Help Desk System for International Trade

By

Mr. Pichet Nitichakorn

Final Report of the Three - Credit Course
CS 6998 System Development Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer Information Systems
Assumption University

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Academic Year	October 1999

The Graduate School of Assumption University has approved this final report of the three-credit course, CS 6998 System Development Project, submitted in partial fulfillment of the requirements for the degree of Master of Science in Computer Information System.

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ABSTRACT

Thai Farmers Bank Public Company Limited is the Bank which pioneered a program to "re-engineer" bank operations in order to improve customer service and operational efficiency including International Trade Service. After they had implemented the re-engineering program for an International Trade Center (ITC), they established the International Trade Supporting division or the Help Desk to support and maintain users' operations when they have problems about their operations or systems including support data when other departments requested. Thus, they have to keep a record of users and problem including its solution when they receive those problems or requests.

The problems of the existing system include loss of information because the documents are kept separately in document files of each sub-division. Because most operations are done manually, data redundancy creates difficulty in referencing the approved solution because they have to find the data from a document file. There is no security for data access. It takes more time to summarize and make a Help Desk report to an executive officer at the end of month and there is no standard of data entry because it depends on the form designed by each sub-division. The existing system requires several staff to handle and keep records. As a result, costs increase and time is wasted. All the problems need to be solved and improved in order to operate efficiently.

The proposed system will focus on the details and problems of the existing system and identify the solution in order to improve efficiency in keeping information and data management by providing a computerized system to handle it. This will not only decrease cost in support management, but also improve work efficiency and make workflow faster.

ACKNOWLEDGEMENTS

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I. INTRODUCTION

1.1 Background of the Project

Thai Farmers Bank Public Company Limited is a reputable financial institute that provides various services to customers such as commercial banking and financial services. The Bank started to improve customer service and operations which is also known as re-engineering. The International Trade Department was part of the re-engineering program for improving the operations by implementing a new system called Eximbills. Eximbills is a system that provides users both import and export functions such as Import Letter of Credit, Import T/R, Packing Credit, etc. The services provide to customers include storing Trade Finance data. Therefore, the International Trade Supporting Division is established to support users when they have some problem using the Eximbills system or when network is interrupted. Moreover, the division supports Trade Finance information when other departments make requests. The International Trade Supporting Division or Help Desk is comprised of three sub-divisions. (Figure 1.1.)

1. Business Help Desk : They are responsible for giving advice and solving problems for users when they use the Eximbills system. Moreover, the division supports other departments when they request Trade Finance information.
2. Support Control : They control and monitor the account posting accuracy of each International Trade Center (ITC) including accounting adjustments when they have posted an incorrect account into the system. In addition, they generate a specific report or an ad hoc report to support the decision making of an executive officer when needed.

3. Hardware Help Desk : The main responsibility of this sub-division is to solve a problem when the communication or computer network of Eximbills system breaks down. This includes the case of inoperable hardware of International Trade Centers.

Therefore, the main responsibility of International Trade Supporting Division or Help Desk is to support and maintain the system and work flow. All these sub-divisions have to keep a record of users' name, branch, division, department, telephone number and problem or request including its solution when users contact them. In the existing system, each sub-division records the information manually in a requested form whenever a user contacts them. Whether the above form is kept in Microsoft Word or Microsoft Excel format depends on each sub-division design. Then they print it out and keep it in a document file without any system to handle it. So, data are kept separately in each sub-division with various formats. Doing this may lead to a problem of information loss because each sub-division keeps its own documents in a document file, which is not durable and is easily damaged. Data redundancy and inefficient use of resources are expected to occur in the future because each sub-division has no standard solution for a particular problem. Each Help Desk officer may respond to users' problems differently and sometimes may take more time to respond. By doing this, they have to analyze and find solutions every time a repeated problem occurrs. In addition, they have to collect data from the document file of each sub-division to generate a Help Desk report to be submitted to an executive officer at every month's end. The report contains problem items of requests from users during that month. Normally, it takes one day and one employee to produce the report. The report is approved by a senior Help Desk officer. Moreover, there is no security control for data management of the existing system. Therefore, this project will focus on the details and problems of the existing system in order to eliminate these problems and also to

improve efficiency in both data management and data storage of Help Desk information. The division will be able to reuse the information when a repeat problem occurrs in the future and also to fulfill user requirements. By doing this, we can decrease the cost of management support, and can improve work efficiency and make workflow faster because this project will store all of the support information in a centralized database and provide a computerized system to handle tasks. Therefore, we can retrieve information to support a user's operation promptly and reduce data redundancy by sharing data and other resources. By storing data centrally, they can easily produce the report to the executive officer using less time.

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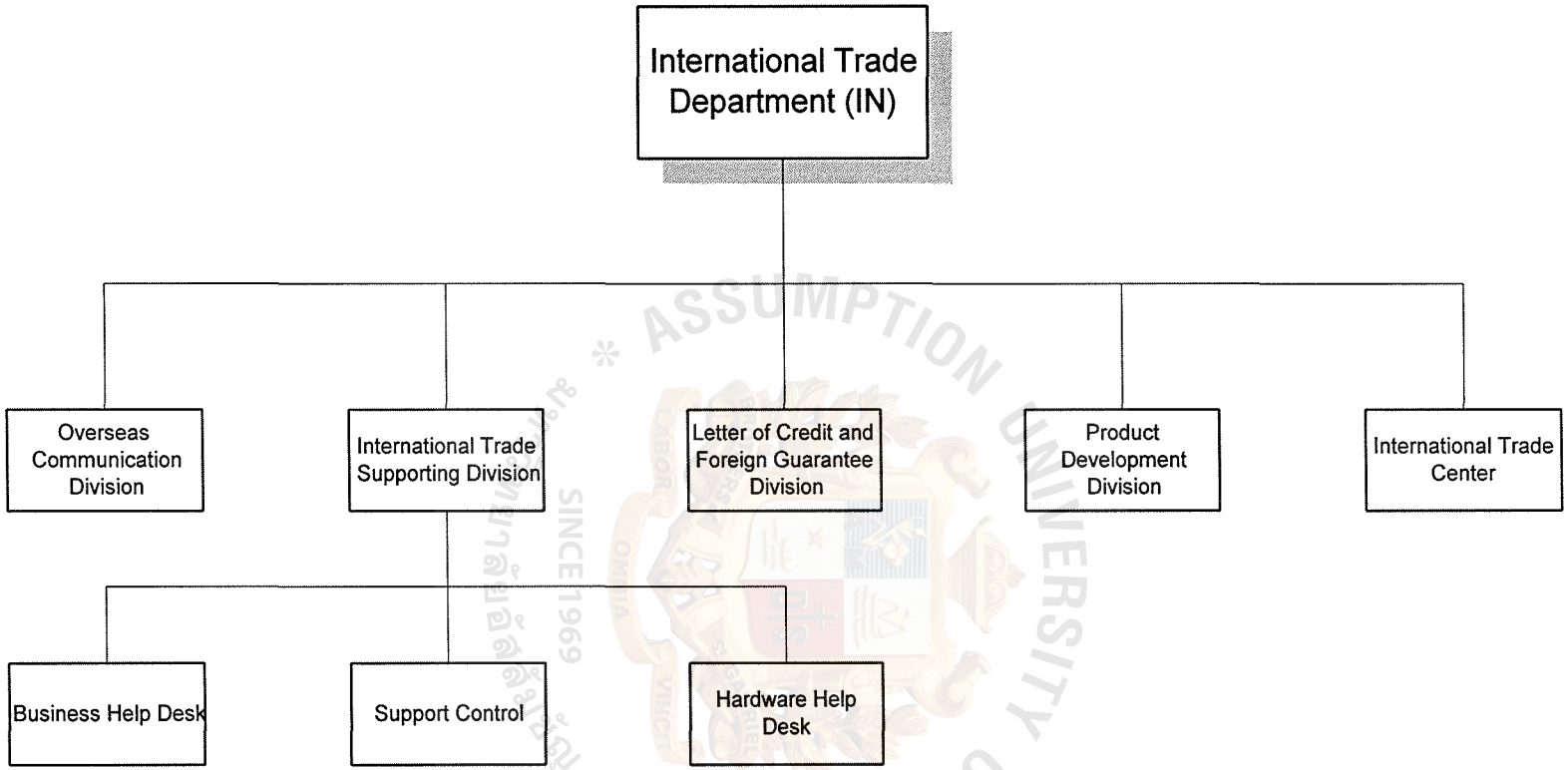

Figure 1.1. Organization Chart of International Trade Department.

1.2 Objectives of the Project

The problems of the existing system—loss of information, data redundancy, difficulty in referencing the approved solution or the approved request of other departments for information needed, time consumption in summarizing and making reports for the executive officer at the end of month, no standard of information stored—need to be solved and improved in order to increase operating efficiency. Thus this project will focus on solving the problems of the existing system of the International Trade Supporting Division or Help Desk. The expected results of this project will be :

1. Improve data management and data accuracy. According to the existing system, each Help Desk officer responds to a user's problem with different solutions depending on his experience. This leads to inaccurate data because there is no standard solution. So, the proposed system will collect and categorize both the problem and its correct solution according to the group of business such as Import L/C, Import T/R, Export Finance, Packing Credit etc. The standard information and other support information will be kept in the centralized database in order that a Help Desk officer will respond to users in the same way with the correct solution. This will improve response time for the problem solving process. Moreover, it provides more security for data access into the system.
2. Eliminate loss of information and improve data stored by keeping data in a database file or permanent storage such as disk or tape.
3. Eliminate data redundancy and overlapping by storing data in a centralized database. Data and other resources are shared unlike the existing system in which data is kept separately in each sub-division which creates the problem of data redundancy and inefficient resource use.

4. Provide a function that allows the user to inquire or retrieve required information from the system easily. This includes providing a management information system report or MIS report when the executive officer needs to plan, monitor, and control business operations. In contrast, the existing system is inefficient in referencing the approved solution or the approved request of other departments when they need this information.
5. Set standard data entry format to facilitate data stored. Data will be kept in the same format. This will be easy for users to understand. There will be no problem for job rotation when required. Moreover, it's convenient to retrieve and combine the entire support information of sub-divisions to produce a report.
6. Reduce time needed to make a Help Desk report or access other information about support information. The proposed system will provide a routine report for users and they can retrieve data from the system whenever they need it.
7. Provide support information to Help Desk officers for measuring their performance in Help Desk operation. The information will be used for consideration of promotion at the end of year.
8. Decrease cost in management support and makes flow faster as it needs less staff to handle a specific problem. In the normal case, it doesn't need a specialist to solve the problem as a Help Desk officer can search the problem and get the correct solution from the system, then implement for users according to this support information. The solution can be retrieved to respond to users immediately.

II. EXISTING SYSTEM

2.1 Background of the Existing System

The International Trade Supporting Division or Help Desk responds to both International Trade Center users and International Trade Department users when they have problems using the system. The problems include user's error, application functions error, communication of Eximbills system corrupted, account posting inaccuracy and report requirements. Moreover, the division responds to other departments when they request Trade Finance information. In practice, users call or send a request form (Request for Assistance) about problem details to the Help Desk. The Help Desk officer registers the problem into the register book and sends the problem to the sub-division involved. The sub-division that received the request for assistance will analyze and define a solution for the user's problem and then send its solution to a senior officer for approval. The approved solution will be sent to the users who made the request for assistance. After the officer finishs solving the problem then he will record the problem into a Microsoft Word or Microsoft Excel form depending on each Help Desk sub-division design. Each of these processes are done manually without any system support of their operations.

For information requested from other departments, they have to send a request form to the Help Desk and then the officer will register the request into the request book in order to issue a request number for the department that requested the information. Then the Help Desk officer will retrieve the information from the data warehouse for them. In the case that Help Desk cannot retrieve or produce such requested information by themselves, they will make a request to an outsourcer who made a support agreement with the bank, so that they will write a program to retrieve such information for them. After the outsourcer finishs their assignment, they will send the information requested

to the Help Desk. The Help Desk will check this information and then close the outsourcing requested. At the end of every month, each sub-division has to collect both the problems and requests that occurred during the month to report to the executive officer. The above process of the existing system can be illustrated in Figure 2.1.

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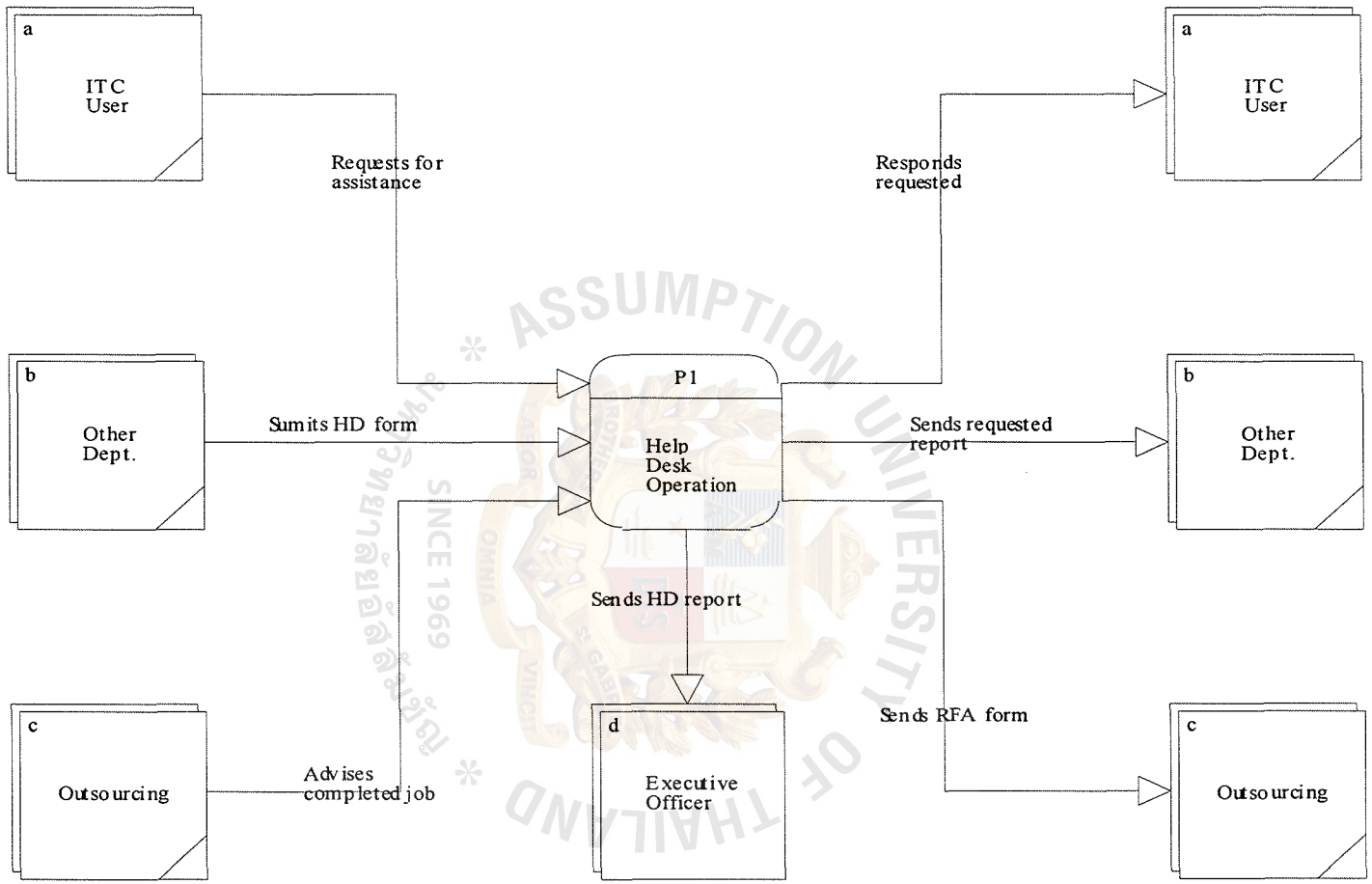

Figure 2.1. Context Diagram of the Existing System.

2.2 Existing Business Functions

For better understanding, Help Desk functions can be divided into 4 main tasks : Problem solving task, Respond requested task, Create and close RFA task, and Produce Help Desk report task. The problem solving task is a task that responds to a user's problem with a solution when they have problems using Eximbills system. The respond requested task would perform when other departments request Trade Finance information from the International Trade department. The create and close RFA task will be carried out when the Help Desk has to request an outsourcer to handle information retrieval according to the users' request. Finally, the producing report task of the Help Desk is to collect all of the Help Desk tasks during month and report to the executive officer. (See Figure 2.2.)

2.2.1 Problem Solving Task

1. International Trade users call or send RFA to the Help Desk division to request suggestions and solutions.
2. When a Help Desk officer receives a request, the Help Desk officer will register the problem down in the register book. Then he will send it to the Help Desk sub-division intended to solve such problems.
3. Next, the officer of the Help Desk sub-division will analyze the problem and identify the solution in order to solve that problem and send it to a senior Help Desk officer for approval. The approved solution will be implemented for the user who requested assistance.
4. After the problem has been solved and a solution has been implemented, the Help Desk officer will record both problem and solution into a form that each sub-division is designed for keeping. Normally, each sub-division will use Microsoft Office e.g. MS Microsoft Word, Microsoft Excel etc., to design their form for

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keeping data. A record will be kept in that form and it will be printed out and kept in the document file of each sub-division.

5. At the end of each month, each Help Desk sub-division will collect all of the problems that occurred during the month. Then they will use MS Microsoft Word or Microsoft Excel to produce a report and send it to their executive officer.

2.2.2 Respond Requested Task

1. When the other departments need Trade Finance information from the International Trade department, they will send a request to the Help Desk division to retrieve the information needed.
2. The Help Desk officer will respond to the request by sending it to the senior Help Desk officer for approval and then performing according to the request. If the Help Desk cannot retrieve data by themselves, they will request the outsourcer to perform instead. After they get the information needed from the outsourcer, they will send it to the department that requested the information.
3. After the request has been responded to the Help Desk officer will record the request and result into a form that each sub-division designed for and keep it in a document file of each sub-division.
4. At the end of each month, each Help Desk sub-division will collect all the requests that occurred during the month to produce the Help Desk report to their executive officer.

2.2.3 Create and Close RFA Task

1. According to the above user's problem or the request from other departments, sometimes the Help Desk can't respond by themselves, so they have to request help from the outsourcer who signed an agreement contract with the bank for support such as IBM, Progress Software Co.,ltd., Robotic Co.,ltd. etc.

2. The Help Desk officer will create a RFA or Request for Assistance and send it to the outsourcer to perform according to their request.
3. After the outsourcer has finished the Help Desk request, then they will advise the Help Desk. The Help Desk officer will check the task of the outsourcer.
4. The Help Desk officer will close that RFA by signing with the accepted date and putting it into a document file of each sub-division.
5. At the end of each month, each Help Desk sub-division will collect all of the RFAs that occurred during the month in order to report to their executive officer.

2.2.4 Produce Help Desk Report Task

1. A Help Desk report is a task that every Help Desk sub division has to do at the end of the month in order to report their tasks during the month to the executive officer.
2. Each Help Desk sub-division has to collect their task from the document file and input their task information by using MS Microsoft Excel to produce a Help Desk report.
3. The Help Desk report will be checked by the senior Help Desk officer before it will be sent to their executive officer.

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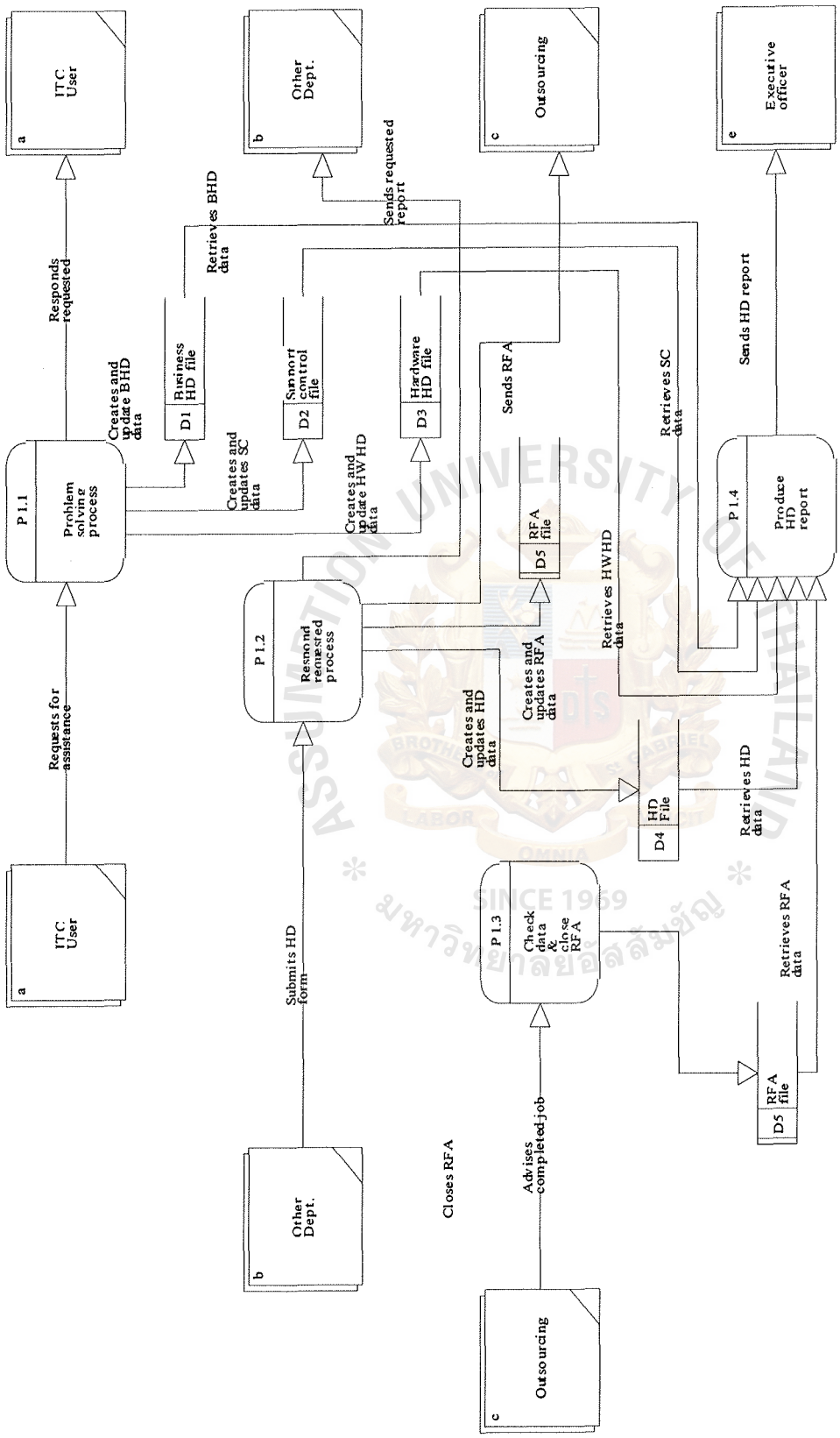

Figure 2.2. DFD Level 0 of the Existing System.

2.3 Current Problems and Areas for Improvement

2.3.1 Current Problems

Currently, Help Desk operation is under the control of the International Trade Department They support and maintain all of the International Trade Centers' operations and respond to other departments when they request Trade Finance information. In the existing system, Help Desk officers have to work manually, which takes more time to solve a user's problem. It's easy to make mistakes in their daily operations because there is no standard solution for a repeat problem. It depends on each Help Desk officer's experience. Without a centralized database and computerized system in the Help Desk to handle their operation for data management and support information, several problems have occurred which have caused problems with the bank's operation. The existing problems can be summarized as follows:

- When a user contacts the Help Desk, the Help Desk officer will input data about the user's problem into document form such as Microsoft Word or Microsoft Excel form and then print it out in order to keep it in the document file of each sub-division. Sometime these documents are not kept in the document file because they forgot it. This leads to data loss. In other cases, they took this support information out from the document file to be used as reference for solving a problem and didn't put it back into the document file, which caused document loss.
- There is data redundancy and overlap due to data that is kept separately in each sub-division. For instance, each sub-division has to keep the user's information every time they contact Help Desk. Moreover, the same problem may be stored more than one time.

- When the problem occurrs repeatedly, it might be solved using different solutions because some Help Desk officer used their experience to solve the problem. So the best solution may not be used, and it is easier to make a mistake.
- The existing system makes it difficult to reference the approved solution or the approved request of other departments. When a Help Desk officer needs this information, they have to look in the document file where documents are not sorted, so it would take more time for finding references.
- There is no standard format for storing data in each sub-division. This leads to difficulty in creating a report. Moreover, it causes problems when users rotate their job to another sub-division, as there are various entry data formats, which each sub-division designed for their own use.
- Time is wasted in preparing a monthly report for the executive officer because they have to collect data from the document files of each sub-division manually.
- They need more staff to handle the user's requests and to keep data in the document files. This includes when other departments request Trade Finance information.

All of these problems directly affect the Help Desk's performance. Thus, we can analyze these problems as cause-clue and effect analysis. (Table 2.1.)

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Table 2.1. Cause-Clue and Effects Analysis.

CAUSES	CLUES	EFFECTS
• Each sub-division keeps data independently. • Each Help Desk officer has different working experience in solving user's problems. • No efficiency in keeping data including corresponding user's problems or requests.	• Data is kept separately in each sub-division in the document files. • Different data entry format of each sub-division depends on their design such as Microsoft Word, Microsoft Excel format. • Help Desk officer responds to the user with their experience.	• Data redundancy and resources are not shared in each sub-division. • User may not get the best solution when a repeat problem occurrs. • Various data entry formats make it difficult to produce a Help Desk report. This includes a problem when they rotate job. • High support management cost, as it requires more staff to handle a user's problem and request assistance.

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2.3.2 Areas for Improvement

For this project, we focus on the accuracy, flexibility, and adaptability of data management including efficient workflow by using the SDLC or System Development Life Cycle approach to improve the existing system. Therefore, the areas for improvement will focus and improve the existing system as follows:

- Eliminate data redundancy and overlap by collecting all problems and defining the correct solution. The information will be organized and categorized according to the group of the product in the Eximbills system such as Import L/C, Import T/R, Import Payment, Export Finance, Packing Credit, etc. Data is kept in the support information centralized database for a standard solution. A Help Desk officer can directly access the database by searching the problem and getting the correct solution promptly. In spite of how many times a repeat problem occurrs, the user will always get the same solution. If a new problem occurrs, a specialist will analyze it and then both problem and solution must be approved by a senior officer before it is stored in the centralized database for reuse in the future. Moreover, the security will be improved for data access by defining the users who can create, update, and delete data in order to prevent data from being damaged by unauthorized user access.
- Gather all requests; either a user's request for assistance or an other department's request and keep them in the centralized database. It will be used when Help Desk users want to track or find references in order to schedule time to process efficiently.
- Gathering staff's information into the system for internal usage or personal management purposes such as staff promotion or increasing salary. The executive officer can retrieve personal data from the system whenever they need without having to request from the Personnel Department.

- Increase speed of working process and response times as a Help Desk officer can access the centralized database directly with a standard solution if a repeat problem occurrs, and reduce time consumption for defining the solution of the user's problem except in the case of new problem.
- Eliminate various data entry format by designing a standard data entry format. The format should be easy to use and easy to understand for every sub-division in order to facilitate data entry so they work in the same format and have no problem when they rotate their job. Moreover, it's easy to retrieve data for producing a report, as the data of sub-divisions are of the same platform.
- Provide both routine reports and MIS reports for users. The reports will be used for the daily operations and decision making of management. This will reduce the time spent preparing reports because the user can retrieve data from the system immediately and get the correct data.

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III. PROPOSED SYSTEM

3.1 User Requirements

We collected and analyzed all of the existing problems from users. All of those problems need to be solved in order to improve operating efficiency. Thus we can summarize the user requirements as follows:

1. Collect and define a standard solution for each problem, then categorize according to the group of business and keep it in a file. It can be retrieved every time a repeat problem occurrs. This increases the speed of the response time for the problem solving process. Authorized data access or security control should be defined by allowing only Help Desk officers to access data.
2. Standard data entry format is required in order to get complete information, which will be used to solve a problem. Moreover, it should be easy to use and easy to understand both in data entry and in making a report.
3. Store all requests from users or other departments into the centralized file for tracking and scheduling response time efficiently when they want to manage such requests in order to respond within the expected time.
4. Collect all requests for outsourcers in the centralized file for tracking and scheduling response times efficiently when the Help Desk requests an outsourcer to operate according to their request.
5. Produce report for daily operation in order to control their work and support their operation. MIS reports should be included to aid decision making, as sometimes the executive officer needs to know about support information for daily, weekly, or monthly periods to facilitate the management in the Help Desk division.

3.2 System Design

This project will design a system that both fulfills requirements and will be friendly to its end-users by using data modeling and process modeling in the system design phase. Data modeling will be used for preparing the database design of the proposed system in order to eliminate data redundancy. The normalization technique will be applied to organize data attributes so that they are grouped to form stable, flexible and adaptive entities. Process modeling organizes the flow of data through a system's processes in which it will be divided into levels, which are logical, and a physical level for use in system design.

3.2.1 Data Model

We use data modeling for organizing and documenting the data that must be stored in a database by drawing an entity relationship diagram (ERD). In designing the database of the proposed system, we focus on efficient storage, updates and retrieval of data, so we use a database file with Client/Server to store data and to fulfill user requirements. This is because it makes a database more adaptable and scalable to new and unforeseen requirements and applications. For better understanding of how the proposed system will work, we would like to explain the relationship of each entity by using an entity relationship diagram. The new system has proposed the new entity relationship diagram, which consists of 8 main entities; namely, the ITC User, ITC requested, Problem and Solution, Help Desk User, RFA, Outsourcing, Department and HD entity. Thus we can summarize the relationship of each entity as follows : (See Figure 3.1.)

1. One ITC user belongs to one department.
2. One department can have one or more ITC users.
3. One ITC requested can have one or more problems.

4. One problem can occur in one or more ITCs requested.
5. One Help Desk user can receive zero or more HD forms.
6. One HD is responded to by one Help Desk user.
7. One RFA is created by one Help Desk user.
8. One Help Desk user can create zero or more RFAs.
9. One outsourcing responds to one or more RFA.
10. One RFA is responded to by one outsourcing.
11. One Department can send zero or more HD forms.
12. One HD form is sent by one department.

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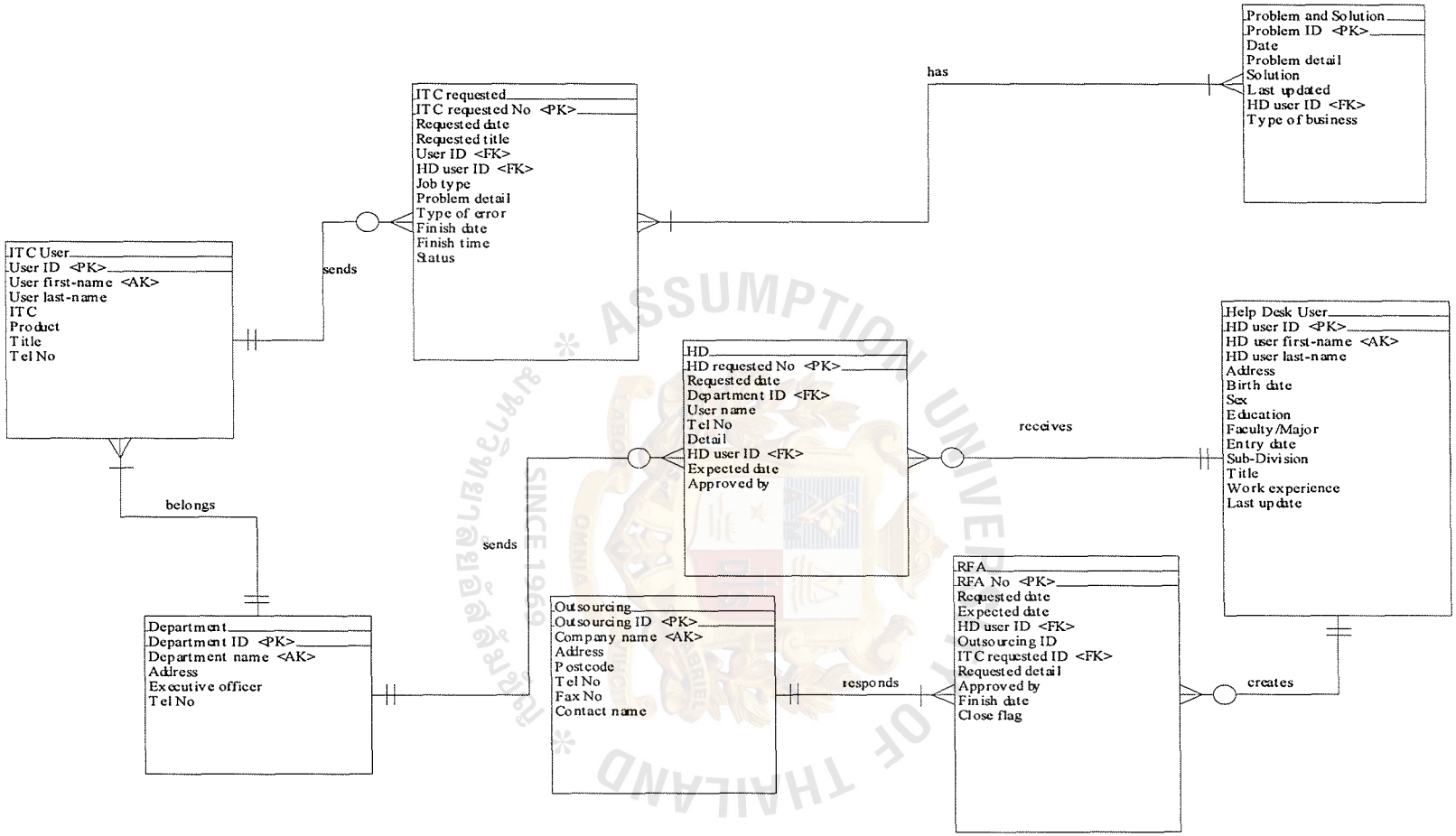

Figure 3.1. ERD of the Proposed System.

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3.2.2 Process Model

Process modeling will be used for organizing and documenting the process requirements and design for the proposed system. A Data Flow Diagram (DFD) will be used for process modeling. It is a tool that depicts the flow of data through the proposed system and the work or processes performed by this system. For the proposed system, data will be stored in a centralized database in the Help Desk system. Thus, all of the Help Desk sub-divisions can access the centralized database. This eliminates data redundancy in each sub-division and also improves data consistency. Both problems and solutions of the International Trade Center will be kept in the centralized database sever for future use. By doing this, we can reduce the time of the problem solving process when ITC users send a repeat problem to the Help Desk. Therefore, we need only a few Help Desk officers to solve a specific problem.

Moreover, the Help Desk officer's information will be stored in the proposed system in order to support the internal personnel management of the International Trade Supporting division. WinFax Pro software is added to keep the documents of an ITC user's problem in electronic form because we can save an ITC user's request in a computer simultaneously when users send request forms by FAX. All of the requests from both ITC users and other departments will be stored in the system, including an RFA that is sent to an outsourcer. The system will keep not only Help Desk tasks, but also a Help Desk user's information, which will be used to produce a report for their executive officer. A Data Flow Diagram (DFD) can be classified into logical data models for better understanding of user requirements and physical data models to reflect the design of the proposed system.

- Logical Data Flow Diagram (Logical DFD)

We use the logical DFD to represent processes. It is based on the solution that can support all the user requirements and gain the highest Return on Investment (ROI) from the analysis. In the context diagram of the proposed system, data will be stored in the Help Desk system. Thus when ITC users send a request for assistance to the Help Desk, they can retrieve support information from the system and respond to users immediately. Moreover, other departments' requests will be also kept in the system so that they will be used for tracking and scheduling time in the case of an outsourcing request. Staff information will be stored in the system for use by internal management. All of this information can be retrieved from the system in order to produce a Help Desk report for the executive officer. (See Figure 3.2.)

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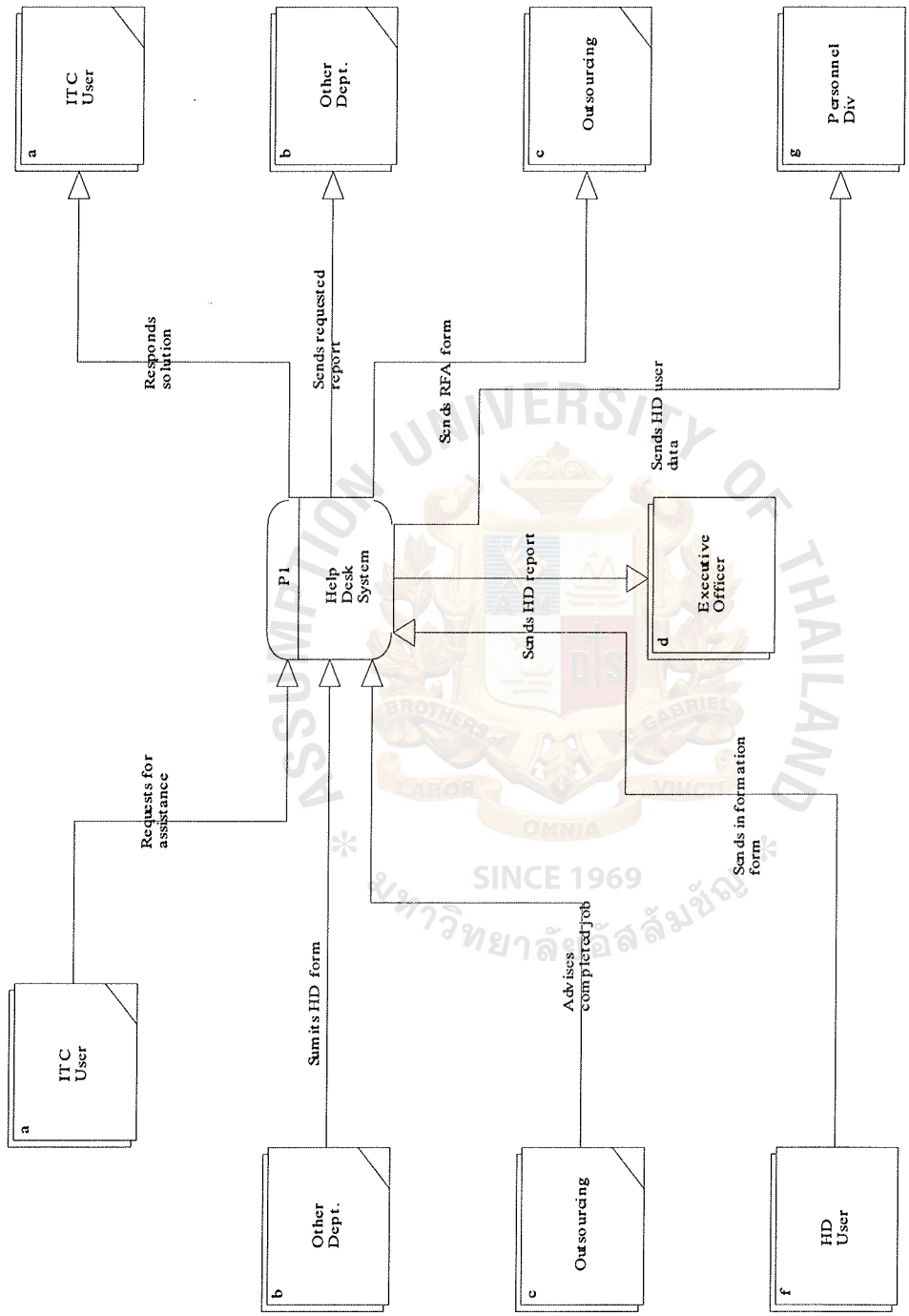

Figure 3.2. Context Diagram of the Proposed System.

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For better understanding, the proposed system can be divided into 5 main processes as follows: (See Figure 3.3.)

Process 1 : Problem solving process : This process starts when ITC users call or send a request for assistance to the Help Desk to solve their problem. The Help Desk will respond to the user with the correct solution from the centralized database.

Process 2- Respond requested process : When other departments need Trade Finance information, they will send the HD form to request the Trade Finance information needed. Thus the Help Desk division has to respond to the request by retrieving the data needed and sending it to them.

Process 3- Check data & close RFA process : If the Help Desk can not respond to the request by themselves, then they will send the request to an outsourcer instead. After the outsourcer has finished the Help Desk request, they will advise the Help Desk. The Help Desk officer will check the task of the outsourcer. If it is completed, a Help Desk officer will close the RFA of that outsourcing.

Process 4- Produce HD report : The Help Desk will make a Help Desk report at the end of every month. The report contains the support tasks during month. It will be sent to the executive officer.

Process 5- Maintain HD user record process : The staff information will be stored in the system for internal management.

- Physical Data Flow Diagram (Physical DFD)

During system design, the logical process model will be transformed into a physical process model for the chosen technical architecture. This model will reflect the technical capabilities and limitations of the chosen technology. For the proposed system, we provide the application by using MS Visual Basic 6.0 version and use Oracle database server to manage the centralized database. For the OS or Operating

System, we select Windows 98 to support the Help Desk operation. The centralized database server will be managed and controlled by Oracle 7 sever and Developer 2000 for work group access and concurrency control. There are 5 main functions in the physical DFD of the proposed system for banking business. They are the problem solving process, respond requested process, check data & close RFA, produce HD report and maintain HD user record process. (See Appendix C)

Process 1 : Problem solving process

This process starts when ITC users call or send a request for assistance to the Help Desk to solve their problem. This process can be further subdivided into 4 sub-processes. (Figure C.1.)

Process 1.1- Initial problem_: When ITC users call or send a request for assistance to solve their problem, then a Help Desk officer will initial that problem into the proposed system or the Help Desk system in order to create a transaction for such a problem. The transaction will be stored in both the ITC requested file and the problem and solution file for the next process. This process can be subdivided into 2 processes. (See Figure C.2.)

Process 1.1.1- Issue request number : This process will be done by the Help Desk officer in order to issue the number of a problem transaction and to input details of that problem including the user's information in the system. This problem transaction will be sent via a window dialog box to an expert officer who will find the correct solution.

Process 1.1.2- Screen problem : When the expert officer receives the problem transaction, he will screen that problem before sending it to the find solution process.

Process 1.2- Find solution : The problem transaction will be analyzed by the expert officer. This process will return a solution. There are 2 sub-processes in this process as follows : (See Figure C.3.)

Process 1.2.1- Analyze the problem : The officer will search the same problem in the problem and solution file.

Process 1.2.2- Define solution : If the problem is the same as in the Help Desk database, the solution will be retrieved for implementation in the next process. If not, the expert officer will define a suitable solution in order to solve that problem.

Process 1.3- Approval solution : Before the solution will be implemented for the ITC user, it has to be approved by a senior Help Desk officer. This process can be divided into 2 sub-processes. (Figure C.4.)

Process 1.3.1- Re-check : A senior officer will check the solution of that problem via a window dialog box again before it will be implemented for the ITC user. He focuses on the correctness of the solution as it should be able to solve the problem without any effects.

Process 1.3.2- Sign approved : After that solution is checked then it will be approved by the senior officer. The senior officer will key his code in that problem transaction and release it in order to update the database and send it to the implement solution process.

Process 1.4- Implement solution : The approved transaction will be implemented for the ITC user. This process can be further divided into 4 sub-processes. (See Figure C.5.)

Process 1.4.1- Contact user : The Help Desk officer will contact the user who requested assistance in order to implement the solution.

Normally, he will call the user according to the user's telephone number in the database.

Process 1.4.2- Explain solution : The officer will explain the way to solve the problem to the user. Sometimes, the Help Desk officer will send the solution through facsimile to the user who requested the solution document.

Process 2- Respond requested process : Other departments will send the HD form for request Trade Finance information needed. Thus, the Help Desk division has to respond to the request by retrieving the data needed and sending it to them. There are 5 sub-processes for this process. (See Figure C.6.)

Process 2.1 Issued HD No : This process will issue a number for those requests and keep the request details in the HD file.

Process 2.2 Re-check requested : The request will be checked and reviewed in order to approve such requests and to assign jobs in the next process.

Process 2.3 Assign job : If the request can be performed by the Help Desk, then it will be assigned to the Help Desk officer. If not, that request will be sent to outsourcing.

Process 2.4 Respond requested : The Help Desk officer will respond according to the request.

Process 2.5 Create RFA : If that request has to be performed by outsourcing, then the Help Desk officer will create an RFA or request for assistance and send it to outsourcers in order to make the request. The RFA information will be stored in the RFA file.

Process 3- Check data & close RFA process : After the outsourcer has performed the Help Desk request, then they will advise the Help Desk. The Help Desk officer will

check the task of the outsourcer and accept it. The Help Desk officer will close the RFA of that outsourcing into the proposed system. There are 3 sub-process in this process.

Process 3.1- Check data : The Help Desk officer will check the task of the outsourcer before sending it to the user.

Process 3.2- Deliver report : The report will be sent to the department which requested that information. It may be sent by mail, messenger or transferring file through the Eximbills system.

Process 3.3- Close RFA : The RFA that outsourcer has responded to will be closed by marking close flag in the RFA file.

Process 4- Produce HD report : At the end of each month, each Help Desk sub-division has to send a report that contains the Help Desk tasks during month to their executive officer. There are 3 sub-processes. (See Figure C.10.)

Process 4.1- Collect data : The proposed system will retrieve data from the database sever to produce the Help Desk report.

Process 4.2- Merges data : Data from the various file will be merged into the same format and printed into a report.

Process 4.3- Check report : Before the report will be sent to their executive officer, it will be checked by the senior Help Desk officer.

Process 5- Maintain HD user record process : This process involves keeping the Help Desk user's information in the system for personnel management. There are 4 sub-processes. (See Figure C.9.)

Process 5.1- Create user ID : The information of a new Help Desk user will be created and issued identification for reference in the HD user file.

Process 5.2- Update record : Whenever the Help Desk user's information changes, it will be updated in the HD user file accordingly for data consistency.

Process 5.3- Print report : Each division will add a new Help Desk user's record or update to the existing Help Desk user record, and the system will produce a report to be sent to the Personnel division.

Process 5.4- Check user data : The report will check the data before it will be sent to the Personnel division.

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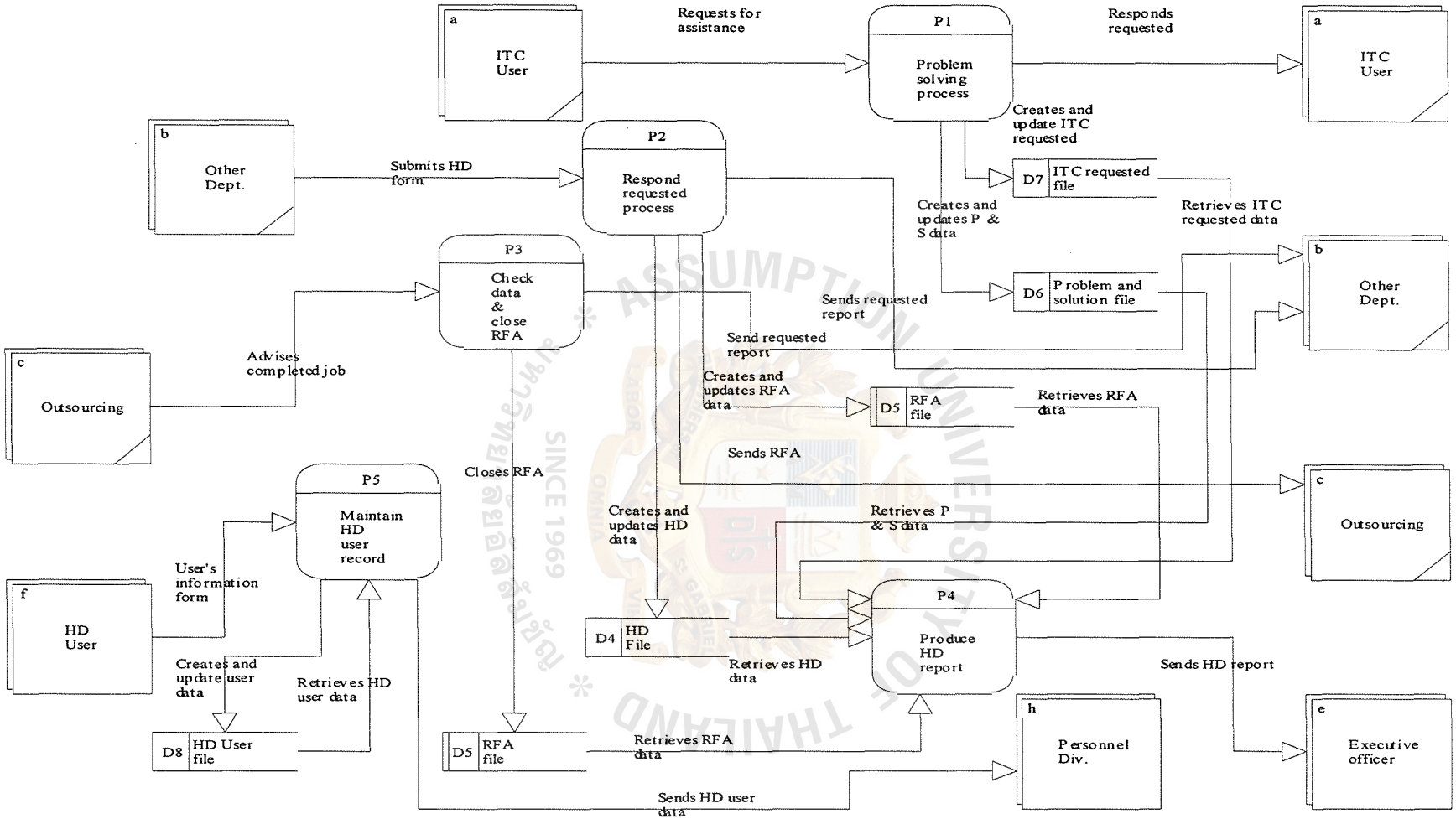

Figure 3.3. DFD Level 0 of the Proposed System.

3.2.3 Normalization Entity Relationship Diagram

After we have presented the data model (Entity Relationship Diagram) and process model (Physical Data Flow Diagram) of the proposed system, this part will normalize the Entity Relationship Diagram to be the third Normal Form (3NF) in order to reduce data redundancy and to ensure good management of the database for the Help Desk system. Normalization is applied for the proposed system in order to organize data attributes, so they are grouped to form stable, flexible, and adaptive entities. There are 3 steps in Normalization. The first normal form (1NF) eliminates repeating groups or attributes that have more than one value for a single instance of the entity. The secondary normal form (2NF) has non-primary key attributes, which are dependent on the full primary key, not just part of it. The third normal form (3NF) has non-primary key attributes, which are dependent on any other non-primary key attributes. Therefore, this proposed system provides ERD into 3 levels that are context data model, key based data model and fully attributed data model. (See Appendix B)

The 3NF of the proposed system is composed of 8 main entities with one associative entity. The relationship between the ITC requested entity and the problem & solution entity is a many-to-many relationship (m:n) or nonspecific relationship, so we can resolve it into a pair of specific (one-to-many) relationships to an associative entity. The relationship will be described as follows: (see Figure 3.4.)

1. One ITC user belongs to one department.
2. One department can have one or more ITC users.
3. One ITC requested can have one or more problem.
4. One problem can occur in one ITC requested.
5. One problem and solution can occur in one or more problem.
6. One problem can occur in one problem and solution.

7. One Help Desk user can receive zero or more HD form.
8. One HD is responded to by one Help Desk user.
9. One RFA is created by one Help Desk user.
10. One Help Desk user can create zero or more RFAs.
11. One outsourcing responds to one or more RFAs.
12. One RFA is responded to by one outsourcing.
13. One Department can send zero or more HD form.
14. One HD form is sent by one department.

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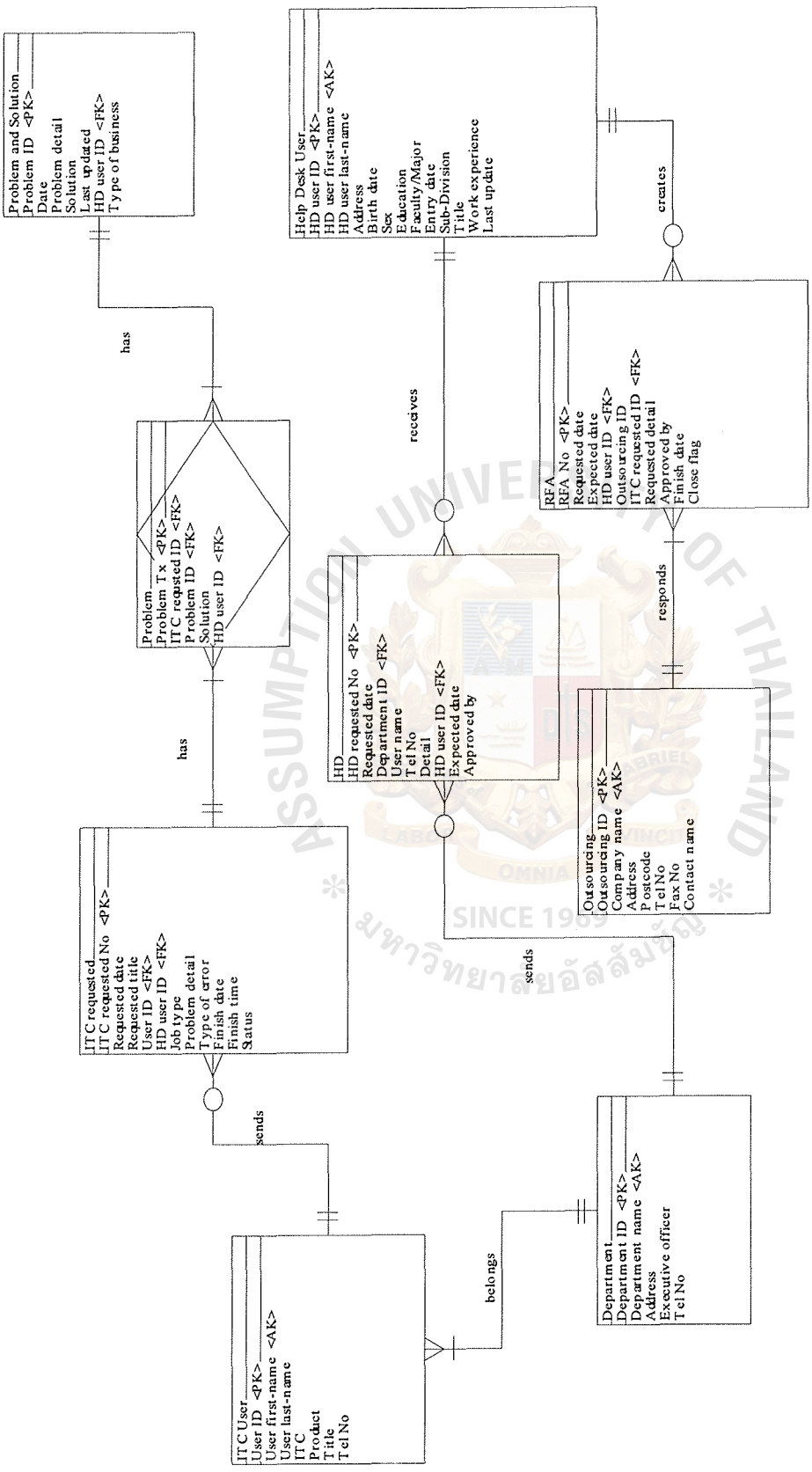

Figure 3.4. Normalized ERD of the Proposed System.

3.2.4 Input and Output Design

Input design serves an important goal : to capture and get data into a format suitable for the computer. For the proposed system, there are 2 source documents or paper forms used to record data that will eventually be input to a computer : A Help Desk Form for Other Department Requested and a Help Desk Form for the ITC user requested (See Appendix H) Data input will be on-line input, so the user can input data at its point of origin in the Help Desk system and for the direct inputting of that data to the computer, preferably as soon as possible after the data originates. The on-line system includes a monitor screen and a keyboard that are directly connected to a computer system through screens having a "graphical" looking appearance, called graphical user interface (GUI). The proposed system uses Microsoft Visual Basic V.6.0 to develop both input and output design with GUI.

Moreover, the system provides users with screen-based controls for inputting data including : Text box, radio button, check box, list box, drop-down list, combination box and spin box in order to facilitate users when they input data through computer screens. (See Appendix I) Outputs present information to users in the way that they fulfill user requirements in both daily operation and in decision making, such as an MIS report. Therefore, the proposed system provides 8 reports for daily operations in the Help Desk and 4 MIS reports for the decision making of the executive officer. However, we will get users involved by using prototyping outputs demonstrated to them in order to obtain feedback from users, including appropriate help or instructions during output design time. (See Appendix J)

3.3 Hardware and Software Requirements

Currently, the bank has LAN implemented already. The network architecture of the existing system is LAN, setting peer to peer, in which a network node is able to send information directly to another network node without routing it through a central device. This network is easy to set up. In addition, each workstation can keep and manage data by itselves without any effects should the network be corrupted. Workstations will not be able to connect to each other, but computers can still work individually. (See Figure 3.5.) Network topology is a ring network, using an Ethernet LAN card as a network interface card, which allows a workstation to communicate with other workstations. The protocol of the existing system is TCP/IP. Thus, we can classify LAN components of the existing system as follows :

- PC Workstations : Digital Pentium II 300 MHz, RAM 32 Mb, Hard Disk 3.2 Gb., Monitor 15". There are 15 workstations in the existing system.
- Network topology : Ring network. Network interface cards (NICs) for each workstation (Ethernet LAN Card 10/100 Mbps).
- Protocol : TCP/IP.
- Cables to connect each workstation : Unshielded Twisted Pair.
- Network operating system to control the use of the network : Windows' 95.
- HUB D-Link : 24 Ports 10/100 Auto-sensing stackable HUB.
- Laser Printers : Hewlett Packard LaserJet 4Si. There are 3 printers.
- Scanner : Epson GT-6500. There is 1 machine.

As I mentioned, the network architecture of the existing system is a peer to peer configuration, so it's not suitable for supporting a centralized database and concurrent user access to the database. Moreover, it can not serve database expansion in the future. Thus, the network architecture of the proposed system will be two-tiered client/server

system or local area network (LAN), in which is more flexible than a peer to peer system and supports future expansion better than the existing system. The two-tiered client/server system is a set of client computers in which each sub-division is connected to one server computer through a cable over relatively short distances within a single department and the same floor of the building.

By doing this, the system will store all support information in the centralized database server and distribute software applications and user interfaces on the client servers. Computers of each Help Desk sub-division will be linked to the central database server to retrieve and update data directly according to security controls. In addition, they can share other resources such as laser printers, Fax-modems, scanners, and file including other software and hardware. As the data is kept centrally, the data will retain integrity and be updated all the time.

For network topology, the ring network will be implemented for the proposed system like in the existing system because it can connect multiple computers and some peripheral units into a ring-like structure. Ring networks generally transmit data in one direction; therefore many computers can transmit at the same time to increase network throughput by using an Ethernet card to connect them. (See Figure 3.6.)

Data architecture of the proposed system is a shared data resource. It will be suitable to keep data in the form of a relational database. The Oracle database server will be implemented in order to control and manage the proposed system better than the existing system for user access to the database as DBMS. Both input and output interface have been designed in the form of Graphical User Interfaces (GUIs), because users are more familiar with graphical than primitive user interfaces and it's also easier for end users to key in and access data. Moreover, On-line processing is selected for the interfacing of this solution because Help Desk users can access data quickly and get

updated data. The process architecture of the proposed system uses MS Visual Basic 6.0 version software for creating application functions of the Help Desk system for banking business because it's currently flexible and powerful software.

In the proposed system, we need to add only a computer sever and software to manage and control concurrent access and its components. Most of the new system can be shared from the current LAN System of the bank. Therefore, the hardware and software required for the proposed system are as follows:

3.3.1 Hardware Requirement

- COMPAQ ProLiant 800 Computer Server :-- CPU Pentium II 450MHz., 512 KB Cache, RAM 64MB (expandable 1 GB), Harddisk 9GB (max. 72,8 GB) SCSI, Monitor 14", CD-Rom SCSI, Slots 3PCI 3ISA, Ethernet LAN Card 10/100 Mbps Wake up on LAN, Option: Tape Drive 12/24DAT (Auto Loader)

3.3.2 Software Requirements

- Oracle 7 Server Enterprise & Concurrent User
- Developer 2000
- SCO Unix & Concurrent Access
- Windows 98 for 10 licenses
- MS Visual Basic 6.0 for server
- WinFax Pro for server

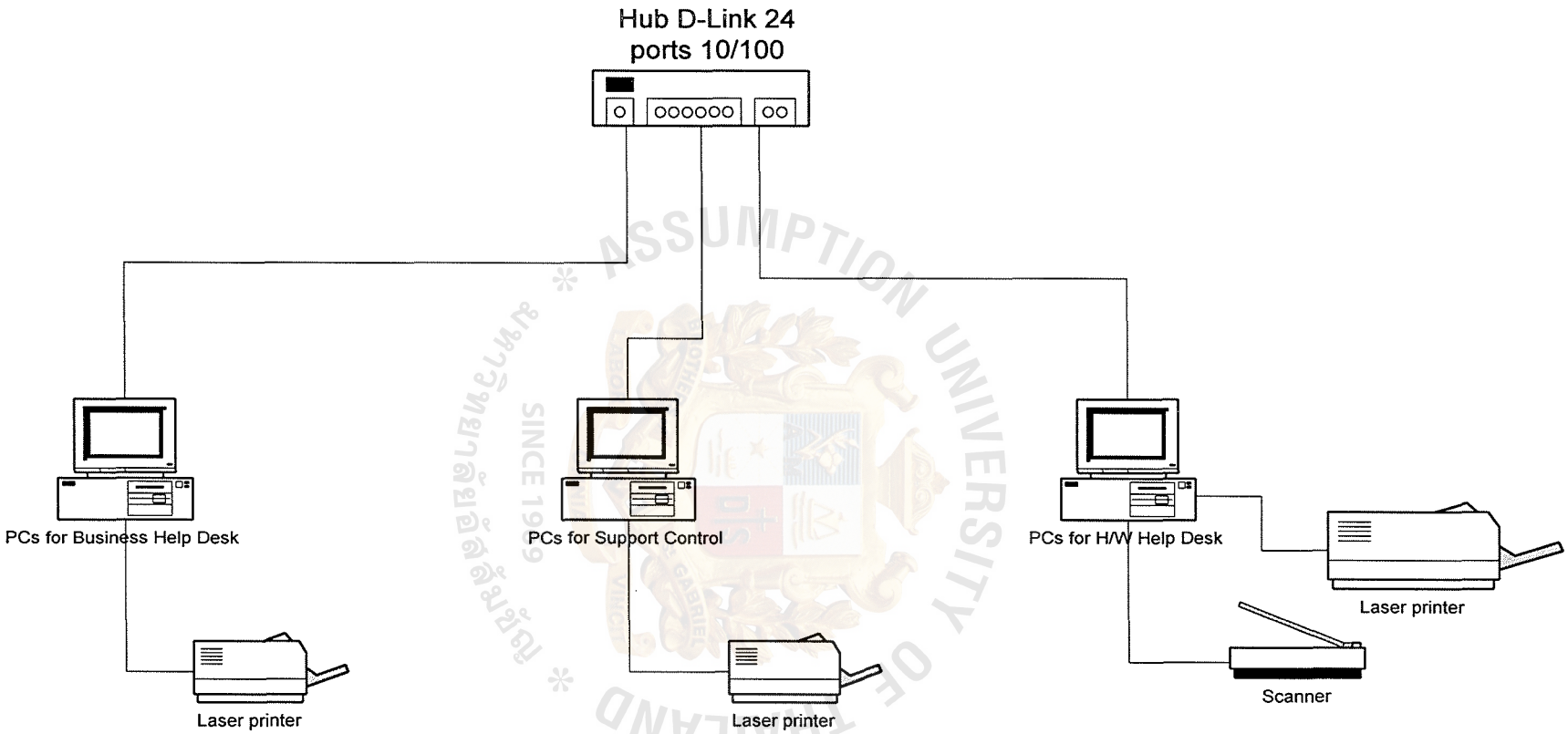

Figure 3.5. Network Configuration of the Existing System.

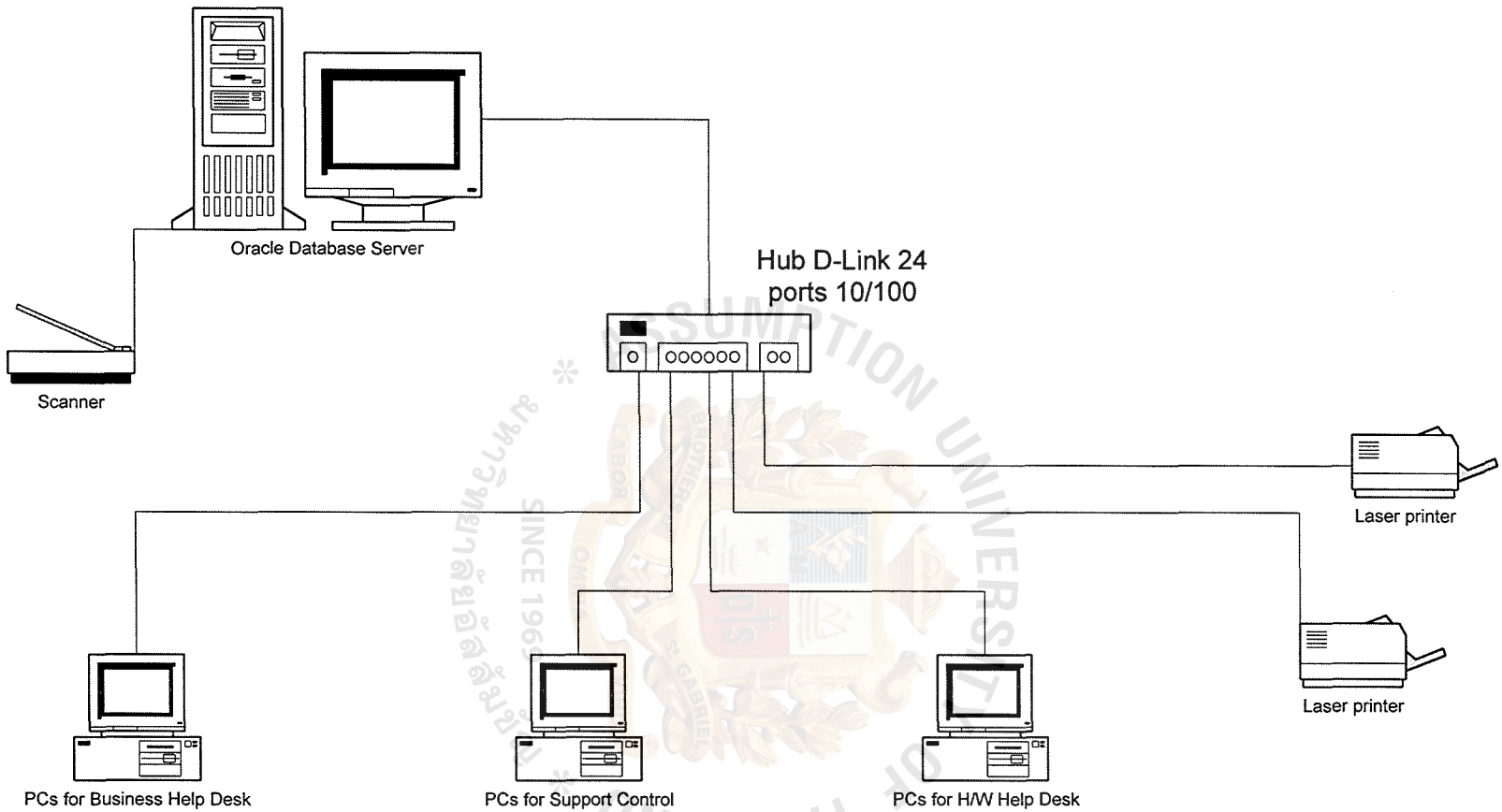

Figure 3.6. Network Configuration of the Proposed System.

3.4 Security and Controls

Security and Controls of the Help Desk System can be classified simply into: -

3.4.1 Logical Security

- Password : The first security control of the Help Desk System is the password. There are two password levels to access through the system. The first level allows a person to have the authority to use a file of the Help Desk System. The second one is the password of the system itself to control the function of each module of the system including editing and modifying the program.
- Security Control Log and Audit Trail : Possible attempts to use the Help Desk System illegally can be highlighted by a review of the log together with an exception report on invalid using.
- File Control : It is to ensure suitable storage and to limit access to the system files. This file is normally labeled externally and internally, and stored in a library when it is not in use.
- System Force Change Password : The system will force users to change their password periodically once a month. Additionally, users can make a change to his/her password at anytime.

3.4.2 Physical Security

- Back-up Facilities : All the files will be backed up to the diskette daily by the Oracle Database System at the Database Server. The data files and system files will be backed up daily. In this connection, the data file can be restored to the system whenever there is file loss or corruption. The data back up diskette will be kept in the strong room of the bank in order to protect from fire damage and it will be in a sequence of circulation for 7 days.

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- UPS (Uninterruptable Power Source) : Dirty power, such as sag and surges in power output or low power, cause data transmission errors and program execution errors. An UPS system serves as a control buffer between the external source and the computer system. If the external power fails, the UPS system permits operation to continue for a short period of time after the outage. This allows operators to either "power down" normally or to switch to a back up power source.

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3.5 Cost/Benefit Analysis

3.5.1 Cost Analysis

The cost estimation will consist of 2 main parts that are development costs and projected annual operating costs. Development costs will include the cost of hiring personnel to develop the new system, the expense that will be required for training and the cost for acquiring new hardware and software. For this project, some of the personnel to develop the new system can be requested from the Information System and Engineering Department for organization such as programming. Thus, the cost of hiring personnel will be required for hiring a Systems Analyst and a Database Specialist. Moreover, some of the hardware and software are available in the organization, so the cost of available equipment and software tools will not be included.

The second part of cost estimation will be the Projected Annual Operating Costs. This part will include the cost after the system has been implemented. This will include the Personnel cost and other maintenance costs required. These costs will be incurred every year. (See Table 3.1)

3.5.2 Benefit Analysis

Benefits of the Help Desk System can be divided into two parts:

Tangible benefits: Tangible benefits are the benefits of solving data inconsistency and redundancy problems, benefits of less paper printing, and benefits of requiring fewer staff to support users and increase throughput. (See Table 3.2)

- By reducing the number of employees necessary to operate the manual system, we can save salary and bonus for 3 persons :

  Salary 3 persons (8000 * 12 moths * 3) = 288,000

  Bonus 3 person (8000 * 2 moths * 3) = 48,000

- Decrease the cost of paper used because we use WinFax Pro to keep documents in the computer when a user sends a request form through facsimile. There will be no need to print the document out.
- Decrease in overtime because the Help Desk system can handle both filing and document tasks and it enhances the user's operation efficiency.

For better understanding, we provide information about the company as following :

There are 3 sub-divisions in the Help Desk division.

- There are 7 staff for each sub-division who respond to a user's problem and to other department's requests, including the document tasks.
- The average staff member's salary is 8,000 Baht with a bonus for 2 months per person.
- The amount of paper used each month is 10 reams.
- Overtime 50 hours per month at 100 Baht per hour rate.

Intangible benefits : Intangible benefits are about employees' morale :

- Improve employee goodwill because they have a system to handle their tasks and reduce their workload.
- In the proposed system, data will be kept in permanent storage, which eliminates loss of information and damaged documents and provides more security than the existing system.
- Increase the quality and efficiency of Help Desk tasks in keeping data in a standard format and in sharing resources.

3.5.3 Cost and Benefit Analysis

We would recommend implementing the proposed system because it supports all user requirements and the technology used supports the future expansion of the organization. Moreover, the payback period is approximately 1.33 years (See Table

3.3., Figure 3.8.), so it's a good investment and the return on investment (ROI) is calculated as follows: (See Table 3.4)

ROI = (Estimated lifetime benefits – Estimated lifetime costs) / Estimated lifetime costs

= (1,529,477 – 539,307) / 539,307

= 1.84 = 184% for 5 years

This is a lifetime ROI, not an annual ROI, so it will be divided by the lifetime of the system yields and average ROI equals 36.8% per year. The return on investment (ROI) is a high rate and the payback period is not too long, which is a good condition. By implementing the new system, the organization will benefit and get the total support of the Help Desk system as required.

3.5.4 Cost Trade-Off Analysis

The cost trade-off analyses in both the existing system cost and the proposed system cost. (See Table 3.5.,3.6.) It's used as a tool in, which supports their decision making for investment in the proposed system. For this project, the cost of the proposed system will be higher than the cost of the existing system in the first period but it will be decreasingly in the next time. Then we will get a lot of benefits from the proposed system usage. (See Figure 3.7.)

Table 3.1. Cost of the Proposed System.

DEVELOPMENT COSTS:		
Personnel:		Amount (Baht)
	Work hours required 30 hours for Systems Analyst	
1	Systems Analyst (1,000 Baht / hour)	30,000
	Work hours required 20 hours for DB Specialist	
1	Database Specialist (500 Baht / hour)	10,000
	Work hours required 20 hours for users (help in testing and recording)	
3	User [(O.T. rate 100 Baht/hour)x3]	6,000
Expenses:		
User Training hours needed 15 hours		
User Training rate : 100 Baht per hours		
Total number of user 30 persons		
User Training Cost		45,000
DEVELOPMENT COSTS:		
New Hardware :		
1	COMPAQ ProLiant 800 Computer Server - CPU Pentium II 450MHz., 512 KB Cache, RAM 64MB (expandable 1 GB), Harddisk 9GB (max. 72,8 GB) SCSI, Monitor 14", CD-Rom SCSI, Slots 3PCI 3ISA, Ethernet LAN Card 10/100 Mbps Wake up on LAN, Option: Tape Drive 12/24DAT (Auto Loader)	200,000
New Software :		
1	Oracle 7 server enterprise & concurrent user	50,000
1	Developer 2000	30,000
1	SCO Unix & concurrent access	25,000
10	Windows 98	30,000
1	MS Visual Basic 6.0 version for server	20,000
1	WinFax Pro for server	5,000
Total Development Costs:		451,000
PROJECTED ANNUAL OPERATING COSTS:		
Personnel:		
	Work hours required 5 hours for Systems Analyst	
1	Systems Analyst (1,000 Baht / hour)	5,000
	Work hours required 5 hours for DB Specialist	
1	Programmer (500 Baht / hour)	2,500
Expenses:		
Maintenance agreement for Pentium Pro Server		8,000
Maintenance agreement for Server DBMS software		5,000
Total Projected Annual Operating Costs:		20,500
Total Costs:		471,500

Table 3.2. Benefits of the Proposed System.

	Existing System	Proposed System
Staff rate(Baht) per month	8,000	8,000
Required staff	30	27
Saving cost of salary+bonus decrease per year	0	336,000
Cost of paper per ream	80	80
Paper used per year	120	60
Saving cost of paper decrease per year	0	4,800
Overtime per year	600 hrs.	120 hrs.
Overtime rate 100 Baht/hr		
Saving cost of overtime	0	48,000
Total of Tangible Benefits (Baht)		388,800

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Table 3.3. Payback Period of the Proposed System.

Cash flow description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Development cost:	-451,000					
Operating & Maintenance Cost:		-20,500	-22,550	-24,805	-27,286	-30,014
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted costs (adjusted to present value):	-451,000	-18,304	-17,977	-17,656	-17,340	-17,031
Cumulative time-adjusted costs over lifetime:	-451,000	-469,304	-487,280	-504,936	-522,276	-539,307
Benefit derieved from operation of new systems:	0	388,800	408,800	428,800	448,800	468,800
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.567
Time-adjusted benefits (adjusted to present value):	0	347,143	325,893	305,211	285,221	266,010
Cumulative time-adjusted benefits over lifetime:	0	347,143	673,036	978,247	1,263,468	1,529,477
Cumulative lifetime time-adjusted cost and benefits:	-451,000	-122,161	185,755	473,311	741,191	990,170

Table 3.4. Net Present Value of the Proposed System.

Cash flow description	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Development cost:	-451,000						
Operation & maintenance cost:		-20,500	-22,550	-24,805	-27,286	-30,014	
Discount factors for 12%:	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual costs:	-451,000	-18,304	-17,977	-17,656	-17,340	-17,031	
Total present value of lifetime costs:							-539,307
Benefits derived from operation of new systems	0	388,800	408,800	428,800	448,800	468,800	
Discount factor for 12%	1.000	0.893	0.797	0.712	0.636	0.567	
Present value of annual benefits:	0	347,143	325,893	305,211	285,221	266,010	
Total present value of lifetime benefits:							1,529,477
Net present value of this alternative :							990,170
Return on investment :							1.84

Table 3.5. Existing System Cost and Proposed System Cost.

Cost Descriptions	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
List of Existing System Cost						
Salary (10% Increase)	2,016,000.00	2,217,600.00	2,439,360.00	2,683,296.00	2,951,625.60	3,246,788.16
Bonus	336,000.00	369,600.00	406,560.00	447,216.00	491,937.60	541,131.36
Paper	9,600.00	10,100.00	10,600.00	11,100.00	11,600.00	12,100.00
Overtime	60,000.00	66,000.00	72,600.00	79,860.00	87,846.00	96,630.60
Other Expenses	40,500.00	42,525.00	44,651.25	46,883.81	49,228.00	51,689.40
Total Cost of Existing System	2,462,100.00	2,705,825.00	2,973,771.25	3,268,355.81	3,592,237.20	3,948,339.52
Cumulative Cost of Existing System	2,462,100.00	5,167,925.00	8,141,696.25	11,410,052.06	15,002,289.27	18,950,628.79
List of Proposed System Cost						
Salary (10% Increase)	2,016,000.00	1,900,800.00	2,090,880.00	2,299,968.00	2,529,964.80	2,782,961.28
Bonus	336,000.00	316,800.00	348,480.00	383,328.00	421,660.80	463,826.88
Paper	9,600.00	4,800.00	4,300.00	3,800.00	3,300.00	2,800.00
Overtime	60,000.00	12,000.00	10,800.00	9,720.00	8,748.00	7,873.20
Other Expenses	71,200.00	56,960.00	45,568.00	36,454.40	29,163.52	23,330.82
New H/W, S/W	451,000.00					
H/W, S/W Maintenance		20,500.00	22,550.00	24,805.00	27,285.50	30,014.05
Total Cost of Proposed System	2,943,800.00	2,311,860.00	2,522,578.00	2,758,075.40	3,020,122.62	3,310,806.23
Cumulative Cost of Proposed System	2,943,800.00	5,255,660.00	7,778,238.00	10,536,313.40	13,556,436.02	16,867,242.25

Table 3.6. Existing System Cost vs Proposed System Cost.

Year	Existing System Cost	Proposed System Cost
0	2,462,100.00	2,943,800.00
1	5,167,925.00	5,255,660.00
2	8,141,696.25	7,778,238.00
3	11,410,052.06	10,536,313.40
4	15,002,289.27	13,556,436.02
5	18,950,628.79	16,867,242.25

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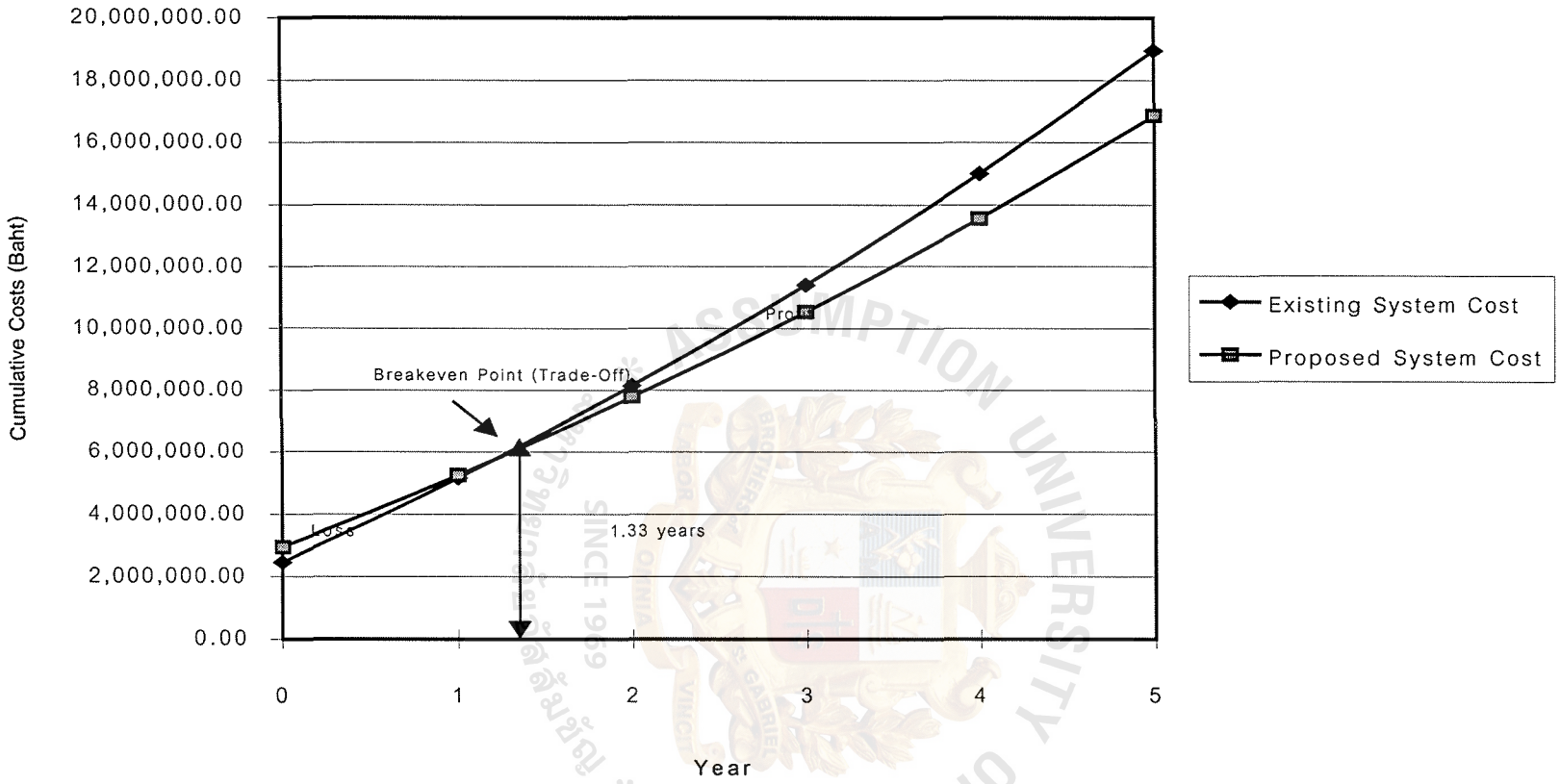

Figure 3.7. Existing System Cost vs Proposed System Cost.

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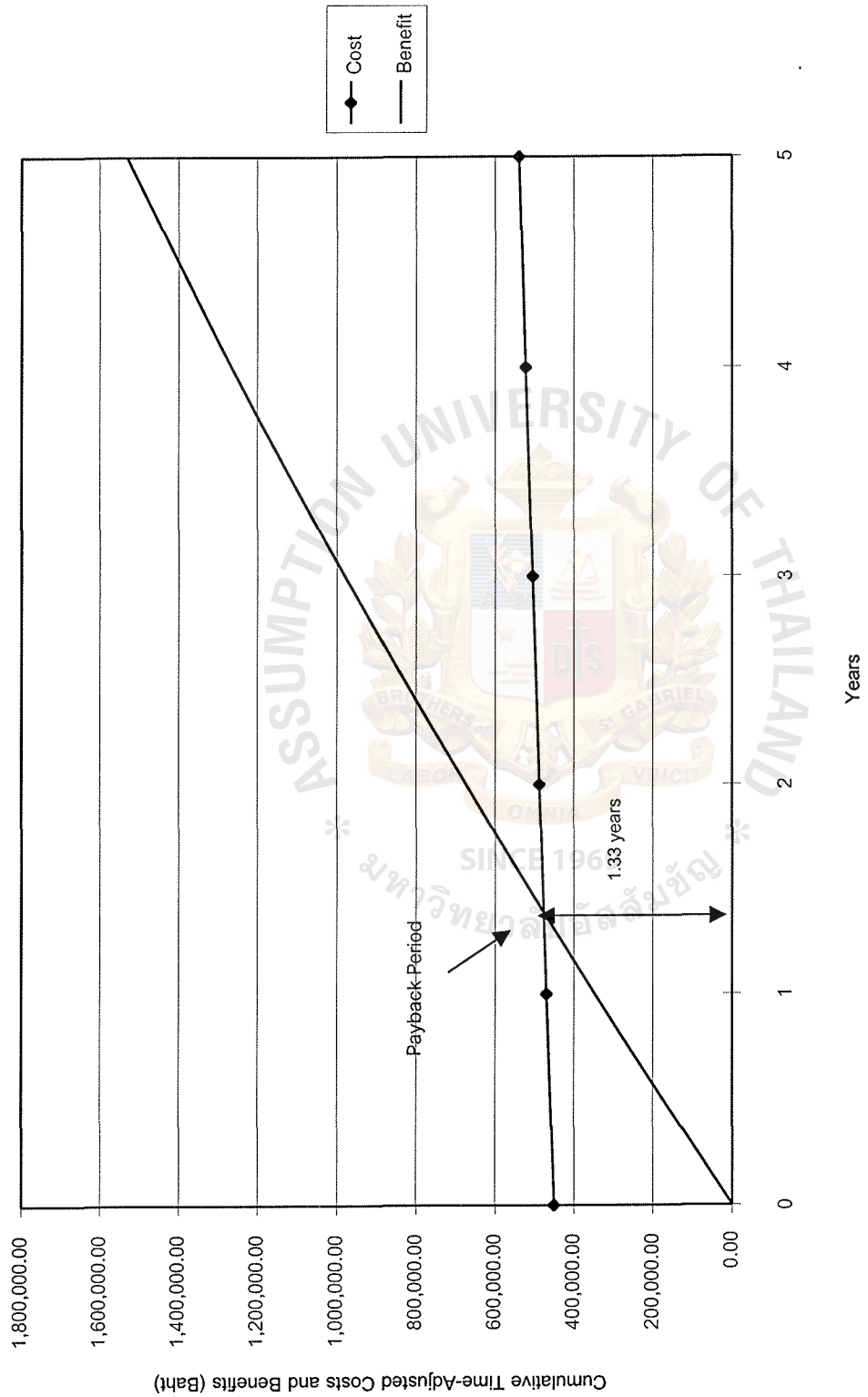

Figure 3.8. Payback Analysis of the Proposed System.

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IV. PROJECT IMPLEMENTATION

4.1 Project Implementation Schedules

The project plan of the Help Desk System is approximately within the period of 4 months (See Figure 4.1). The project plan is presented in the Gantt Chart showing the timeline in the horizontal axis and work to be completed on the vertical column. The project plan will include 3 major activities—System Analysis, System Design and System Implementation. Each activity contains Work Breakdown, which is related to Deliverables. The project implementation schedules are classified into 3 major activities which consist of :

4.1.1 System Analysis

This task is to survey and plan the project, study and analyze the current system, and define the business requirements of the current jobs of users in order to develop the software that can solve the problems of user directly or at least to relieve the burden of users for the routine job of help desk operation. This analysis will identify the main objectives of the Help Desk system and develop a system which can fulfill these objectives.

4.1.2 System Design

There are 7 activities in the system design phase; namely cost/benefit analysis, application architecture, process modeling, data modeling, data dictionary, structure chart & module specification and input/output design. This design phase is to submit the results of development which are mainly taken from the analysis of the System Analysis task. The main objective of submission of the analysis & design of the system is to let the user have a chance to understand and review the features of the structure of the proposed system and to gather more ideas from the users. After the review of users,

if there are no additional requests raised by the user, the user has to sign off the design of the system.

4.1.3 System Implementation

This session is the program construction. The system is prepared to be developed by using Oracle Database server as the database of the system and by using the Developer 2000 to develop a system which is a development tool of the system. The development is done according to the requirements of the user in the form of a system objective and the module specification of the system document. After the software development, the development team verifies the objectives, and the system will be tested for new software. For any mistakes or bugs generated from the system, the team will make a record and try to make adjustments during the software adjustment session. The adjustment will correct all the bugs as recorded and the system will be verified and adjusted again until it is approved by the system development team. The system that has been tested by the development team will be installed on the test machine in order to grant a chance from the user to overview the menus and features of the system that will be tested by the customers. The user test team will be set up, and training will be given to the users to understand the system. Test cases will be created by users to test whether the system can produce the correct result for the user or not. After the testing is approved, the testing team will sign off the acceptance test. The training course of the system will be arranged for all the users for their operations after the system testing has been completed. All users will be trained to understand the structure of the system and to let them know the normal functions and advanced concepts of the system. Additionally, it gives them a case study to let them have a chance to really work with a developed system with better understanding of the system concept.

The proposed system will be started at the end of August. The development team will always give assistance to the users for the first week of live environment.

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ID	Task Name	Duration	Start	Finish
1	System Analysis	21d	Mon 3/1/00	Mon 31/1/00
2	Survey and plan the project	5d	Mon 3/1/00	Fri 7/1/00
3	Study and analyze the existing	10d	Mon 10/1/00	Fri 21/1/00
4	Define business requirement	11d	Mon 17/1/00	Mon 31/1/00
5	System Design	24d	Tue 1/2/00	Fri 3/3/00
6	Cost/Benefi analysis	4d	Tue 1/2/00	Fri 4/2/00
7	Application Architecture	5d	Mon 7/2/00	Fri 11/2/00
8	Process modeling	10d	Mon 7/2/00	Fri 18/2/00
9	Data modeling	15d	Mon 7/2/00	Fri 25/2/00
10	Data Dictionary	15d	Mon 7/2/00	Fri 25/2/00
11	Structure chart & module spec.	15d	Mon 7/2/00	Fri 25/2/00
12	Input/output design	15d	Mon 14/2/00	Fri 3/3/00
13	System Implementation	45d	Mon 28/2/00	Fri 28/4/00
14	Construct the new system	20d	Mon 28/2/00	Fri 24/3/00
15	Install the system test version	5d	Mon 20/3/00	Fri 24/3/00
16	Conduct the sytem test	10d	Mon 27/3/00	Fri 7/4/00
17	Train users	10d	Mon 10/4/00	Fri 21/4/00
18	Convert to new system	5d	Mon 24/4/00	Fri 28/4/00

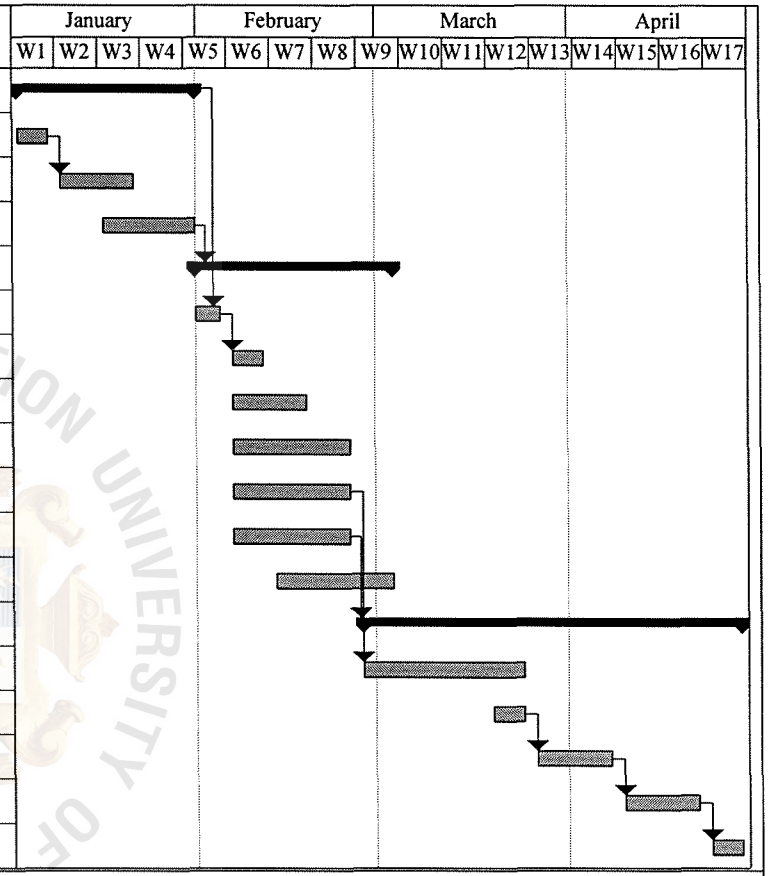

Figure 4.1. Implementation Plan.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

We have proposed the solution to solve the problems of the existing system. The proposed system improves the user's problem solving process of the Help Desk within the International Trade Supporting division. We collected problems and defined the correct solutions for standard information, then stored it in the centralized database for a standard response to users' problems, including reduced time consumption. Moreover, the proposed system gathers all requests; both users' requests or other departments' requests, into the system in order to improve tracking and scheduling time to respond to users. Data is kept in the centralized database to reduce the data redundancy as well as the cost of operation. Not only good management of the problem solving process in Help Desk operation is achieved, but the new system also supports the database management for concurrent user access in order to protect unauthorized user access. In enhancing data management in the proposed system, we change the network configuration of the existing system to two-tired Client/Server which supports and controls not only concurrency access in the database but also supports the future expansion of the database. Therefore, the advantages of this new system are satisfying the user's requirements, reducing the data redundancy, preserving data consistency, ease of usage and maintenance, and reducing cost of operation. Besides that, the payback period of the system is approximately 1.33 years and return on investment (ROI) is 36.8% per year, which is in a good rate.

To implement the proposed solution, we can conclude that we get various benefits from the Help Desk system. The problems of the existing system can be solved with increasing efficiency and throughput in the system at the same time.

5.2 Recommendations

Though the system is quite complex and requires more time for designing, installation and implementation, the end user will gain benefit from usage convenience. It may be complex to use during the initial period, but the users will get used to the new systems. In addition, this system can support the future expansion of the organization with efficient use of the Help Desk database. For future expansion, we can add an automatic answering machine into the system in order to improve the service of the Help Desk. By linking the automatic answering machine with the database, which contains both problems and solutions by using software that can be controlled by users, access through telephone line is possible. So when users have problems, they can call the Help Desk and select menus from an automatic answering machine through the telephone keypad in order to get a solution by themselves. By doing this, we need fewer Help Desk officers to handle a specific problem.

Moreover, all the Help Desk tasks should be defined in a standard time to service users or service level agreement in order to improve the speed of the Help Desk responses to users. Therefore, adding fields for counting start and finish time in the data structure for recording such data can modify the system. Moreover, a new report can be created for the executive officer's management without any effects. All of the support information—problems or standard solutions—can be categorized and stored in a CD-ROM by grouping according to business types and sending to ITC in order to retrieve the correct solution from CD-ROM by themselves. By doing this, they don't need to contact the Help Desk and it also reduces the cost of Help Desk support.

APPENDIX A

LOGICAL DATA FLOW DIAGRAMS

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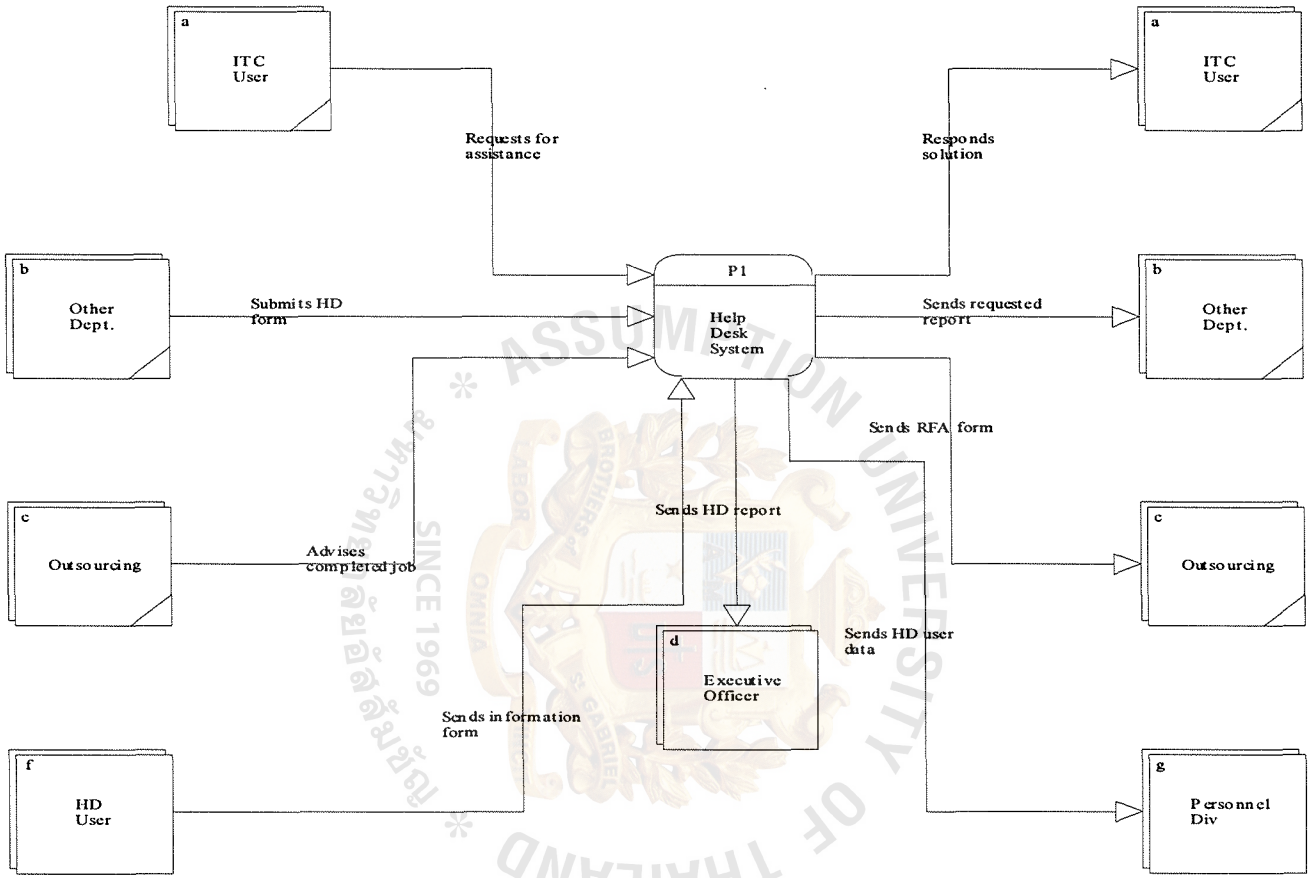

Figure A.1. Logical DFD- Context Diagram of the Proposed System.

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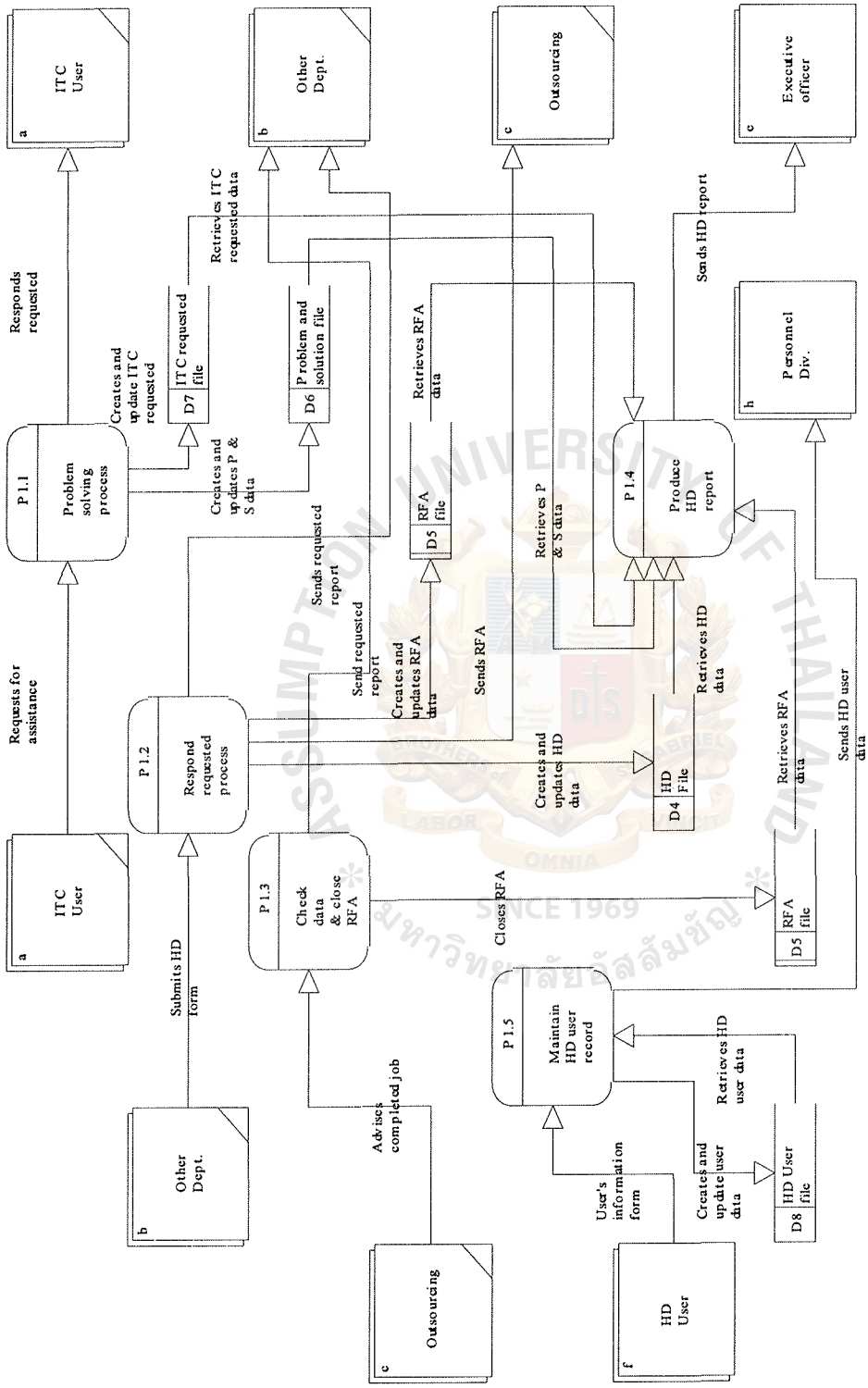

Figure A.2. Logical DFD- Level 0 of the Proposed System.

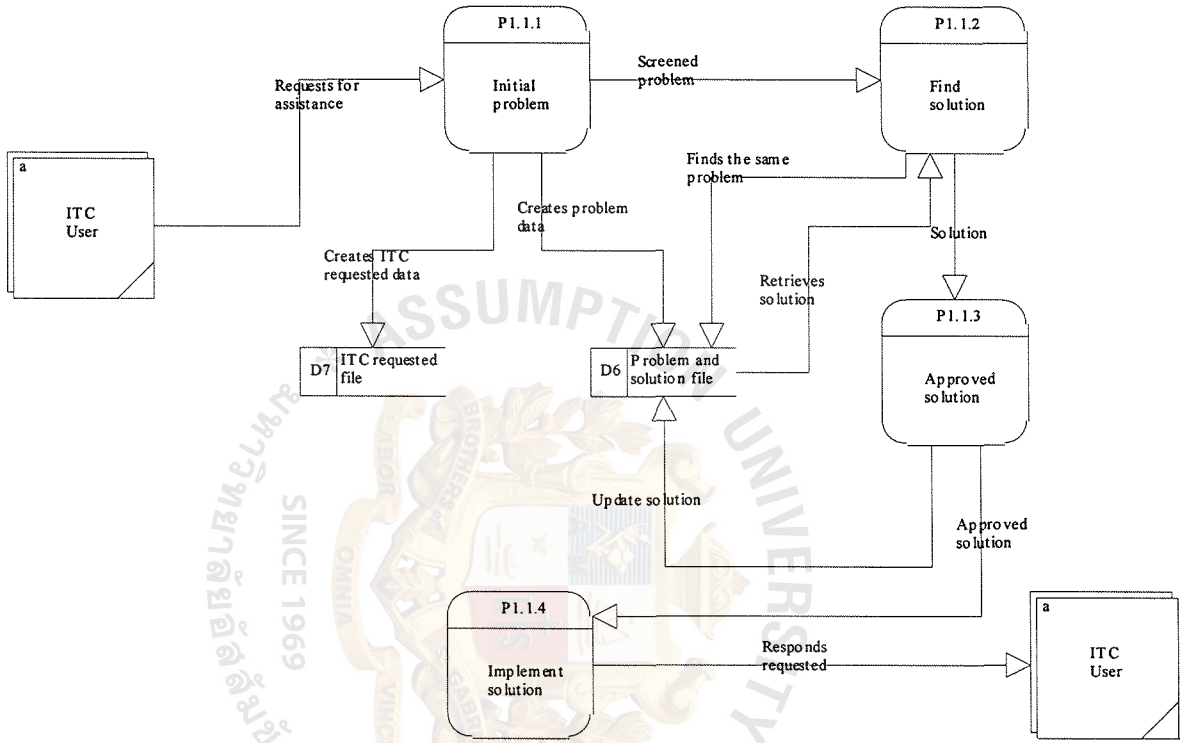

Figure A.3. Logical DFD- Level 1 for Problem Solving Process [Proposed System].

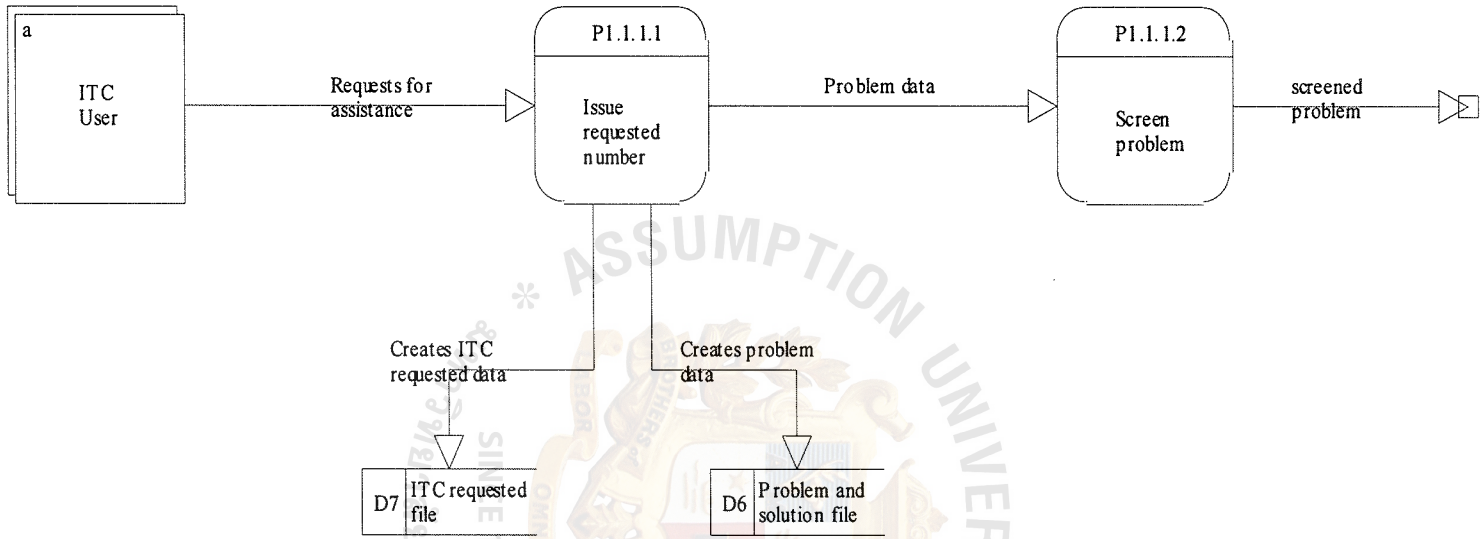

Figure A.4. Logical DFD- Level 1.1 for Initial Problem Process [Proposed System].

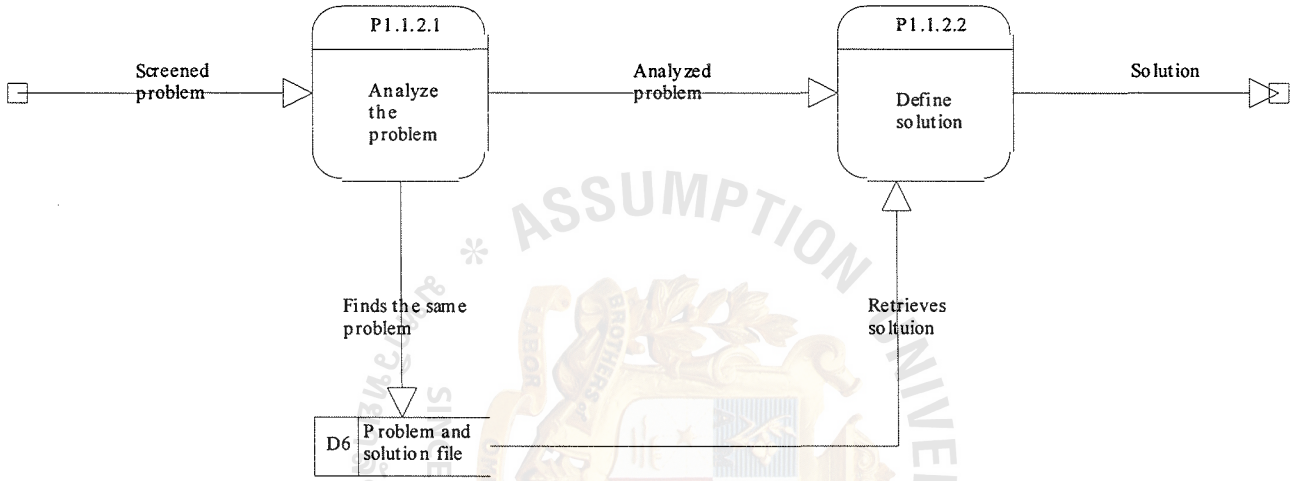

Figure A.5. Logical DFD- Level 1.2 for Find Solution Process [Proposed System].

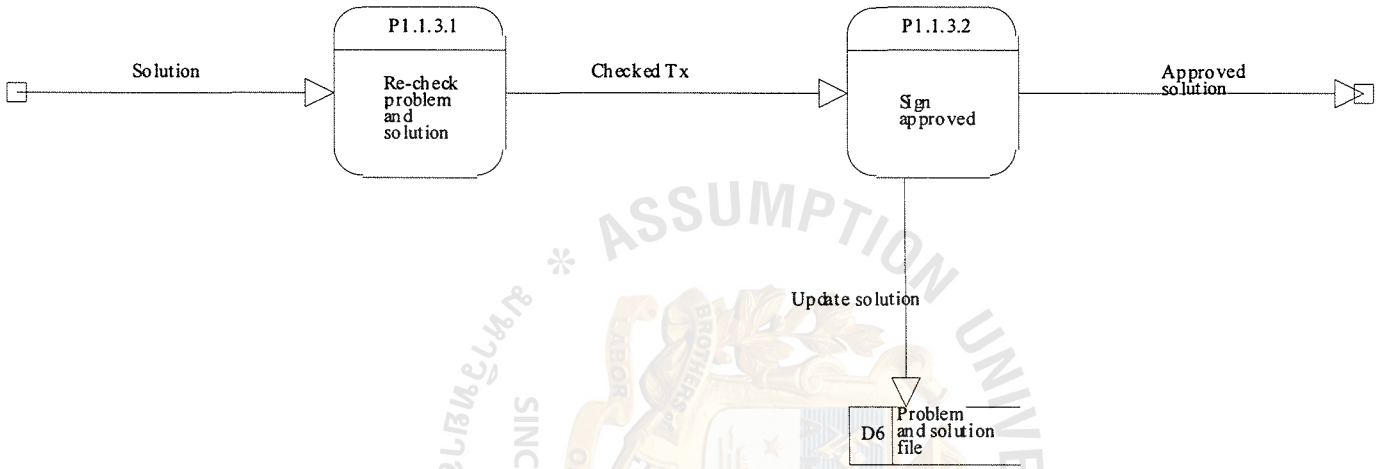

Figure A.6. Logical DFD- Level 1.3 for Approved Solution Process [Proposed System].

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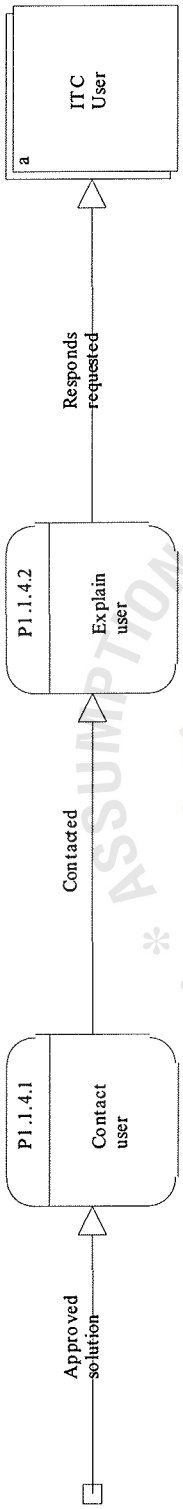

Figure A.7. Logical DFD- Level 1.4 for Implement Solution Process [Proposed System].

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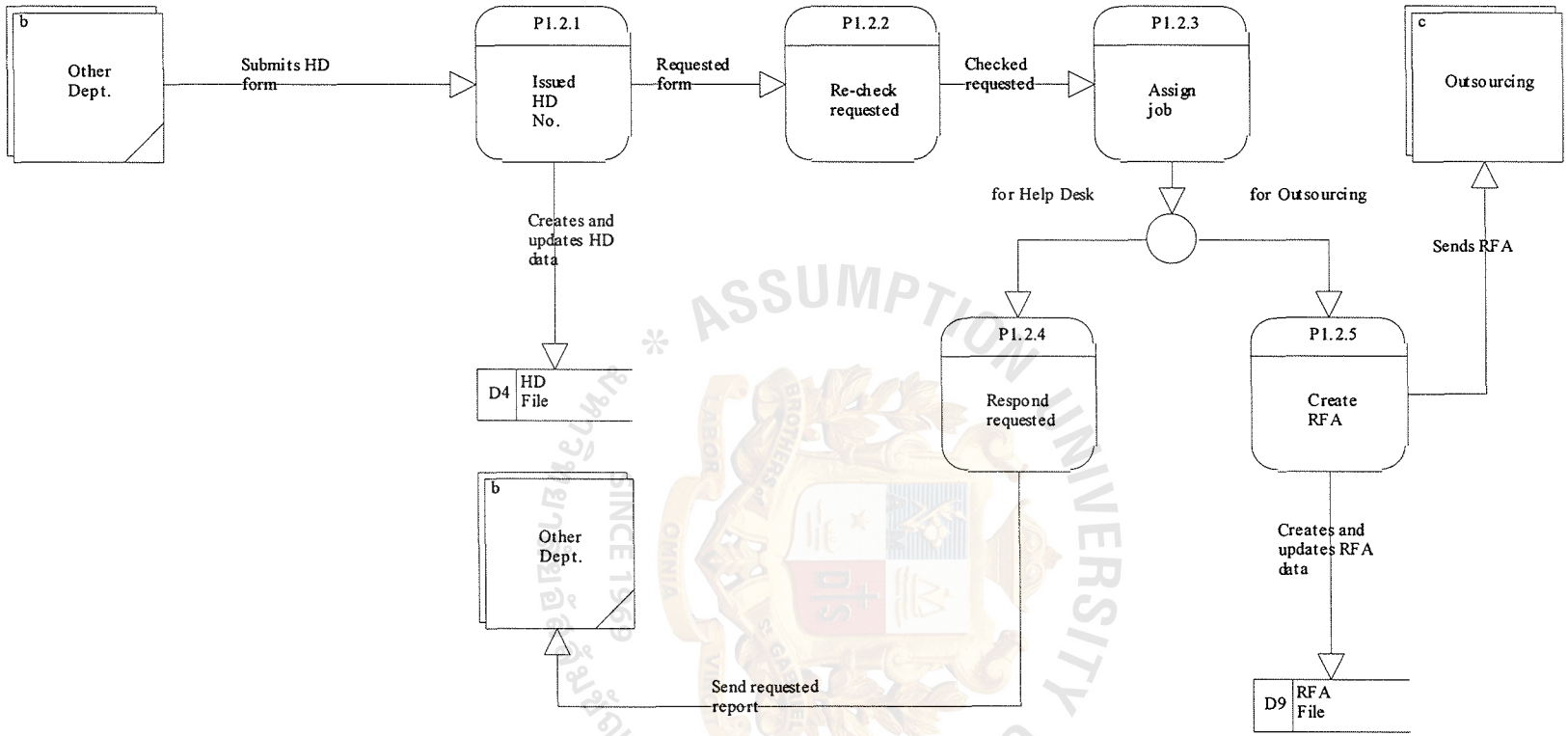

Figure A.8. Logical DFD- Level 2 for Respond Requested Process [Proposed System].

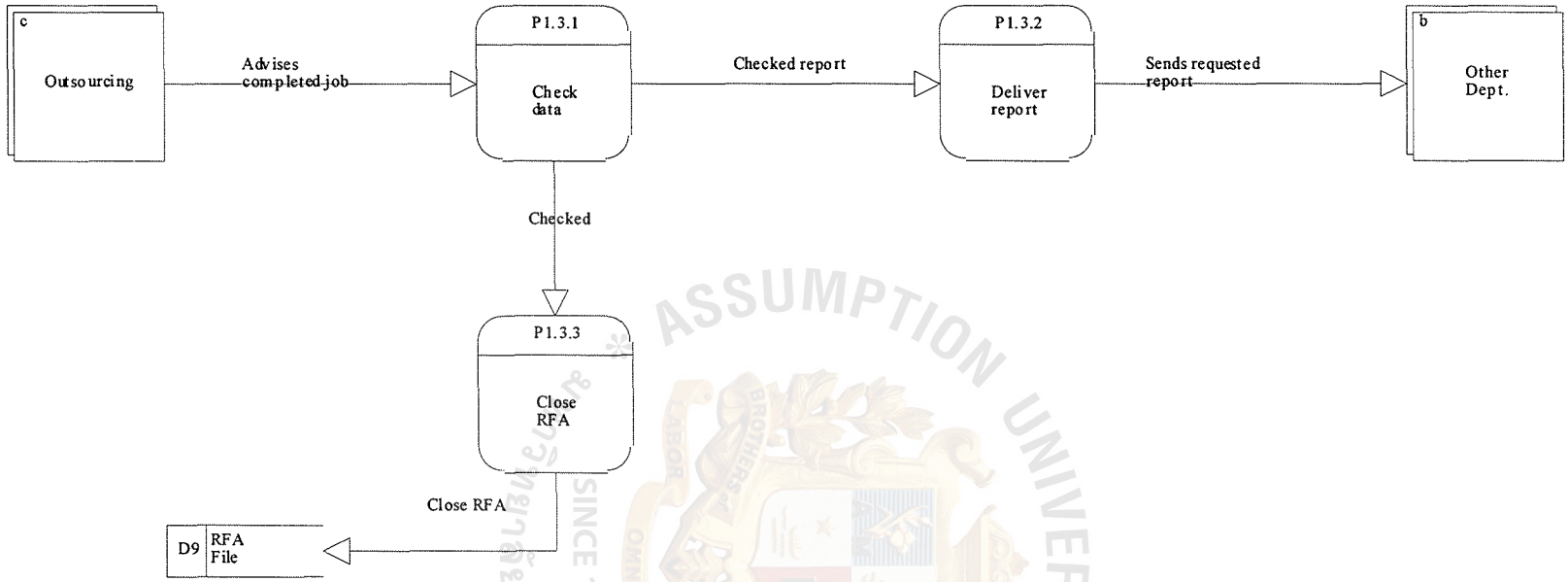

Figure A.9. Logical DFD- Level 3 for Check Data & Close RFA Process [Proposed System].

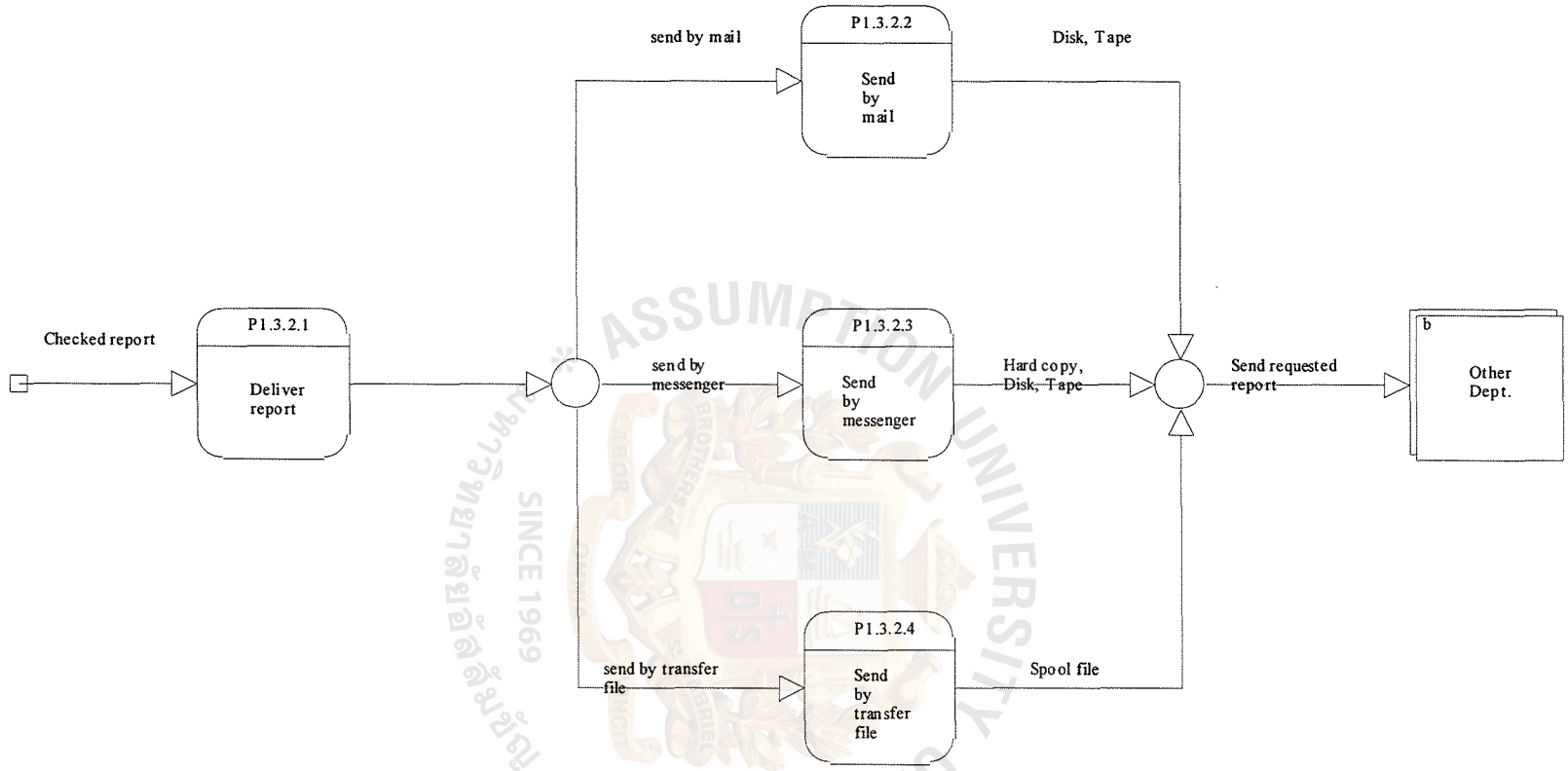

Figure A.10. Logical DFD- Level 3.2 for Delivery Report Process [Proposed System].

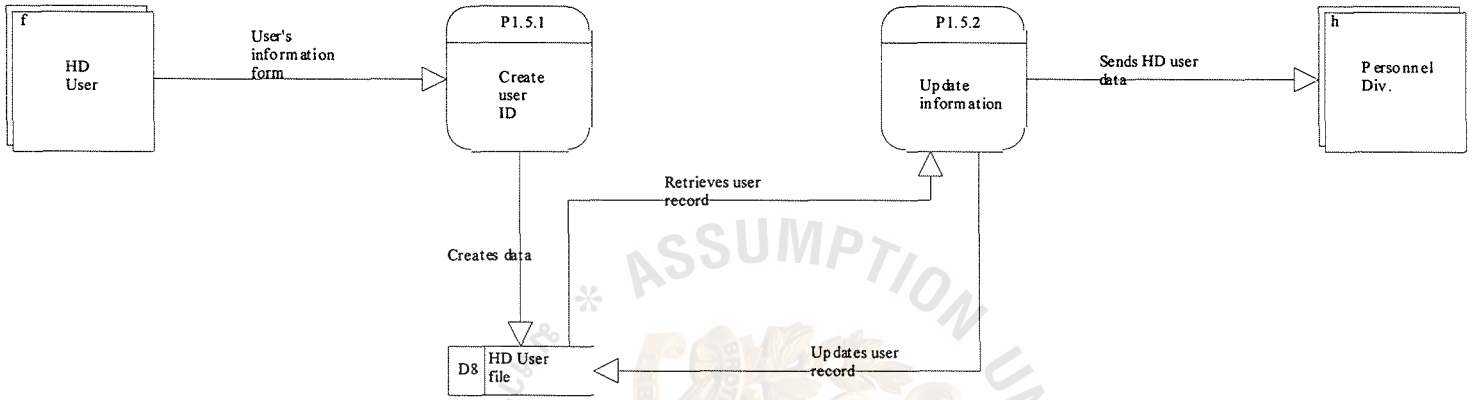

Figure A.11. Logical DFD- Level 4 for Maintain HD User Record [Proposed System].

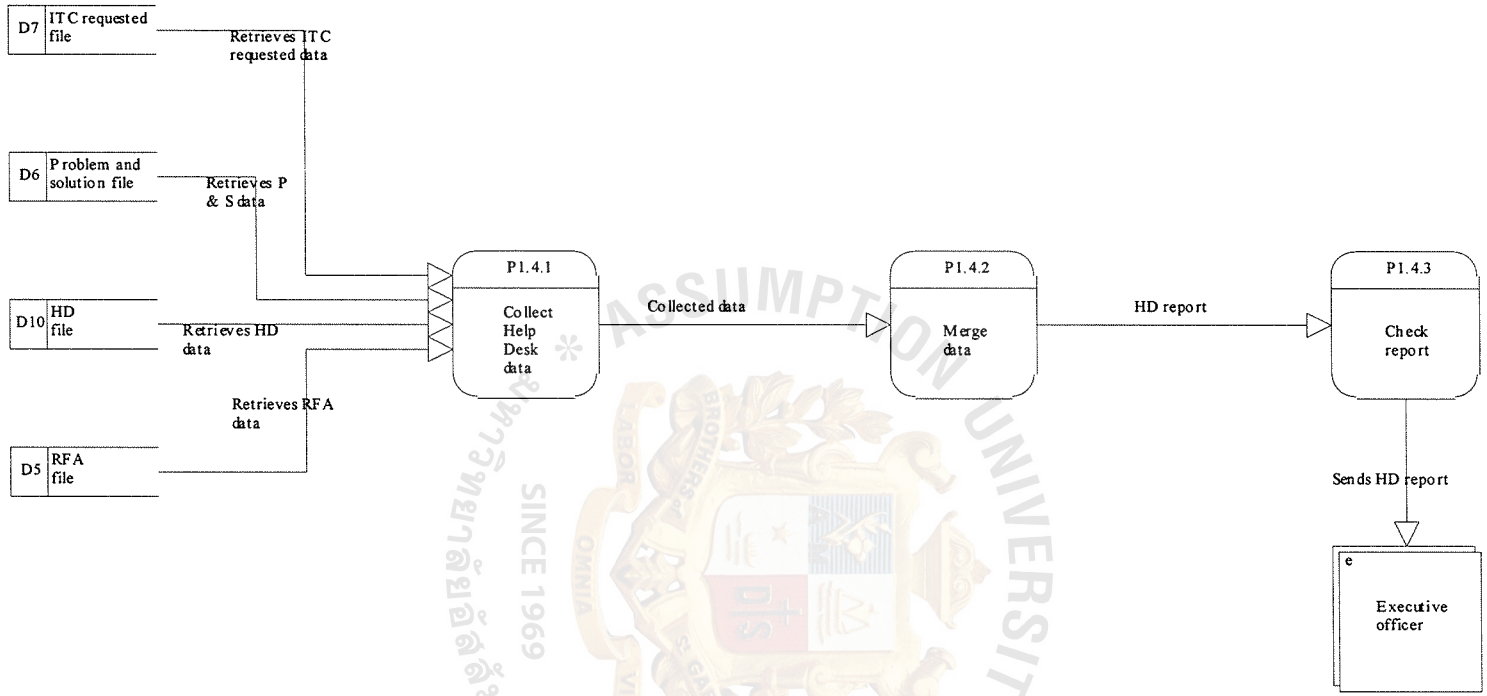

Figure A.12. Logical DFD- Level 5 for Produce HD Report [Proposed System].

APPENDIX B

ENTITY RELATIONSHIP DIAGRAMS

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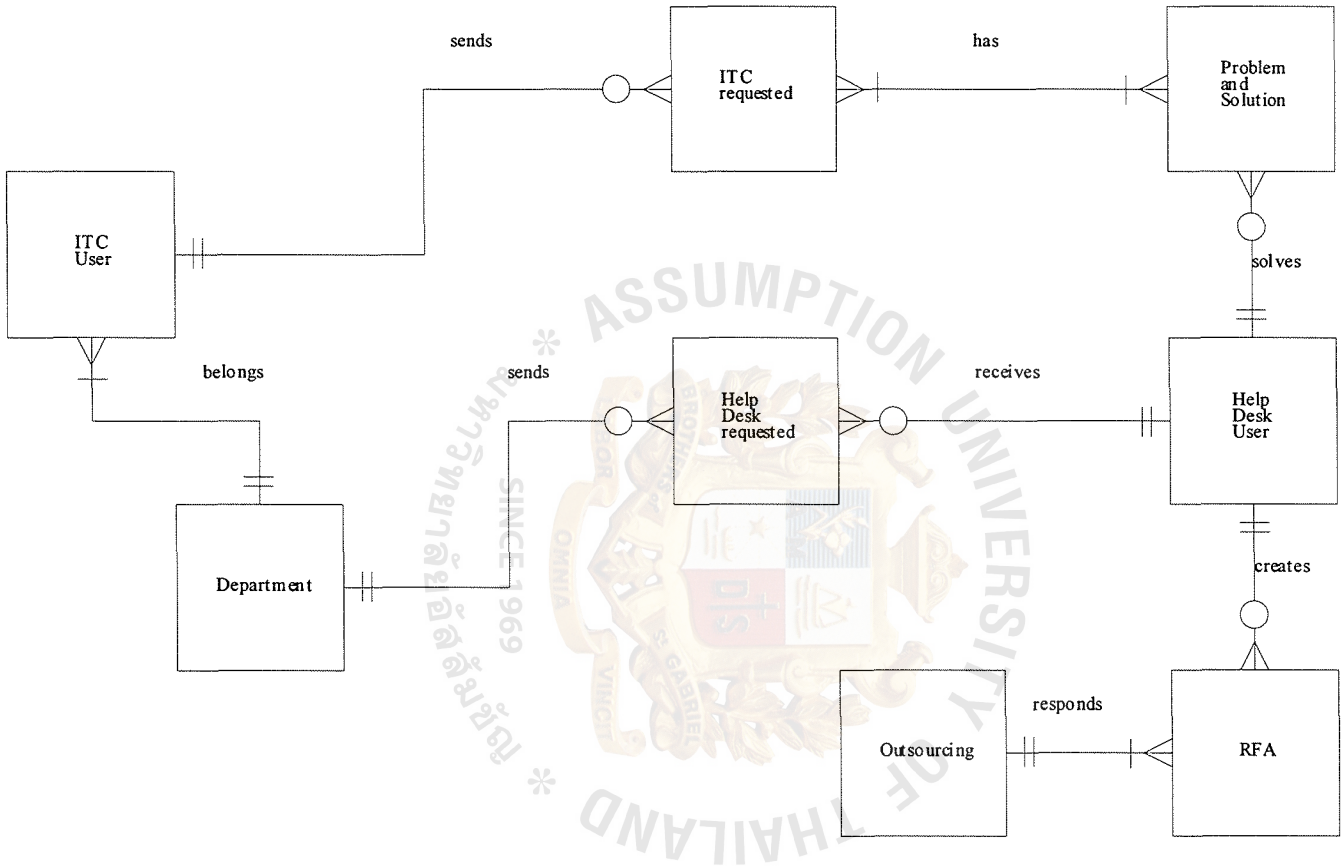

Figure B.1. ERD- Context Data Model of the Proposed System.

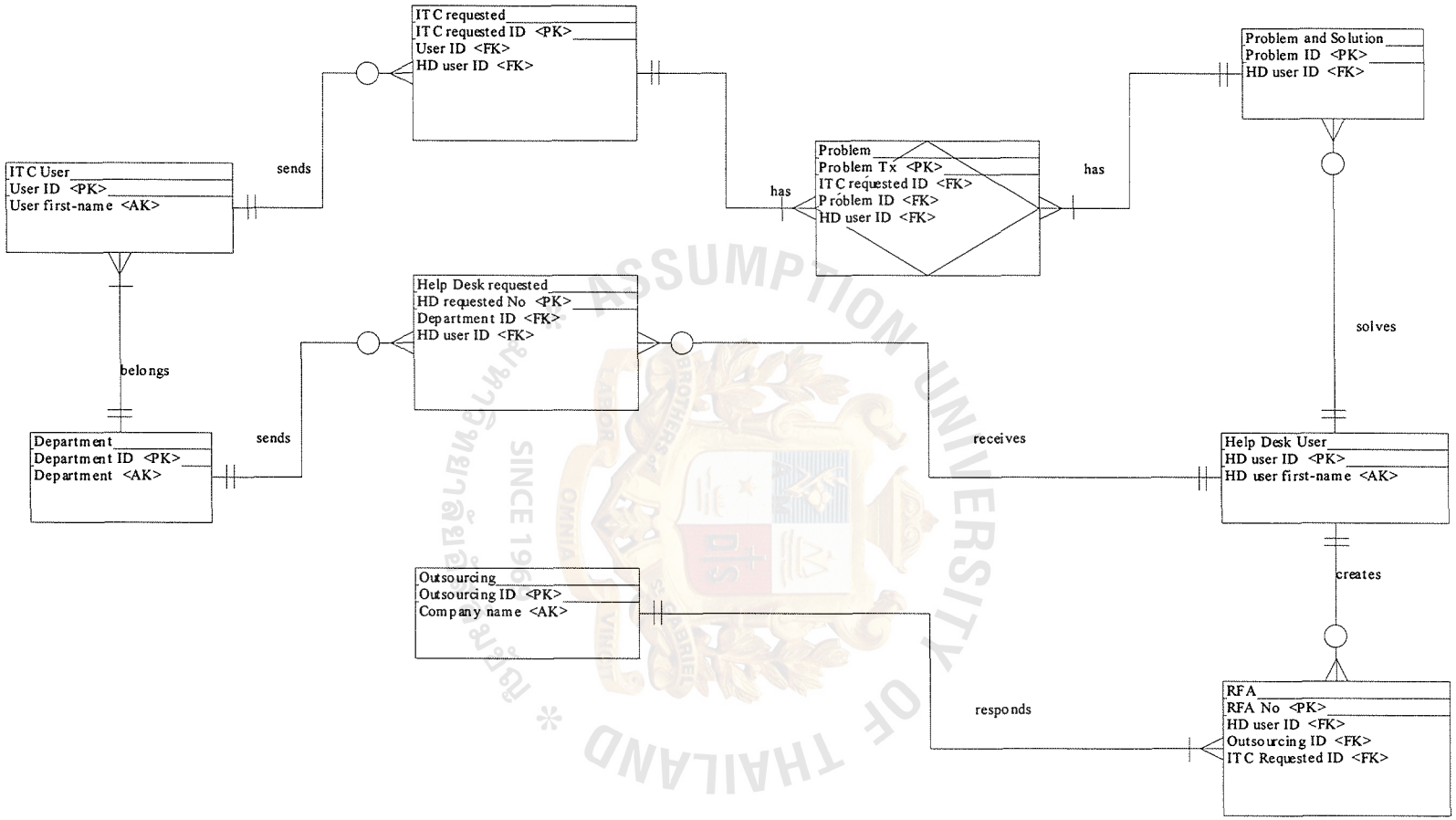

Figure B.2. ERD- Key Based Data Model of the Proposed System.

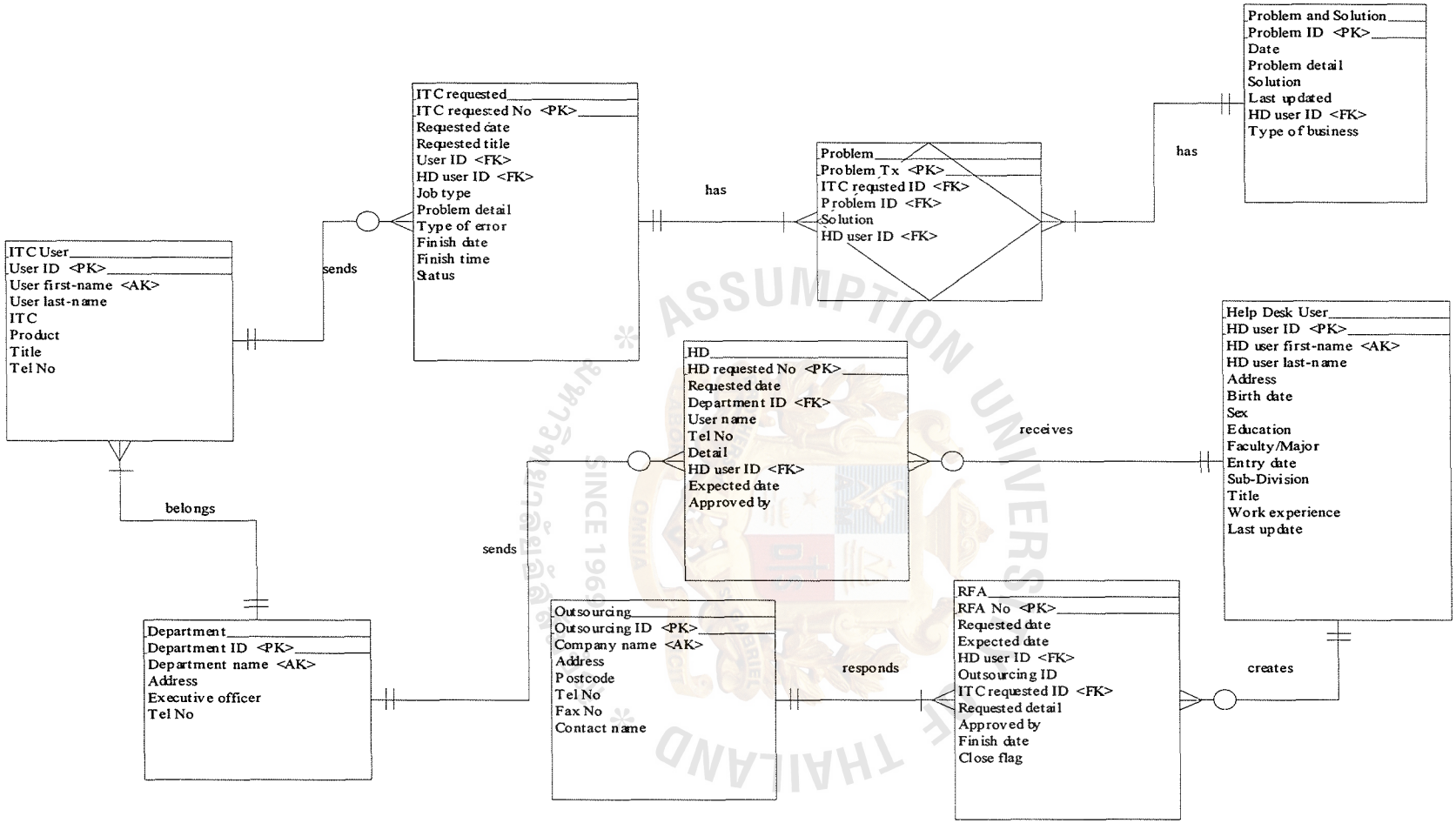

Figure B.3. ERD- Fully Attributed Data Model of the Proposed System.

APPENDIX C

PPYSICAL DATA FLOW DIAGRAMS

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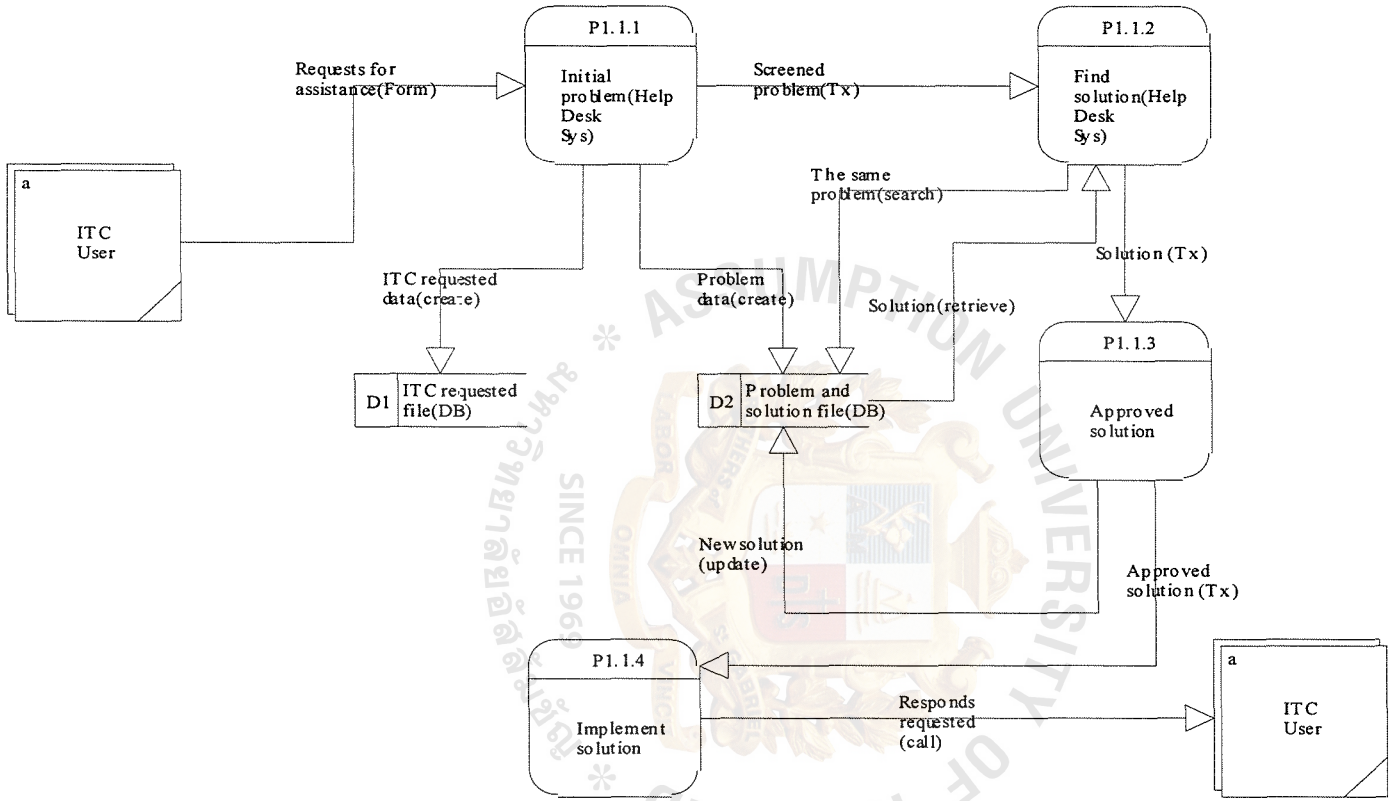

Figure C.1. Physical DFD- Level 1 for Problem Solving Process [Proposed System].

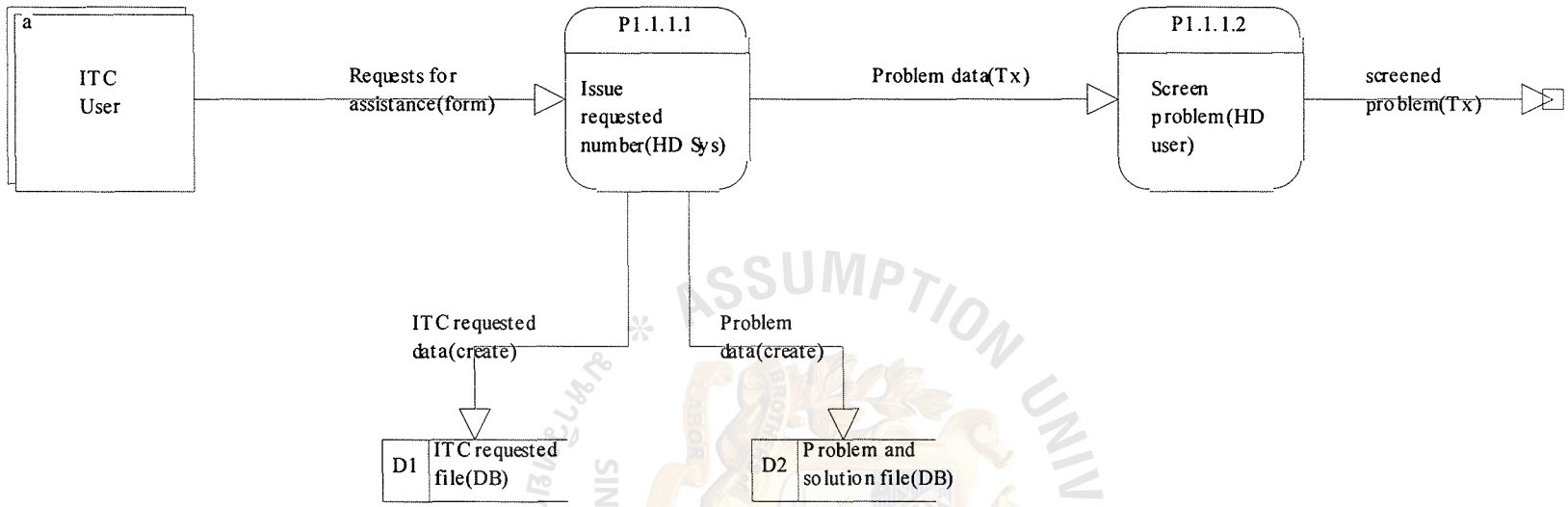

Figure C.2. Physical DFD- Level 1.1 for Initial Problem Process [Proposed System].

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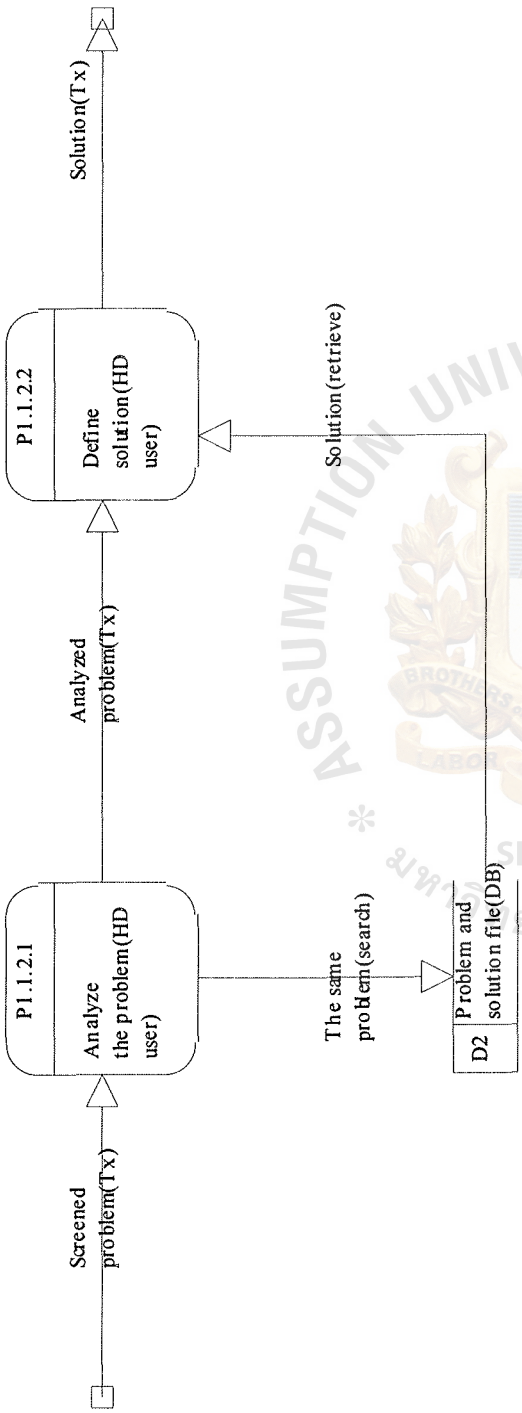

Figure C.3. Physical DFD- Level 1.2 for Find Solution Process [Proposed System].

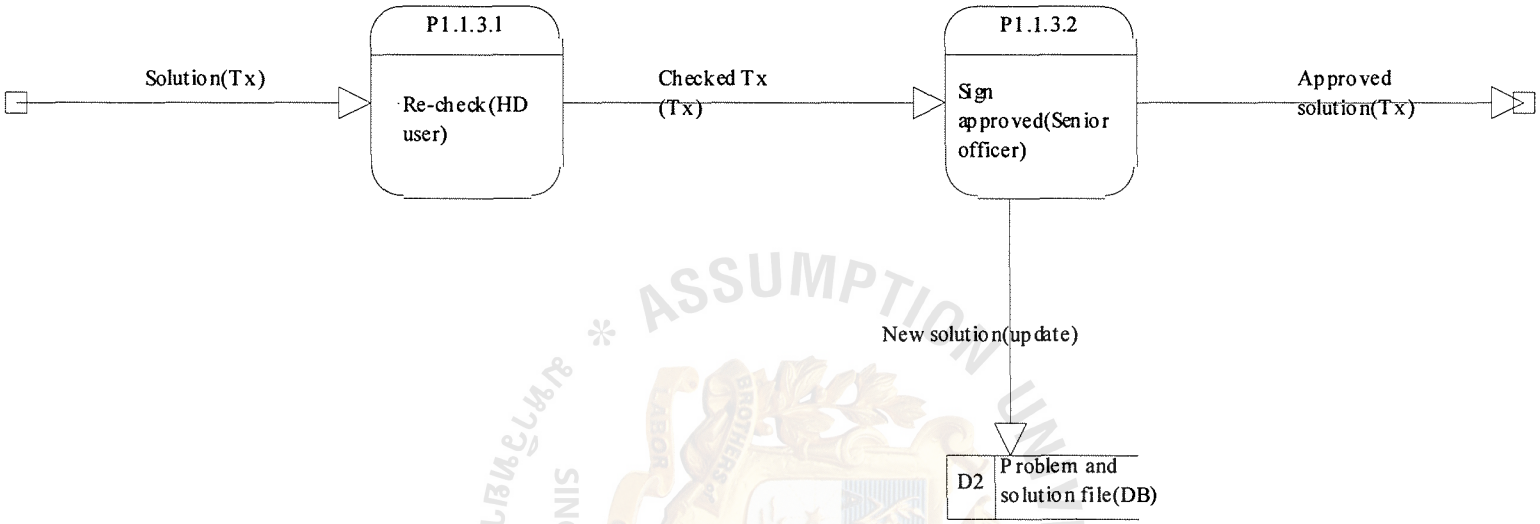

Figure C.4. Physical DFD- Level 1.3 for Approved Solution Process [Proposed System].

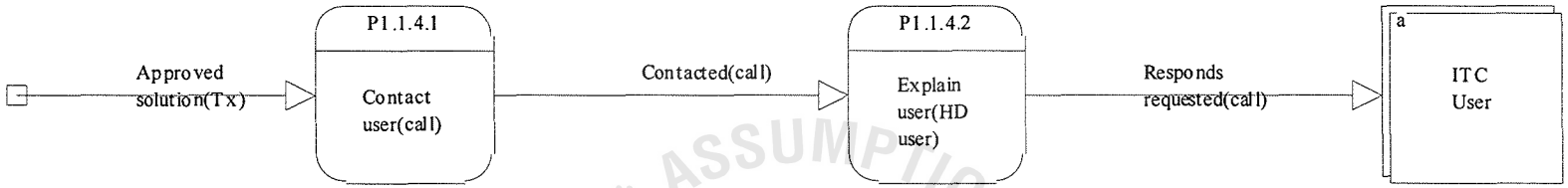

Figure C.5. Physical DFD- Level 1.4 for Implement Solution Process [Proposed System].

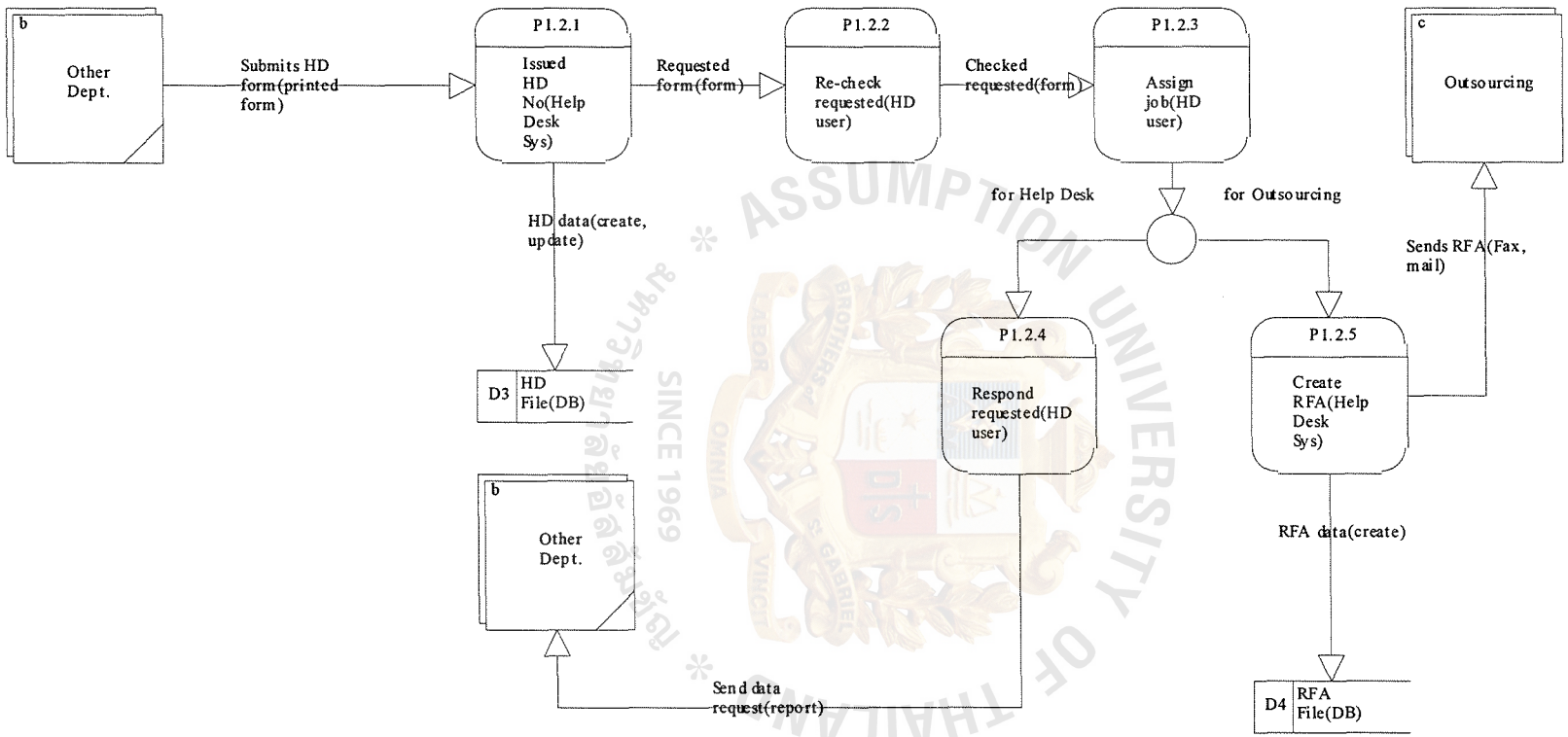

Figure C.6. Physical DFD- Level 2 for Respond Requested Process [Proposed System].

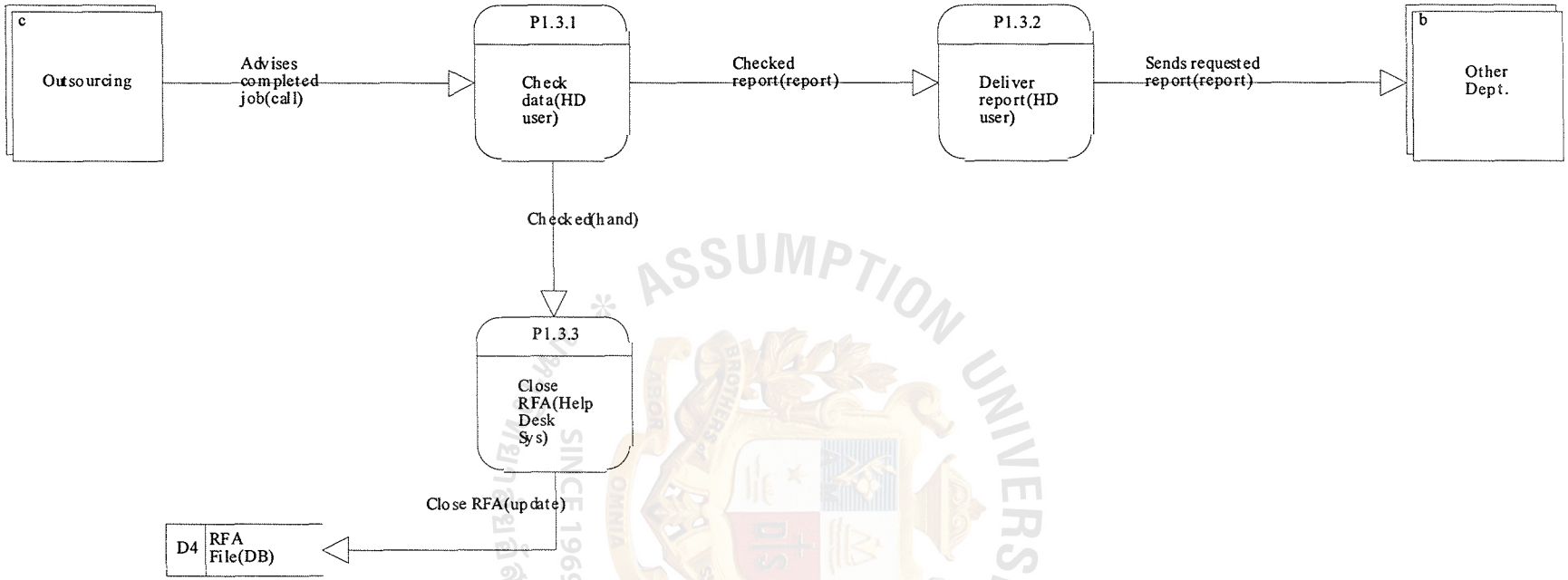

Figure C.7. Physical DFD- Level 3 for Check Data & Close RFA Process [Proposed System].

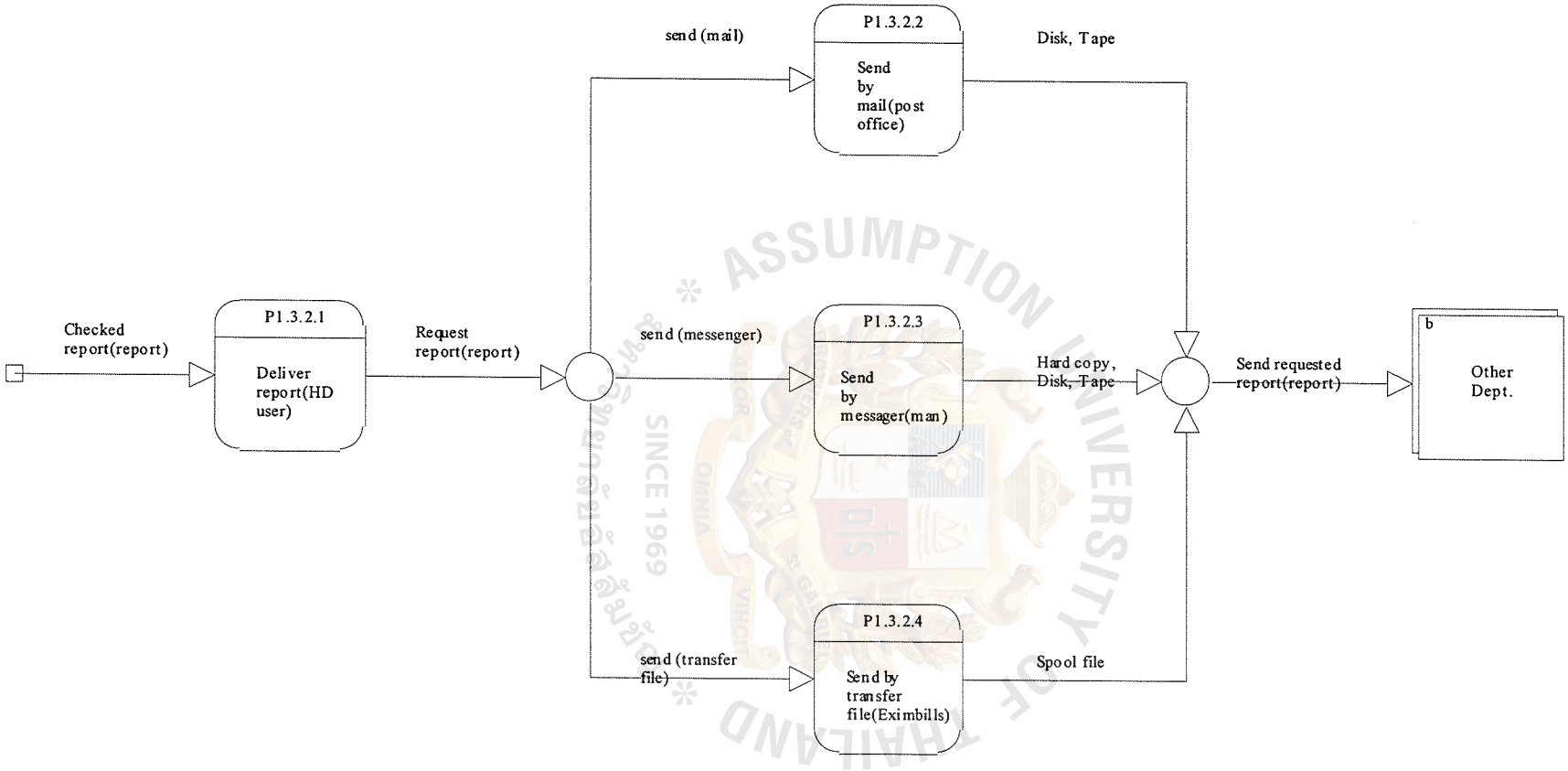

Figure C.8. Physical DFD- Level 3.2 for Delivery Report Process [Proposed System].

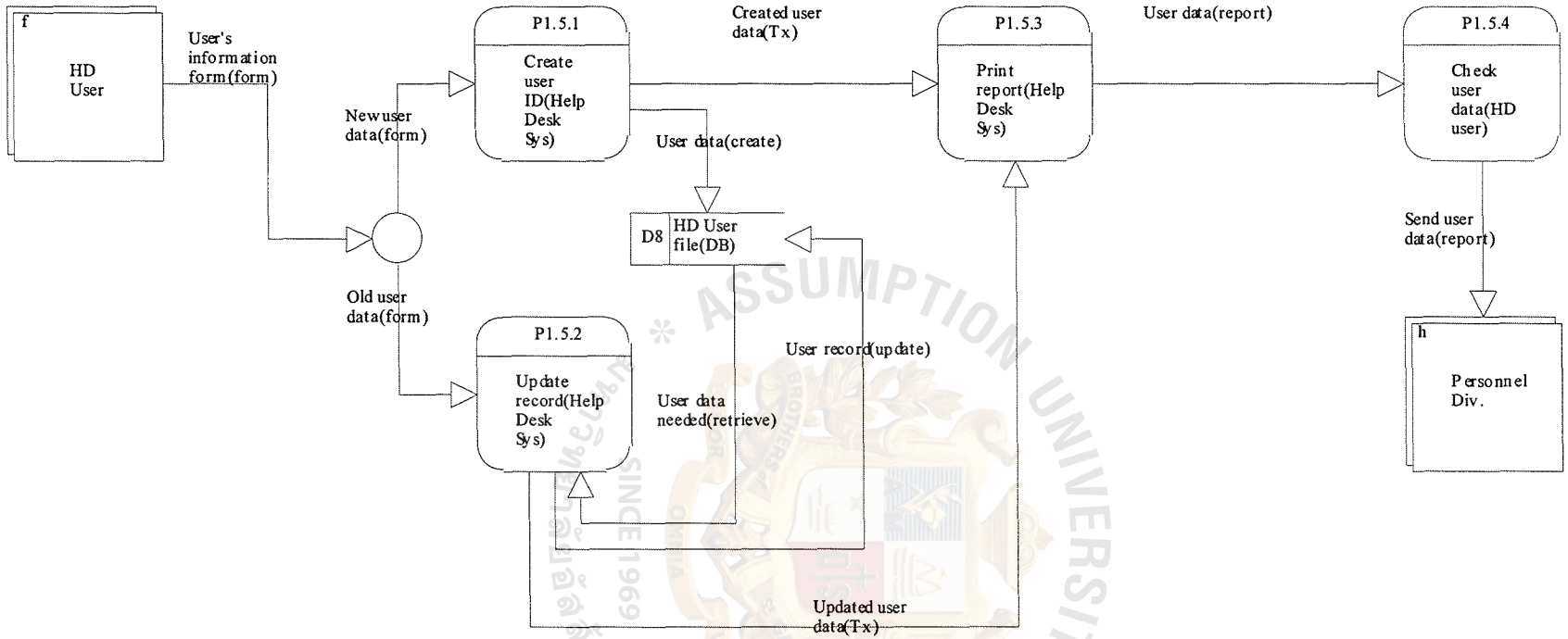

Figure C.9. Physical DFD- Level 4 for Maintain HD User Record [Proposed System].

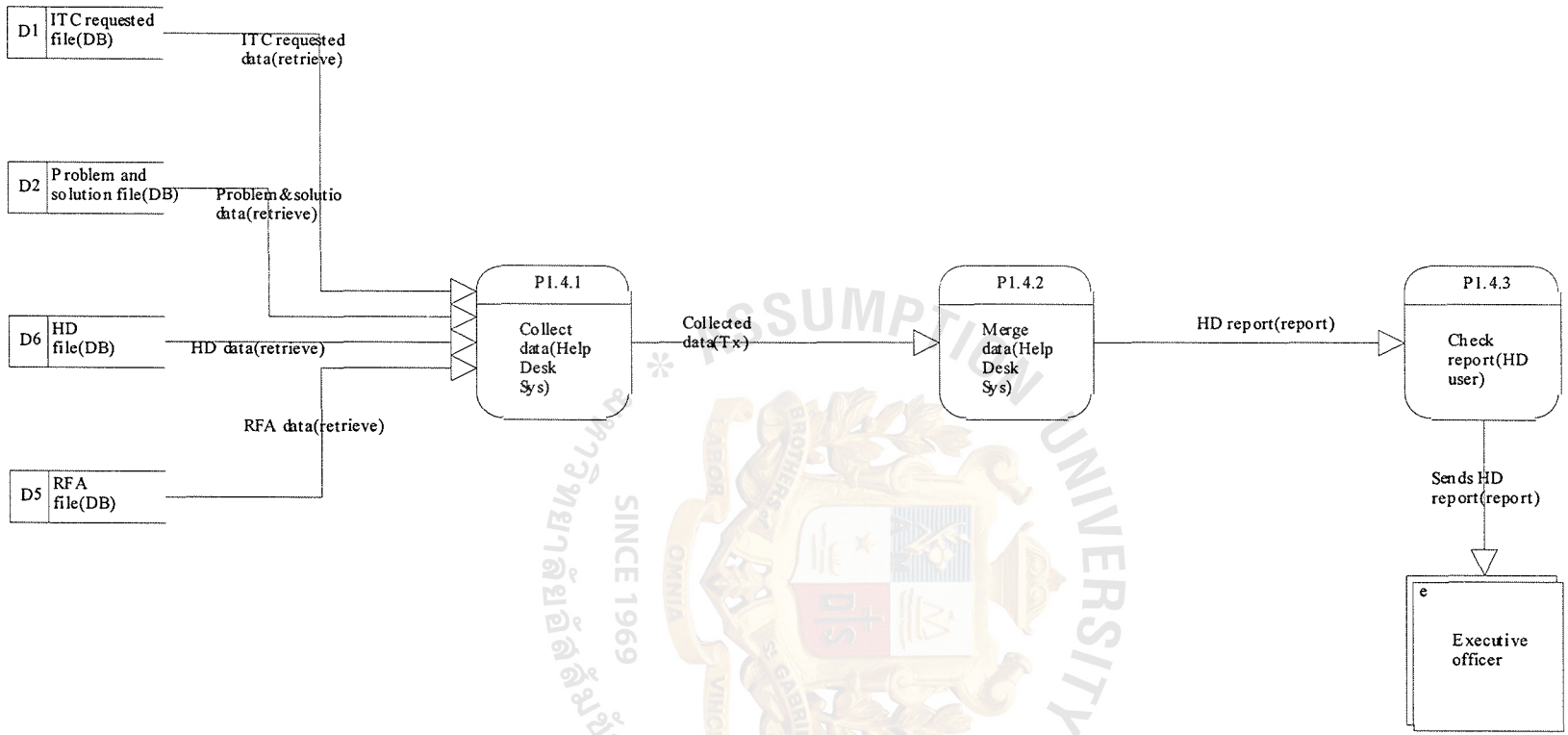

Figure C.10. Physical DFD- Level 5 for Produce HD Report [Proposed System].

APPENDIX D

STRUCTURE CHARTS

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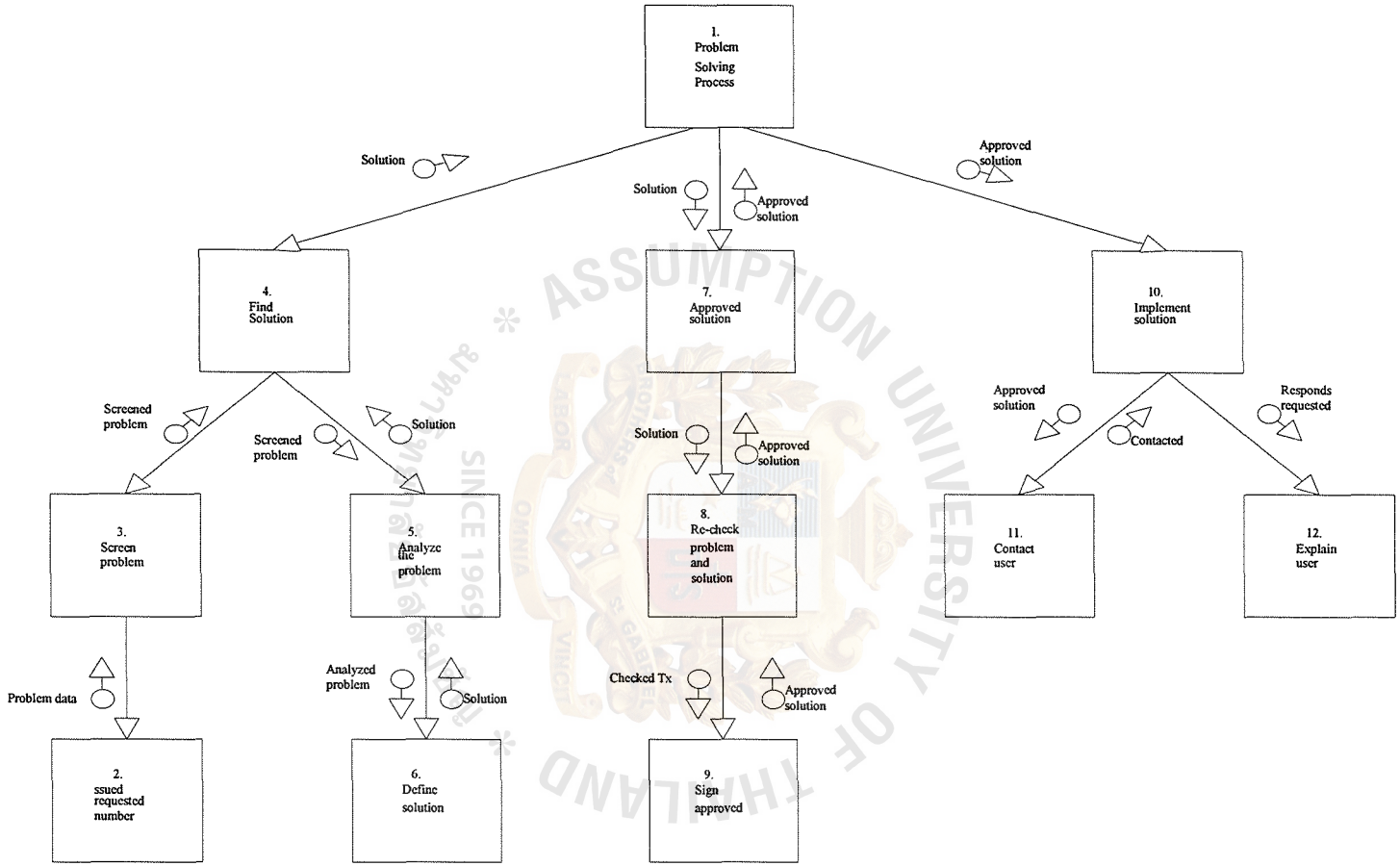

Figure D.1. Structure Chart- Problem Solving Process [Proposed System].

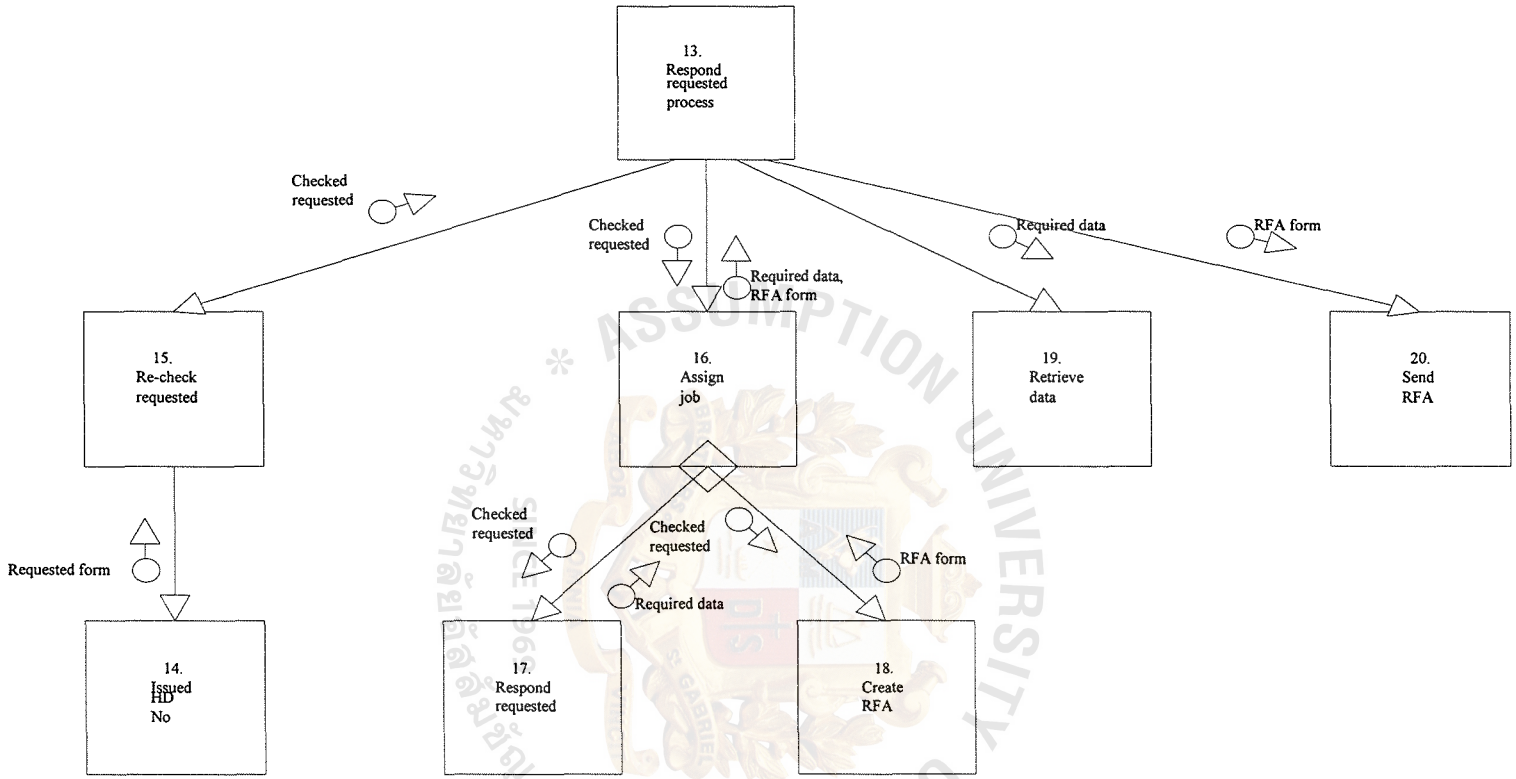

Figure D.2. Structure Chart- Respond Requested Process [Proposed System].

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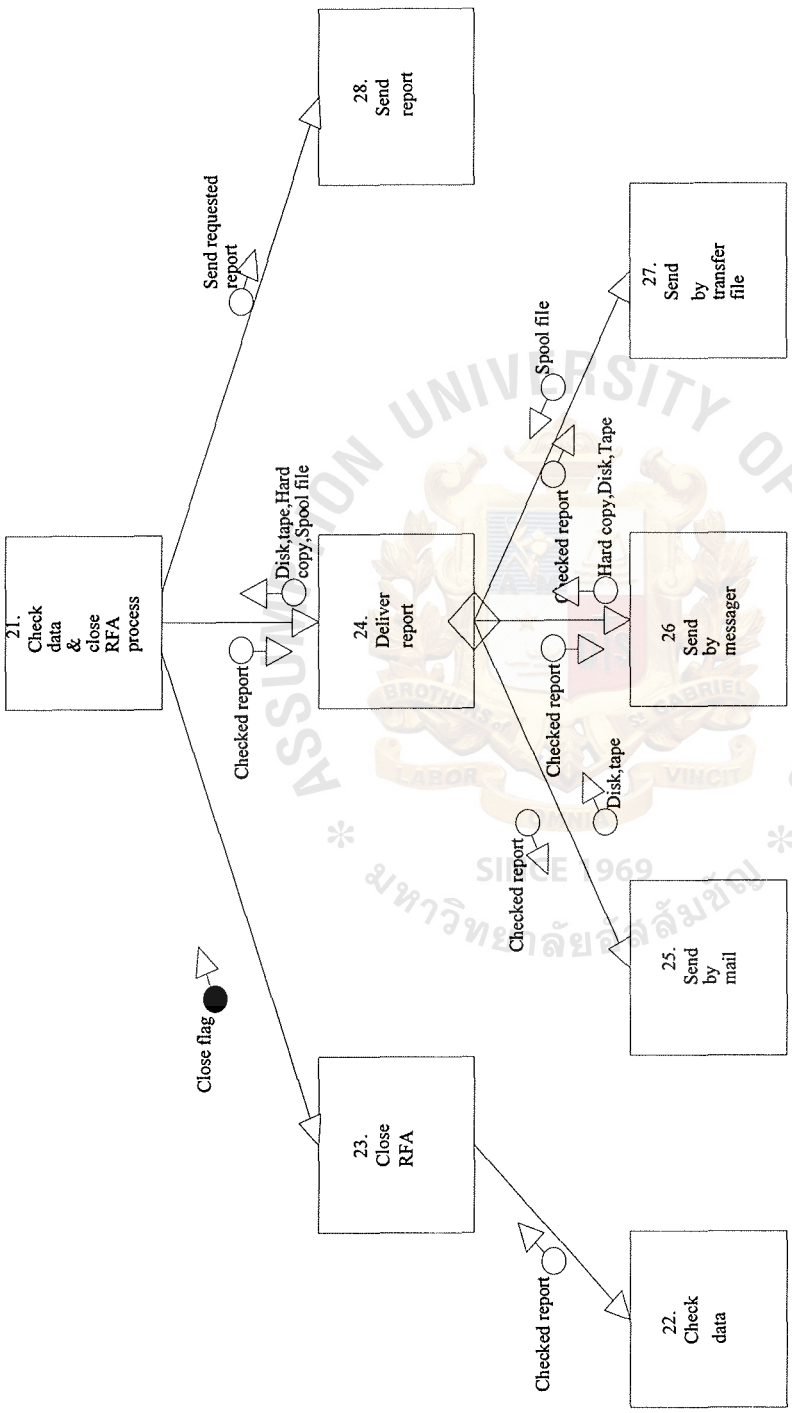

Figure D.3. Structure Chart- Check Data & Close RFA Process [Proposed System].

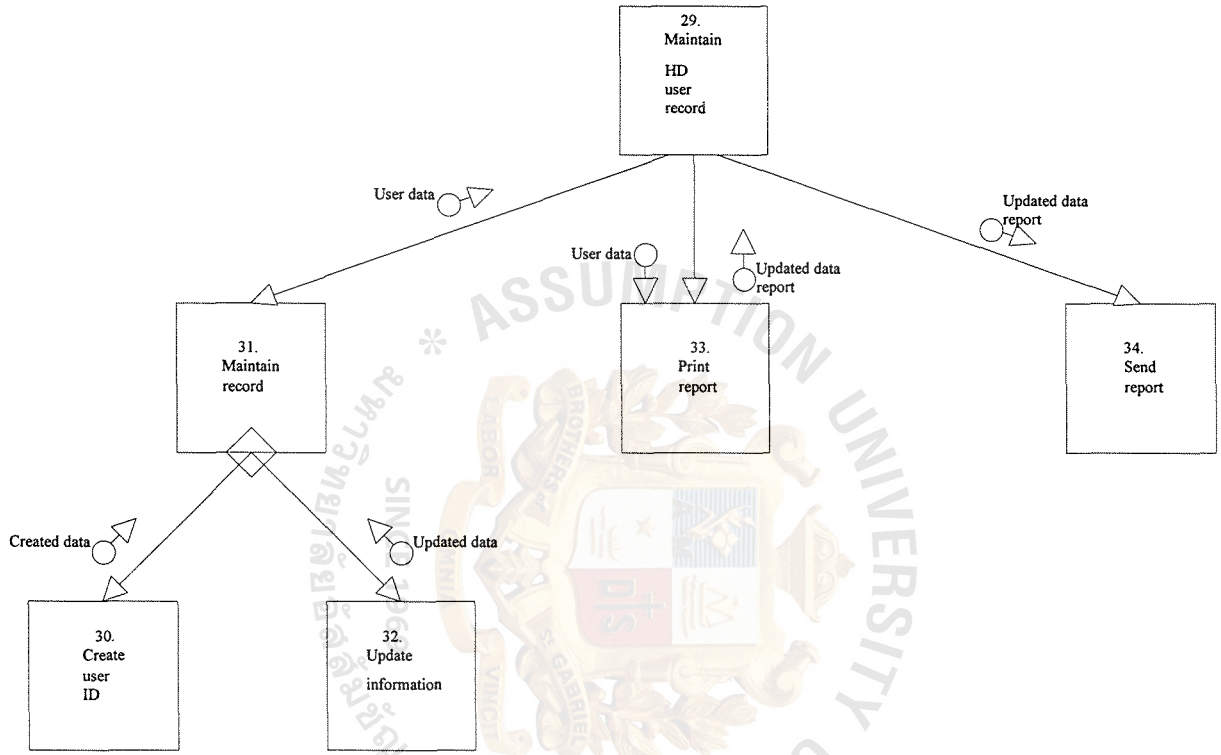

Figure D.4. Structure Chart- Maintain HD User Record [Proposed System].

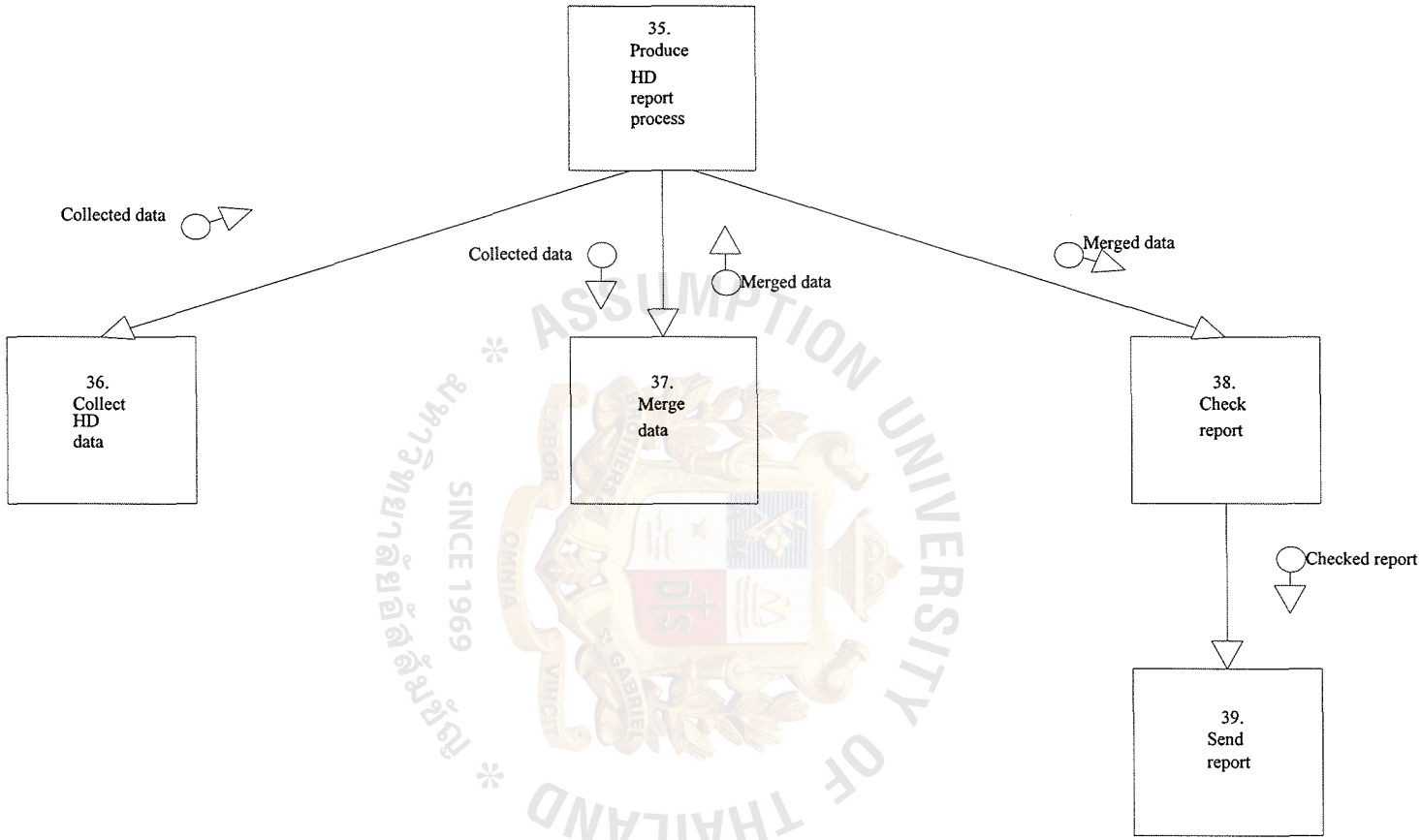

Figure D.5. Structure Chart- Produce HD Report [Proposed System].

APPENDIX E

MODULE SPECIFICATIONS

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MODULE SPECIFICATION

From Transaction Analysis, we have gathered all 39 modules specification into table form in order to have better understanding the purpose or objective, input, output of each module of the proposed system. For structure charts developed of this project through structured design are evaluated for quality by dividing a program into modules. As we can end up with modules that are said to be loosely coupled and highly cohesive in order to recognize that the data and control flow symbols depicted on a structure chart can serve as aids in determining the degree of coupling and cohesion of modules. Accordance, coupling is used to refer the level of dependency that exists between modules in which it should be loosely coupled modules or less likely to be dependent on one another in order to reduce any effect when we make a change on modules. Cohesion refers to the degree to which a module's instructions are functionally related in which it should be highly cohesive modules. Because highly cohesive modules contain instructions that collectively work together to solve a specific task. Thus, we can ensure that modules exhibit a high degree of cohesiveness. For better understanding, we describe each module in structure charts as following :

Module No.	**M1**
Module name	Problem solving process
Purpose/ Objective	To support user's problem efficiently
Input	User's problem
Output	Solution
Invoker	User
Callee	-
Constraints / Condition	-

Module No.	**M2**
Module name	Issue request number
Purpose/ Objective	Generates transaction
Input	Request for assistance
Output	Problem transaction
Invoker	User
Callee	-
Constraints / Condition	For a specific problem, the support officer (Help Desk) will respond to their users.
Module No.	**M3**
Module name	Screen problem
Purpose/ Objective	Check a problem transaction roughly that is a new one or not.
Input	Problem transaction
Output	Screened problem
Invoker	M4
Callee	M2
Constraints / Conditions	-
Module No.	**M4**
Module name	Find solution
Purpose/ Objective	Solving problem with suitable solution
Input	Screened problem
Output	Solution
Invoker	M4
Callee	M2

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Constraints / Conditions	-
Module No.	**M5**
Module name	Analyze problem
Purpose/ Objective	Analyzes the problem that how it occurs and how we can solve it.
Input	Screened problem
Output	Analyzed transaction
Invoker	M6
Callee	M4
Constraints / Condition	-
Module No.	**M6**
Module name	Define solution
Purpose/ Objective	Define the best solution according to the problem.
Input	Analyzed transaction
Output	Cleared transaction
Invoker	M7
Callee	M5
Constraints / Conditions	-
Module No.	**M7**
Module name	Approved solution
Purpose/ Objective	The solution will be approved before implement to user in order to ensure that the solution is suitable for that problem.
Input	Solution
Output	Approved solution

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Invoker	M6
Callee	M7
Constraints / Conditions	-
Module No.	**M8**
Module name	Re-check transaction
Purpose/ Objective	The problem Tx will be re-checked again in order to ensure that the solution is suitable for that problem.
Input	Solution
Output	Approved solution
Invoker	M7
Callee	M9
Constraints / Conditions	-
Module No.	**M9**
Module name	Sign approved
Purpose/ Objective	When the transaction has been checked already, it will be signed approval by senior officer so that it can implement to user.
Input	Checked Tx
Output	Approved solution
Invoker	M8
Callee	M10
Constraints / Conditions	-
Module No.	**M10**
Module name	Implement solution
Purpose/ Objective	The solution will be implemented to user for solving their

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	problem
Input	Approved solution
Output	Responds requested
Invoker	M11
Callee	M9
Constraints / Conditions	-
Module No.	**M11**
Module name	Contact user
Purpose/ Objective	Implement the solution to user
Input	Approved solution
Output	Contacted
Invoker	M12
Callee	M10
Constraints / Conditions	-
Module No.	**M12**
Module name	Explain user
Purpose/ Objective	HD user explains the detail solution to user.
Input	Contacted
Output	Responds requested
Invoker	User
Callee	M11
Constraints / Conditions	-
Module No.	**M13**
Module name	Respond requested process
Purpose/ Objective	When other departments request to Help Desk for

	retrieving data needed.
Input	Help Desk form (request)
Output	Report needed
Invoker	Other departments
Callee	-
Constraints / Conditions	-
Module No.	**M14**
Module name	Issued HD no
Purpose/ Objective	Issue Help Desk number for each request when other departments request to Help Desk for retrieving data needed.
Input	Help Desk form (request)
Output	Requested form
Invoker	M15
Callee	Other departments
Constraints / Conditions	-
Module No.	**M15**
Module name	Re-check requested
Purpose/ Objective	After issued Help Desk number then HD user will re-check such requested form in order to design how retrieving data needed.
Input	Requested form
Output	Checked requested
Invoker	M16
Callee	M14

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Constraints / Conditions	-
Module No.	**M16**
Module name	Assign job
Purpose/ Objective	Assign HD user to respond such request.
Input	Checked requested
Output	Data needed, RFA
Invoker	M17
Callee	M15
Constraints / Conditions	-
Module No.	**M17**
Module name	Respond requested
Purpose/ Objective	HD user retrieves data after they are assigned to respond such request.
Input	Checked requested
Output	Data needed
Invoker	M19
Callee	M16
Constraints / Conditions	-
Module No.	**M18**
Module name	Create RFA
Purpose/ Objective	If that requested couldn't respond by Help Desk, so HD user will create a RFA in order to assign job to outsourcing to respond such request.
Input	Checked requested

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Output	RFA form
Invoker	M20
Callee	M16
Constraints / Conditions	-
Module No.	**M19**
Module name	Retrieve data
Purpose/ Objective	HD user retrieves data needed from Eximbills system and sends it to other departments as they needed.
Input	Required data
Output	Report
Invoker	Other departments
Callee	M17
Constraints / Conditions	-
Module No.	**M20**
Module name	Send RFA
Purpose/ Objective	After created RFA form, it will be sent to outsourcing.
Input	Required data
Output	RFA form
Invoker	Outsourcing
Callee	M18
Constraints / Conditions	-
Module No.	**M21**
Module name	Check data & close RFA process
Purpose/ Objective	After outsourcing responded request according to RFA, they will inform HD user and they have to check data and

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	close such RFA.
Input	Advises completed job
Output	Checked report
Invoker	Outsourcing
Callee	-
Constraints / Conditions	-
Module No.	**M22**
Module name	Check data
Purpose/ Objective	HD user checks data in report after outsourcing responded request according to RFA.
Input	Advises completed job
Output	Checked report
Invoker	M23
Callee	Outsourcing
Constraints / Conditions	-
Module No.	**M23**
Module name	Close RFA
Purpose/ Objective	RFA will be closed after HD user checked data in report and it's completeness.
Input	Checked report
Output	Close flag
Invoker	M24
Callee	M22
Constraints / Conditions	-

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Module No.	**M24**
Module name	Deliver report
Purpose/ Objective	Report will be sent to department which requested that data,
Input	Checked report
Output	Disk, tape, hard copy, spool file
Invoker	M25, M26, M27
Callee	M23
Constraints / Conditions	-
Module No.	**M25**
Module name	Send by mail
Purpose/ Objective	Report will be stored in disk or tape and sent to department that requested that data by mail.
Input	Checked report
Output	Disk, tape
Invoker	M28
Callee	M24
Constraints / Conditions	-
Module No.	**M26**
Module name	Send by messenger
Purpose/ Objective	Report will be printed to hard copy and sent to department that requested that data by messenger.
Input	Checked report
Output	Hard copy
Invoker	M28

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Callee	M24
Constraints / Conditions	-
Module No.	**M27**
Module name	Send by spool file
Purpose/ Objective	Report will be saved in spool file and sent to department, which requested that data by transferring file.
Input	Checked report
Output	Spool file
Invoker	M28
Callee	M24
Constraints / Conditions	-
Module No.	**M28**
Module name	Send report
Purpose/ Objective	Report will be sent to department, which requested that data.
Input	Checked report
Output	Requested report
Invoker	Other departments
Callee	M25, M26, M27
Constraints / Conditions	-
Module No.	**M29**
Module name	Maintain HD user record
Purpose/ Objective	Maintenance personnel data of Help Desk users.
Input	HD user's information form
Output	Updated data report

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Invoker	HD user
Callee	-
Constraints / Conditions	-
Module No.	**M30**
Module name	Create user ID
Purpose/ Objective	Giving user ID when new user applied in Help Desk.
Input	HD user's information form
Output	Created data
Invoker	M31
Callee	HD user
Constraints / Conditions	-
Module No.	**M31**
Module name	Maintain record
Purpose/ Objective	HD user record can be both created and updated data.
Input	HD user's information form
Output	Created data, updated data
Invoker	M33
Callee	M30, M32
Constraints / Conditions	-
Module No.	**M32**
Module name	Update information
Purpose/ Objective	When HD user have some information change, they will request to update their record.
Input	HD user's information form
Output	Updated data

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Invoker	M31
Callee	HD user
Constraints / Conditions	-
Module No.	**M33**
Module name	Print report
Purpose/ Objective	Both new user record and updated user records in Help Desk will be printed report and sent to Personnel division.
Input	User data
Output	Updated data report
Invoker	M34
Callee	M31
Constraints / Conditions	-
Module No.	**M34**
Module name	Send report
Purpose/ Objective	Report will be sent to Personnel division in order to update for both new user record and updated user record in Help Desk.
Input	Updated data report
Output	Report
Invoker	Personnel division
Callee	M33
Constraints / Conditions	-
Module No.	**M35**
Module name	Produce HD report process
Purpose/ Objective	HD user has to collect data about Help Desk task in every

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	month and report their executive officer.
Input	Database
Output	HD report
Invoker	Executive officer
Callee	-
Constraints / Conditions	-
Module No.	**M36**
Module name	Collect HD data
Purpose/ Objective	HD user has to collect data about Help Desk task in every month and report their executive officer.
Input	Help Desk tasks
Output	Collected data
Invoker	M37
Callee	Executive officer
Constraints / Conditions	-
Module No.	**M37**
Module name	Merge data
Purpose/ Objective	As HD user have to collect data about Help Desk task in various files, so they have to combine these data in report.
Input	Collected data
Output	Merged data
Invoker	M38
Callee	M36
Constraints / Conditions	-

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Module No.	**M38**
Module name	Check report
Purpose/ Objective	HD user have to check the correctness of HD report before send it to their executive officer.
Input	Merged data
Output	Checked report
Invoker	M39
Callee	M37
Constraints / Conditions	-
Module No.	**M39**
Module name	Send report
Purpose/ Objective	HD report will be sent to their executive officer.
Input	Checked report
Output	Report
Invoker	Executive officer
Callee	M38
Constraints / Conditions	-

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APPENDIX F

DATA DICTIONARY OF DATA FLOW DIAGRAMS

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Object Name	**ITC User**
Object Type	External Entity
Definition	ITC user = User ID + User first-name + User last-name + ITC + Product + Title + Tel No
Short Description	ITC user is an officer who works at International Trade Center.
Object Name	**Other Dept**
Object Type	External Entity
Definition	Other Dept. = Department ID + Department name + Address + Executive officer + Tel No
Short Description	Other Department is a department that contacts with International Trade Supporting division for support their needed.
Object Name	**Outsourcing**
Object Type	External Entity
Definition	Outsourcing = Outsourcing ID + Company name + Address + Post code + Tel No + Fax No + Contact name
Short Description	Outsourcing is a company that signed a support agreement with bank.
Object Name	**HD User**
Object Type	External Entity
Definition	HD user = HD user ID + HD user first-name + HD user last-name + Address + Birth date + Sex + Education + Education + Faculty/Major + Entry date + Sub-division + Title + Work experience + Last update
Short	HD user is an officer who responds and supports ITC users

Description	requested.
Object Name	**Executive officer**
Object Type	External Entity
Definition	Executive officer = HD user file = HD user ID + HD user first-name + HD user last-name + Address + Birth date + Sex + Education + Education + Faculty/Major + Entry date + Sub-division + Title + Work experience + Last update
Short Description	Executive officer is a director who manages the International Trade Supporting Division or Help Desk.
Object Name	**Personnel Div**
Object Type	External Entity
Definition	Personnel Div. = Division name + Address + Executive officer + Tel No
Short Description	Personnel division is a division that works about personnel record in an organization.
Object Name	**ITC Requested file**
Object Type	Data Store
Definition	ITC requested file = ITC requested no + Requested date + Requested title + User ID + HD user ID + Job type + Problem detail + Type of error + Finish date + Finish time + Status
Short Description	ITC requested file is a file that contains a request of ITC users for solving their problem.
Object Name	**Problem and Solution file**
Object Type	Data Store
Definition	Problem and solution file = Problem ID + Date + Problem detail +

	Solution + Last updated + HD user ID + Type of business
Short Description	Problem and solution file is a file that contains both problem and solution of International Trade center.
Object Name	**RFA file**
Object Type	Data Store
Definition	RFA file = RFA No + Requested date + Expected date + HD user ID + Outsourcing ID + ITC requested ID + Requested detail + Approved by + Finish date + Close flag
Short Description	RFA file is a file that contains about request for assistance in which Help Desk sent to outsourcing.
Object Name	**HD file**
Object Type	Data Store
Definition	HD File = HD requested no + Requested date + Department ID + User name + Tel No + Detail + HD user ID + Expected date + Approved by
Short Description	HD file is a file that contains information of Help Desk tasks.
Object Name	**Request for Assistance**
Object Type	Data Flow
Definition	Requests for assistance = Requested date + Requested title + User name + Tel no + Department + Problem detail
Short Description	When ITC user has some problem about their system then they will send a request for assistance to Help Desk in order to solve their problem.
Object Name	**Responds Requested**

Object Type	Data Flow
Definition	Responds requested = Problem Tx + Problem ID + Problem detail + Solution + HD user name
Short Description	HD user will respond user requested with solution according to their problem.
Object Name	**Submits HD form**
Object Type	Data Flow
Definition	Submits HD form = Requested date + Department name + User name + Tel no + Detail + Expected date
Short Description	Other department may be send requested form in order to request Help Desk to retrieve data their need.
Object Name	**Sends Requested Report**
Object Type	Data Flow
Definition	Sends requested report = HD Requested no + Department name + User name + Tel no + Detail + Expected date + Approved by
Short Description	Help Desk sends report in which contained data to other departments and close file of HD requested.
Object Name	**Creates and update P & S data**
Object Type	Data Flow
Definition	Creates and update P & S data = Date + Problem detail + HD user name
Short Description	New problem will be kept in problems and solution as it can be retrieved to user in the next time when the same problem occur.
Object Name	**Creates and update ITC requested**
Object Type	Data Flow

Definition	Creates and update ITC requested = Requested date + Requested title + User name + Tel no + Department + Problem detail
Short Description	ITC requested information will be stored in ITC requested file, so that Help Desk can use it for keeping record.
Object Name	**Retrieves ITC requested data**
Object Type	Data Flow
Definition	Retrieves ITC requested data = Requested date + Requested title + HD user name + Finish date
Short Description	ITC requested data will be retrieved to produce report for executive officer.
Object Name	**Advises completed job**
Object Type	Data Flow
Definition	Advises completed job = RFA no + HD user name + Outsourcing name + ITC reqyested + Requested detail
Short Description	Outsourcing will advise to HD user to check data in report when they retrieved data according to Help Desk requested.
Object Name	**Sends requested report**
Object Type	Data Flow
Definition	Sends requested report = HD Requested no + Department name + User name + Tel no + Detail + Expected date + Approved by
Short Description	Help Desk sends report in which it is produced by outsourcing to other departments and close file of HD requested.
Object Name	**Creates and updates HD data**
Object Type	Data Flow
Definition	Creates and updates HD data = HD requested no + Requested date

	+ HD user ID + Finish date + Task
Short Description	Keep record about help desk task when other departments send a request.
Object Name	**Sends RFA**
Object Type	Data Flow
Definition	Sends RFA = RFA no + Requested date + Expected date + HD user name + Outsourcing name + ITC requested + Requested detail + Approved by
Short Description	Help Desk will send such request to outsourcing to perform according to their requested.
Object Name	**Creates and updates RFA data**
Object Type	Data Flow
Definition	Creates and updates RFA data = RFA no + Requested date + Expected date + HD user name + Outsourcing name + ITC requested + Requested detail + Approved by
Short Description	Other department's request will be stored in RFA when Help Desk requests to outsourcing to perform according to their requested.
Object Name	**Retrieves RFA data**
Object Type	Data Flow
Definition	Retrieves RFA data = Requested date + Requested detail + HD user name + Finish date
Short Description	RFA data will be retrieved to produce report for executive officer.
Object Name	**User's information form**
Object Type	Data Flow

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Definition	User's information form = HD user first-name + HD user last-name + Address + Birth date + Sex + Education + Education + Faculty/Major + Entry date + Sub-division + Title + Work
Short Description	New HD user's information will be stored in Help Desk user file and they can be updated user's information whenever information changed in order to use for personnel management.
Object Name	**Creates and update user data**
Object Type	Data Flow
Definition	Creates and update user data = HD user ID + HD user first-name + HD user last-name + Address + Birth date + Sex + Education + Education + Faculty/Major + Entry date + Sub-division + Title + Work experience + Last update
Short Description	New HD user's information will be stored in Help Desk user file and there may be updated user's information in order to use for personnel management.
Object Name	**Retrieves HD user data**
Object Type	Data Flow
Definition	Retrieves HD user data = HD user ID + HD user first-name + HD user last-name + Address + Birth date + Sex + Education + Education + Faculty/Major + Entry date + Sub-division + Title + Work experience + Last update
Short Description	There may be updated user's information when user's information changed in order to use for personnel management.
Object Name	**Sends HD user data**
Object Type	Data Flow

Definition	Sends HD user data = HD user name + Address + Birth date + Sex + Education + Faculty/Major + Sub-division + Title + Work experience + Last updated
Short Description	HD user's information will be sent to Personnel division in order to use for personnel management.
Object Name	**Retrieves RFA data**
Object Type	Data Flow
Definition	Retrieves RFA data = Requested date + Requested detail + HD user name + Finish date
Short Description	RFA data will be retrieved to produce report for executive officer.
Object Name	**Sends HD report**
Object Type	Data Flow
Definition	Sends HD report = HD user name + Tx date + Finish date + Task + Status + Refer ref
Short Description	Help Desk has to collect data about help desk tasks and reports to executive officer every month.
Object Name	**Closes RFA**
Object Type	Data Flow
Definition	Closes RFA = RFA no + HD user ID + Finish date + Close flag
Short Description	When outsourcing performed Help Desk request, HD user will close RFA.
Object Name	**Retrieves HD data**
Object Type	Data Flow
Definition	Retrieves HD data = HD requested no + Requested date + HD user

	ID + Finish date + Task
Short Description	Help Desk Task will be retrieved from HD file to produce report in order to send executive officer in the end of month.
Object Name	**Retrieves ITC requested data**
Object Type	Data Flow
Definition	Retrieves ITC requested data = Requested date + Requested title + HD user name + Finish date
Short Description	ITC requested data will be retrieved to produce report for executive officer.
Object Name	**Problem solving process**
Object Type	Data Process
Definition	Problem solving process = Problem ID + Requested date + Problem detail + Solution + Last updated + HD user ID + Type of business
Short Description	When ITC user requests for assistance then HD user will respond user's request with solution that solves their problem and keeps both problem and solution in database.
Object Name	**Respond requested process**
Object Type	Data Process
Definition	Respond requested process = Requested date + Department name + User name + Tel no + Detail + Expected date
Short Description	Help Desk user will respond a request of other departments according to their request.
Object Name	**Check data & close RFA**
Object Type	Data Process
Definition	Check data & close RFA = RFA no + HD user name + Outsourcing

	name + ITC requested + Requested detail + Approved by + Finish date + Close flag
Short Description	Report that outsourcing produced will be checked the completeness. After HD user checked the report, they will close RFA.
Object Name	**Produce HD report**
Object Type	Data Process
Definition	Produce HD report = HD user name + Tx date + Finish date + Task + Status + Refer ref
Short Description	All of Help Desk tasks will be collected and merged in order to produce report to their executive officer.
Object Name	**Maintain HD user record**
Object Type	Data Process
Definition	Maintain HD user record = HD user first-name + HD user last-name + Address + Birth date + Sex + Education + Faculty/Major + Entry date + Sub-division + Title + Work experience + Last update
Short Description	HD user record will be maintained including create, update, delete record in Help Desk user file in order to use for personnel management.
Object Name	**Retrieves P & S data**
Object Type	Data Flow
Definition	Retrieves P & S data = Problem ID + Problem detail + Solution + HD user name + Last update
Short Description	New problem occurring will be reported to executive officer in the end of month.

APPENDIX G

DATA DICTIONARY OF ENTITY RELATIONSHIP DIAGRAMS

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Object Name	**ITC User**
Object Type	Entity
Definition	ITC user = User ID + User first-name + User last-name + ITC + Product + Title + Tel No
Short Description	User's information in which Help Desk or support division need.
Object Name	**ITC Requested**
Object Type	Entity
Definition	ITC requested = ITC requested ID + Requested date + Requested title + User ID + HD user ID + Job type + Problem detail + Type of error + Finish date + Finish time + Status
Short Description	Request or problem in which users need to be solved by Help Desk when they has some problem.
Object Name	**Problem**
Object Type	Entity
Definition	Problem = Problem Tx + ITC requested ID + Problem ID + Solution + HD user ID
Short Description	There may be many problems in one request, so each problem must be solved by specific solution.
Object Name	**Problem and Solution**
Object Type	Entity
Definition	Problem and Solution = Problem ID + Date + Problem detail + Solution + Last update + HD user ID + Type of business
Short Description	Both problem and solution will be kept to database in order to retrieve in the next time when the same problem occurs again.

Object Name	**Department**
Object Type	Entity
Definition	Department = Department ID + Department name + Address + Executive officer + Tel No
Short Description	Other departments that contact with International trade department so that request some information they need.
Object Name	**HD**
Object Type	Entity
Definition	HD = HD requested No + Requested date + Department ID + User name + Tel No + Detail + HD user ID + Expected date + Approved by
Short Description	Help Desk Requested number will be issued when other departments request some data from International Trade department in order to keep record abou such requested.
Object Name	**Help Desk User**
Object Type	Entity
Definition	Help Desk User + HD user ID + HD user first-name + HD user last-name + Address + Birth date + Sex + Education + Faculty/Major + Entry date + Sub-division + Title + Work experience + Last updated
Short Description	Help Desk user's information.
Object Name	**Outsourcing**
Object Type	Entity
Definition	Outsourcing = Outsourcing ID + Company name + Address + Post code + Tel No + Fax No + Contact name

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Short Description	Some problem can not be solved by Help Desk, so they must request to outsourcing who are companies that made support agreement with bank for supporting bank operation.
Object Name	**RFA**
Object Type	Entity
Definition	RFA = RFA No + Requested date + Expected date + HD user ID + Outsourcing ID + ITC requested ID + Requested detail + Approved by + Finish date
Short Description	RFA is request for assistance that will be created when Help Desk requests outsourcing to response their request.
Object Name	**Sends**
Object Type	ERD Connection
Definition	sends = relationship between ITC User and ITC request (1:0,n)
Short Description	One ITC user can send zero or more ITC requests but one ITC requested must has only one ITC user.
Object Name	**Has**
Object Type	ERD Connection
Definition	has = relationship between ITC requested and problem (1:1,n)
Short Description	ITC requested can has one or more problems while one problem must has only one ITC request,
Object Name	**Belongs**
Object Type	ERD Connection
Definition	belongs = relationship between ITC user and department (1,m : 1)
Short Description	A ITC user must belong in one department but each department there may be one or more ITC users.

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Object Name	**Receives**
Object Type	ERD Connection
Definition	received = relationship between Help Desk requested and Help Desk user (0,m : 1)
Short Description	A Help Desk Requested must be received by one Help Desk user but one Help Desk user can receive zero or more Help Desk requests.
Object Name	**Responds**
Object Type	ERD Connection
Definition	responds = relationship between outsourcing and RFA (0,m:1)
Short Description	One outsourcing responds one or more RFA but one RFA must has one outsourcing.
Object Name	**Creates**
Object Type	ERD Connection
Definition	creates = relationship between RFA and Help Desk user (0,m : 1)
Short Description	One RFA must has one Help Desk user to create RFA but one Help Desk user can create zero or more RFAs.

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APPENDIX H

INPUT FORMS

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Help Desk

Request form

ธนาคารกสิกรไทย

Help Desk No.		ฝ่าย / ส่วนงาน	
ผู้ขอ / เบอร์โทร		ผู้อนุมัติ / เบอร์โทร	
วันที่ขอ		วันที่อนุมัติ	
กำหนดเสร็จ		ลายเซ็นต์	

เรียน	ธนกรวิทศพาณิชย์จำนวยการ
เรื่อง	
ระบบที่เกี่ยวข้อง ❍ EXIMBILLS ❍ EQUATIONS ❍ อื่น ๆ	❍ เอกสารแนบ จำนวนหน้า .....
รายละเอียดเพิ่มเติม	

เฉพาะเจ้าหน้าที่ Help Desk

❍ Help Desk ดำเนินการ ❍ Progress Software Co.,ltd. ดำเนินการ (RFA No.....) ❍ อื่นๆ .....

ผู้รับผิดชอบ :	ผู้อนุมัติ :
วันที่ :	วันที่ :

การตรวจรับ ❍ ถูกต้อง ❍ ไม่ถูกต้อง ❍ อื่น ๆ			
ผู้ตรวจรับ / เบอร์โทร		วันที่ตรวจรับ	
ลายเซ็นต์			

Figure H.1. Help Desk Form for Other Departments Requested.

บมจ. ธนาคารกสิกรไทย

แบบขอแก้ไขงานในระบบ EXIMBILLS

วันที่ .....

เรียน วิเทศพาณิชย์ธนกรอำนวยการ

เนื่องจาก ศูนย์ฯ .....

.....

.....

ดังนั้น ขอให้ Help Desk ช่วยดำเนินการ .....

.....

.....ตามรายการต่อไปนี้

ลำดับที่	ชื่อลูกค้า	Ref.1 No.	Ref.2 No.	Amount สกุลเงิน

จึงเรียนมาเพื่อโปรดพิจารณาดำเนินการ

.....

( )

ผู้จัดการศูนย์ธุรกิจต่างประเทศ.....

กรณีต้องการข้อมูลเพิ่มเติม ติดต่อคุณ..... โทร : .....

หมายเหตุ : .....

.....

Figure H.2. Help Desk Form for ITC Requested.

Progress

Request Form

ฝ่าย	วิทศพาณิชย์	เลขที่อ้างอิง	
ผู้ขอ/ เบอร์โทร		ผู้อนุมัติ / เบอร์โทร	
วันที่ขอ		วันที่อนุมัติ	
กำหนดเสร็จ		ลายเซ็นต์	

เรื่อง		
ระบบที่เกี่ยวข้อง ❍ EXIMBILLS ❍ EQUATIONS ❍ อื่น ๆ		❍ เอกสารแนบ จำนวนหน้า .....
รายละเอียดเพิ่มเติม		
ผู้รับผิดชอบ :		
Help Desk No :		

การตรวจรับ ❍ ถูกต้อง ❍ ไม่ถูกต้อง ❍ อื่น ๆ			
ผู้ตรวจรับ / เบอร์โทร		วันที่ตรวจรับ	
ลายเซ็นต์			

ASSUMPTION UNIVERSITY OF THAILAND
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Figure H.3. Request for Assistance to Outsourcing Form.

APPENDIX I

SCREEN LAYOUTS

ASSUMPTION UNIVERSITY OF THAILAND
BROTHERS OF ST. GABRIEL
LABOR OMNIA VINCIT
SINCE 1969
มหาวิทยาลัยอัสสัมชัญ

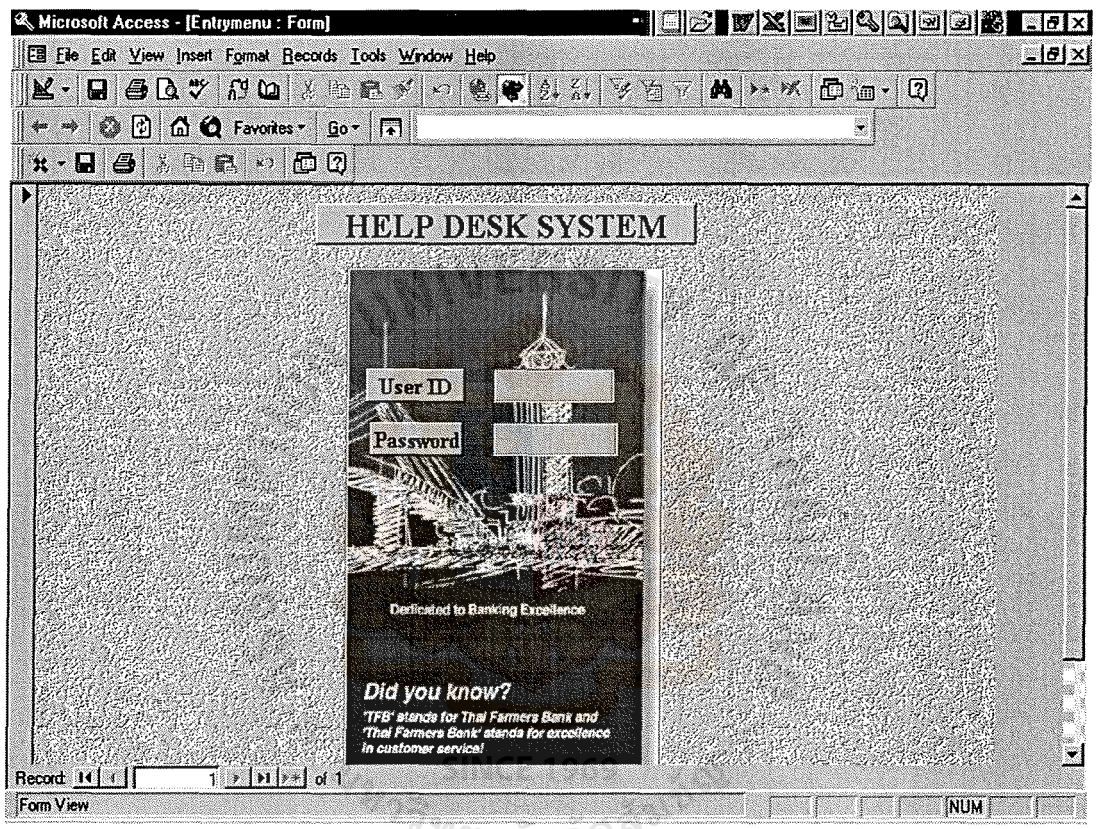

Figure I.1. Help Desk System Screen.

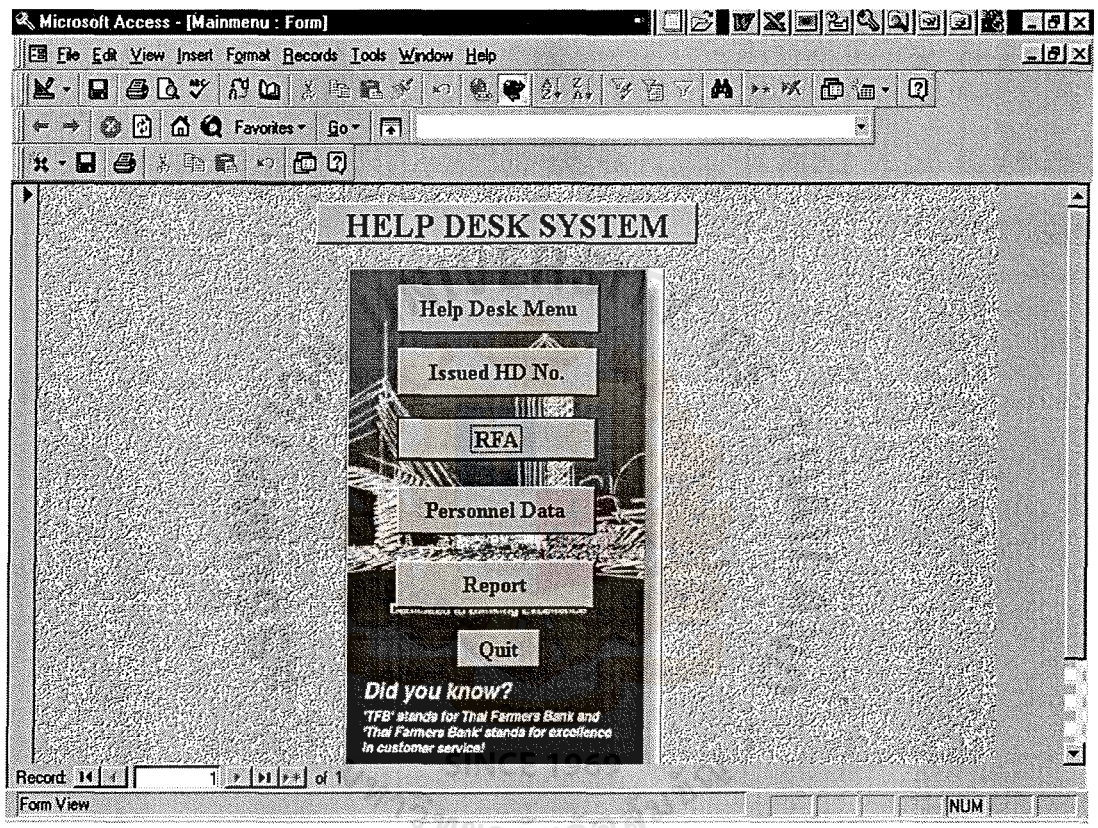

Figure I.2. Main Menu Screen.

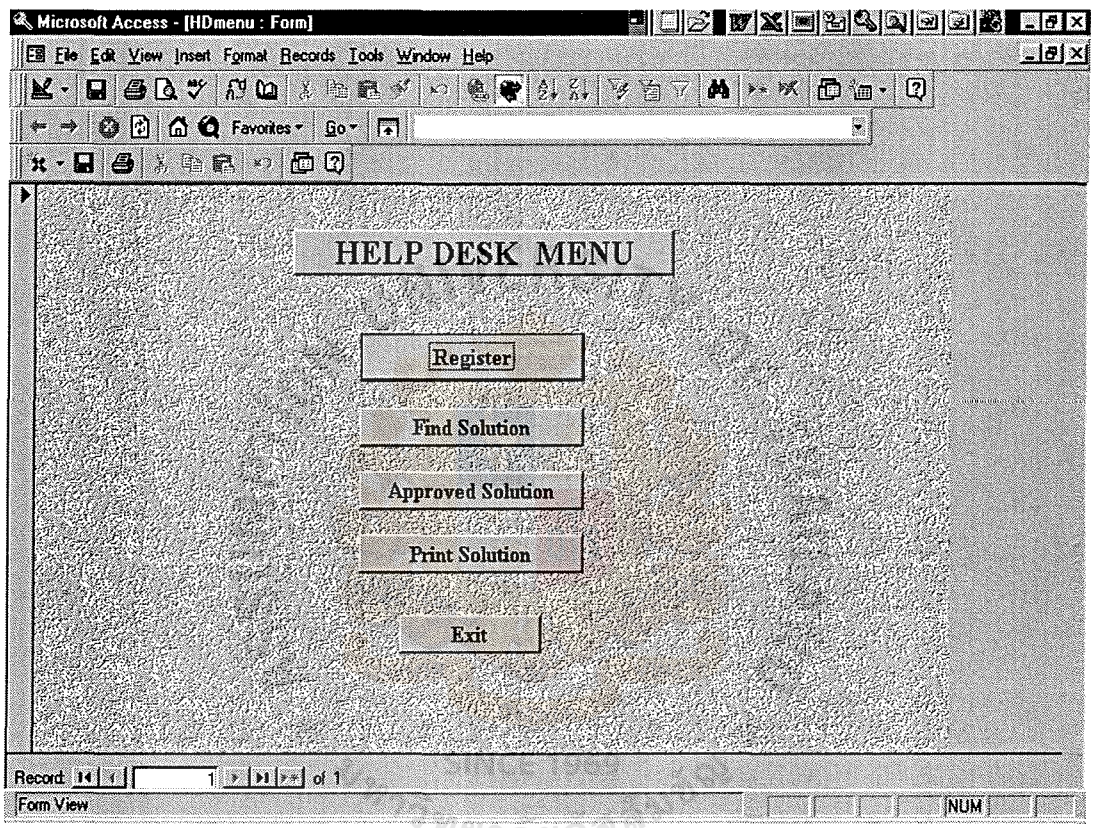

Figure I.3. Problem Solving Screen.

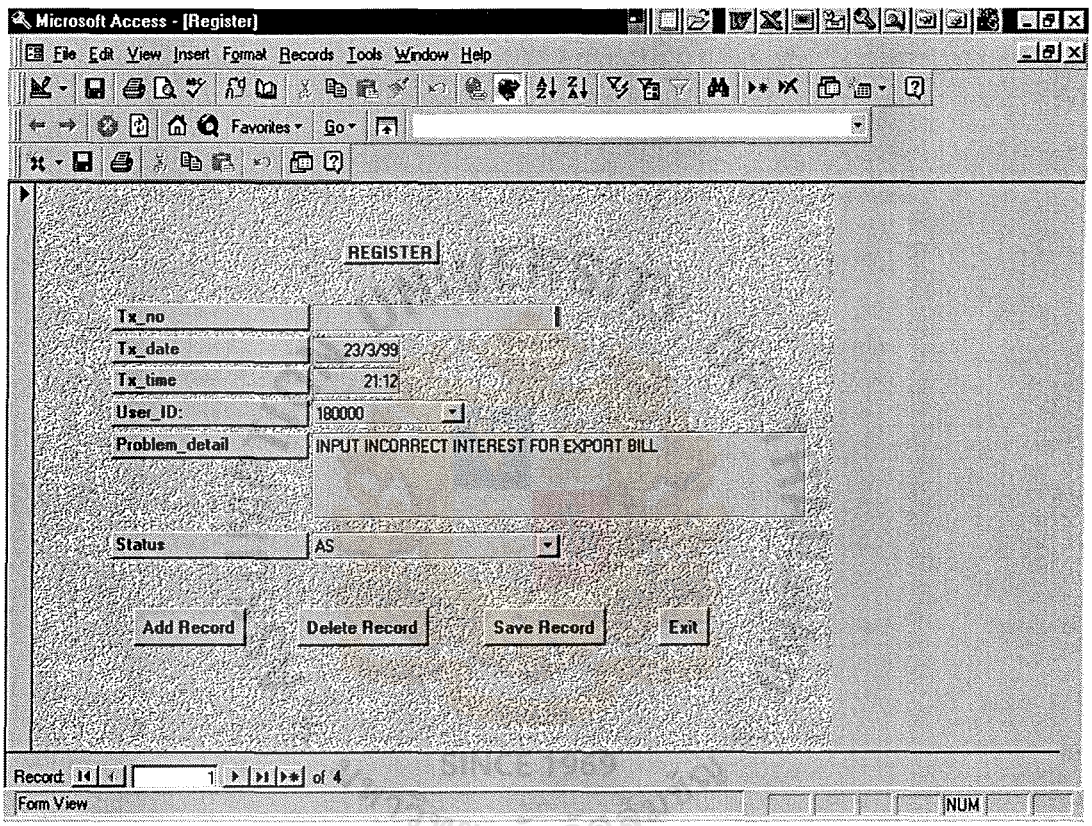

Figure I.4. Register Problem Screen.

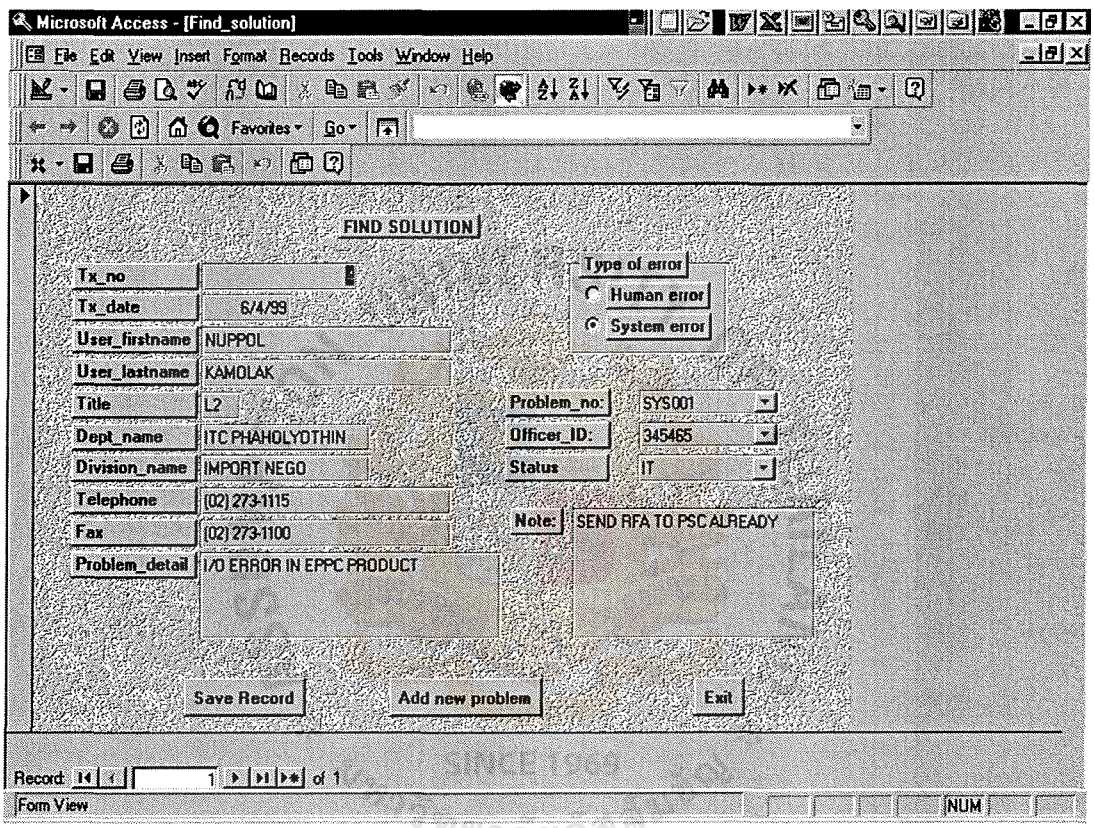

Figure I.5. Find Solution Screen.

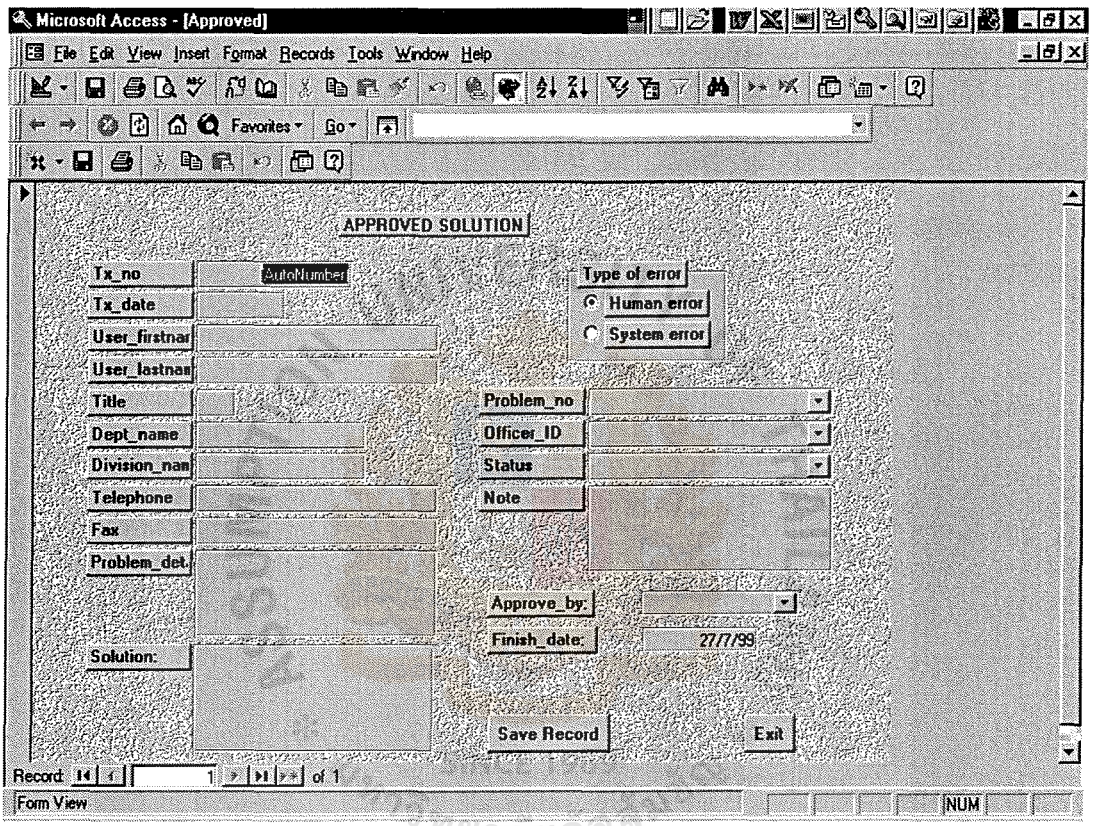

Figure I.6. Approved Solution Screen.

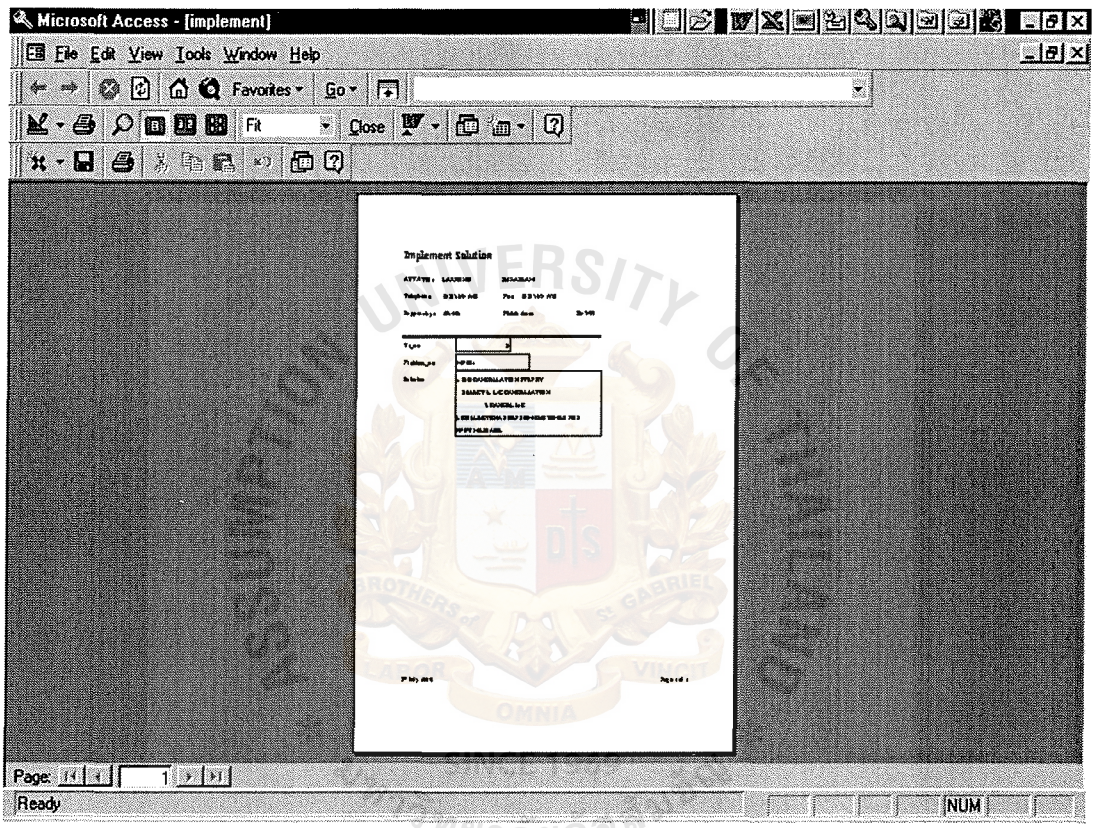

Figure I.7. Preview Report Screen.

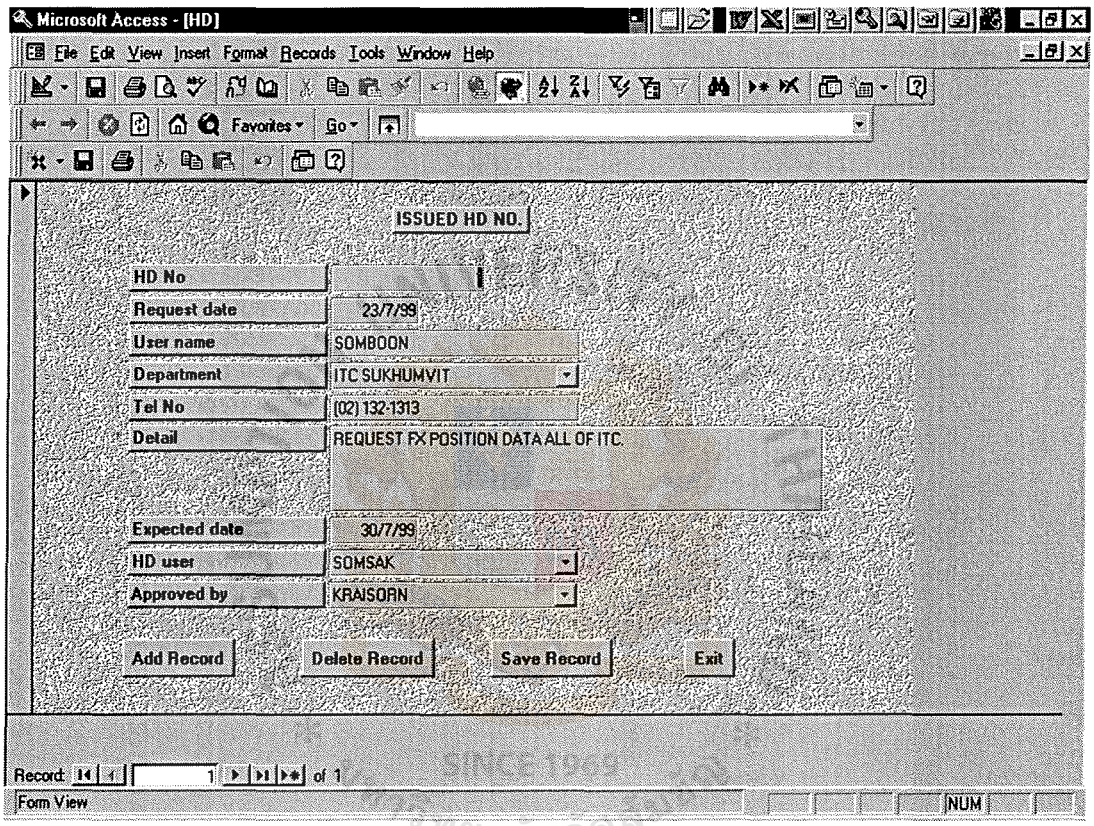

Figure I.8. Issued Help Desk Number Screen.

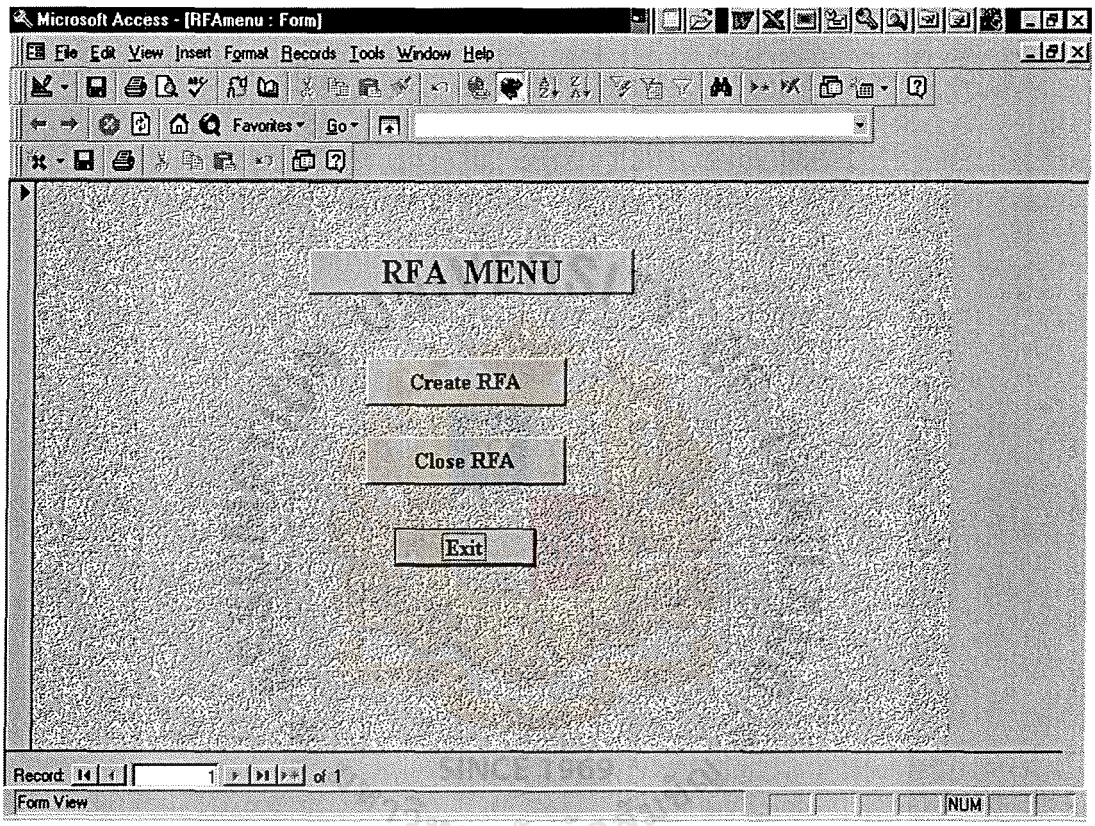

Figure I.9. RFA Task Menu Screen.

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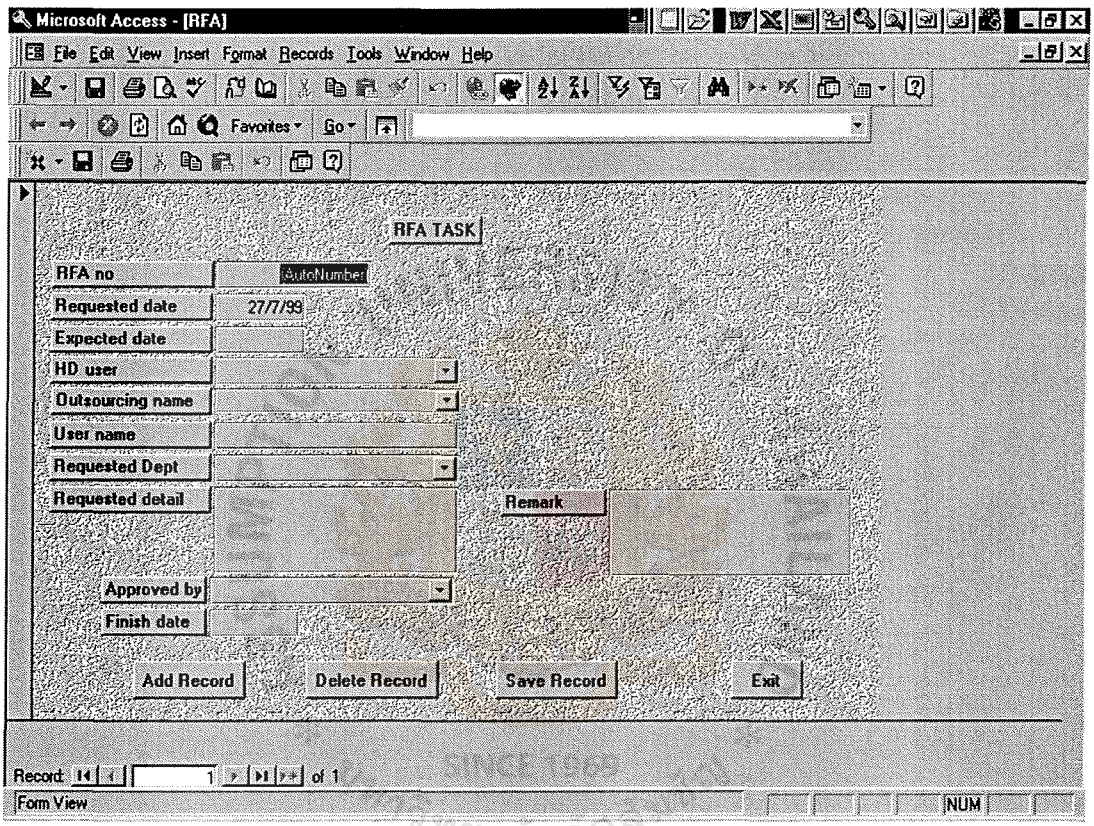

Figure I.10. Create RFA Screen.

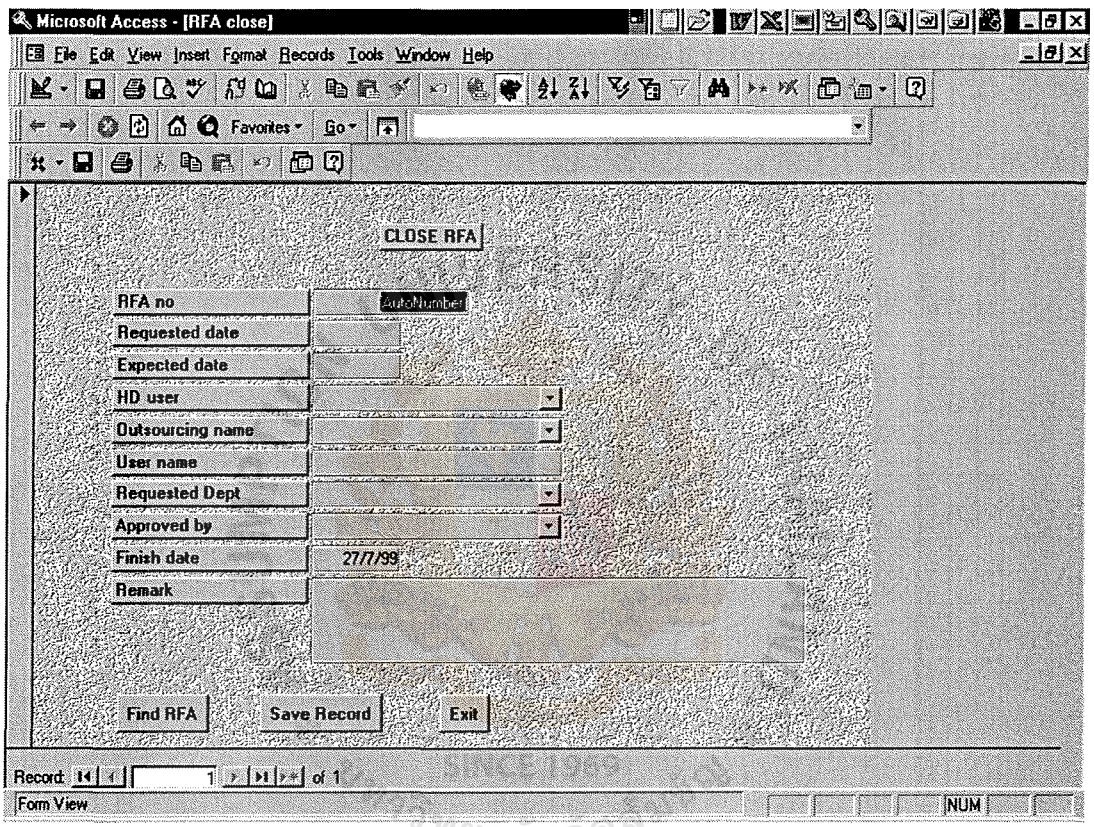

Figure I.11. Close RFA Screen.

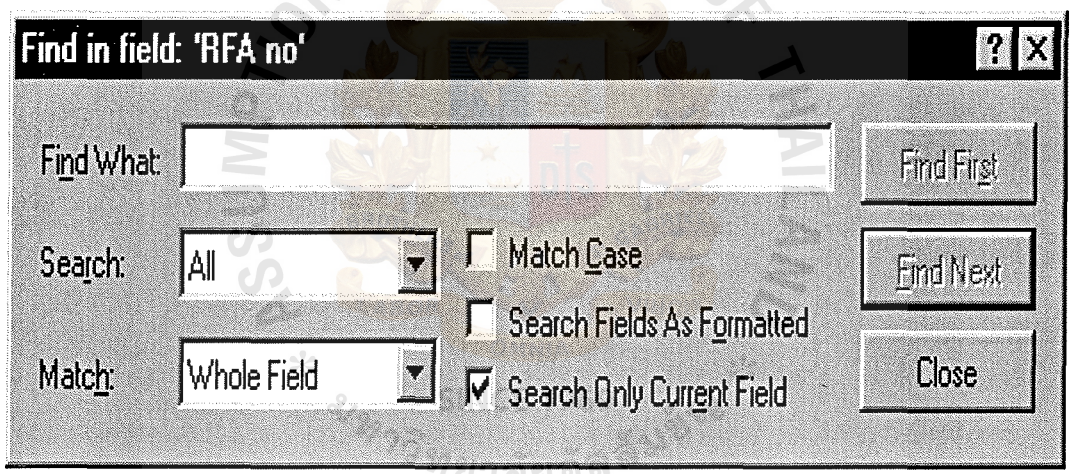

Figure I.12. Find Information Tool Screen.

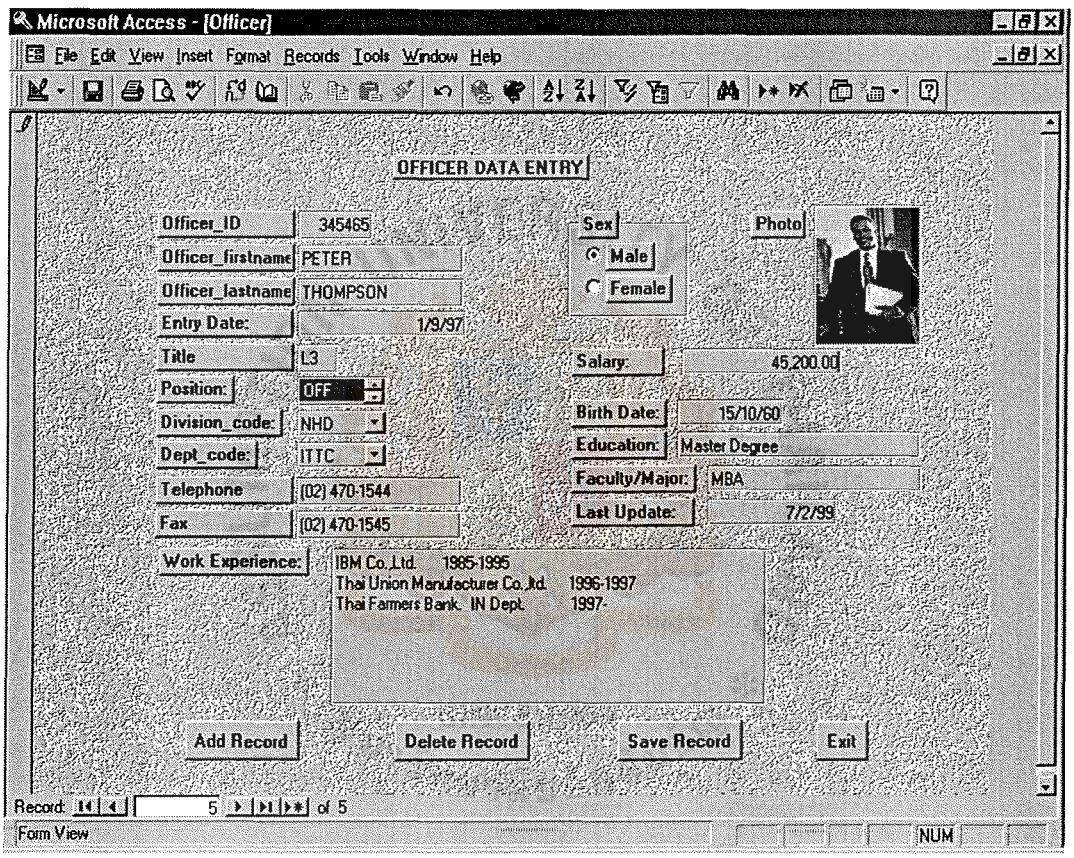

Figure I.13. Officer Data Screen.

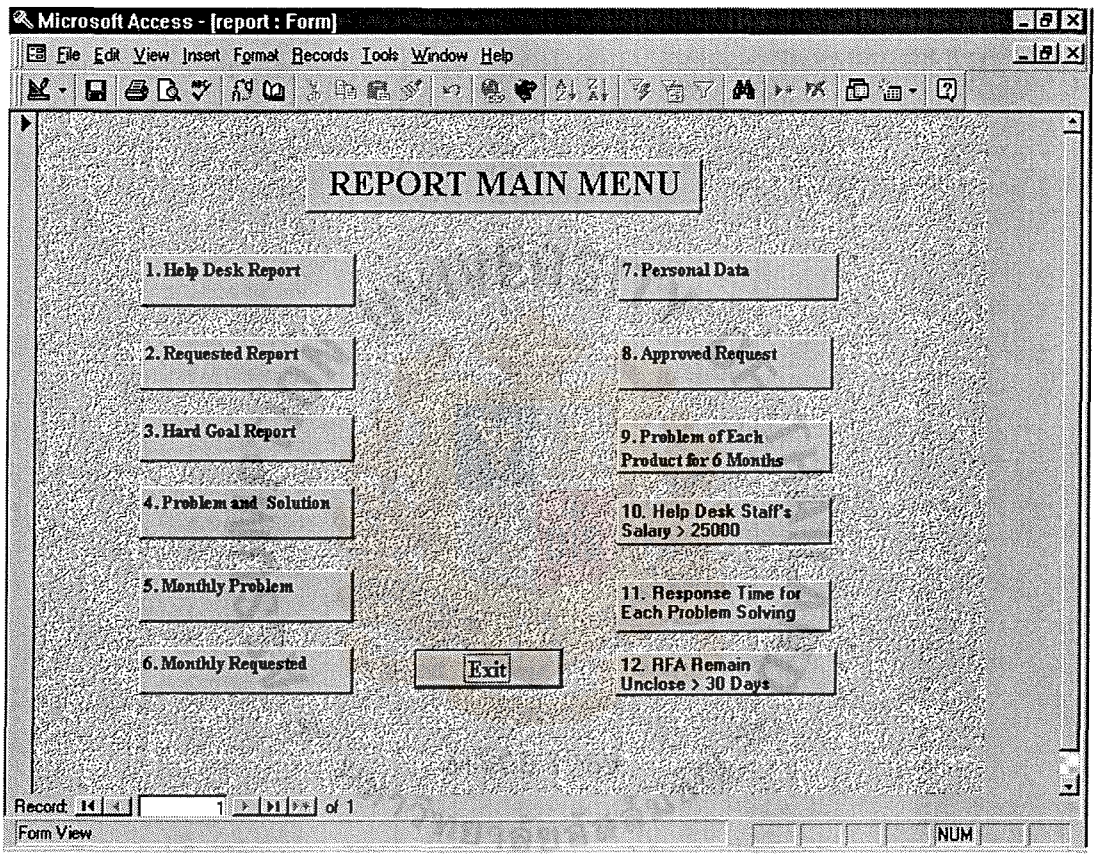

Figure I.14. Report Menu Screen.

APPENDIX J

REPORT SAMPLES

ASSUMPTION UNIVERSITY OF THAILAND
BROTHERS OF ST. GABRIEL
LABOR OMNIA VINCIT
SINCE 1969
มหาวิทยาลัยอัสสัมชัญ

Help Desk Report
On Dated 99/99/9999

Date : 99/99/999
Page : 999

Dept_Name	User Name	Problem No	Tx_Date	Error Type	Solved By
xxxxxxxxxx					
	xxxxxxxxxxxxx	xx999	99/99/9999	999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xx999	99/99/9999	999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xx999	99/99/9999	999	xxxxxxxxxxxxx
Sub Total Problem : 999 Items					
xxxxxxxxxx					
	xxxxxxxxxxxxx	xx999	99/99/9999	999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xx999	99/99/9999	999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xx999	99/99/9999	999	xxxxxxxxxxxxx
Sub Total Problem : 999 Items					
xxxxxxxxxx					
	xxxxxxxxxxxxx	xx999	99/99/9999	999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xx999	99/99/9999	999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xx999	99/99/9999	999	xxxxxxxxxxxxx
Sub Total Problem : 999 Items					
Grand Total Problem : 999 Items					

End of Report

Figure J.1. Help Desk Report.

ASSUMPTION UNIVERSITY OF THAILAND
SINCE 1969

Requested Report
On Dated 99/99/9999

Date : 99/99/999
Page : 999

Dept_Name	User Name	Title	Requested Date	Expected Date	Approved By
xxxxxxxxxx					
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
xxxxxxxxxx					
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
xxxxxxxxxx					
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx

Total Requested : 999 Items

End of Report

Figure J.2. Requested Report.

Hard Goal Report
From Dated 99/99/9999 to 99/99/9999

Date : 99/99/999
Page : 999

HD Name	Problem No	Req_Date	Req_Time	Fin_Date	Fin_Time	Total Time	Approved By
xxxxxxxxxx							
	xx999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
	xx999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
	xx999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
Sub Total :	999 Items						
xxxxxxxxxx							
	xx999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
	xx999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
	xx999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
Sub Total :	999 Items						
xxxxxxxxxx							
	xx999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
	xx999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
	xx999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
Sub Total :	999 Items						
Grand Total :	999 Items						

End of Report

Figure J.3. Hard Goal Report.

Problem and Solution Report
On Dated 99/99/9999

Date : 99/99/999
Page : 999

Problem No	Problem	Solution	Last Update	Product	Approved By
xx999					
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
xx999					
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
xx999					
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx

Total : 999 Items

End of Report

Figure J.4. Problem and Solution Report.

Monthly Problem Report
On Month 99/9999

Date : 99/99/999
Page : 999

Problem No	Problem	Solution	Tx_Date	Product	Solved By
xx999					
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxxx
xx999					
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxxx
xx999					
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxxx

Total : 999 Items

End of Report

Figure J.5. Monthly Problem Report.

Monthly Requested Report
On Month 99/9999

Date : 99/99/999
Page : 999

Request No	Request	Remark	Req_Date	Product	Approved By
999					
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
999					
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
999					
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxx	xxxxxxxxxxxxx

Total : 999 Items

End of Report

Figure J.6. Monthly Requested Report.

Personal Data Report
On Dated 99/99/9999

Date : 99/99/999
Page : 999

HD First Name	HD Last Name	Title	Sub-Div	Entry Date	Education	Salary	Last Update
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999

Total : 999 Items

End of Report

Figure J.7. Personal Data Report.

Approved Requested Report
On Date 99/9999

Date : 99/99/999
Page : 999

Request No	Request	Approved Date	Expected Date	Product	Approved By
999					
	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	99/99/9999	xxxx	xxxxxxxxxxxxx
999					
	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	99/99/9999	xxxx	xxxxxxxxxxxxx
999					
	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	99/99/9999	xxxx	xxxxxxxxxxxxx
	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	99/99/9999	xxxx	xxxxxxxxxxxxx

Total : 999 Items

End of Report

Figure J.8. Approved Requested Report.

Problem of Each Product for 6 Months
On Dated 99/9999

Date : 99/99/999
Page : 999

Product	Problem No	Problem Solution	Req_Date	Solved By
xxxx				
	xx999	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx
	xx999	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx
	xx999	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx
xxxx				
	xx999	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx
	xx999	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx
	xx999	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx
xxxx				
	xx999	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx
	xx999	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx
	xx999	xxxxxxxxxxxxxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx

Total : 999 Items

End of Report

Figure J.9. Problem of Each Product for 6 Months Report [MIS].

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Help Desk Staff's Salary > 25000
On Dated 99/99/9999

Date : 99/99/999
Page : 999

HD First Name	HD Last Name	Title	Sub-Div	Entry Date	Education	Salary	Last Update
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
xxxxxxxxxxxxx	xxxxxxxxxxxxx	xxxxxxxxx	xxxxxxxxxx	99/99/9999	xxxxxxxxxxxxx	999,999.99	99/99/9999
	Total : 999 Items						

End of Report

Figure J.10. Help Desk Staff's Salary > 25000 Report [MIS].

Response Time for Each Problem Solving
On Date 99/99/9999

Date : 99/99/999
Page : 999

Problem No	Req_No	Req_Date	Req_Time	Fin_Date	Fin_Time	Total Time	Solved By
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx
xx999	999	99/99/9999	99:99	99/99/9999	99:99	99:99	xxxxxxxxxxxxxx

Grand Total : 999 Items

End of Report

Figure J.11. Response Time for Each Problem Solving Report [MIS].

RFA Remain Unclose > 30 Days
On Dated 99/99/9999

Date : 99/99/999
Page : 999

RFA No	User Name	Title	Requested Date	Expected Date	Approved By
999					
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
999					
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
999					
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx
	xxxxxxxxxxxxx	xxxxxxxxxxxx	99/99/9999	99/99/9999	xxxxxxxxxxxxx

Total Requested : 999 Items

End of Report

Figure J.12. RFA Remain Unclose > 30 Days Report [MIS].

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