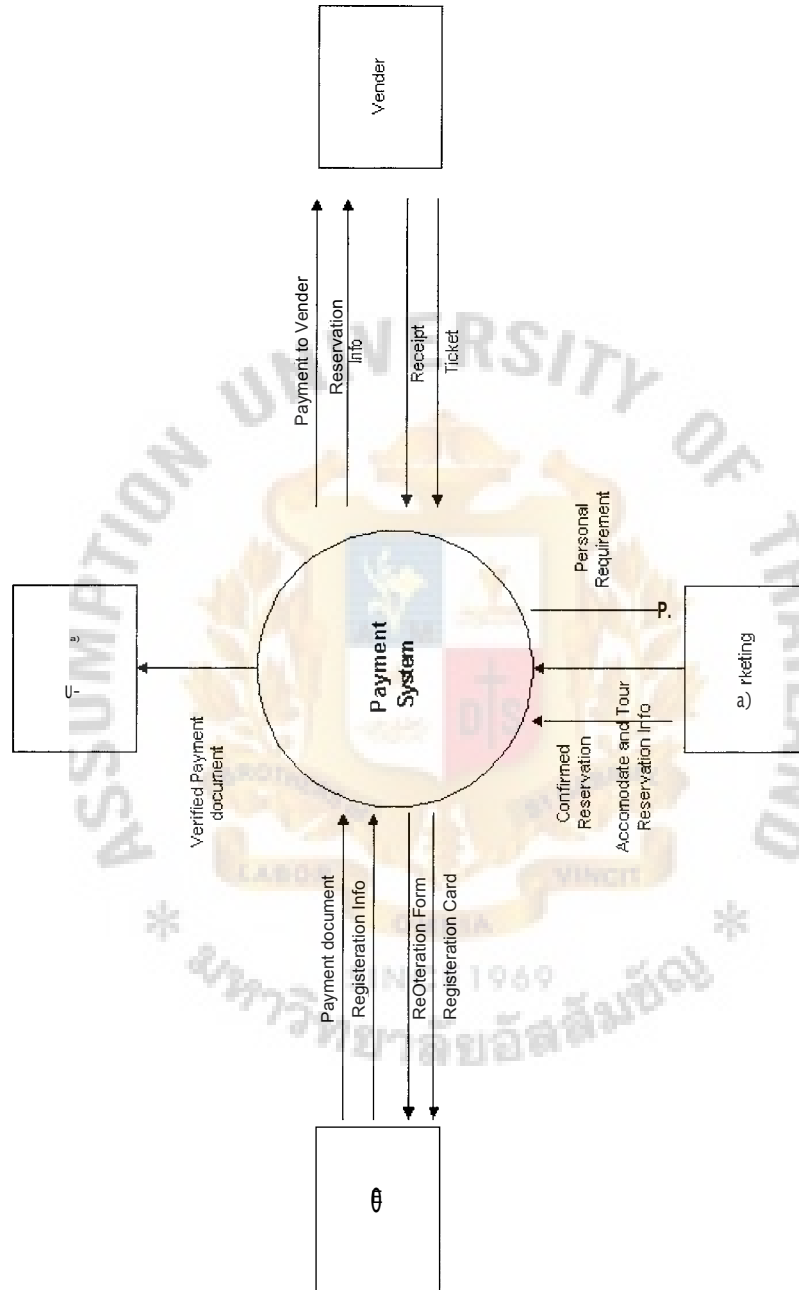


Figure B.2. Context Diagram of New System.



## APPENDIX C

### DATAFLOW DIAGRAM

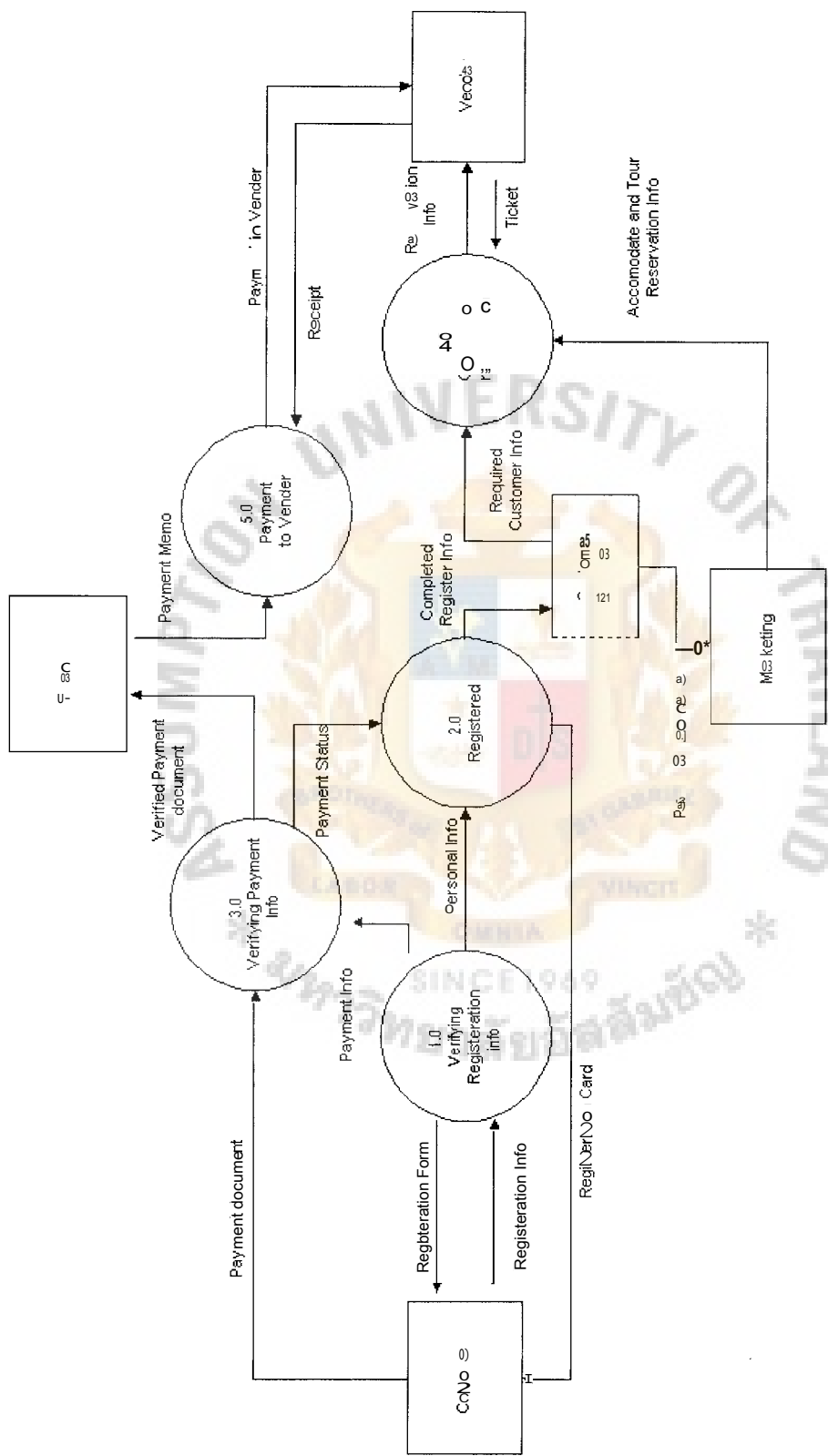
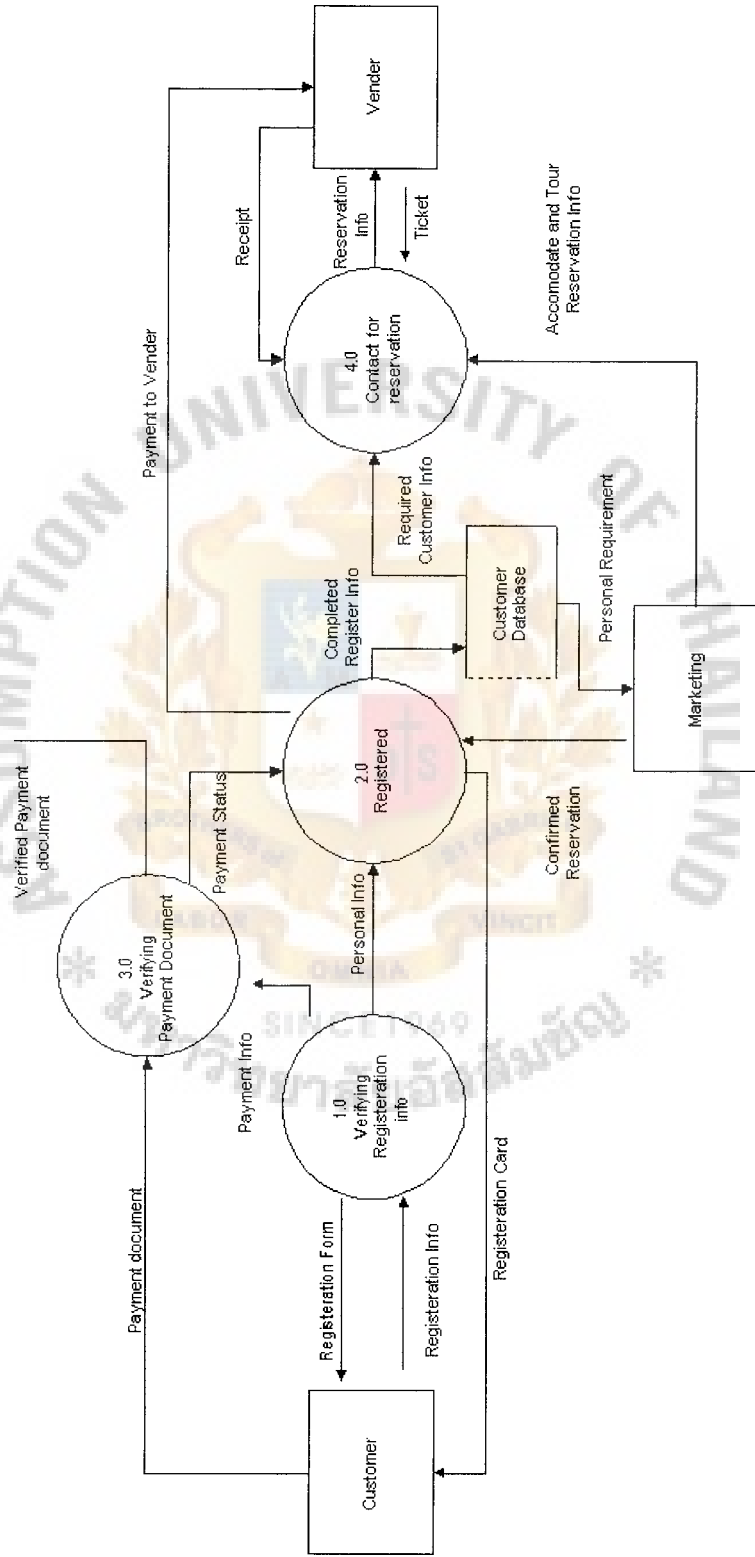
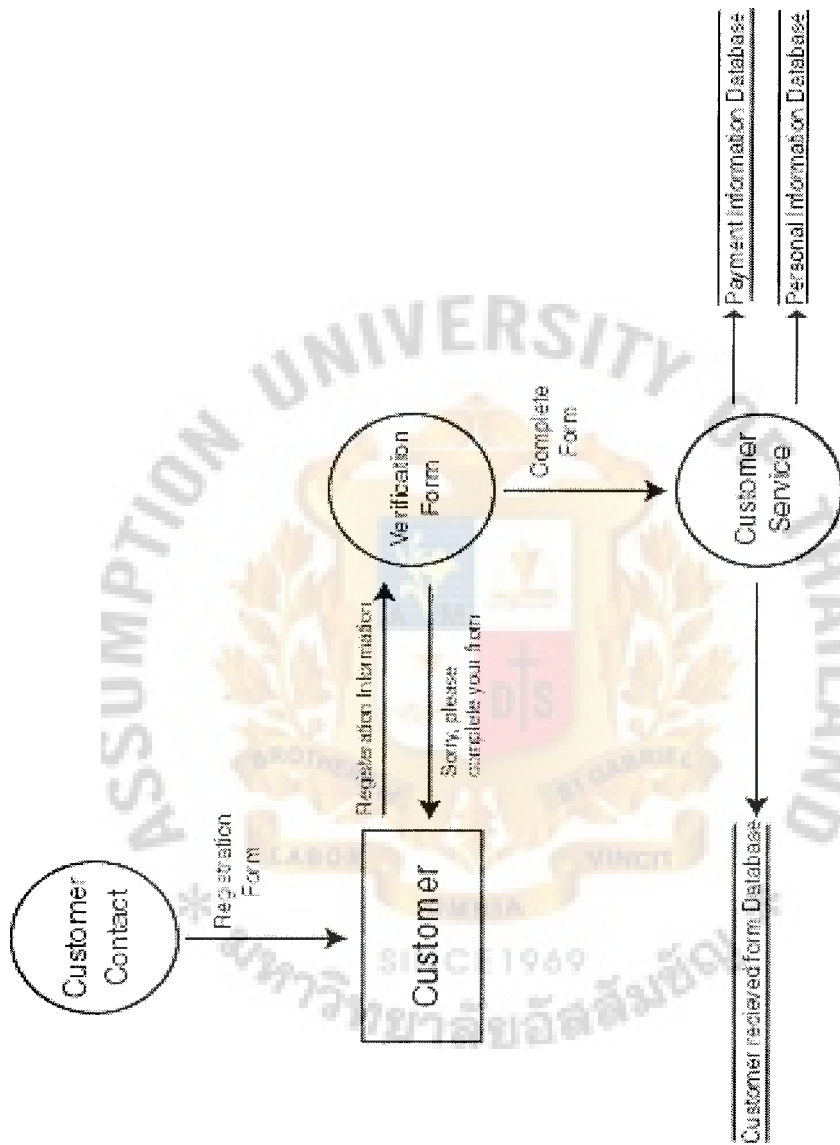
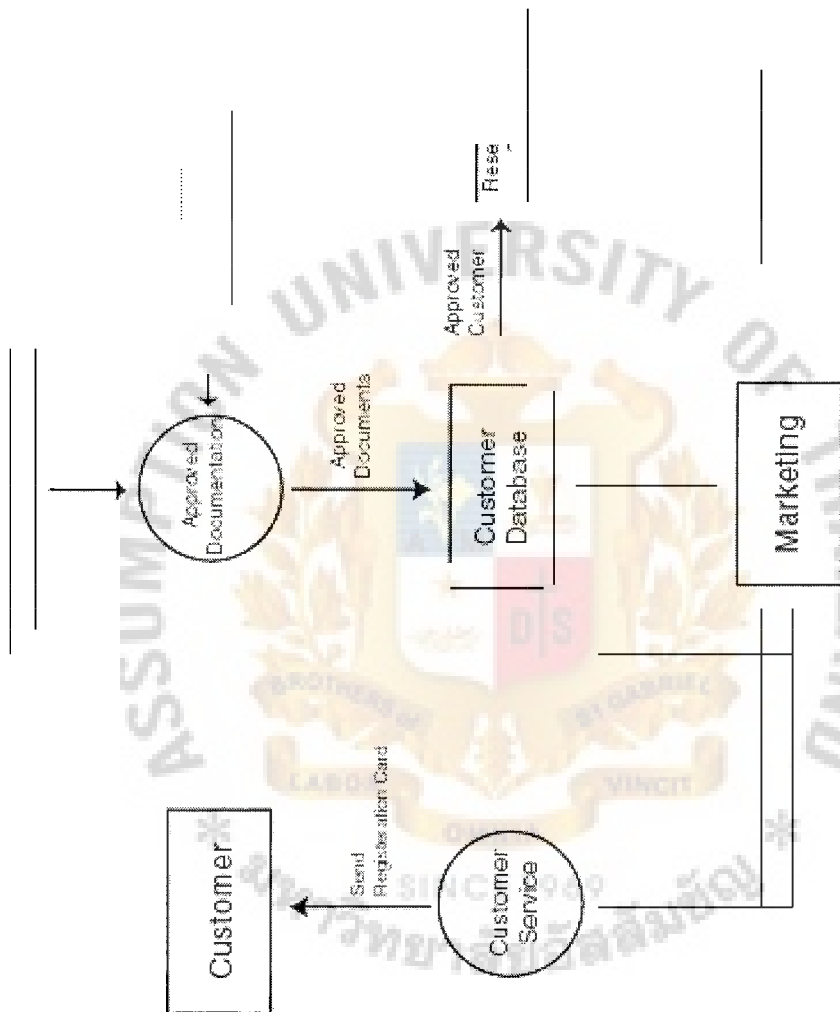


Figure C.1.1. Dataflow Diagram Level 0 (Old System).

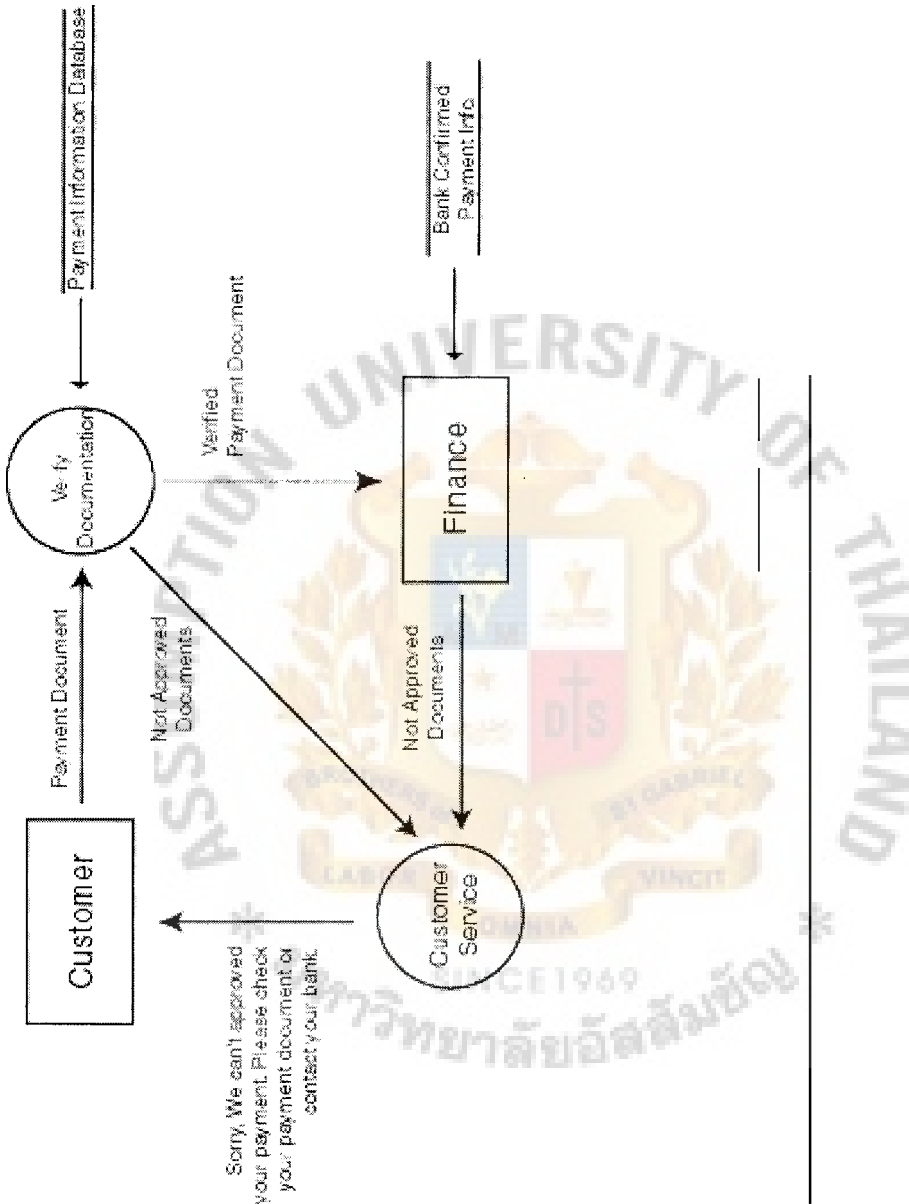




Dataflow Diagram Level 1 Process 1 (Verify Registration Information).

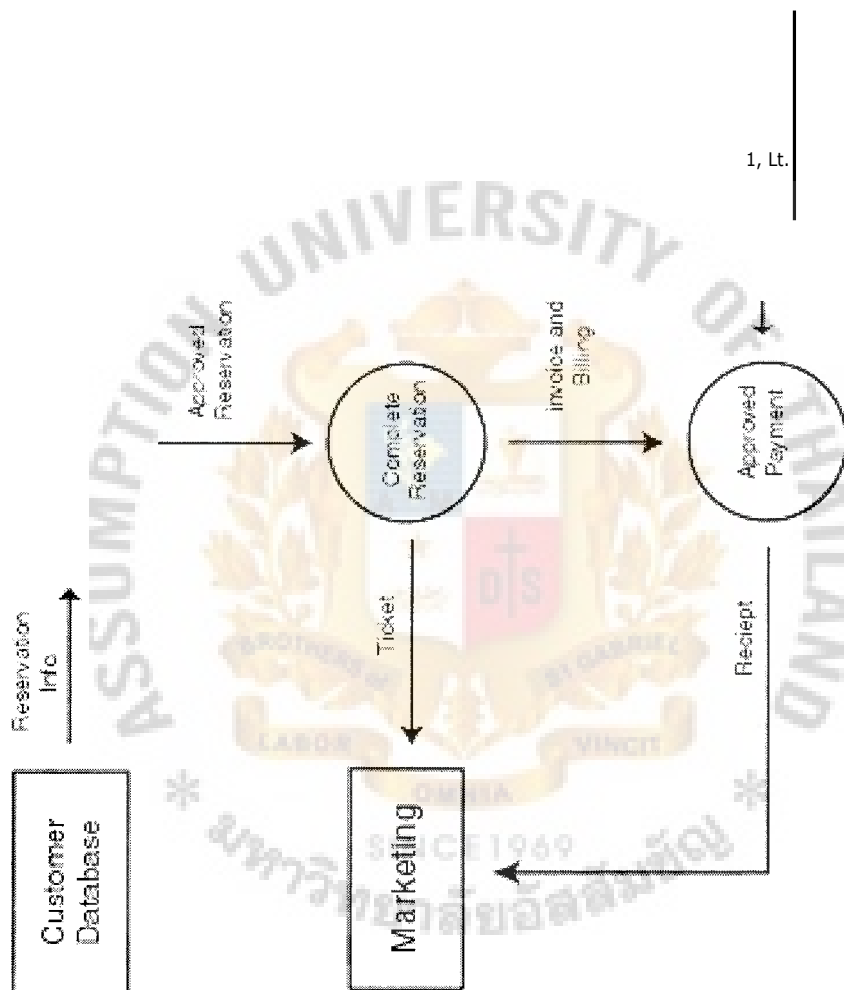


Dataflow Diagram Level 1 Process 2 (Registered).



Dataflow Diagram Level 1 Process 3 (Payment Information).





1, Lt.



APPENDIX D  
FILE STRUCTURE

Table D.1. File Structure of Personnel Data File.

FILE STRUCTURE			
FILE NAME : CUSTOMER			
FIELD NAME	TYPE	LENGTH	DEC
CUS NO	NUMERIC	8	
CUS_NAME	CHARACTER	30	
BILL ADDR	CHARACTER	200	
SHIP ADDR	CHARACTER	200	
CUS TEL	NUMERIC	10	
CUS FAX	NUMERIC	10	
CUS E MAIL	CHARACTER	30	
CUS MOBILE	NUMERIC	10	
LAST SALE	DATE	10	
LAST PAY	DATE	10	
BALANCE	NUMERIC	15	2
DISCOUNT	NUMERIC	5	2
CREDIT ALL	NUMERIC	4	

Table D.2. File Structure of Reservation Files.

FILE STRUCTURE			
FILE NAME : RESERVE			
FIELD NAME	TYPE	LENGTH	DEC
ORDER NO	NUMERIC	8	
CUS NO	NUMERIC	8	
PRODUCT_NO	NUMERIC	8	
ORDER_QUANTITY	NUMERIC	10	
ORDER DATE	DATE	10	
ORDER_DUE	DATE	10	
PAY_TYPE	CHARACTER	10	
SALESPERSON	CHARACTER	10	

Table D.3. File Structure of Registration Files.

FILE STRUCTURE			
FILE NAME : REG			
FIELD NAME	TYPE	LENGTH	DEC
PRODUCT_NO	CHARACTER	8	
PRODUCT NAME	CHARACTER	15	
PRODUCT DESP	CHARACTER	200	
UNIT PRICE	NUMERIC	8	2
OUT BALANCE	NUMERIC	15	

Table D.4. File Structure of Payment File.

FILE STRUCTURE			
FILE NAME: PAYMENT			
FIELD NAME	TYPE	LENGTH	DEC
PAY_NO	NUMERIC	8	
S NO	NUMERIC	8	
PRODUCT_NO	NUMERIC	8	
PAY DATE	DATE	10	
PO DATE	DATE	10	
UNIT PRICE	NUMERIC	8	2
TOTAL	NUMERIC	15	2

St. Gabriel's Library

Table D.S. File Structure of Receipt File.

FILE STRUCTURE			
FILE NAME : REC			
FIELD NAME	TYPE	LENGTH	DEC
S_NO	NUMERIC	8	
RECP NUMBER	NUMERIC	8	
REC DATE	NUMERIC	10	
DELIVERY DATE	DATE	10	





APPENDIX E  
DATA DICTIONARY

OLD SYSTEM
------------

Payment Document = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL.

Registration Form = NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE + ACCOMPANY NO. + [DRAFT I TRANSFER] + {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE I DOUBLE I DELUXE]

Registration Info = NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE + ACCOMPANY NO. + [DRAFT I TRANSFER] + {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE DOUBLE I DELUXE]

Registration Card = NAME + ADDRESS + TEL. + EMAIL + FAX + HOTEL + {TOUR} + DEPARTURE + ARRIVAL + [SINGLE I DOUBLE I DELUXE]

Payment Info = NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE + [DRAFT I TRANSFER]

Payment Memo = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL. + VENDER INFO

Payment Status = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL.+ STATUS

Verified Payment Document = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL.+ STATUS

Personal Info = NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE  
Completed Register Info = NAME + ADDRESS + TEL. + EMAIL + FAX +  
INSTITUTE + ACCOMPANY NO. + [DRAFT I TRANSFER] + {HOTEL} + {TOUR}  
+ SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY +  
[SINGLE I DOUBLE I DELUXE] + ACCOUNT NO. + PAYMENT DATE +  
AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + STATUS

Payment to Vender = ACCOUNT NO. + PAYMENT DATE + AMOUNT +  
SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL.  
+ VENDER INFO

Receipt = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE +  
CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL. + VENDER  
INFO + VENDER INFO + PAYMENT FOR

Reservation Info = {HOTEL} + {TOUR} + SPECIAL REQUIREMENT +  
DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE I DOUBLE I DELUXE] +  
NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE

Ticket = {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE +  
ARRIVAL + NIGHT STAY + [SINGLE I DOUBLE I DELUXE] + NAME +  
ADDRESS + TEL. + EMAIL + FAX + INSTITUTE + VENDER INFO + PAYMENT  
FOR

Required Customer Info = NAME + ADDRESS + TEL. + EMAIL + FAX +  
INSTITUTE

Personal Requirement = {HOTEL} + {TOUR} + SPECIAL REQUIREMENT +  
DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE I DOUBLE I DELUXE] +  
NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE

Accommodate and Tour Reservation Info = {HOTEL} + {TOUR} + SPECIAL  
REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE  
DOUBLE I DELUXE]



NEW SYSTEM
------------

Payment Document = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL.

Registration Form = NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE + ACCOMPANY NO. + [DRAFT I TRANSFER CREDIT CARD] + (CREDIT CARD NO.) + (CREDIT EXPIRE) + {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE I DOUBLE I DELUXE]

Registration Info = NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE + ACCOMPANY NO. + [DRAFT I TRANSFER I CREDIT CARD] + (CREDIT CARD NO.) + (CREDIT EXPIRE) + {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE I DOUBLE I DELUXE]

Registration Card = NAME + ADDRESS + TEL. + EMAIL + FAX + HOTEL + {TOUR} + DEPARTURE + ARRIVAL + [SINGLE I DOUBLE I DELUXE]

Payment Info = NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE + [DRAFT I TRANSFER I CREDIT CARD] + (CREDIT CARD NO.) + (CREDIT EXPIRE)

Payment Memo = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL. + VENDER INFO

Payment Status = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL.+ STATUS

Verified Payment Document = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL.+ STATUS

Personal Info = NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE

Completed Register Info = NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE + ACCOMPANY NO. + [DRAFT I TRANSFER I CREDIT CARD] + (CREDIT CARD NO.) + (CREDIT EXPIRE) + {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE DOUBLE I DELUXE] + ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + STATUS

Payment to Vender = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL. + VENDER INFO

Receipt = ACCOUNT NO. + PAYMENT DATE + AMOUNT + SINGNATURE + CHEQUE NO. + BANK + BRANCH + NAME + ADDRESS + TEL. + VENDER INFO + VENDER INFO + PAYMENT FOR

Reservation Info = {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE I DOUBLE I DELUXE] + NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE

Ticket = {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE I DOUBLE I DELUXE] + NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE + VENDER INFO + PAYMENT FOR

Required Customer Info = NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE

Personal Requirement = {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE I DOUBLE I DELUXE] + NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE

Accommodate and Tour Reservation Info = {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE DOUBLE I DELUXE]

Confirmed Reservation = {HOTEL} + {TOUR} + SPECIAL REQUIREMENT + DEPARTURE + ARRIVAL + NIGHT STAY + [SINGLE I DOUBLE I DELUXE] + NAME + ADDRESS + TEL. + EMAIL + FAX + INSTITUTE + RESERVATION STATUS





APPENDIX F  
PROCESS SPECIFICATION

## St. Gabeers library

Table F.1. Process Specification of Verify Registration Information.

Process Name	Record Requested Order
Input:	Order details
Output:	Requested Order Record
Process:	<ol style="list-style-type: none"> <li>1. Receive Requested Order detail from Sales &amp; Marketing Department</li> <li>2. Verify Order Details</li> <li>3. Verify Order No.</li> <li>4. Key — in the order detail into Request Order File</li> </ol>
Attachment	<ul style="list-style-type: none"> <li>• Sales and Marketing department</li> <li>• Orders</li> </ul>

Table F.2. Process Specification of Registration.

Process Name	Check Product Availability
Input:	Product No. Counted_Product_Available Quantity Balance
Output:	The verified product balance
Process:	<ol style="list-style-type: none"> <li>1. Read Product No. from Requested Order</li> <li>2. Check the physical number of ordered product in Warehouse</li> <li>3. Match the physical balance with logical Balance</li> <li>4. Send the accurate product balance to process 1.3</li> </ol>
Attachment	<ul style="list-style-type: none"> <li>• Orders</li> <li>• Warehouse</li> <li>• Products</li> </ul>

Table F.3. Process Specification of Verify Payment Information.

Process Name	Compare Balance and Request
Input:	<ol style="list-style-type: none"> <li>1. Verified product balance</li> <li>2. Ordered Quantity</li> </ol>
Output:	<ol style="list-style-type: none"> <li>1. Order Status Information</li> <li>2. Product Quantity Unavailable</li> </ol>
Process:	<ol style="list-style-type: none"> <li>1. Read ordered quantity form requested order</li> <li>2. Read Product balance of ordered product</li> <li>3. Compare the requested quantity with balance quantity</li> <li>4. Send order status information to Sales &amp; Marketing if balance quantity is enough</li> <li>5. Go to process 1.4 if balance quantity is less than requested quantity</li> </ol>
Attachment	Sales and Marketing Department

Table F.4. Process Specification of Contacting for Registration.

Process Name	Issue Production Requisition
Input:	Unavailable Product Item
Output:	Production Requisition
Process:	<ol style="list-style-type: none"> <li>1. Read unavailable Product details</li> <li>2. Issue Production Requisition</li> <li>3. Send Production Requisition</li> <li>4. Record production Requisition into Production File</li> </ol>
Attachment	<ul style="list-style-type: none"> <li>• Production Department</li> <li>• Productions</li> </ul>



APPENDIX G  
REPORT DESIGN

# SEAGIG 2000

NAME	NAME	IN	ON	ADDRESS	COUNTRY	TEL		EMAIL
Dr. Srinagar M.	A O	JL. Jaya Mandala		2 E-10 Tebet Jakarta 12870	Indonesia	62-021-8301457	62-021-8301457	sklmng@yahoo.com
Dr. Linda	Teoh	The Tun Hussein Onn National		Lorong Utara B, 46200 Petaling Jaya	Malaysia	603-7561511	603-7561511	sklmng@yahoo.com
Dr. John	Chua	Dept. of Ophthalmology & V		7/F Block B, Staff Quarters Prince of	Malaysia	852-2632-2879	852-2648-2943	edisa@diff.com
Dr. Leonida Naraida G.	Affandi	Dept. of Ophthalmology Facu		JL. Salemba Raya No. 6, Jakarta 102	Philippines	62-21-334878	0063-2-9267273	edisa@diff.com
Dr. Seng Kheong	Balajonda	University of Santo Tomas H		28 H Congressional Avenue Quezon	Philippines	603-7561511	603-7561511	skfang@pc.jaring.my
Dr. Wai Man, Catharyne	Fang	The Tun Hussein Onn National		Lorong Utara B, 46200 Petaling Jaya	Malaysia	852-21626901	852-2882990	achan@iohkh.com
Dr. Prateep	Vyas	Tung Wah Eastern Hospital		Eastern Hospital Rd., Causeway Bay	Hong Kong, SAR	91-2482-30764	91-2482-30765	pvyas@netralaya.org
		Shri Ganapati Netralaya		Jalna (m.s.) 431203	India			

Name List Report.



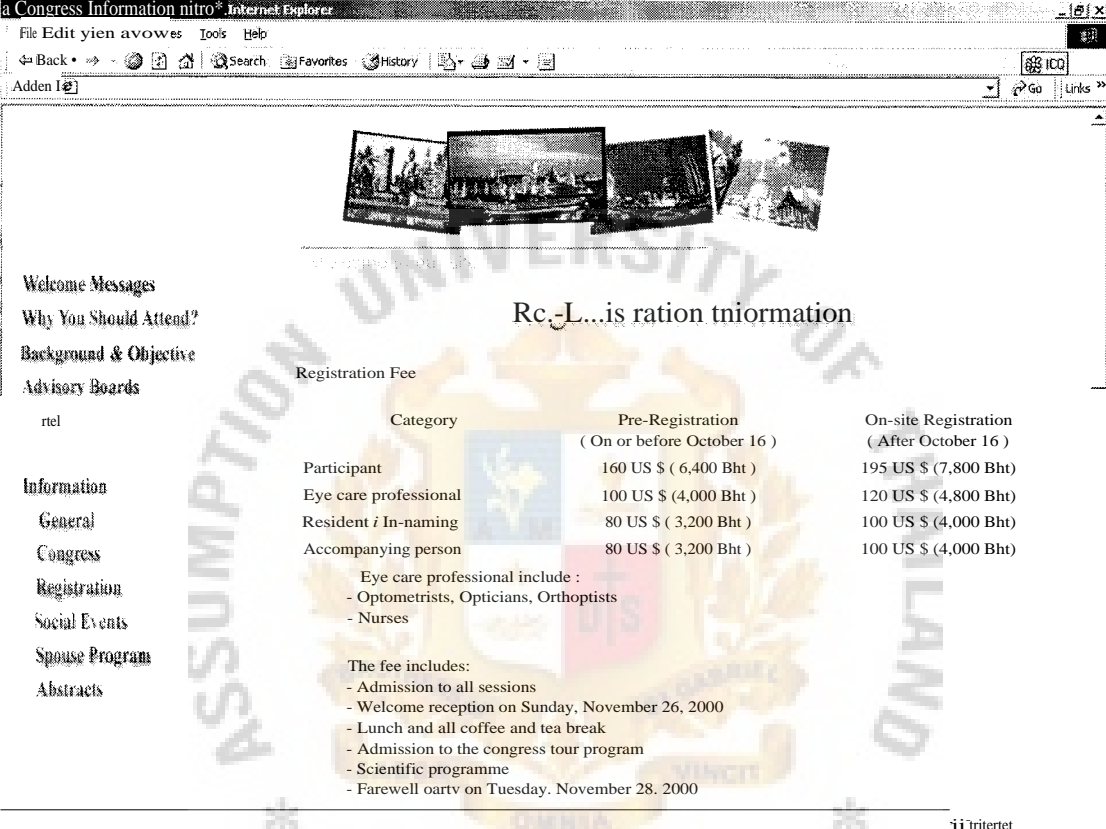
SEA-IG 2000																																																																																																																																																																																																																																																																																															
NAME	NAME	ACCOMPANY NAME(S)	TYPE			IDA] 1VADDIV	a b c	31)10 38111111Vd30	P.O.T N	HOTEL PREFERENCE				S1HDIN  et fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	S1HDIN  fre z	

SEAGIG 2000									
CONTNENE	STNAME	TOTL COST	BANK TRANSFER			CHEQUE			REMARKS
			DATE	NOTE NO.	BANK	QTY	CHEQUE NO.	S/N	
Dr. Srinagar M.	๓	1339 US (240 + 99)	9-Oct-001	3000152331	BANK MANDIRI				
Dr. Linda	๔	165 US					1242057611	RHB Bank BERAD	
Dr. John	Chua	259 US (160 + 99)							Banker Transfer (No statement)
Dr. Leonida Naraida G.	Affandi	259 US (160 + 99)	01-Oct-01		Bank Negara Indonesia				
Dr. Seng Kheong	Balajonda	237 US (160 + 77)	01-Oct-01		Bank Negara Indonesia				(Haven't got cheque and No processing fee)
Dr. Wai Man, Catharyne	1,๐	298 US (100 + 198)							Banker Transfer (No statement)- 2 nights
Dr. Prateep	๑								Waive - Invited speaker & Single self booking for hotel

Payment Report.



APPENDIX H  
SCREEN DESIGN



**Registration Fee**

Category	Pre-Registration ( On or before October 16 )	On-site Registration ( After October 16 )
Participant	160 US \$ ( 6,400 Bht )	195 US \$ ( 7,800 Bht )
Eye care professional	100 US \$ ( 4,000 Bht )	120 US \$ ( 4,800 Bht )
Resident / In-naming	80 US \$ ( 3,200 Bht )	100 US \$ ( 4,000 Bht )
Accompanying person	80 US \$ ( 3,200 Bht )	100 US \$ ( 4,000 Bht )

Eye care professional include :

- Optometrists, Opticians, Orthoptists
- Nurses

The fee includes:

- Admission to all sessions
- Welcome reception on Sunday, November 26, 2000
- Lunch and all coffee and tea break
- Admission to the congress tour program
- Scientific programme
- Farewell party on Tuesday, November 28, 2000

Figure H.1. Registration Information.

Untitled Document - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites History

Address

Type all information : Please make sure that you have read the instructions indicated before completing this form.

First (Presenting) Author :

Name. \_\_\_\_\_

(Family / Last name) (Middle Initial) (First Name)

Degree: \_\_\_\_\_

Department : \_\_\_\_\_

Institution : \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State : I \_\_\_\_\_ Zip \_\_\_\_\_

Country \_\_\_\_\_

Telephone : Home r \_\_\_\_\_ Office \_\_\_\_\_

Fax: \_\_\_\_\_

E-mail address (required) \_\_\_\_\_

Co-Authors :

1 Name \_\_\_\_\_

Institution \_\_\_\_\_

2. Name : \_\_\_\_\_

Institution : \_\_\_\_\_

3. Name \_\_\_\_\_

Institution : \_\_\_\_\_

**Abstract Form**

Title \_\_\_\_\_

Author \_\_\_\_\_

Institution \_\_\_\_\_

Abstract \_\_\_\_\_

Commercial Relationships Disclosure \_\_\_\_\_

Grant Identification \_\_\_\_\_

Preview Clear

Done

SEAGIG 2000  
BANGKOK  
November 26-29, 2000  
Bangkok, Thailand

ASSUMPTION UNIVERSITY OF THAILAND  
BROTHERS OF  
LABOR OMNIA  
VINCIT  
SINCE 1969  
มหาวิทยาลัยอัสสัมชัญ

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Figure H.2. Registration Form for Abstract.









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