Customer Support System for Support Service Provider

By

Ms. Soisawat Jintaphanu

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

April, 1998

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Project Title	:	Customer Support System for Support Service Provider
Name	:	Ms.Soisawat Jintaphanu
Project Advisor	:	Prof.Dr.Srisakdi Charmonman
Academic Year	:	1998

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

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April 1998

ABSTRACT

This proposal is to develop a custom application software which will provides automate working an managment information software for customer service provider in order to improve and be as a part of business strategy. The proposed system will computerizes customer service function related of three departments; Customer Service, Technical Support, and Execute Managment; which will 367,900 baht for investment and takes eleven months on delivery.

According to the existing system is manually, incorrectly, slow response, and not up to date. Also, there are communication gaps among those entities. Whereas the proposed system will utilizes the existing infrastructure to benefit more capable and efficient, and developed on the existing IT manpower. The new system will improve work performance and be on-line communication, which invests minimal costs of development, on the legacy infrastructure and human resource, and long term maintenance. The investment will recovers after eleven months part, then just only five thousand baht payment monthly for the maintenance cost.

As the result of the evaluation testing of the system simulation on the current server; cpu 200 Mhz, 128 KB ram, 1.2 GB storage; connect to three clients in the environment of Windows 95 and Visual Basic development tool with three operators of those three entities. The new system had saved ninety percents of their workload and were excellent performance.

The new system will achieves fast data retrieving, quick updating, shared information, business operation, more efficient performance, and save costs.

Additionally, the new system will also extends integrations with other systems such as Financial, Accounting, Inventory Control; in future. Cause of the system was designed to support futher extending in future.

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I. INTRODUCTION

1.1 Company Background

"New Technology" company is a computer local reseller, which has settled computer business since 1981. The business of "New Technology" is selling computer products and peripherals to local customers. They import computers, which are complete sets, resell to local customers and provide support after sales as service.

"New Technology" has current totally thirty-four employees and four main departments. Those four main departments are Sales Department, Accounting Department, Human Resource Department and Information Technology Department.

Their current infrastructure has one computer system including of one file server, twenty-five workstations, five lazer printes, four dot-matrix printers, two twenty ports hubs. The fileserver is locates at IT department together with two hubs. And also has seven workstations, one lazer printer and one dot-matrix printer. The network is star topology, 10 base T, which has 10 mega bits of communication speed.

Currently, they have already two computerized applications serving their business as core operation;

Accounting application, supports their accounting operation for accounting department, including general ledger, account receivable, account payable, fixed asset, cash flow and inventory control which are all integrated.

Payroll application supports employee salary and overtime calculation. Pay slips can be produced and printed as outcome of the system. Payroll system is also recording employee profile and producing manpower reports.

1.2 Project Objectives

As company has been settled almost seventeen years, thus their business has taken current market share 20% of all, and also they are in the third rank comparing with all other competitors. One of company's goals of this year is to increase sales market share approaching at 30%, that means sales target is considered to increase 5% by this year. Then, the two main sales strategies are, to reduce product cost and improve customer service after sales.

This project is proposed to meet the strategies and be benefited to company approach in short term plan on their current network and availability of software providing.

This project is proposed seven main objectives:

- **To reduce product cost,**

  by reducing operation cost, maintenance cost and service cost, then the product cost will be decreased and able to propose to customer with more cheaper price.

- **To improve customer service after sales,**

  by providing fast service as on-line and interactive system for in-house operation and communication, especially between customer support function and computer/technical support function.

- **To utilize more benefit on existing infrastructure,**

  by using the new system living on the current hardware and network. Furthermore, the new system will be developed by their current software development tools.

- **To save operation cost,**

by decreasing manual works and changing to be computerized system. Many manual work procedures can be performed automatically and completed in a short time.

- **To increase sales market share,**

  by using the new proposed system, the product cost will be cheaper. Then the business can compete with the others in market and able to get increasing of sales volume.

- **To support sales strategy,**

  As the two strategies are increasing sales volume and reducing product cost, then the new proposed system can serves both of these strategies.

- **To support on-line management information,**

  The new proposed system will provides many management reports to adjust their service cost and as a projection of their service operation.

1.3 Scope of the Project

The scope of this project is covered:

- **Get customer request for problems,**

  Customer problem request will be entried at first stage together verifying customer's status automatically. And just one entry only at this stage, then there are no more any repeated performing transactions at other stages.

- **Display customer and product's status,**

  Retrieving valid customer account with their own products to check their status for getting new problem requests.

- **Record symptom of problem and solution,**

  Retrieving entried problem request for update with symptom detail and more update solution.

- **Perform operation and management reports,**

  Automatic producing operation and management reports periodically with more flexible option provided.

1.4 Benefits

This project will benefit to "New Technology" company as following:

- To create a new interested product,
- To have a new market share,
- To increase more revenue,
- To reduce product cost,
- To reduce operation cost,
- To be a strong efficient strategy of the business,
- To satisfaction their customers after sales,
- To improve and monitor support services in a range of time,
- To reduce technical supporting time for primary support level,
- To manage time table of technical support manpower with more efficient,
- To be a shared technical knowledge base.

1.5 Deliverables

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The deliverables of this project is achieved by three related business functions, there are sales, accounting, information technology departments and executive management. These achievement are:

New Problem Reports:

1. New Problem Report by Date for all type
2. New Problem Report by Date for Hardware type
3. New Problem Report by Date for Software type

Status Reports:

1. Hardware Problem Status Report by Date (all)
2. Hardware Problem Status Report by Date (Pending)
3. Hardware Problem Status Report by Date (In Progress)
4. Hardware Problem Status Report by Date (Closed)
5. Software Problem Status Report by Date (all)
6. Software Problem Status Report by Date (Pending)
7. Software Problem Status Report by Date (In Progress)
8. Software Problem Status Report by Date (Closed)
9. Problem Status Report by Technician (all)
10. Problem Status Report by Technician (Pending)
11. Problem Status Report by Technician (In Progress)
12. Problem Status Report by Technician (Closed)

Management Reports:

1. Product Statistical Problem Report for all type
2. Product Statistical Problem Report for all type
3. Top Ten Most Problem Product Report

4. Statistical Problem Product Report

Printed Form:

20. Printed Service Form

Check Lists:

20. Customer List

21. Product List

22. Customer Account List

23. Technician List

1.6 Project Plan

This project is planned to have manpower of three person:

- One Project Manager
- One System Analyst
- One Programmer

and include five main phases as following:

Determine Requirement Phase	11 days
Analysis Phase	10 days
Design Phase	20 days
Development Phase	34 days
Implementation Phase	13 days

Total of project completion is 88 days (please see figure 1.1 Grant Chart).

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Task Name	Duration
Determine Requirement Phase	11d
Overview	3d
Business Goals	1d
IT Goals	1d
Organization Structure	1d
Interview	4d
IT Manager	1d
Managing Director	1d
Customer Support Supervisor	1d
Computer Support Supervisor	1d
Study Work Flow and Procedures	4d
Customer Support Function	2d
Computer Support Function	1d
Collect of service support forms	1d
Analysis Phase	10d
Study major problems	5d
Gap analysis Customer Support & Custom	5d
Design Phase	20d
Design Data Flow Diagram	5d

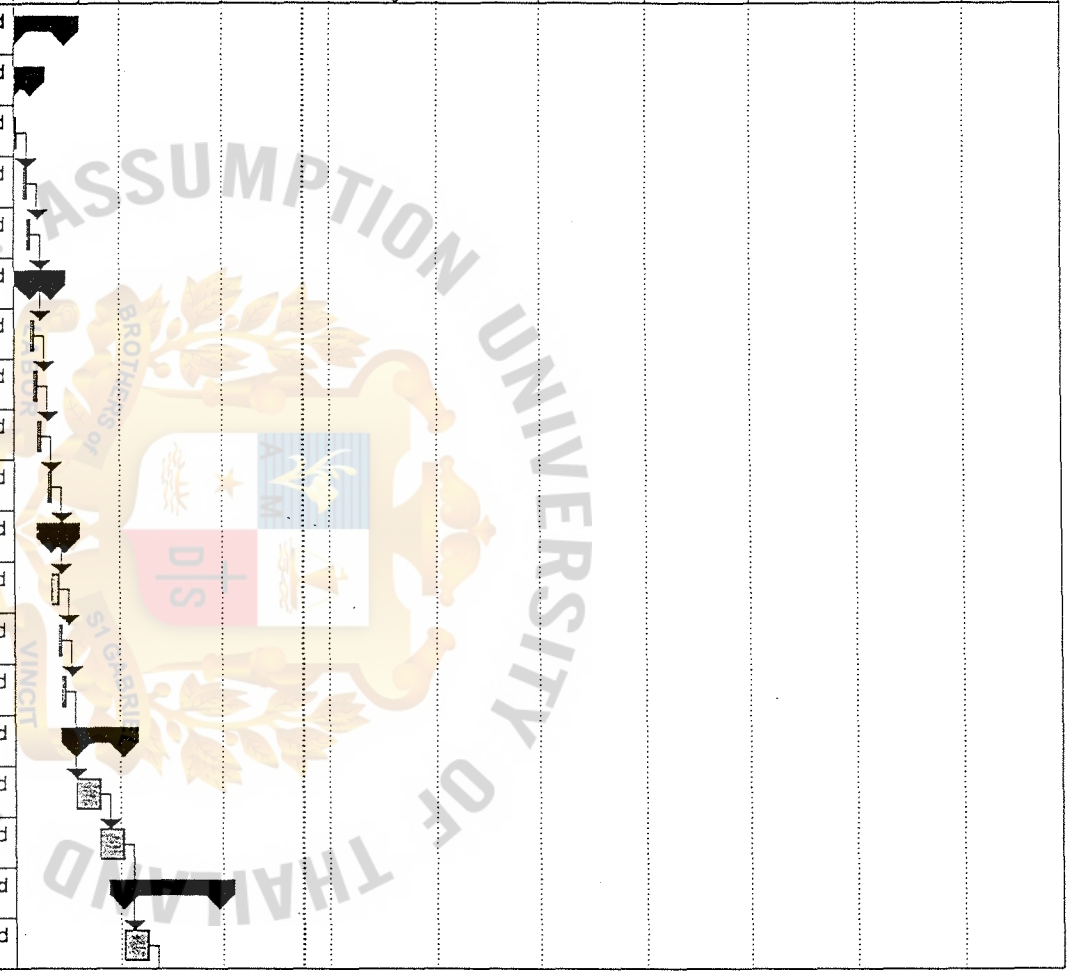

Figure 1.1. Gantt Chart

Task Name	Duration
Design screen format	5d
Design report/enquiry format	5d
Design Data Dictionary	5d
Development Phase	34d
Coding	30d
Testing	18d
Implementation Phase	13d
Training	3d
Implemenation	10d
Life	1d

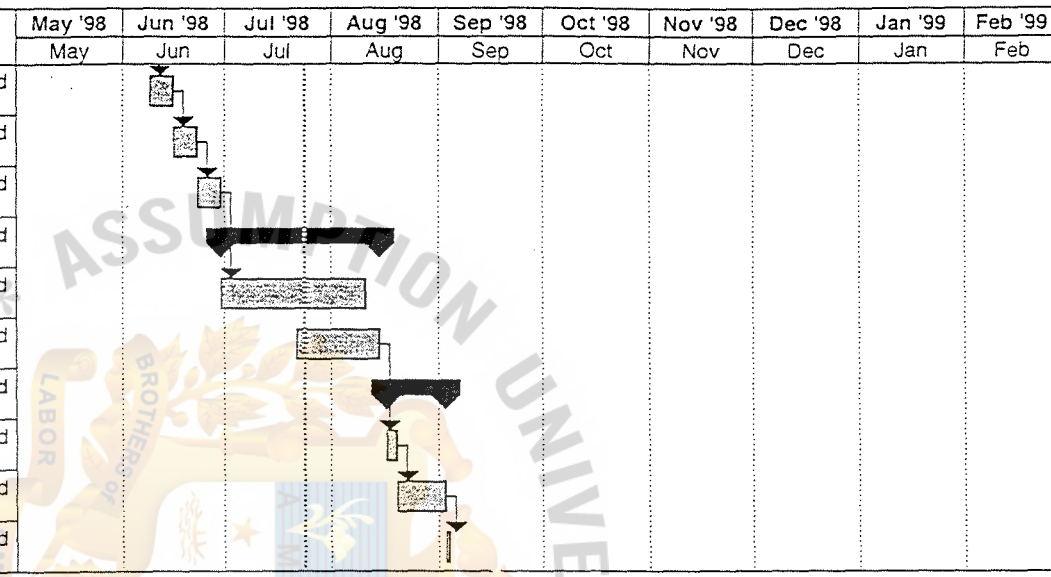

Figure 1.2. Gantt Chart (Continued)

II. EXISTING SYSTEM

2.1 Overview of Company Environment

"New Technology" is a local computer reseller and provide service after sales. Its major revenue is come from computer products, which are imported from "Taiwan" country with complete set. The company has only one office located in Bangkok, and has support service function which is a part of IT department.

Although the main income is computer products but, the company is being confronted with increasing of support service cost. While the computer product revenue is increased gradually, but the support service cost is straight up faster. The company perceives that with quick growth rate of service cost will also impact to product cost as well. Otherwise, they will lose market share and couldn't compete with the others.

Most of company operation are manual working, many data inconsistence and repeatition of procedural work performing. About thirty percent of work are computerized operating on accounting and payroll systems which are not integrated. Especially, sales order procedure and customer service function have not computerized yet, those current works are manually.

The business currently confronts with customer complaining about the support services of information technology department, and not up-to-date information with their service commitment from sales department. Furthermore, technical service takes many days for problem fix and delay on technician assigning.

Management has problem getting delay statistical reports and not up-to-date information included.

2.2 Organization Structure

"New Technology" company has four main departments:

- Sales Department,
- Accounting Department,
- Information Technology Department,
- Human Resource Department.

And has total 34 employees, IT department has most number of staffs and has main work load of support service for customers.

Sales department has one manager, one supervisor and three sales representatives. This function responsibles for sales target achievement, sales procedures, sales order document preparation, sales commission calculation, and sales monthly reports.

Accounting department has one manager, three supervisors and eight accounting staffs. This department divides into three functions; Purchasing, General Ledger and Billing function. Purchasing function has one supervisor and one staff, responsibles for general purchasing, getting purchase order requisition, purchase order document preparation and stock delivery. General Ledger function responsibles for main accounting and financial system, preforming journal entry, accounting posting, accounting/financial reports, inventory control, account receivable, account payable and cash flow. Billing function has one supervisor and one billing staff, responsbiles for customer billing preparation and bill collector.

Human Resource department, has three supervisors and four staffs, divides into three functions; Administration/Recruitment, Payroll and Welfare & Training function. Administration/Recruitment function has one supervisor and one staff, responsibles for new staff recruitment and general office administration. Payroll function has one

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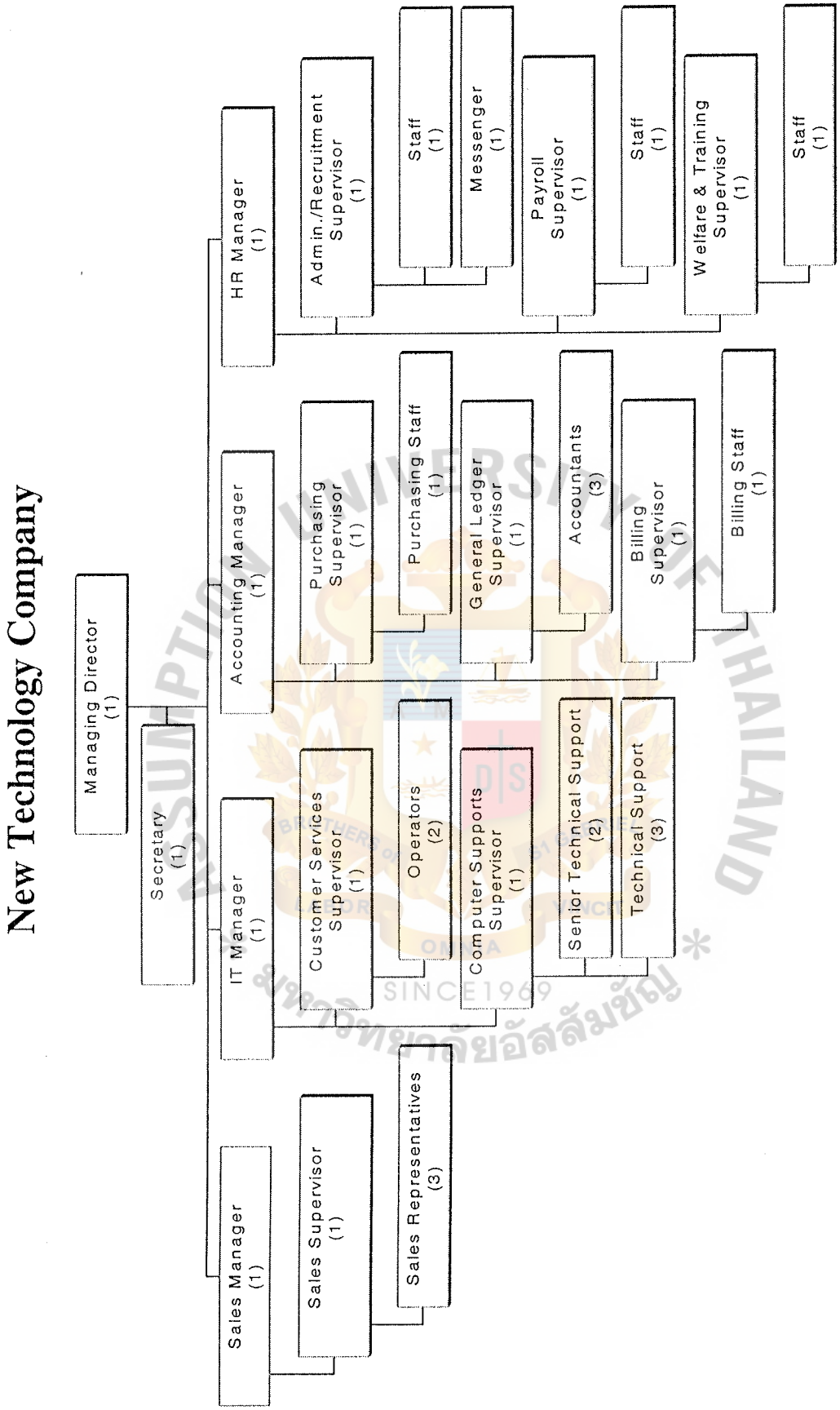

Figure 2.1 . Organization Chart

supervisor and one staff, responsibles for salary calculation, employee profile preparation, overtime calculation and printing payment slips. Welfare & Training function has one supervisor and one staff, responsibles for training preparation, employee's benefits and welfare.

Information Technology department, has one manager, two supervisors and seven staffs, divides into functions; Customer Service and Customer Support function. Customer Service function has one supervisor and two operators receiving problem requests from customers and in-house users. Customer or Technical Support function has one supervisor and five technicians, responsibles for computer supports for customers, in-house users and also providing some small application development.

2.3 Existing Business Function

As their current four main departments of the organization chart, therefore business flow can be operated among of those departments depending on their responsibilities, and capable convenience to the business.

2.3.1 Sales Department

Sales department has only one sales function, which is a main role of company revenue earning. This department has responsibility of:

- Setting sales and marketing strategy planning,
- Setting sales function procedures,
- Coordinate with accounting department for customer billing,

New Technology Company

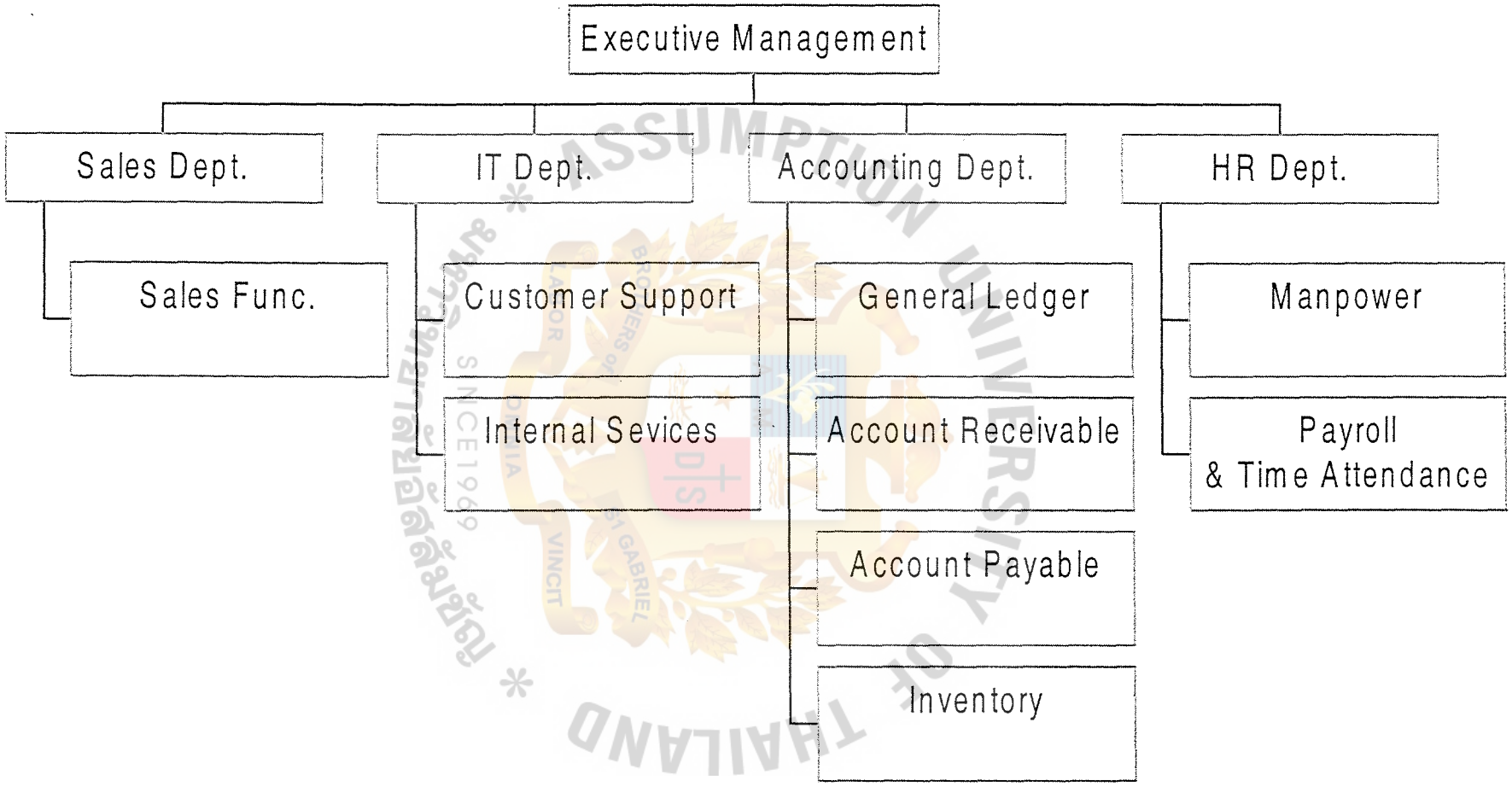

Figure 2.2. Business Structure Chart

- Coordinate with IT department to server customer satisfaction.

2.3.2 Accounting Department

Accounting department is responsible for financial management and accounting performing. This department has four functions for internal operation: General Ledger, Account Receivable, Account Payable and Inventory. Their responsibilities are:

- Setting Financial Planning,
- Setting periodic budget,
- Performing financial statement/reports,
- Performing customer invoicing and billing,
- Performing payment,
- Performing purchasing,
- Performing inventory control.

2.3.3 Human Resource Department

HR department has two main functions. Both of manpower and payroll functions handle for:

- Planning for Man Power management,
- Recording Employee profile,
- Performing monthly payroll and overtime,
- Providing office administration, welfare and training.

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2.3.4 Information Technology Department

IT department has two main functions, one is for customer support and the other one is for internal support. Work load of IT department is mainly for customer support. Their responsibilities are:

- Setting IT strategy plan,
- To coordinate with sales department to achieve customer satisfaction,
- Providing IT support services both external and internal,
- To develop and implement in-house application development,
- To develop cost reduction plan.

2.4 Existing Computer Systems

'New Technology' company has already hardware infrastructure, which supports for application running. The computer system consisting of:

- One file server (Ram 128 MB, CPU 166 Mhz, Hard Disk 36 GB, Network Card 32 bits),
- Twenty-five workstations (Ram 16 MB, CPU 133 Mhz, Hard Disk 2 GB, Network Card 32 bits),
- Five lazer printers,
- Four dot matrix printers,
- Two 12-ports hubs.

2.4.1 Sales Department

Sales department has four computer workstations, one lazer printer and one dot matix printer performing office automation and 'Sales Order' application. Which assigned as following:

- One computer workstation devoted for Sales Manager,
- One computer workstation for Sales Supervisor,
- Two computer workstations for sales operation,
- One lazer printer for general printing,
- and One dot matrix printer for 'Sales Order' printed reports.

2.4.2 Accounting Department

Accounting Department has seven computer workstations, one lazer printer and one dot matix printer performing office automation and accounting application. Which assigned as following:

- One computer workstation devoted for Accounting Manager,
- One computer workstation for Purchasing Supervisor,
- One computer workstation for General Ledger Supervisor,
- One computer workstation for purchasing operation,
- two computer workstations for General Ledger operation,
- one computer workstation for Billing operation,
- One lazer printer for general printing,
- and One dot matrix printer for accounting printed reports.

2.4.3 Human Resource Department

HR department has five computer workstations, one lazer printer and one dot matix printer performing office automation and 'Payroll' application. Which assigned as following:

- One computer workstation devoted for HR Manager,
- One computer workstation for Administration and Recruitment Supervisor,
- One computer workstation for Payroll Supervisor,
- One computer workstations for Administration and Recruitment operation,
- One computer workstation for Welfare and Training operation.
- One lazer printer for general printing,
- and One dot matrix printer for 'Payroll' printed slips.

2.4.4 Information Technology Department

IT department has seven computer workstations, one lazer printer and one dot matix printer performing office automation and testing development application. Which assigned as following:

- One File Server
- Two twelve ports repeaters,
- One 1 KVA of UPS
- One computer workstation devoted for IT Manager,
- One computer workstation for Customer Services Supervisor,

- One computer workstation for Computer Supports Supervisor,
- One computer workstation for customer service operation,
- Three computer workstations for technical support operation,
- One lazer printer for general printing,
- and One dot matrix printer for testing application development and application support.

2.5 Existing Network System

"New Technology" company currently has single network, star shaped topology using the unshielded twisted pair medium with 10Base-T of medium specification. The network system consists of twenty five stations connected to two twelve ports repeaters connected. The length of a link is limited to 100 meters (please see Figure 2.3).
(Remark: the designed network is referenced from Data Communications, Computer Networks and Open Systems, fourth edition, Fred Halsall, Addison Wesley, 1996)

They have their current infrastructure of one computer system including of one file server, twenty-five workstations, five lazer printes, four dot-matrix printers, two twenty ports hubs. The fileserver is locates at IT department together with two hubs. And also has seven workstations, one lazer printer and one dot-matrix printer.

Sales department has four workstations, one lazer printer and one dot-matrix printer. Management function has two workstations and one lazer printer. Accounting department has seven workstations, one lazer printer and one dot-matrix printer. Human Resource department has five workstations, one lazer printer and one dot-matrix printer.

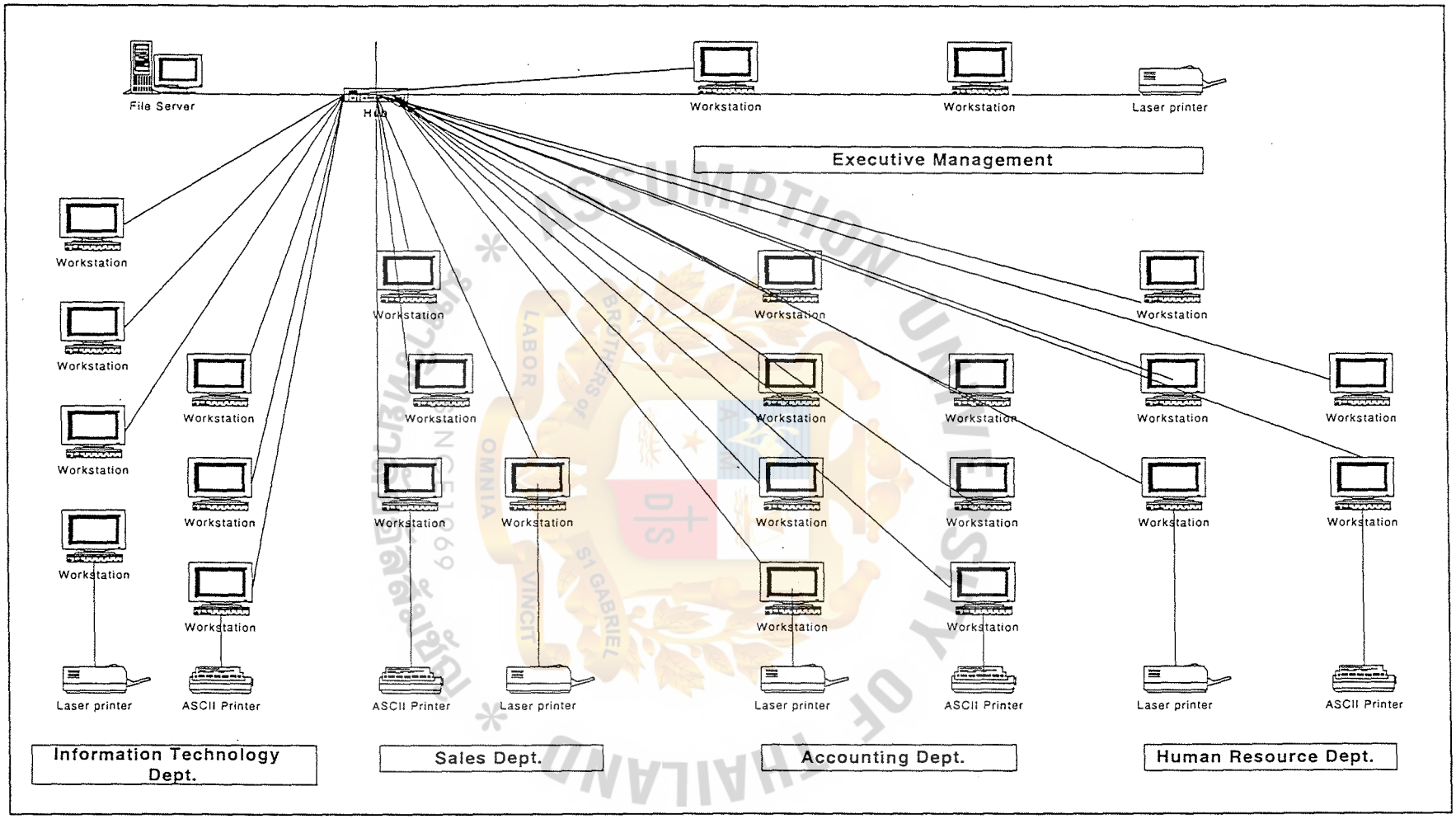

Figure 2.3 Existing Network Diagram

III. THE PROPOSED SYSTEM

3.1 User Requirements

It is important to determine system requirements in order to design matching with the business goals and their work operation. There are many requirement categories to be considered these basic requirement needs.

3.1.1 Input Requirements

The useful sources of information requirements are:

- **Documents**
  - **Problem Request Form**

    Customer Support Function get calling from customers and recording problem request detail.
  - **Problem Request Daily Log Book**

    Customer Support Function records problem request daily on log book.
  - **Service Form**

    Technical Support fill service form after complete his resolve, one copy for customer and another one for function filing.
- **Interviews**
  - **Managing Director**

    Plan to reduce service cost and improve more efficient service.

- **Sales Manager**

  Plan to reduce product cost by reducing service cost, and use customer service to be a sales strategy.

- **IT manager**

  Plan to decrease outstanding problems.

- **Customer Support Staffs**

  Need more convenient procedure.

- **Technical Support Staffs**

  Need consistent information of problem request detail without ambiguity.

3.1.2 Output Requirements

The conclusion requirements are classified as below:

- **Printed Service Form**

  This form will be printed to technical support with two copies, one for customer and another for filing.

- **Check Lists**

  1. Customer List
  2. Product List
  3. Customer Account List
  4. Technician List

- **Reports**

  1. New Problem Report by Date for all type

2. New Problem Report by Date for Hardware type
3. New Problem Report by Date for Software type
4. Hardware Problem Status Report by Date (all)
5. Hardware Problem Status Report by Date (Pending)
6. Hardware Problem Status Report by Date (In Progress)
7. Hardware Problem Status Report by Date (Closed)
8. Software Problem Status Report by Date (all)
9. Software Problem Status Report by Date (Pending)
10. Software Problem Status Report by Date (In Progress)
11. Software Problem Status Report by Date (Closed)
12. Problem Status Report by Technician (all)
13. Problem Status Report by Technician (Pending)
14. Problem Status Report by Technician (In Progress)
15. Problem Status Report by Technician (Closed)
16. Product Statistical Problem Report for all type
17. Product Statistical Problem Report for all type
18. Top Ten Most Problem Product Report
19. Statistical Problem Product Report

3.2 Hardware Requirement

"New Technology" has already current hardware and network provided, which the new system required on the current legacy and be considered enough of requirement for the new system:

- File Server

(Ram 128 MB, CPU 166 Mhz, Hard Disk 40 GB, Network Card 32 bits)

- Workstations

  (Ram 16 MB, CPU 133 Mhz, Hard Disk 2 GB, Network Card 32 bits)

- Lazer printer,
- Dot matrix printer,
- 12 ports Hub,
- One UPS, supply electricity power for file server at least 500 kva
- Tape for Backup Procedure, size 2 GB.

3.3 Software Requirement

As a result of available of current existing softwares, the new system requires as following:

- **System Software**
  - Using the current Operating System, Netware version 4.11, for file server to manage multi user environment.
  - Using Dos 6.2 as Operating System of workstations, and Window 95 as user interface software.
- **Development Tool Software**
  - Using Visual Basic version 4.0 as development tool.
  - Using Microsoft Access version 2.0 as database management.
- **Application Software**
  - The new proposed system is estimated requirement of disk space at least 10 mega bits for application and data base basis.

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3.4 Hardware/Network Design

The new system requires one file server for application installation and data base. Three workstations are required for the new system, they are at least one workstation at customer service function to get informing of customer problem requests and to check problem status when customer asking in while of the process. And more two workstations are required at technical support function for checking new problem request in, assigning technician on job and recording problem solution into the system. One local or connected printer is needed to print automatically of the service forms out on job. All of these workstations of the new system must to integrated communication running on the speed of 10 mega bits at least. And the system is also required more three ports for connection.

The current file server has network is star network topology, 10-Base T, which has 10 mega bits speed of communication to support enough the new system requirement. The network is comprised of one file server with has enough space of disk space for application and data storage, which is located at IT department with current twenty-five workstations for those related functions. Those available workstations are:

- Information Technology Department (seven workstations, two printers)
- Sales Department (four workstations and two printers)
- Accounting Department (seven workstations and two printers)
- Human Resource Department (five workstations and two printers)
- Executive Management Function (two workstation and one printer).

(Please see Figure 2.3: Existing Network Diagram)

As of the availability of current hardware and network, then they are all ready for the new proposed system which can be run on the current workstations. Especially customer support and technical support functions have enough workstations and printers to support the new system.

3.5 System Design

3.5.1 Database Design

This database is designed as relational database, which provides a convenient management. This selected database management tool is 'Microsoft Access'.

3.5.2 File Design Consideration

This project is designed having two file types as below:

- **Master Files**

  Master Files are used for relatively permanent and often be updated.

  - Customer Master File
  - Product Master File
  - Technician Master File
  - Customer-Product Master File
  - Statistical Product Master File

- **Transaction File**

  Transaction File is used for changed data recording and update to master file.

- Service Transaction File

3.5.3 Data Flow Diagrams

Data flow diagrams show graphically how data move within an organization. Context diagram, figure 3.1, specifies on a general level. Figure 3.2 shows top level of data flow diagram, which is called data flow diagram level 0. For further detailed level diagrams are drawn in lower levels. (Data Flow Diagrams are designed by reference from System Analysis and Design, Kenneth E. Kendall and Julie E. Kendall).

This proposal is designed for three levels of data flow diagrams. The diagram level 0 has five parent processes, which is exploded into many child processes. The following processes is explained draftly what the process works (please see diagrams on Appendix A and process detail on Appendix B)

(all of this designed data flow diagrams are referenced from System Analysis and Design, Kenneth E. Kendall and Julie E. Kendall)

<u>Parent Processes</u>

- **Process 1000: Prepare Codes**

  This process initiates new codes into system, these codes are; customer code, product code, technician code and customer account. These initiated codes will be retrieved for using in other next processes. And with this first stage, customer support entity will get four check lists as update outcome (please see Appendix B).

  The parent process, prepare codes, will be exploded into four child processes:

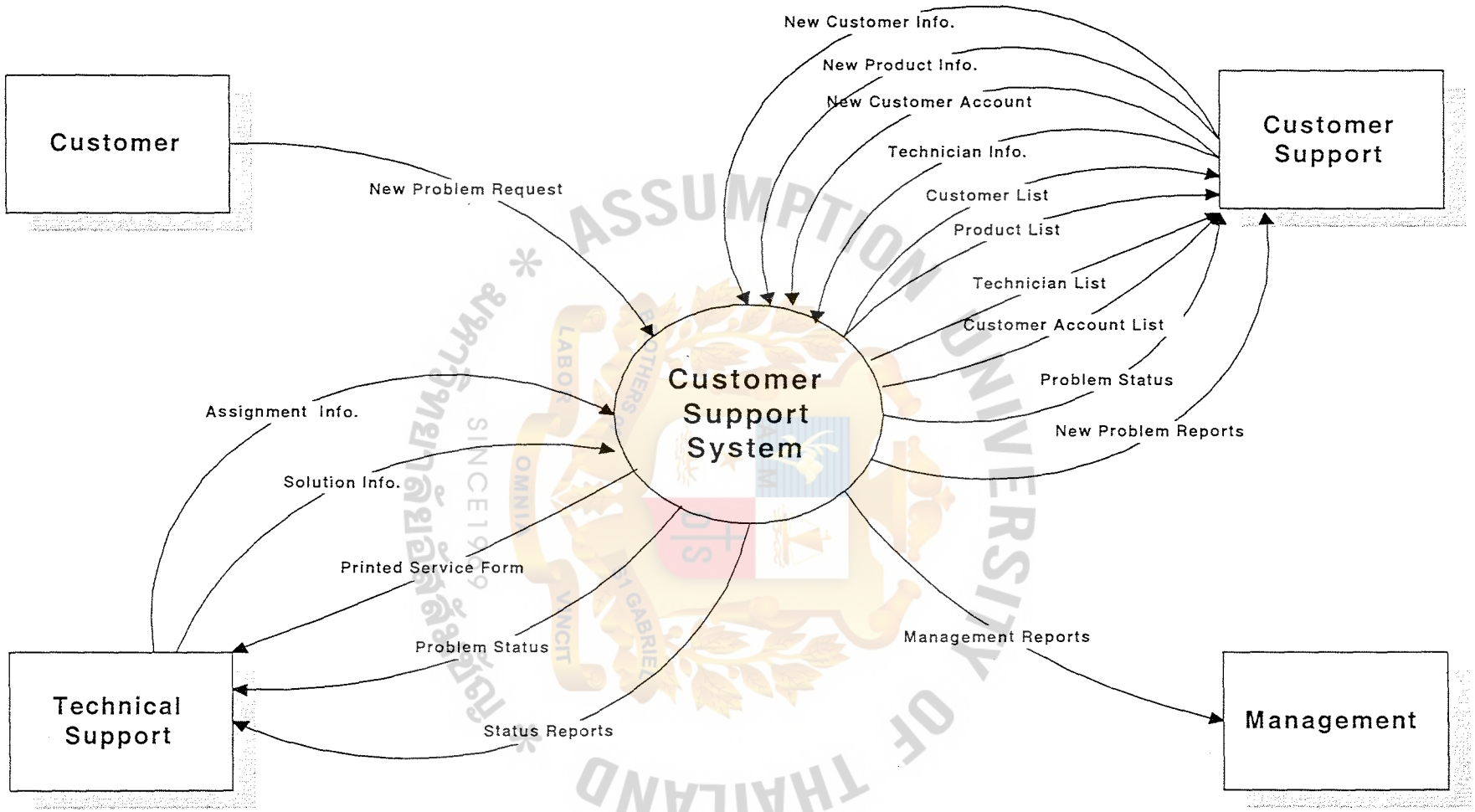

Figure 3.1. Context Diagram of Customer Support System

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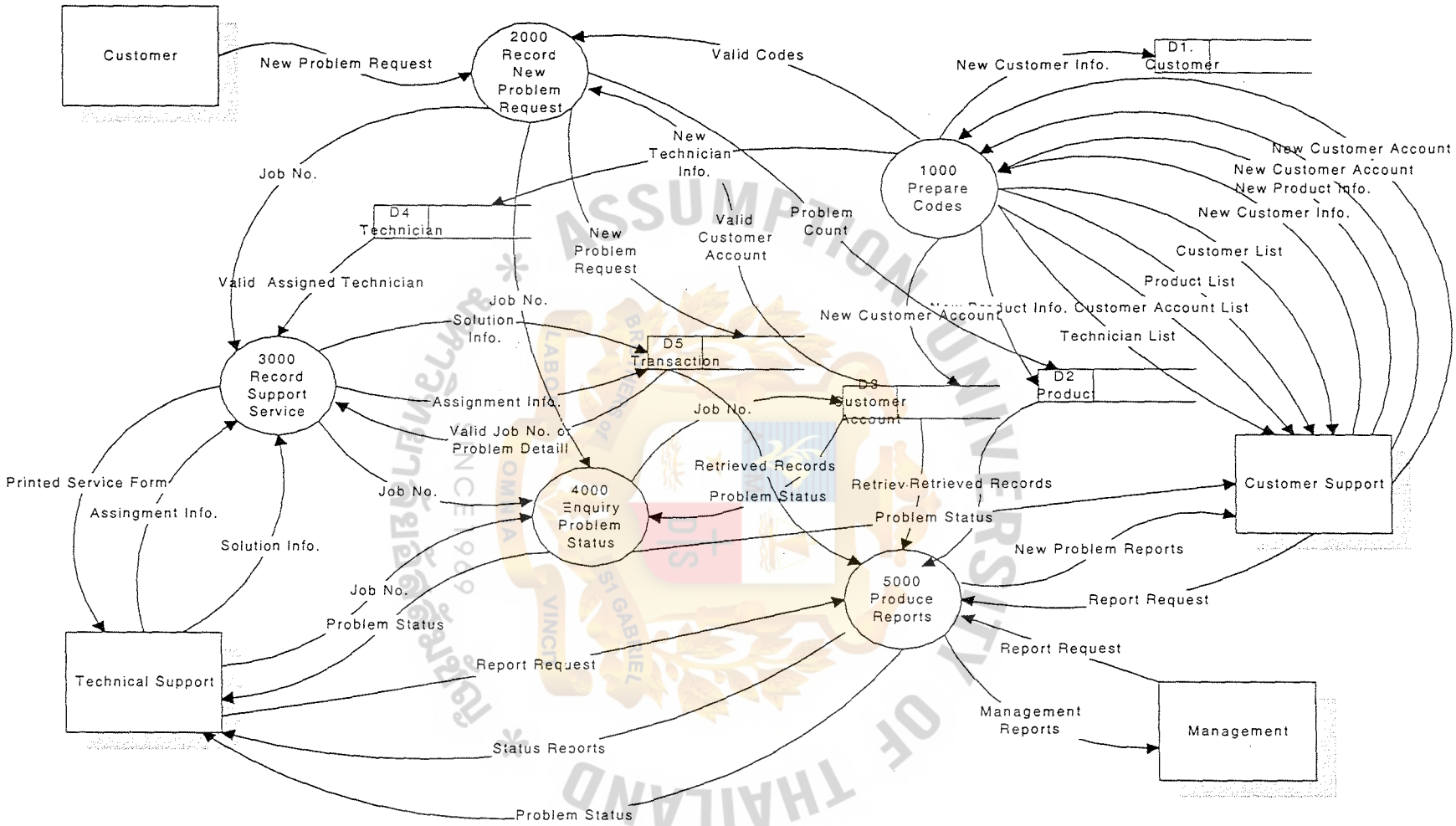

Figure 3.2. Data Flow Diagram Level 0 of Customer Support System

- Process 1100: Record Customer Record
- Process 1200: Prepare Product Record
- Process 1300: Prepare Technician Record
- Process 1400: Prepare Customer Account Record

- **Process 2000: Record New Problem Request**

  This process will perform recording of new problem request, which customer informed in, and also referred to those codes of process 1000. After the problem request is entried, the problem request will be continued to next process 3000, Record Support Service. At this stage, system will produce reports of new problems to customer support function.

  This parent process has three child processes:

  - Process 2100: Input New Problem Request Detail
  - Process 2200: Read/Verify Customer Account Status
  - Process 2300: Update New Problem Record

- **Process 3000: Record Support Service**

  This process will record assignment information on the entried problem request, which be performed by child process 3100, Assigned Technician, and get printed service form. Solution information will go into child process 3200, Record solution, for recording and get job done.

  - Process 3100: Assign Technician
  - Process 3200: Record Solution

- **Process 4000: Enquiry Problem Status**

This process will display problem detail and status for enquired job number. And also be divided into three child processes:

- Process 4100: Get Job No.
- Process 4200: Format Job Detail
- Process 4300: Display problem detail and status

- **Process 5000: Produce Reports**

This process produces reports three categories reports to three entities, new problem reports for customer support entity, status reports for technical support entity, and management reports for management entity. The produced reports will be performed by three child processes:

- Process 5100: Create New Problem Reports
- Process 5200: Create Status Reports
- Process 5300: Create Management Reports

3.5.4 Structure Charts

Structure chart hierarchically organizes each of the program tasks into well-defined modules. The higher-level modules represent control portions of the program; the lowest-level modules do the actual tasks of the program. Unlike the pseudocode, the structure chart does not detail the actual program logic and the order in which tasks are executed. Instead, it shows how all the logical functions of the program fit together as a whole. (referenced Management Information Systems, Strategy and Action, by Charles Parker and Thomas Case, Page 670)

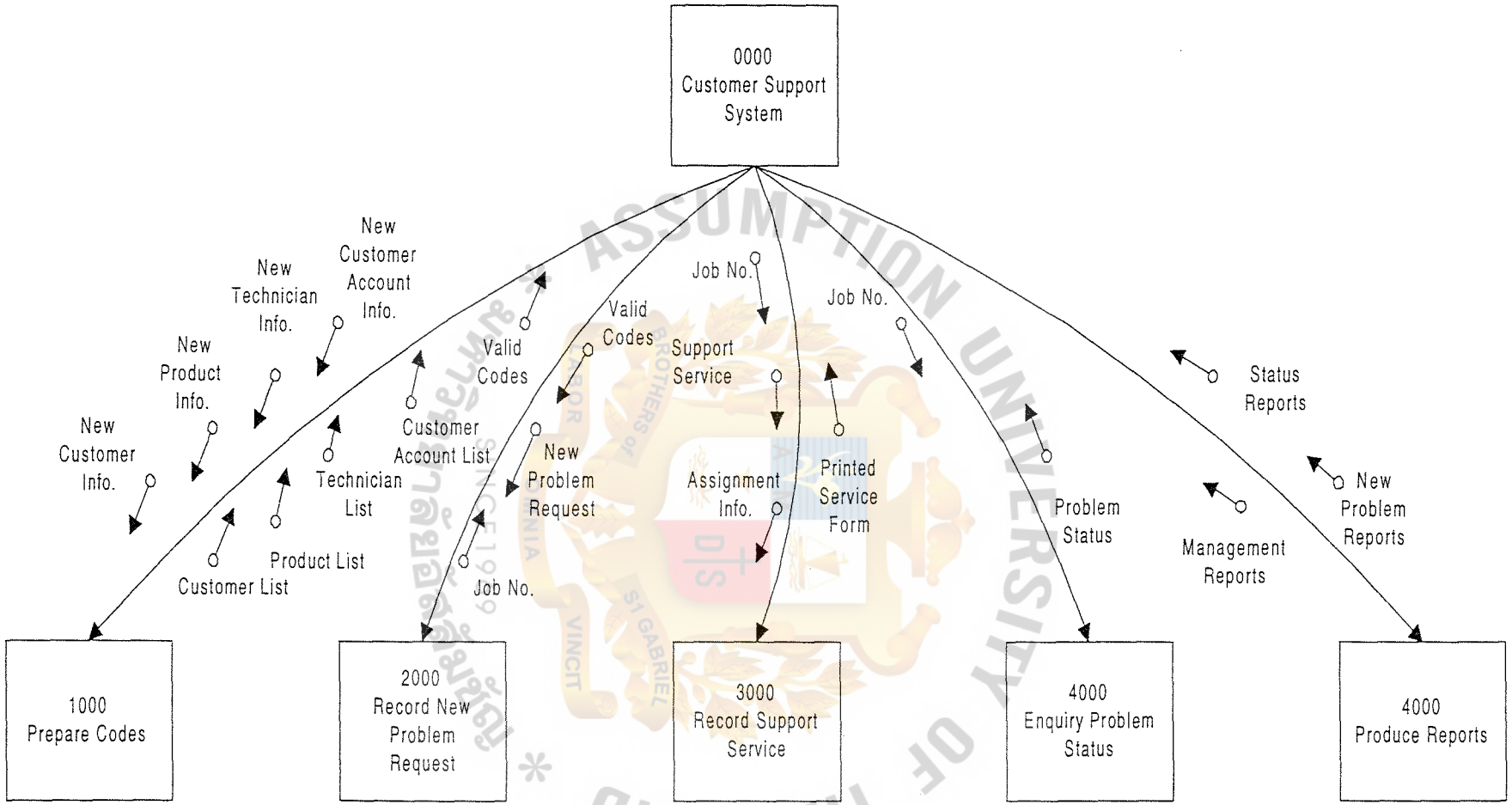

Figure 3.3. Structure Chart of Customer Support System

Structure chart is transformed from data flow diagram. It is important that the decision be made at a high level in the structure chart. (please see more lower-level modules in Appendix C)

3.5.5 Data Dictionary

The data dictionary is a reference work of data which described using the data flowing in or out of the process. Whereas the data dictionary informs users or programmers of what data are available in the database and how they are used, (referenced from Management Information Systems, Strategy and Action, by Charles Parker and Thomase Case, page 317).

This proposed project is designed containing five designed data dictionaries (please see Appendix D).

3.5.6 Screen Design

This proposed project is designed with Graphical User Interface, GUI, which will be ease of use and simplicity. The system will also provides data browsers searching for referenced data, prints checking lists and output reports (please see designed screens from Appendix E).

The following are menu screens of the system:

- Main Menu Screen
- Code Maintenance Menu Screen
- Report Menu Screen
- Problem Request Entry

- Print Service Form

3.5.7 Report/Form Design

The proposed system contains of 19 reports and one output service form, which are designed having flexible filtered data range option before printing (please see Appendix F).

3.5.8 Pseudocode

The proposed system is designed containing of pseudocode which represents the logic of program working processes to programmer for application development (Please see Appendix G for reference).

3.6 System Development

The proposed system is applying the traditional approach, which the system is professionally developed in stages, each of which must be relatively complete before the next stage begins.

The traditional approach has five systems development activities are done in sequence: preliminary investigation, requirement analysis, system design, system acquisition and system implementation and maintenance stages. Project Manager and users are most likely to interact with systems analysts, system designers, and application programmers when the traditional approach is used. During the preliminary investigation and requirement analysis phases- which in this proposal concludes to be

one requirement analysis phase in which user information needs are identified- system development activities are usually lead by a system analyst.

When the traditional development process is strictly applied, an activity is undertaken only when the prior step is fully completed. Typically, project manager and users consider and review the work performed during each step of process before proceeding to next step. Manager will probably review diagrams, explanations, check-lists, charts, and so on, in order to ensure that the work is accurate and complete. If the work is satisfactory, project manager and users formally sign off, or accept, the work and allow the system development team to proceed to the next step. (Reference from Management Information Systems, Strategy and Action, second edition, Charles Parker and Thomas Case, McGraw-Hill)

3.7 Security and Controls

The proposed system is designed having security as following:

- **Application Access Control**
  - User Authentication: unauthorized users are not allowed to access the application.
- **Database Access Control**
  - The database is granted for authorized persons only.
- **Data Storage Control**
  - The system will be backed up daily with two copies, one for internal keeping and another for external.

3.8 Cost/Benefit Analysis

3.8.1 System Cost

• Hardware & Installation Cost	200,000/yr
• Software Cost	40,000/yr
• New System Installation Cost	null
• Development/Implementaion Cost	127,900
Project Manager (2000 x 27 days)	54,000
System Analyst (1000 x 41 days)	41,000
Programmer (700 x 47 days)	32,900
Total Start-Up Costs	**367,900**
• Maintenance Cost	60,000/yr
• Operation Cost	null
Total Operating Costs	**60,000**

3.8.2 System Benefits

Tangible Benefits

• Performance Improvement	420,000/yr.
• Errors Reducing Benefits	42,000/yr.
Total Tangible System Benefits	**462,000**

Intangible Benefits

- Operation Saving
- Better Customer Support
- Decreasing Product Spare Parts Cost

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- Reducing Product Cost

3.8.3 Comparison Costs and Benefits

3.8.3.1 Payback Period Analysis

The payback period determines the length of operation that propose system needs to pay back the cost of investment before it is profitable.

Payback can be determined increasing savings or increasing revenues, then the two methods is also combined to assess alternative investments. The table 3.1 is shown costs and benefits compared at the beginning of investment until payback.

Table 3.1. Costs and Benefits Analysis

Month	Costs	Cumulative Costs	Benefits	Cumulative Benefits
0	367900	367900	0	0
1	5000	372900	38500	38500
2	5000	377900	38500	77000
3	5000	382900	38500	115500
4	5000	387900	38500	154000
5	5000	392900	38500	192500
6	5000	397900	38500	231000
7	5000	402900	38500	269500
8	5000	407900	38500	308000
9	5000	412900	38500	346500
10	5000	417900	38500	385000

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Table 3.2. Costs and Benefits Analysis (Continued)

Month	Costs	Cumulative Costs	Benefits	Cumulative Benefits
11	5000	422900	38500	423500
12	5000	427900	38500	462000
13	5000	432900	38500	500500
14	5000	437900	38500	539000
15	5000	442900	38500	577500
16	5000	447900	38500	616000

The analysis from the table is shown that the investment will be recovered at eleventh month, which is a trade off point as plotting shown on the following graph.

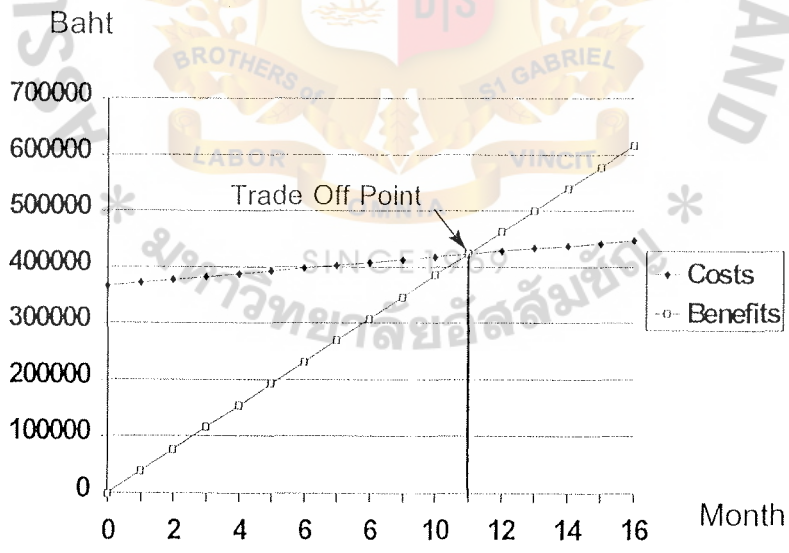

Figure 3.4. Payback analysis showing a payback period of 11 months

3.8.3.2 Net Present Value (NPV)

Net present value is a discount cash approach based on the present value of money. The net present value formula is shown as following:

$$NPV = \frac{R}{(1+K)^1} + \ldots + \frac{R}{(1+K)^N} - PV$$

Where NPV = Net Present Value

R = Cash Flow (Saving)

PV = Cost of Proposed System

= 132,900

K = Interest Rate or Cost of Money

= 10%

N = Number of saving years

= 11 Months

$$NPV = \frac{462,000}{(1.10)^1} - 367,900$$

= 420,000*11/12- 367,900

= 385,000 - 367,900

= 17,100 Baht

The payback period after takes show 11 months and the net present value showns 17,100 Baht, which indicates that the proposed investment is cost-justifiable.

IV. PROJECT IMPLEMENTATION

Implementation is the process of assuring that the new system is operational and then involving well-trained users in its operation. The propose system will have three implementation steps:

4.1 Training

This step will perform manual user and give training to involved users, which will takes 3 days for the whole system using procedure. Users will be guided how to use on various items for working purposes, beginning from nothing of data and able to produce output reports as they need.

- **User Training**

  Training users and personnel to interact with the information system is an important part of implementation. This step, users are determined to be trained into two groups; users and trainers. The trainers will get training from the analyst of the system operation procedures, then they will give training to users next. And also for the users to be trained has to considered as primary and secondary use of the system depending on system operation procedures.

  The trainer should trains a small group of people from each function that will be using the new system; management function, customer support function and technical support function. They in turn can then be used to train the remaining users.

- **Training Materials**

Training materials are important in order to illustrate tutorials to users for understanding. The training materials must be clearly written, well indexed, and available to everyone who needs them.

4.2 Implementation

The process of assuring that the information system is operational and then allowing users to take over its operation for use and evaluation is called implementation.

At this step, which is the main part of project purpose, will takes ten days. Which included three actions:

4.2.1 Installation New System

The system will be installed into the prepared location with null data. Team member will assist users setting parameters and basic requirement codes.

4.2.2 Conversion Procedure

Conversion is also part of the implementation process. At this step, to implement physically converting the old system, manual system, to the new system. There are many types of conversion strategies, this proposed system is selected using parallel conversion which is the most frequently used for conversion approach.

Parallel conversion means to running the old system and the new system at the same time, in parallel. Both old and new systems are run simultaneously for a specified period of time, which is planed as ten days, and the reliability of results

is examined. When the same results can be gained over time, then shall be considered for next stage to review the result and cut off the old system.

4.2.3 Post Implementation Review

The new system must be reviewed to ensure of errors free. Project team and users must participate reviewing the system and meeting the project objectives.

4.3 Life

At this stage, when the result of conversion procedure and post implementation review can be gained over time, the new system is put into use, and the old manual system is stopped and will be life with the new system.

To perform this stage, project manager should coordinates with users to acknowledge of the certain date agreed to be cut off date.

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V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

From the current situation of the organization, it is found that the process of customer support service and technical support service are delayed, and management reports are very late delay on performing. Because of the organization has current operation procedures are entire manual system, and also increase of manual error and misunderstanding communication between related functions.

This impacts to various issues: the business image, sales market share, increasing operation and product cost, decreasing revenue. Furthermore, the executive management can not make decision in a proper time, because of delay of information process.

The proposed system will reduces the tedious manual works, provides new integrated interactive system with fast communication and data accuracy. The new system is also produced operation and management reports automatically. And the most important part is the new system is proposed with lowest investment on the current infrastructure and labour current cost, which gives more benefits to organization in short time. The new system will invests only 367,900 baht, which is hidden in the current assets, but gives more benefits 462,000 baht yearly.

As comparing with the manual and new system, the investment is very low but can achieves more benefits both tangible and intangible consideration. Also the new system meets the target achievement and reduce cost effieciently.

5.2 Recommendations

- **The system should be considered to extend to larger scale**

The new system should be developed further extending to sales function and accounting application system, in order to automatic generate support service charge in case of out of warranty time, and sales staffs are able to check customer status and product information.

- **Yearly evaluating the system**

The system should be reviewed and evaluated yearly, because as the time changes the requirements may be changed. If the system is often evaluated then the outcome of requirement will be considered to modify the changing to match with the new requirement. Otherwise, the system may be obsolete and the organization will reinvest with the new system requirement.

- **Management should leads and makes uses of information**

Management should leads and makes uses of the information in order to decrease possibility of fail. Because of users are newly and changed to the un-acquaint of the new system, they may resist then will brought to be failed.

- **Long Term Plan for network communication improvement**

Management should considers long term plan supporting the data speed of communication. Because of adding one more application, the system will increases traffic communication also. The new system begins with three workstations, but if it is extended more workstations and integrated with other applications then communication speed will decreased. Then, in order to avoid communication problem which is might occurred in future, management should has a plan to improve data communication also.

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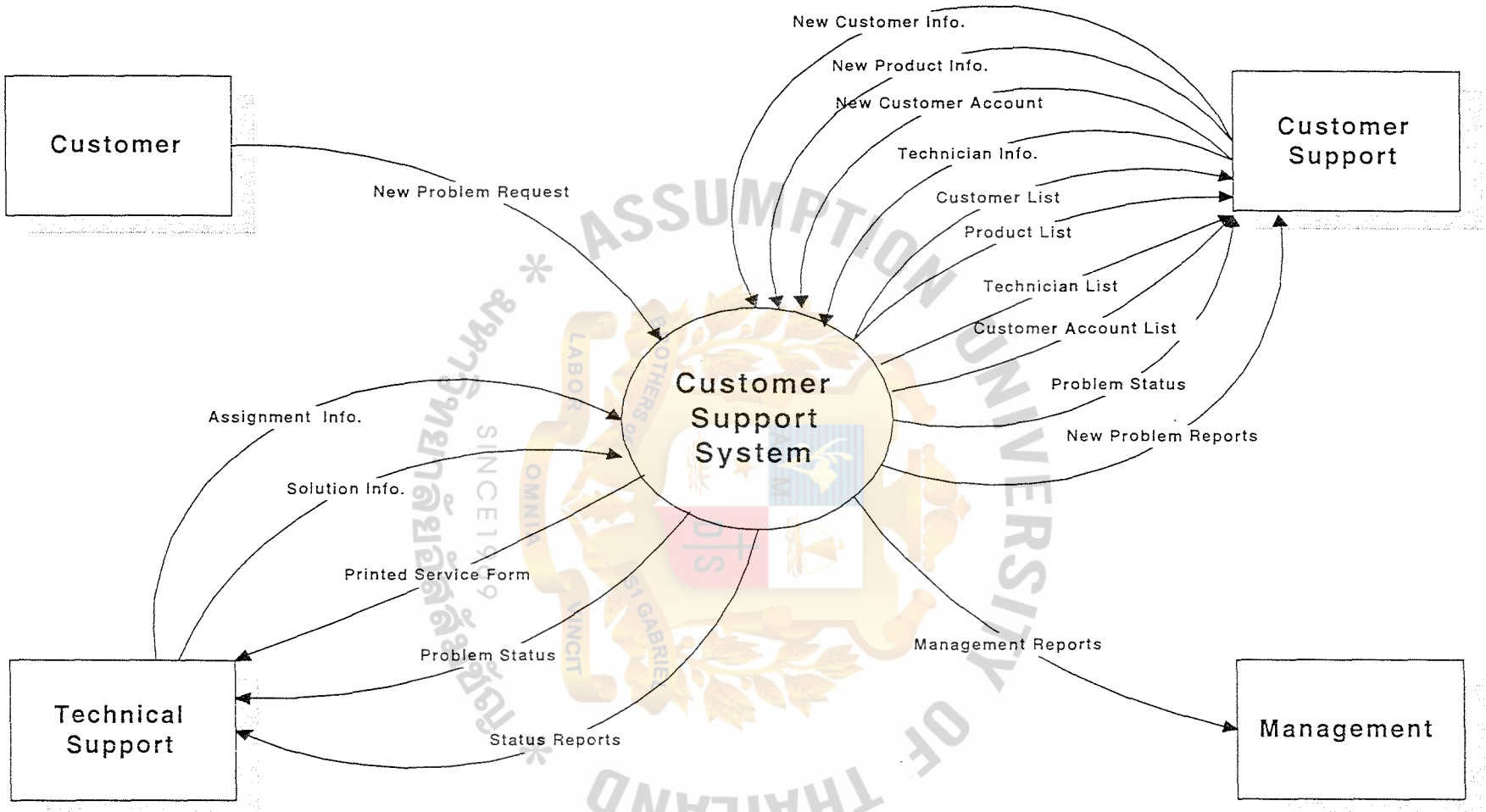

Figure A.1. Context Diagram of Customer Support System

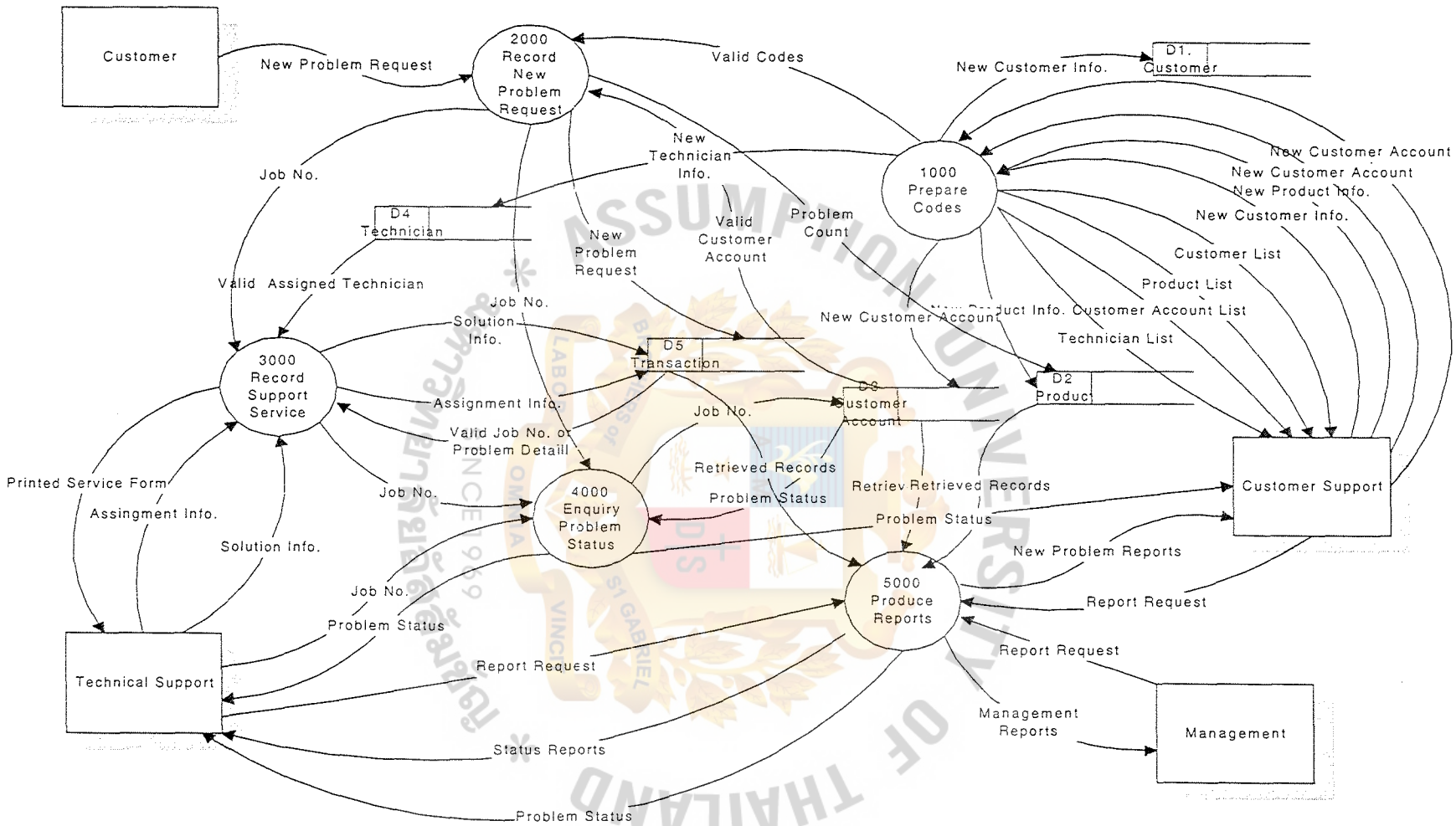

Figure A.2. Data Flow Diagram Level 0 of Customer Support System

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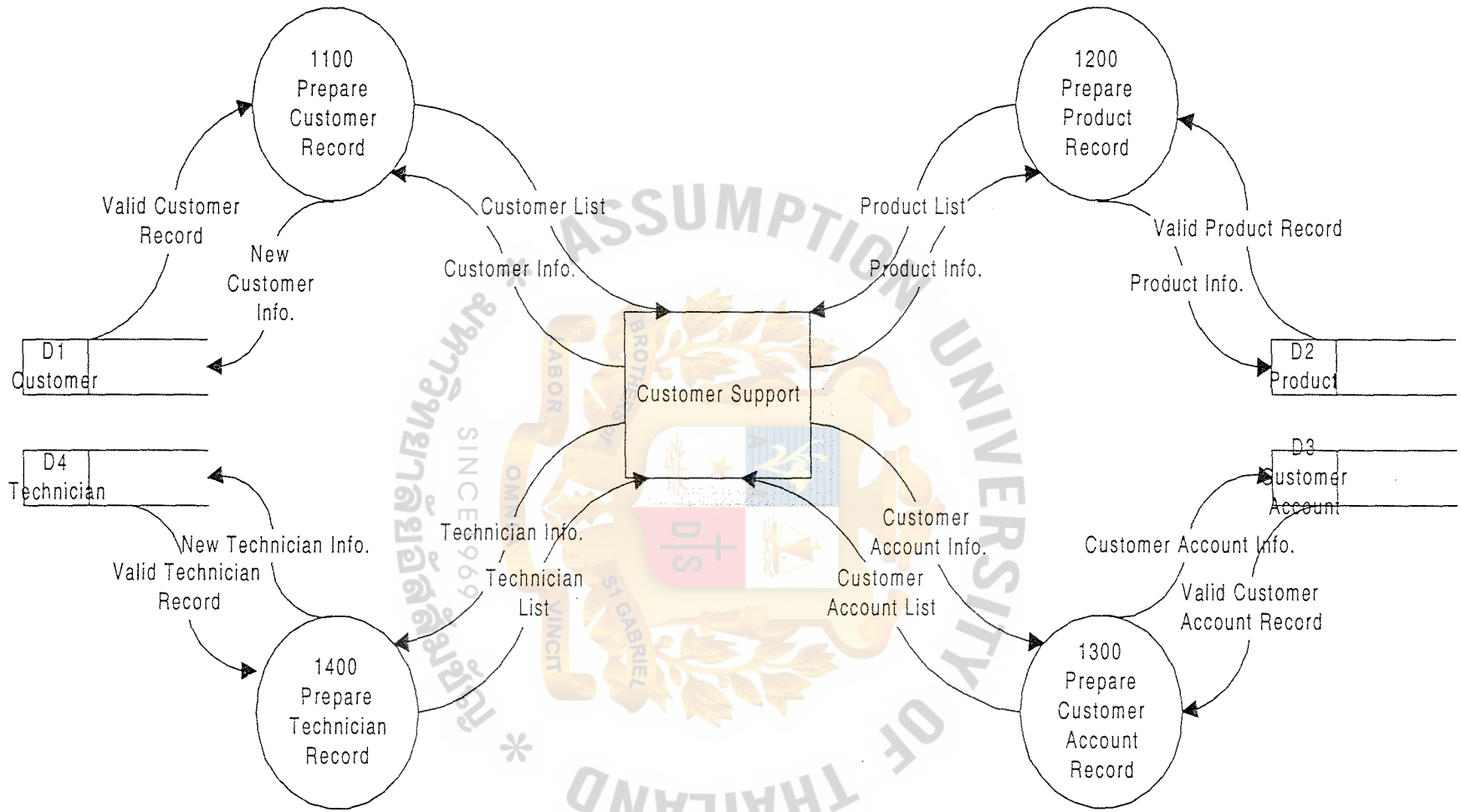

Figure A.3. Data Flow Diagram Level 1 of Process Prepare Codes

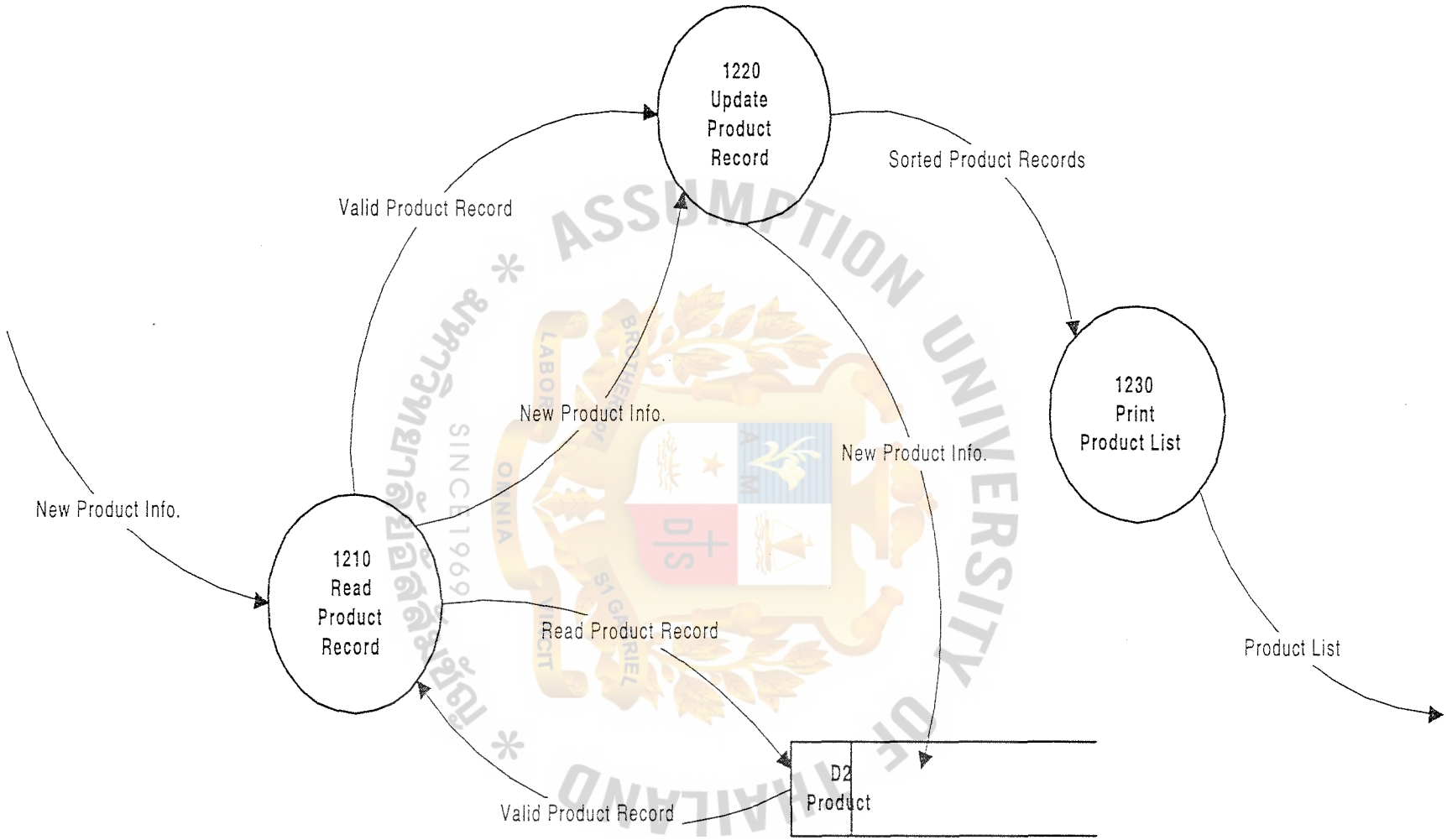

Figure A.5. Data Flow Diagram Level 1 of Process Prepare Codes

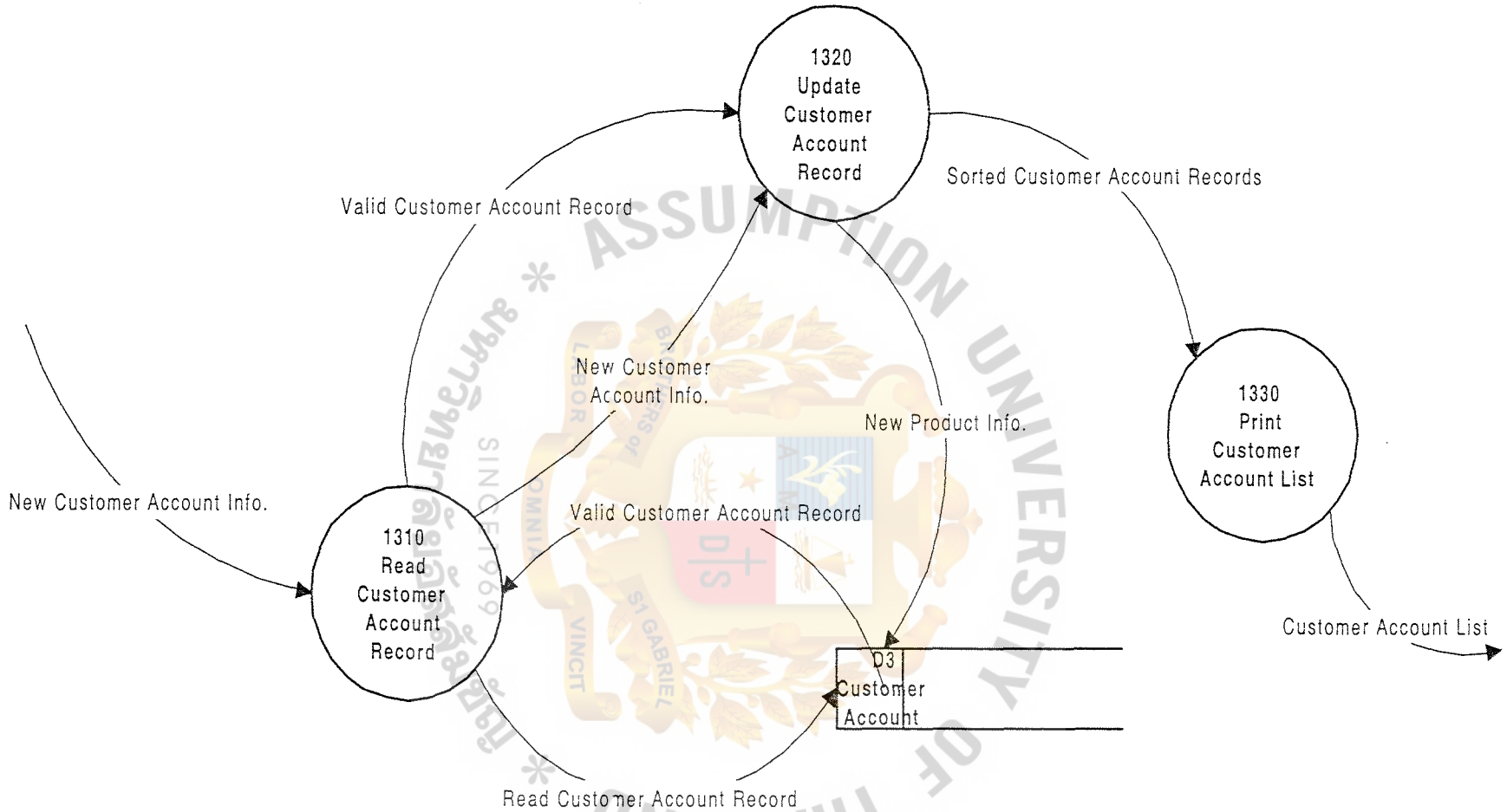

Figure A.6. Data Flow Diagram of Level 2 of Process Prepare Codes

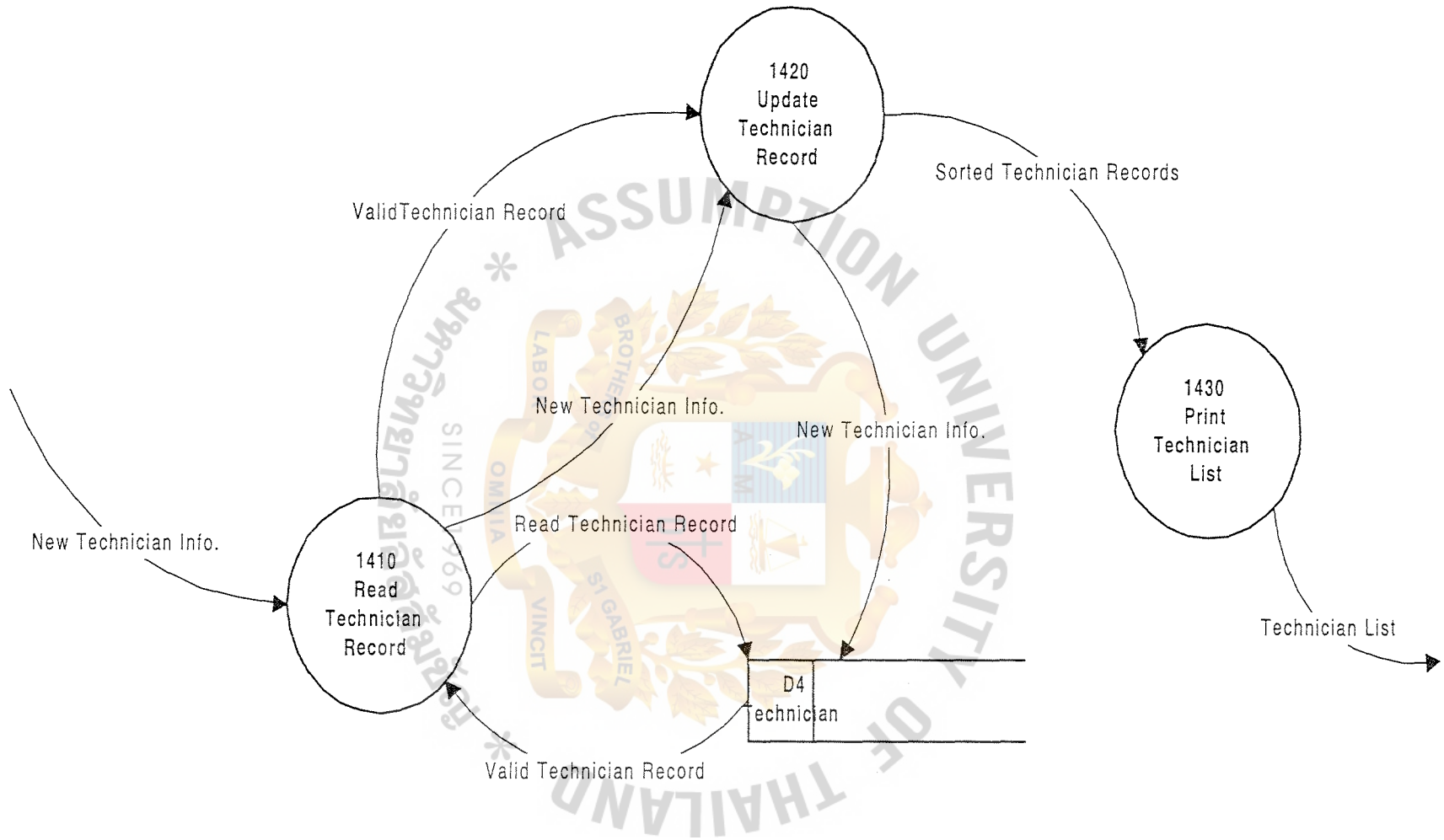

Figure A.7. Data Flow Diagram Level 2 for Process Prepare Codes

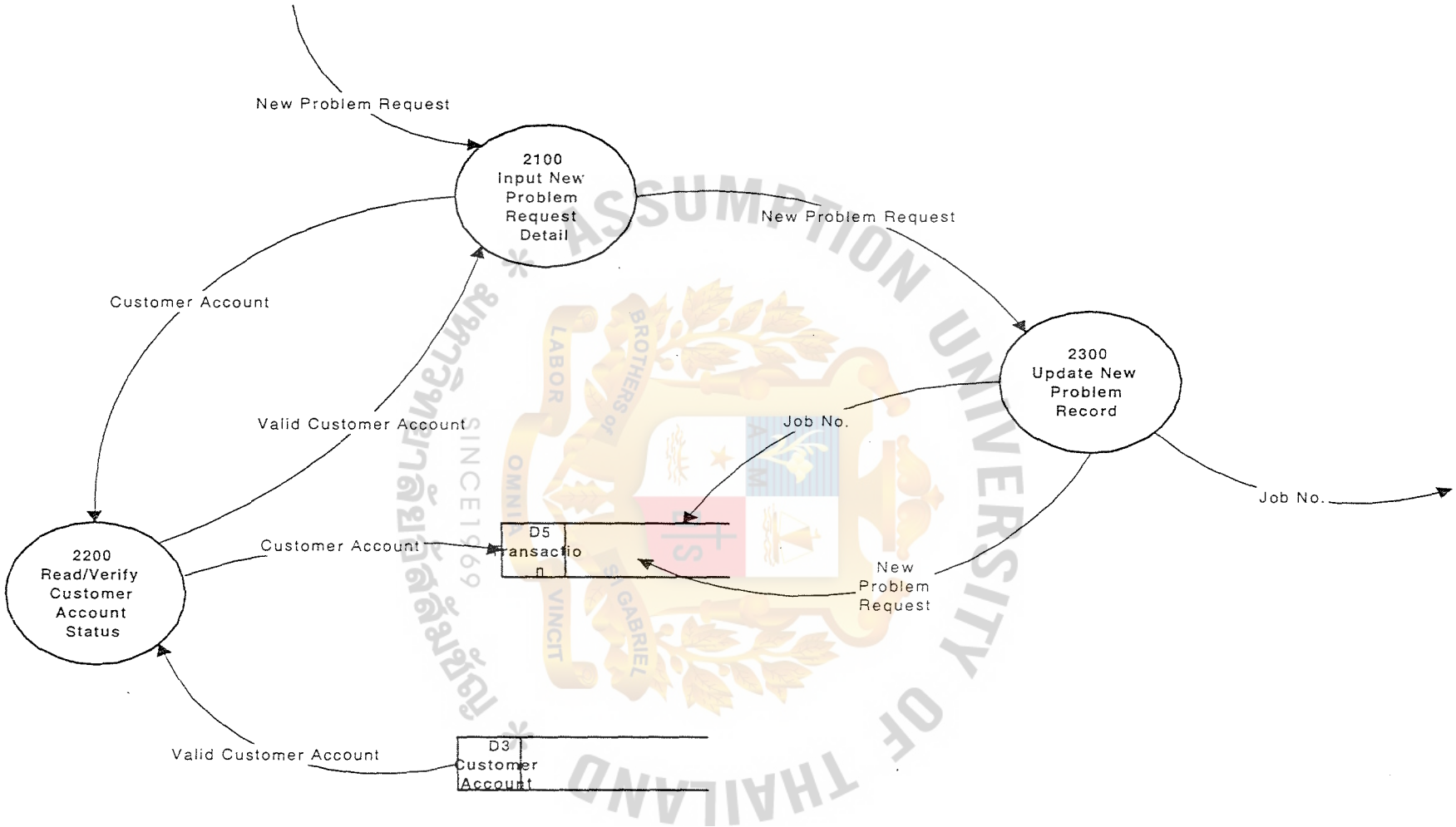

Figure A.8. Data Flow Diagram Level 1 of Process Record Problem Request

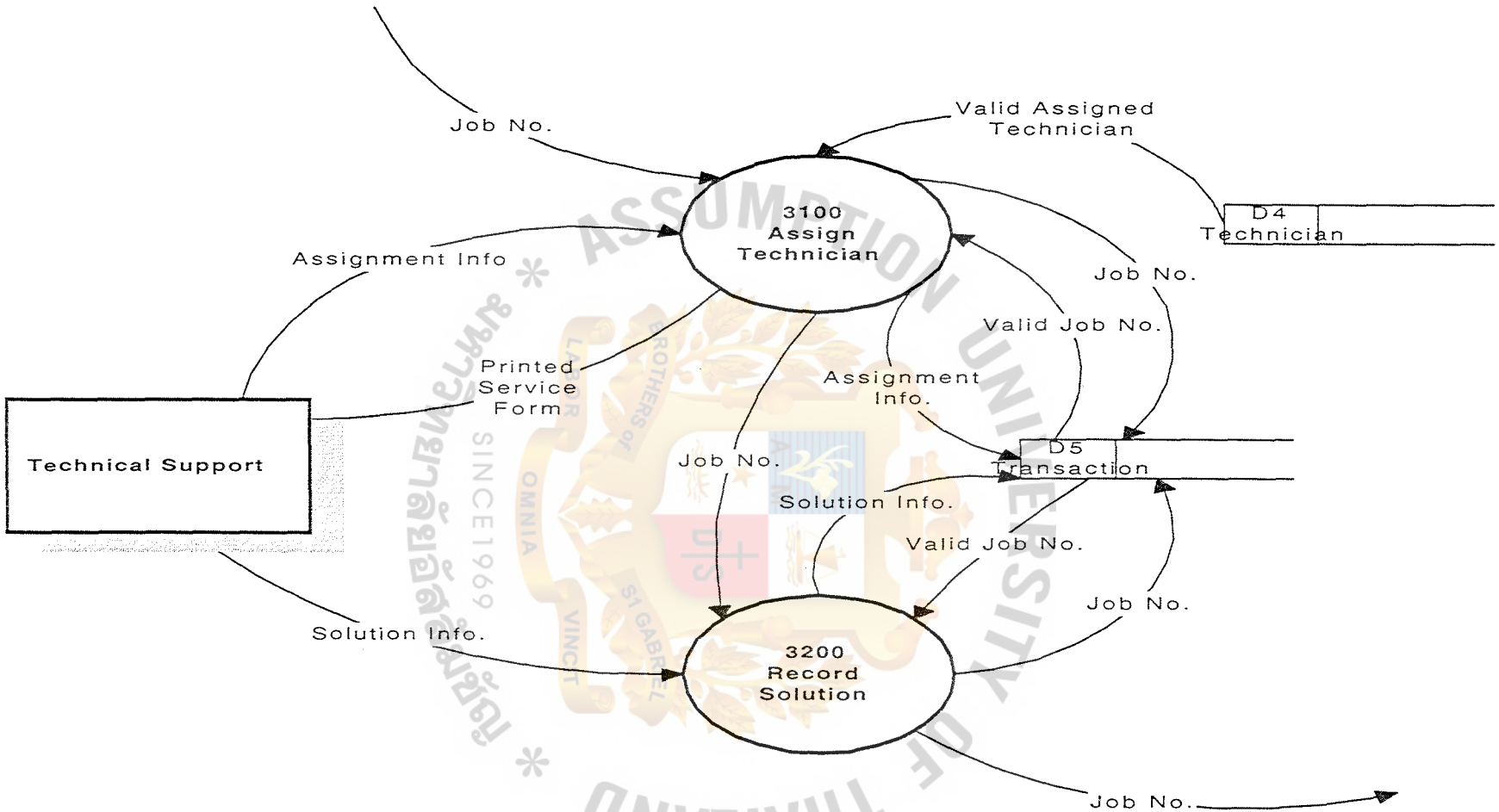

Figure A.9. Data Flow Diagram Level 1 of Process Record Support Service

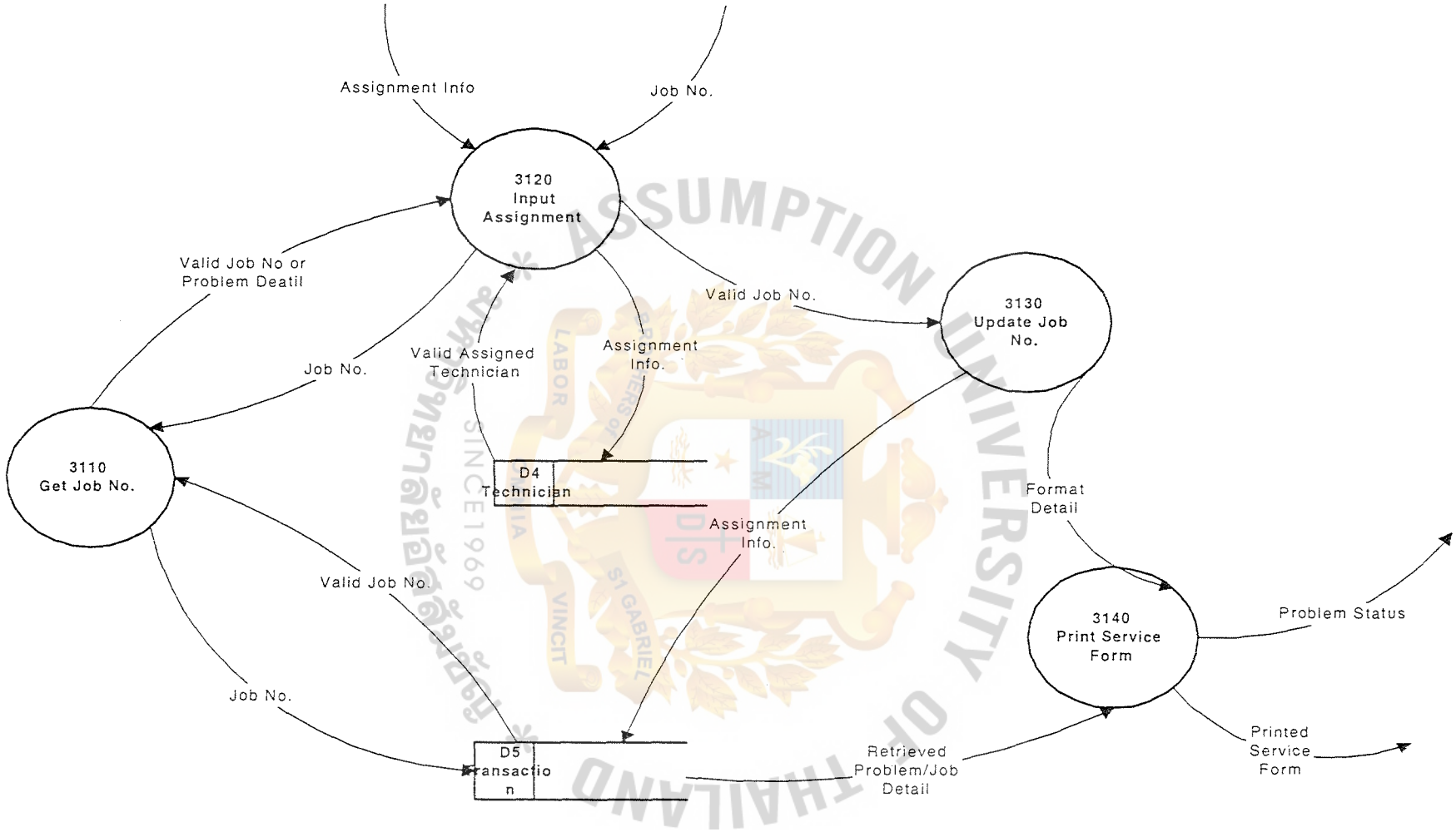

Figure A.10. Data Flow Diagram Level 2 of Process Record Support Service

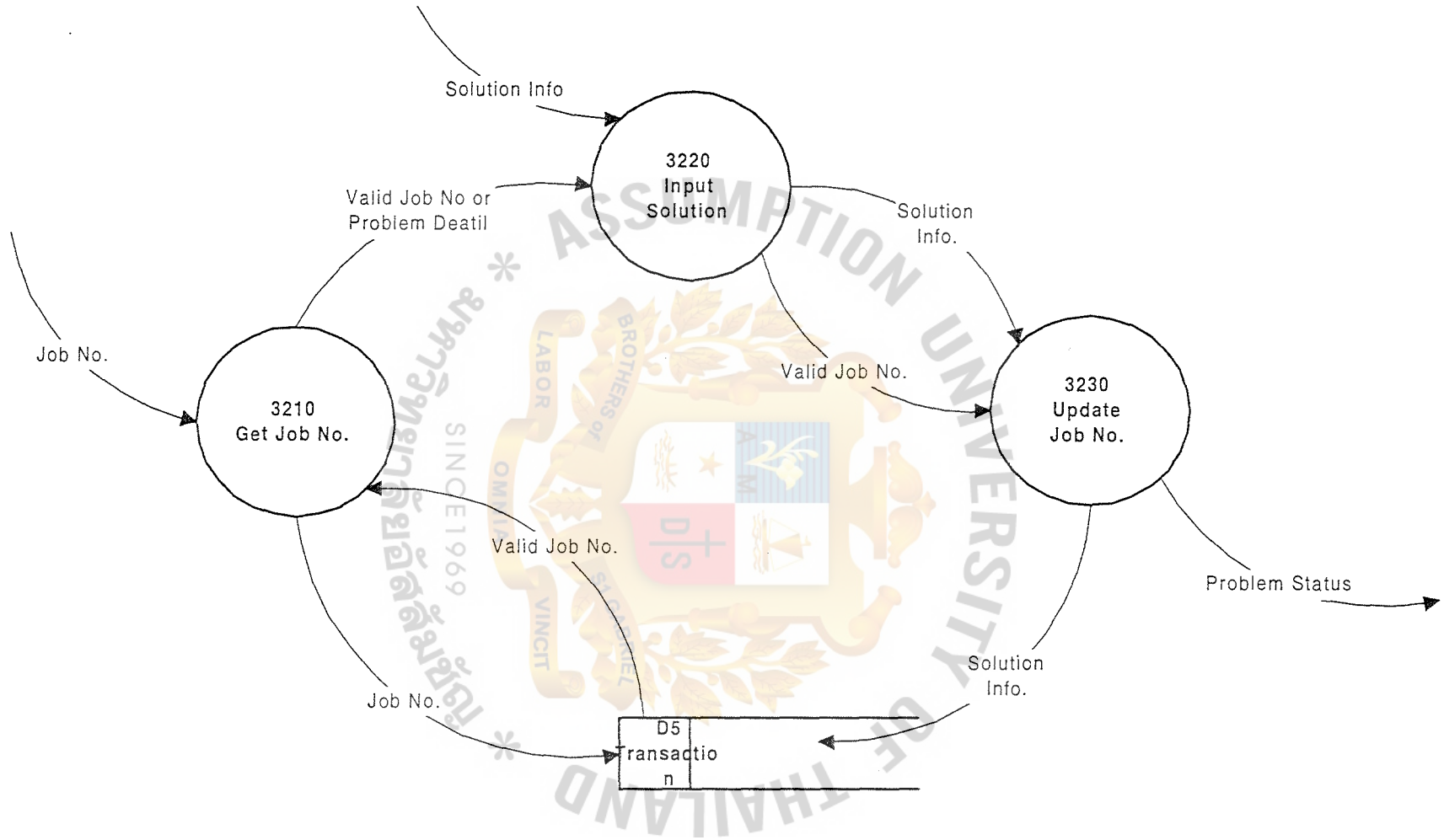

Figure A.11. Data Flow Diagram Level 1 of Process Record Support Service

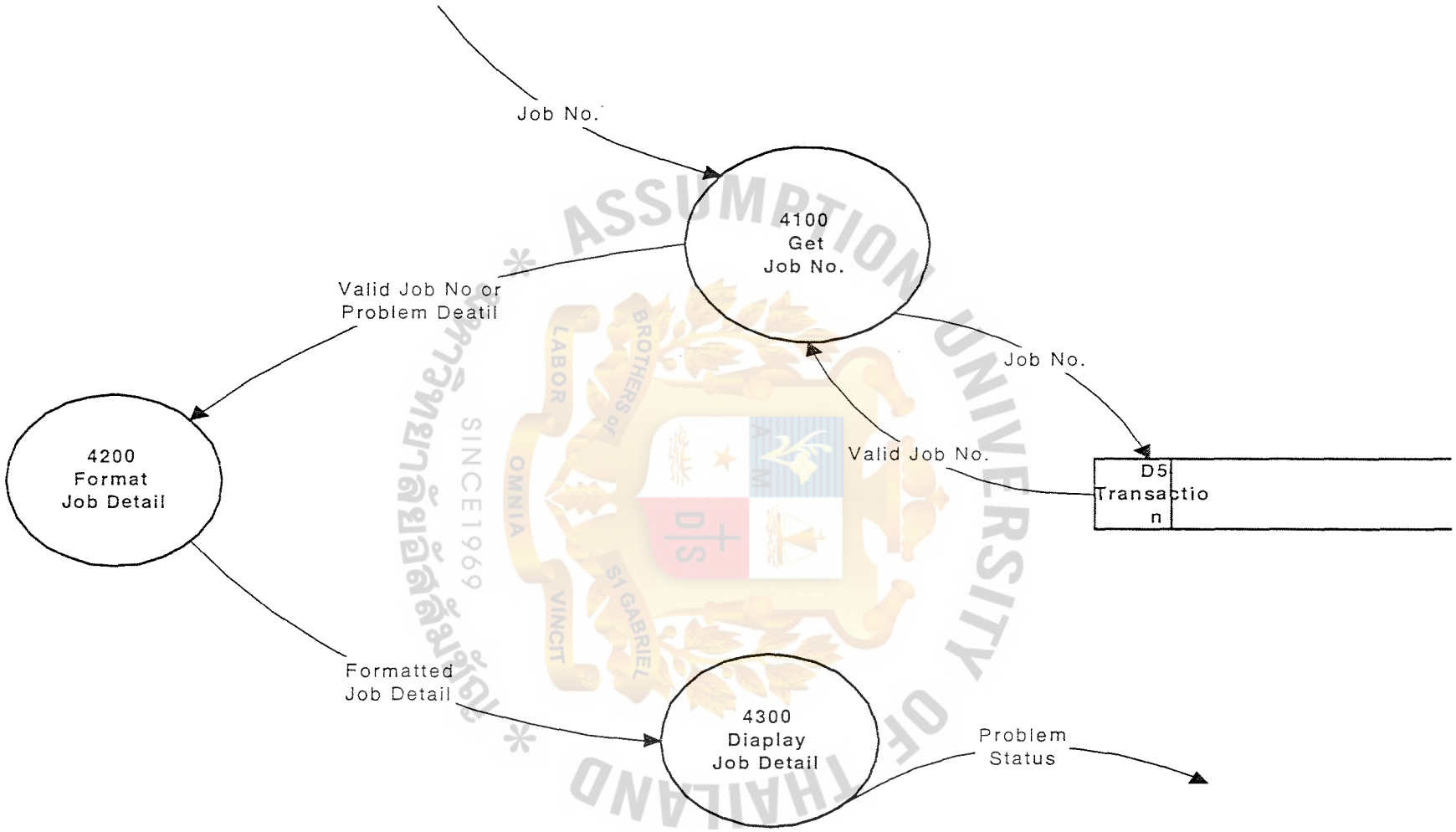

Figure A.12. Data Flow Diagram Level 1 of Process Enquiry Problem Status

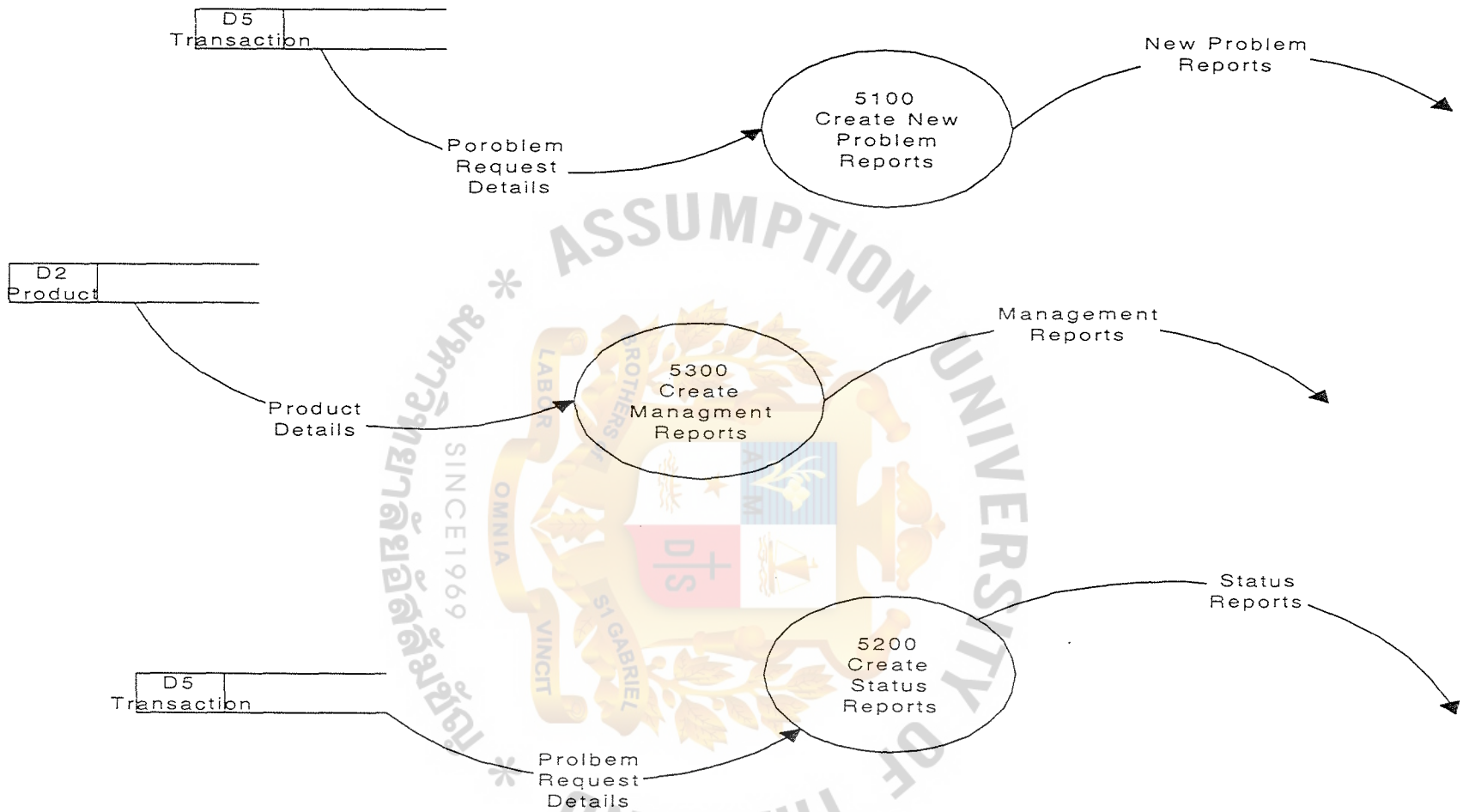

Figure A.13. Data Flow Diagram Level 1 of Process Produce Reports

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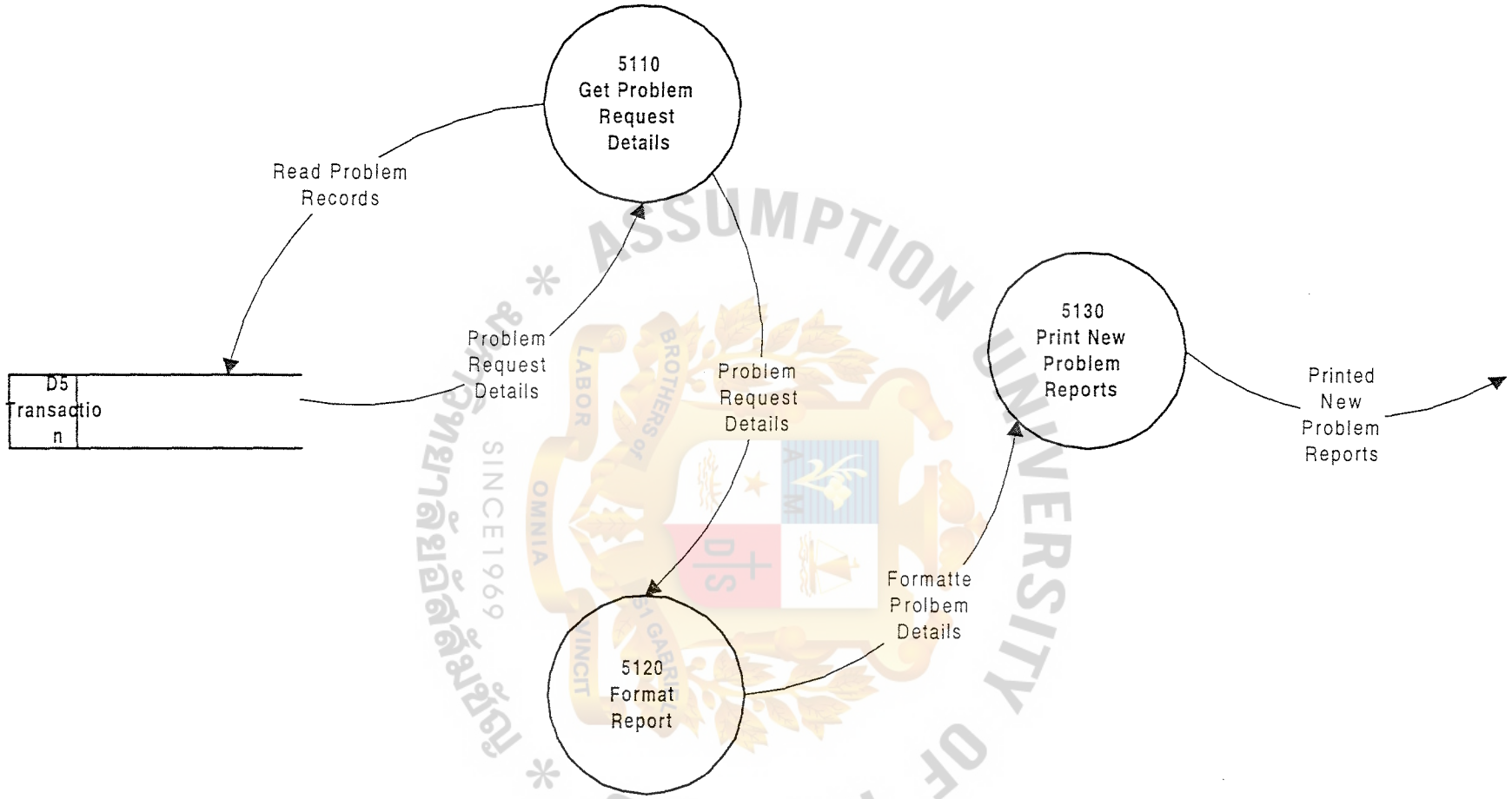

Figure A.14. Data Flow Diagram Level 2 of Process Produce Reports

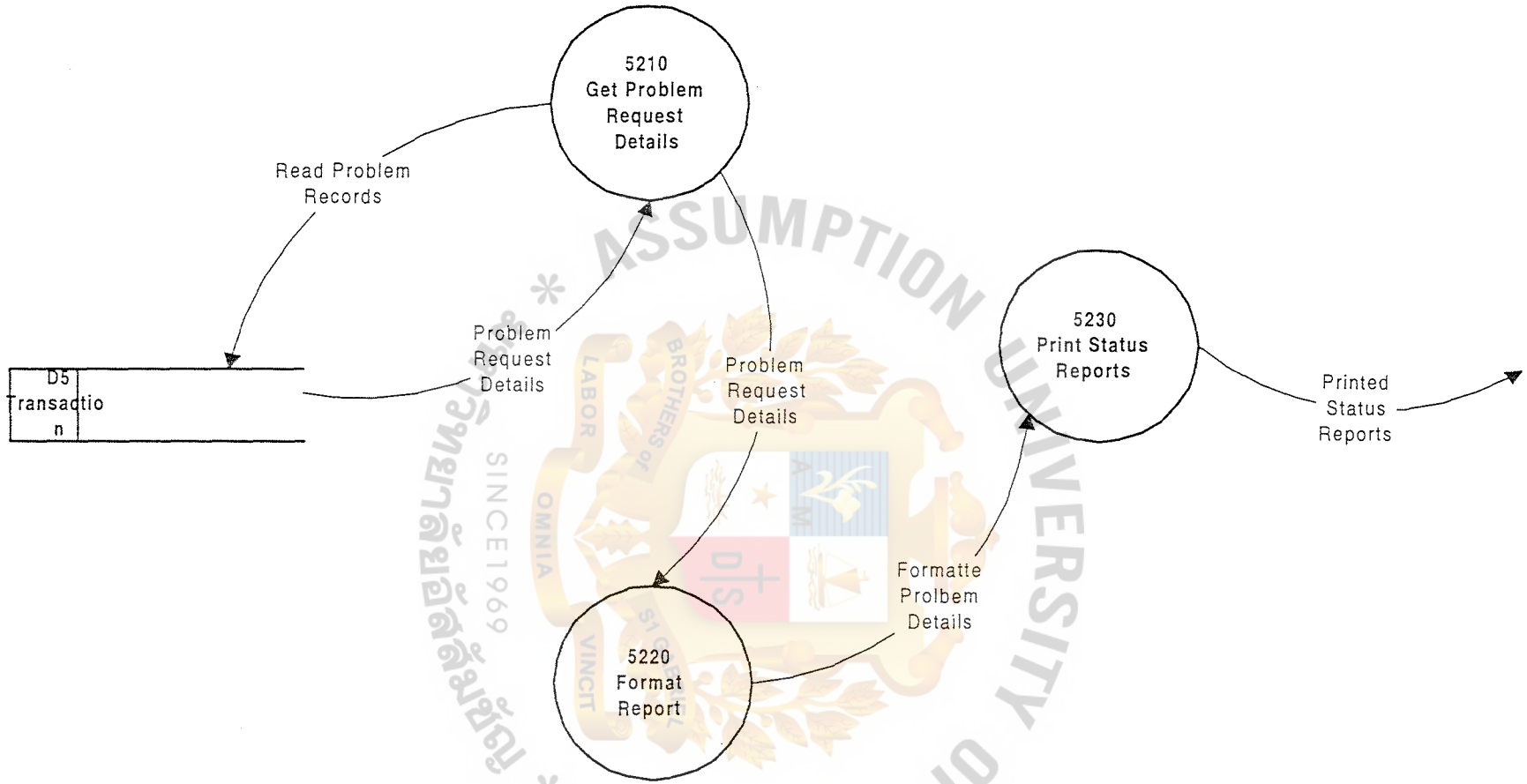

Figure A.15. Data Flow Diagram Level 1 of Process Produce Reports

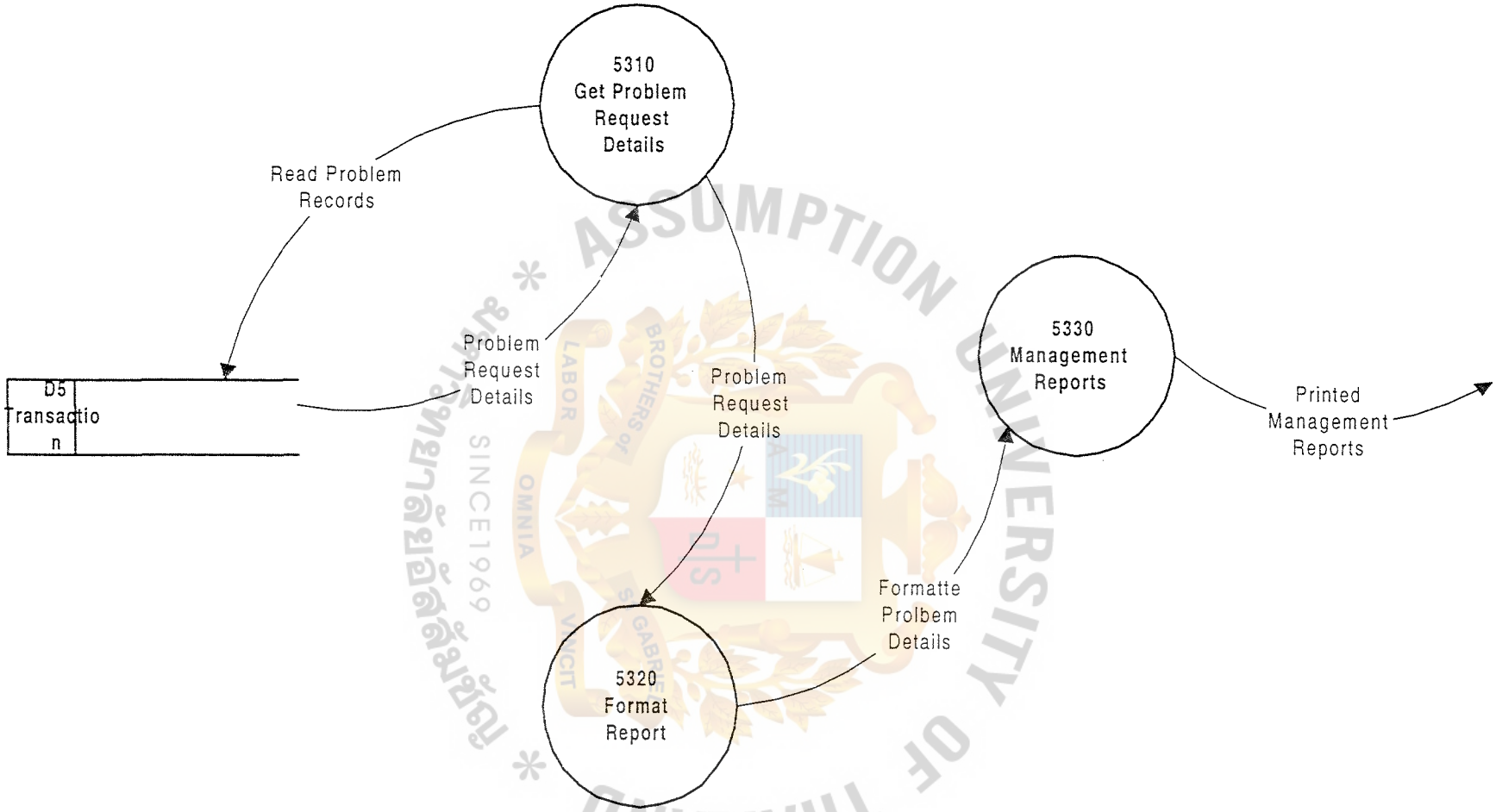

Figure A.16. Data Flow Diagram Level 2 of Process Produce Reports

APPENDIX B

Structure Chart

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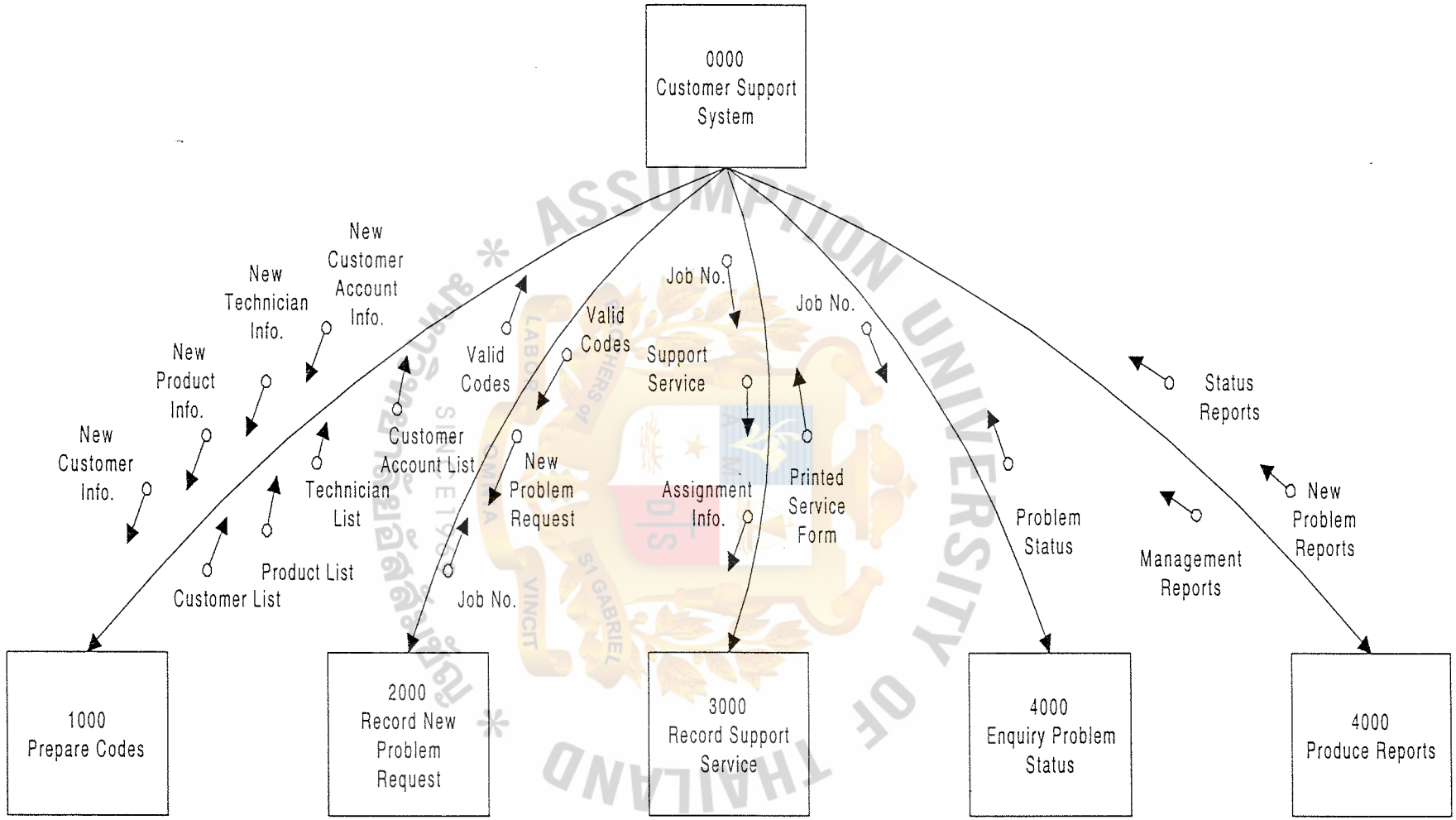

Figure B.1. Structure Chart of Customer Support System

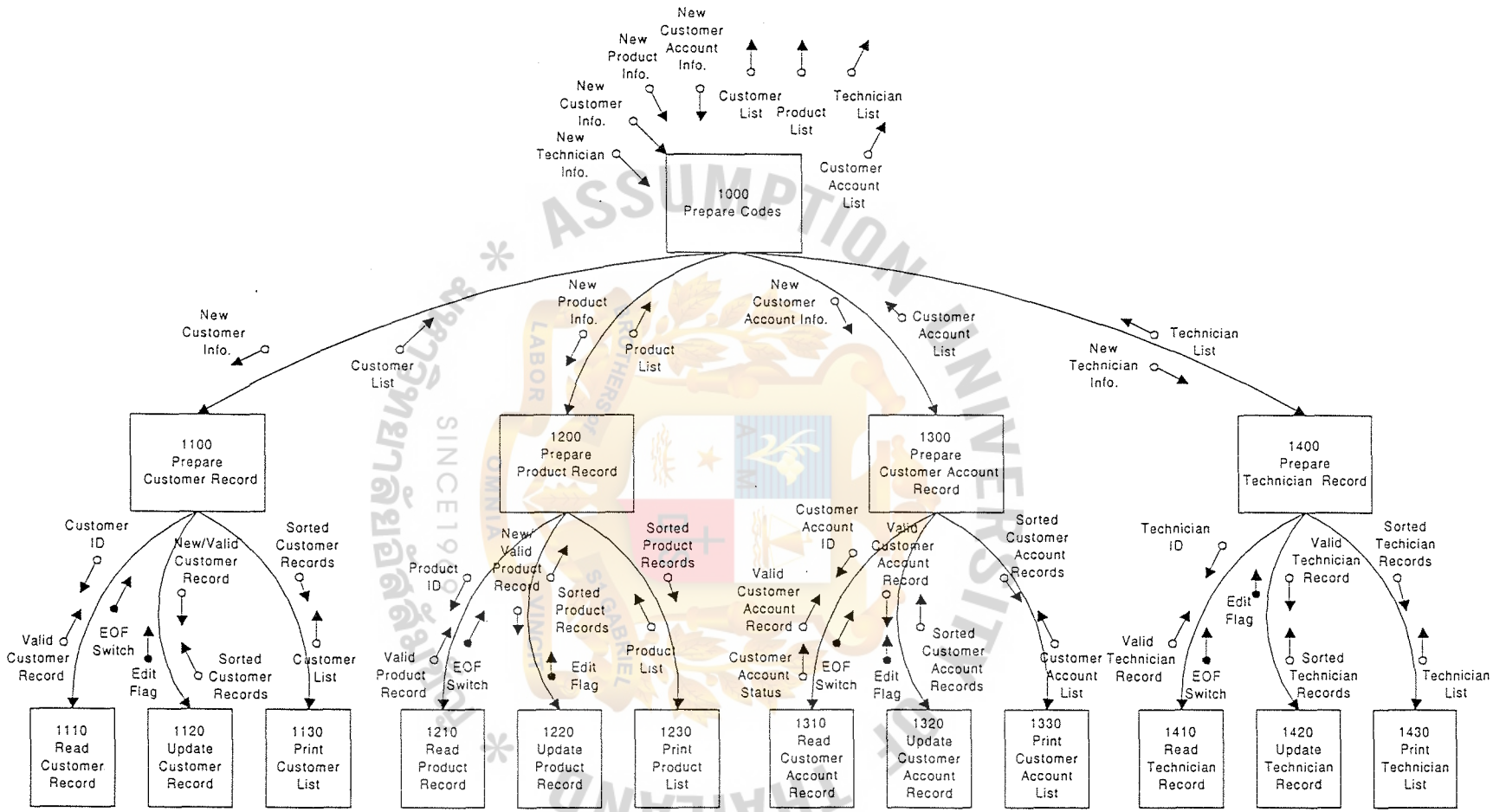

Figure B.2. Structure Chart of Process Prepare Codes

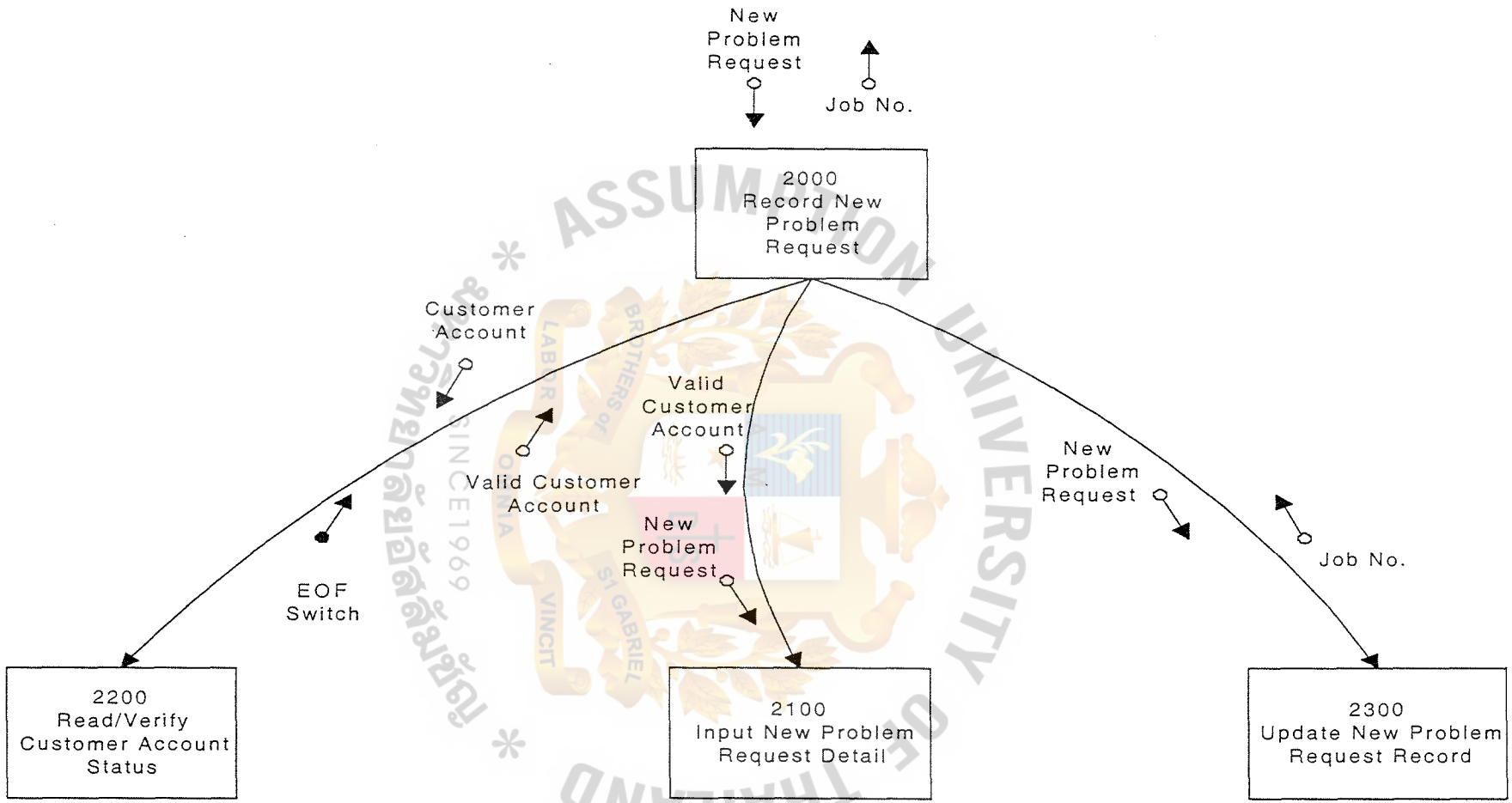

Figure B.3. Structure Chart of Process Record Problem Request

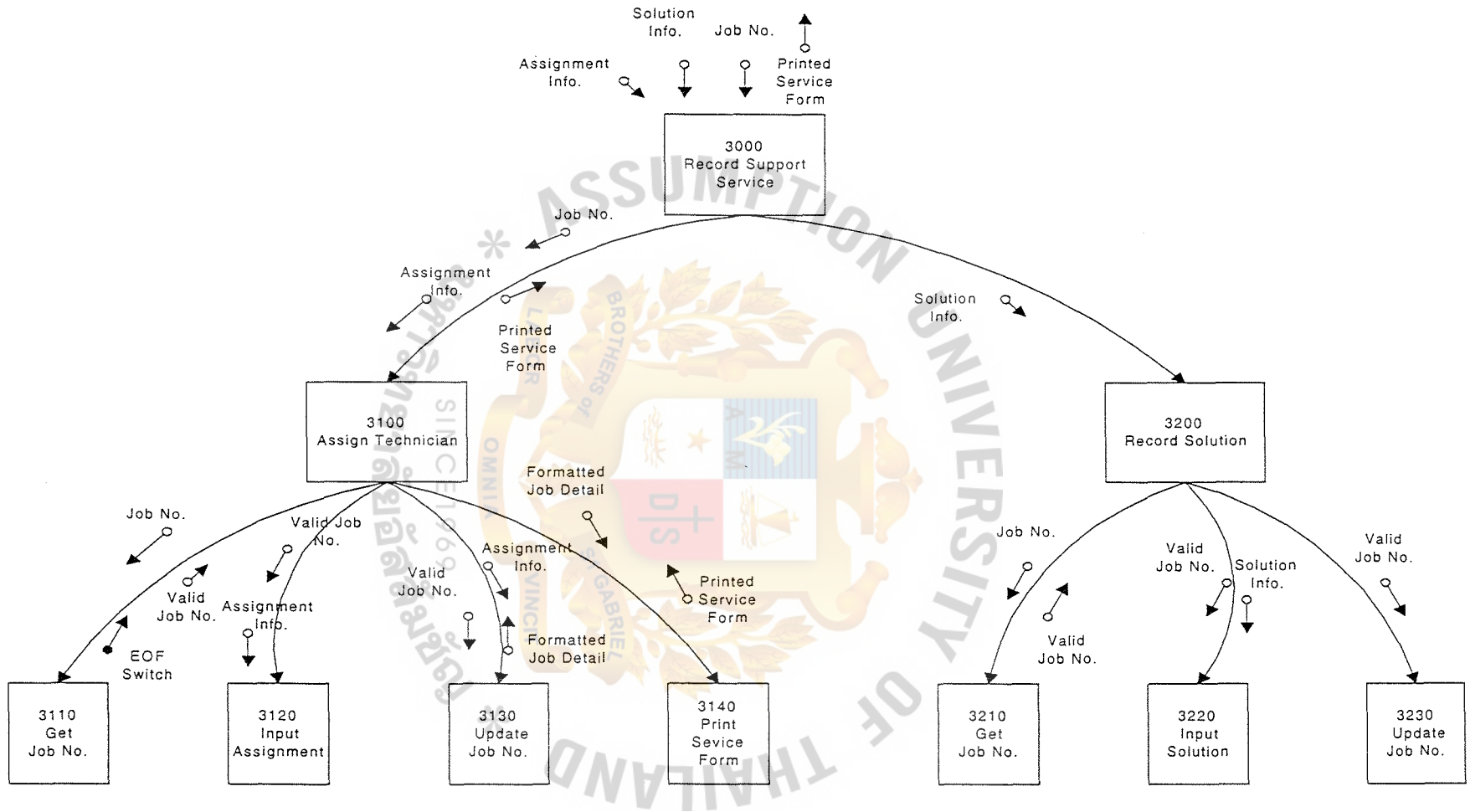

Figure B.4. Structure Chart of Process Record Support Service

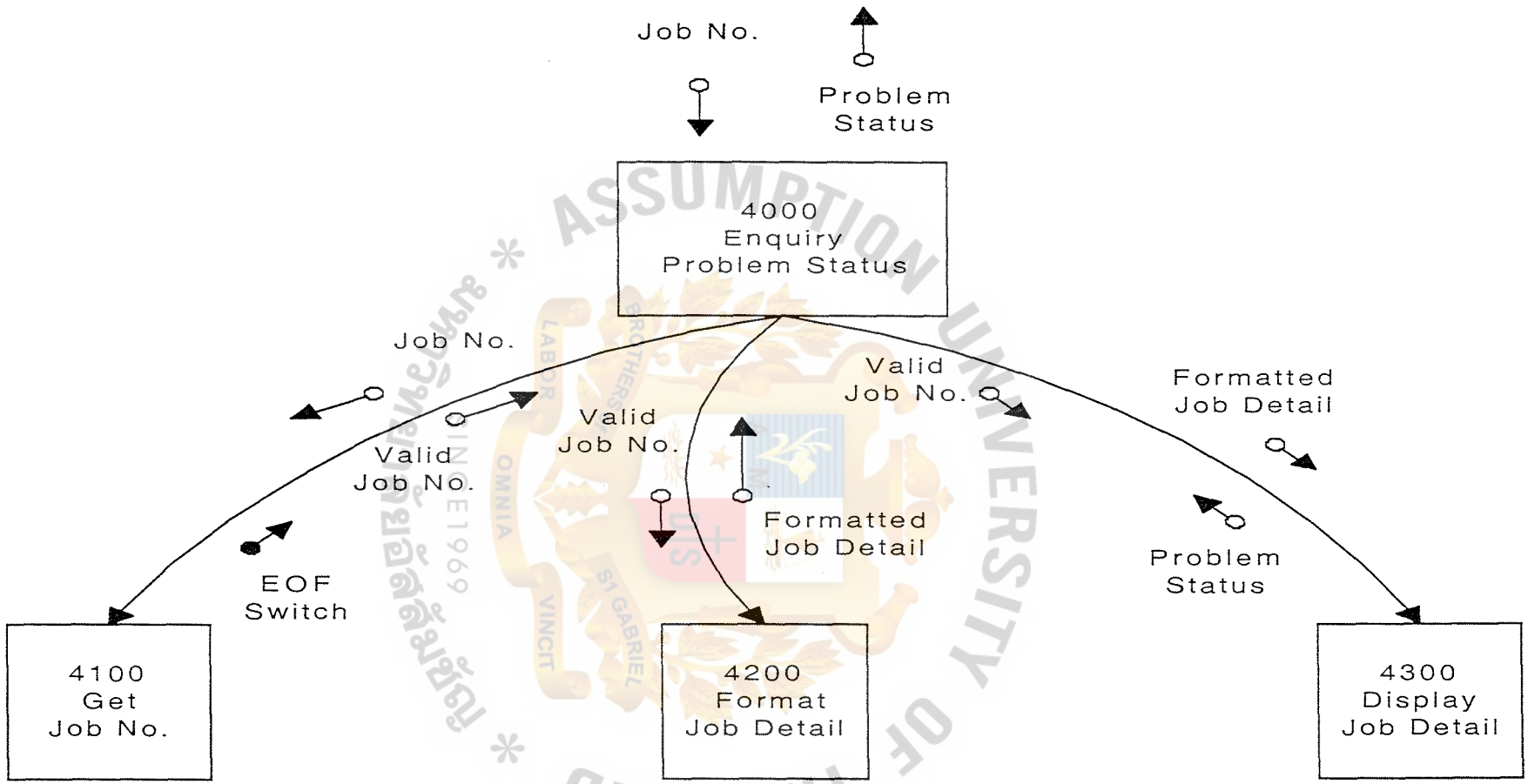

Figure B.5. Structure Chart of Process Enquiry Problem Status

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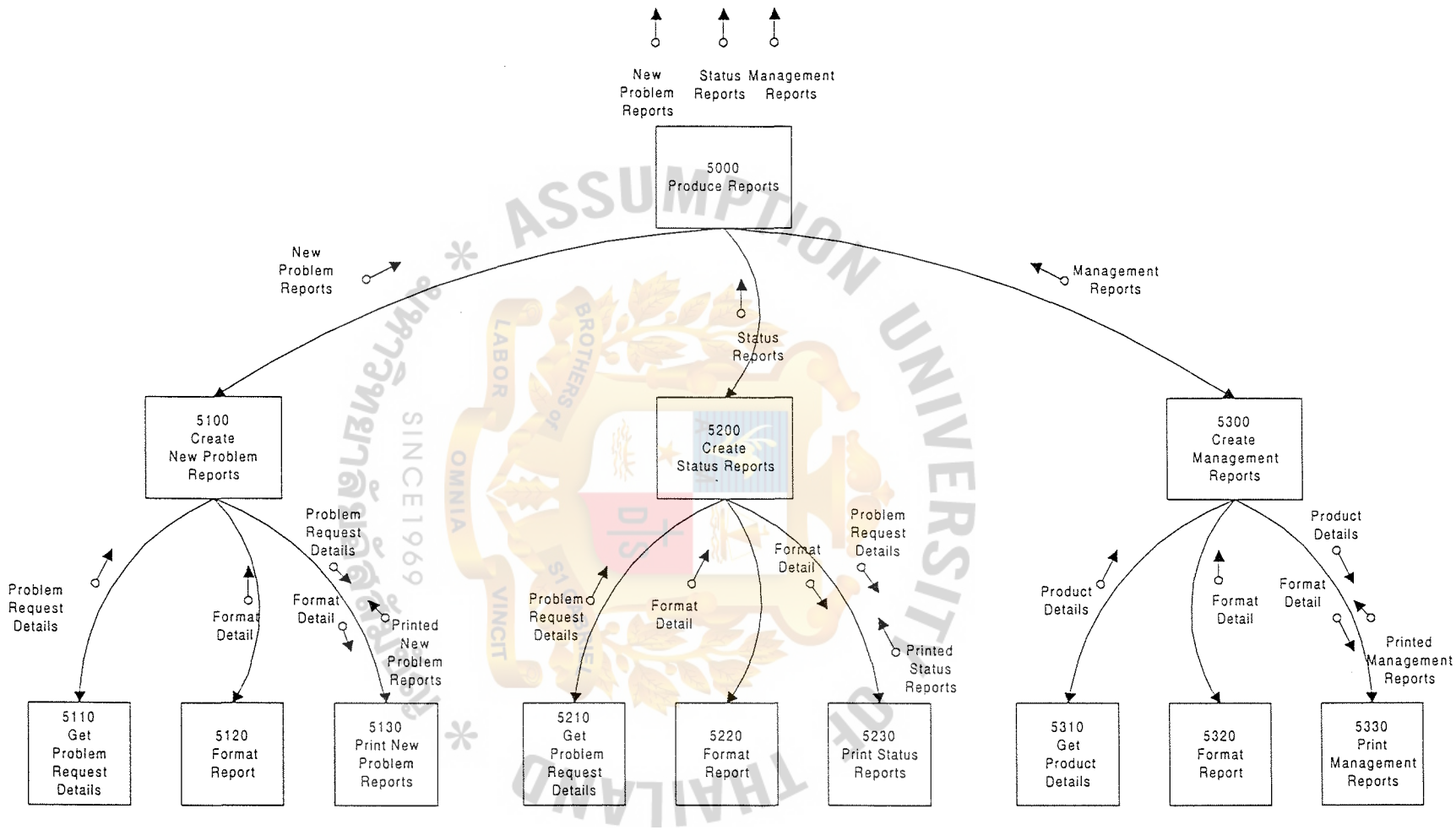

Figure B.6. Structure Chart of Process Produce Reports

APPENDIX C

Screen Design

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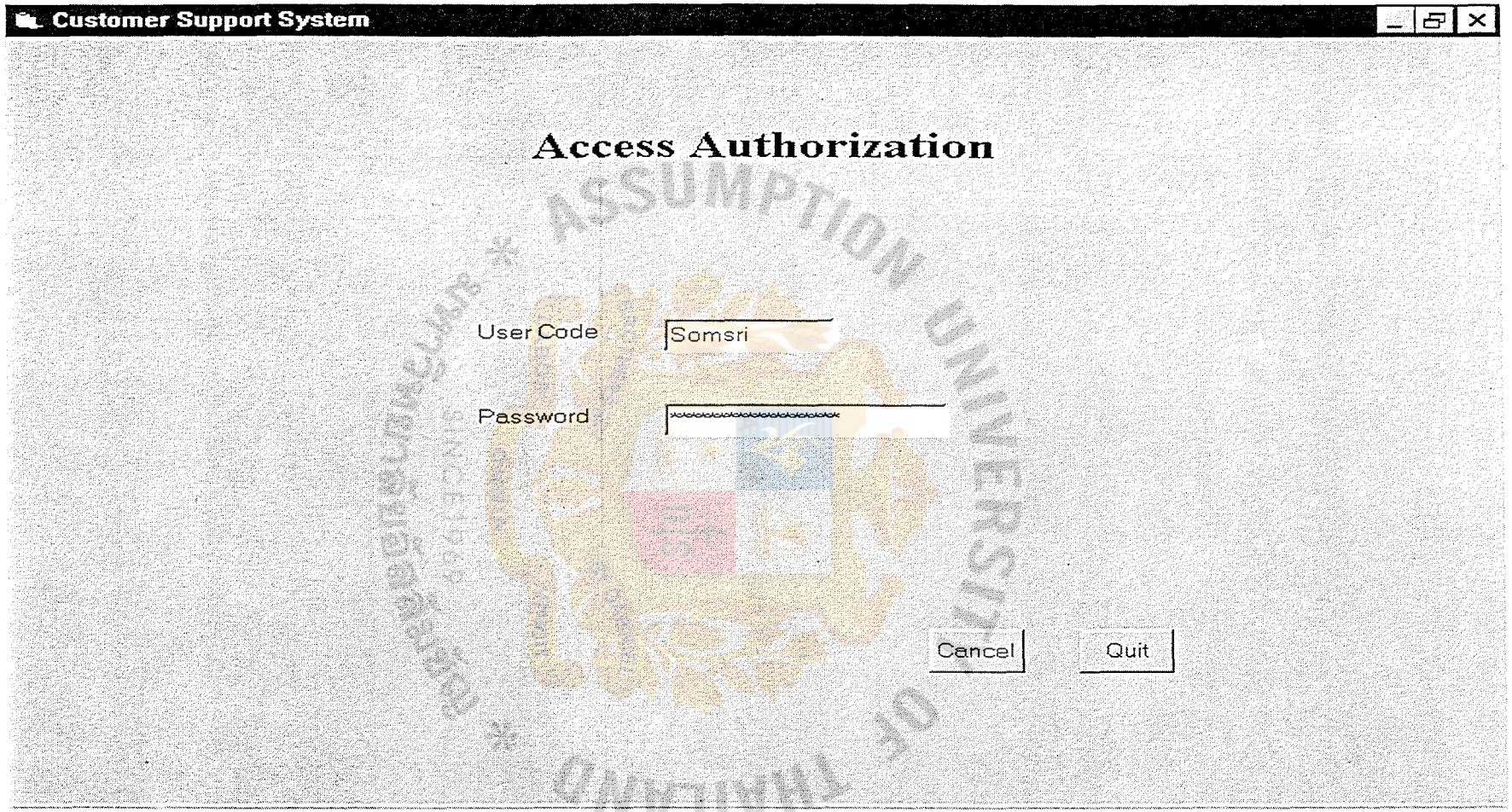

Figure C.1. Password Authorization Screen

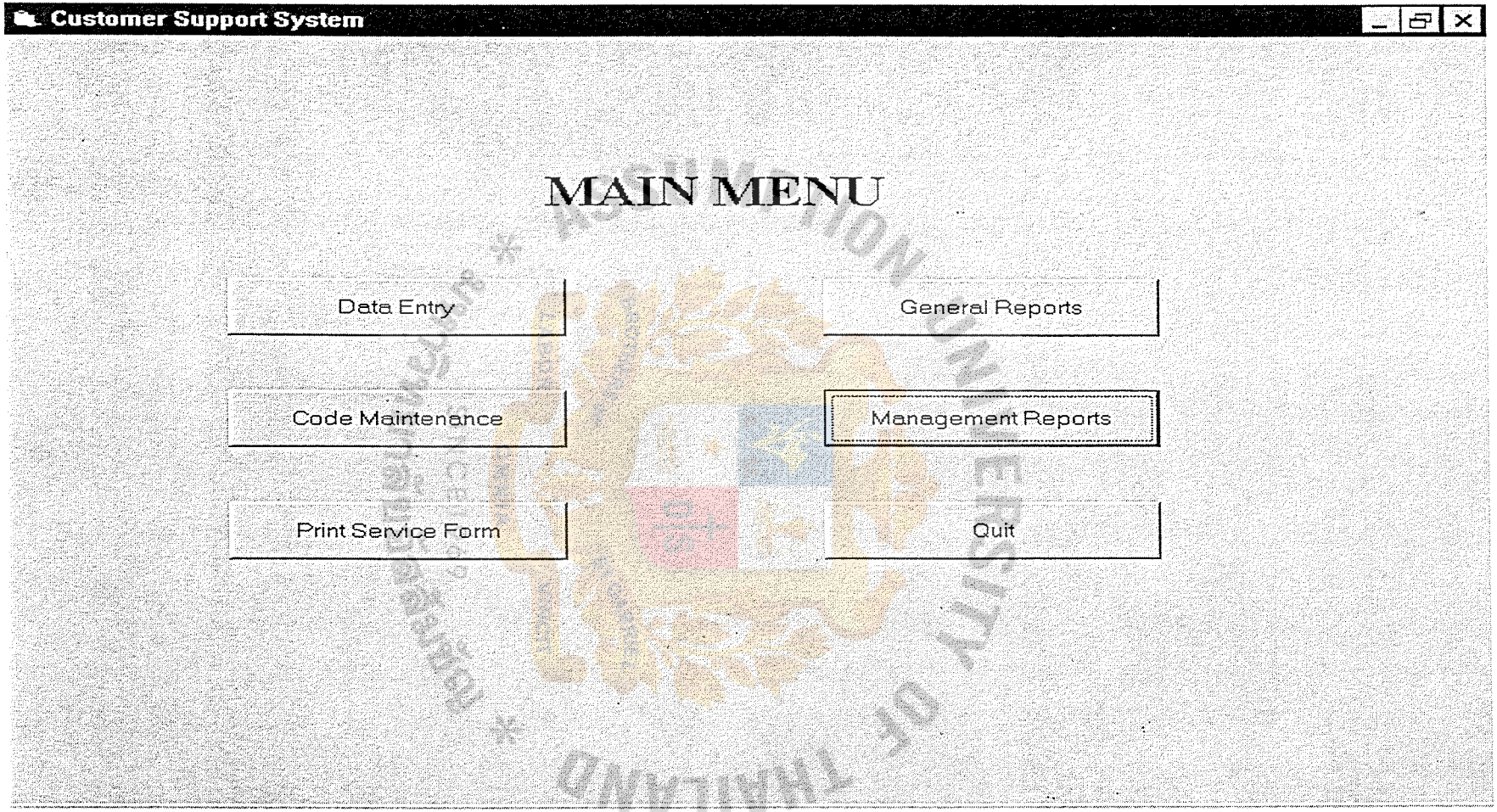

Figure C.2. Main Menu Screen

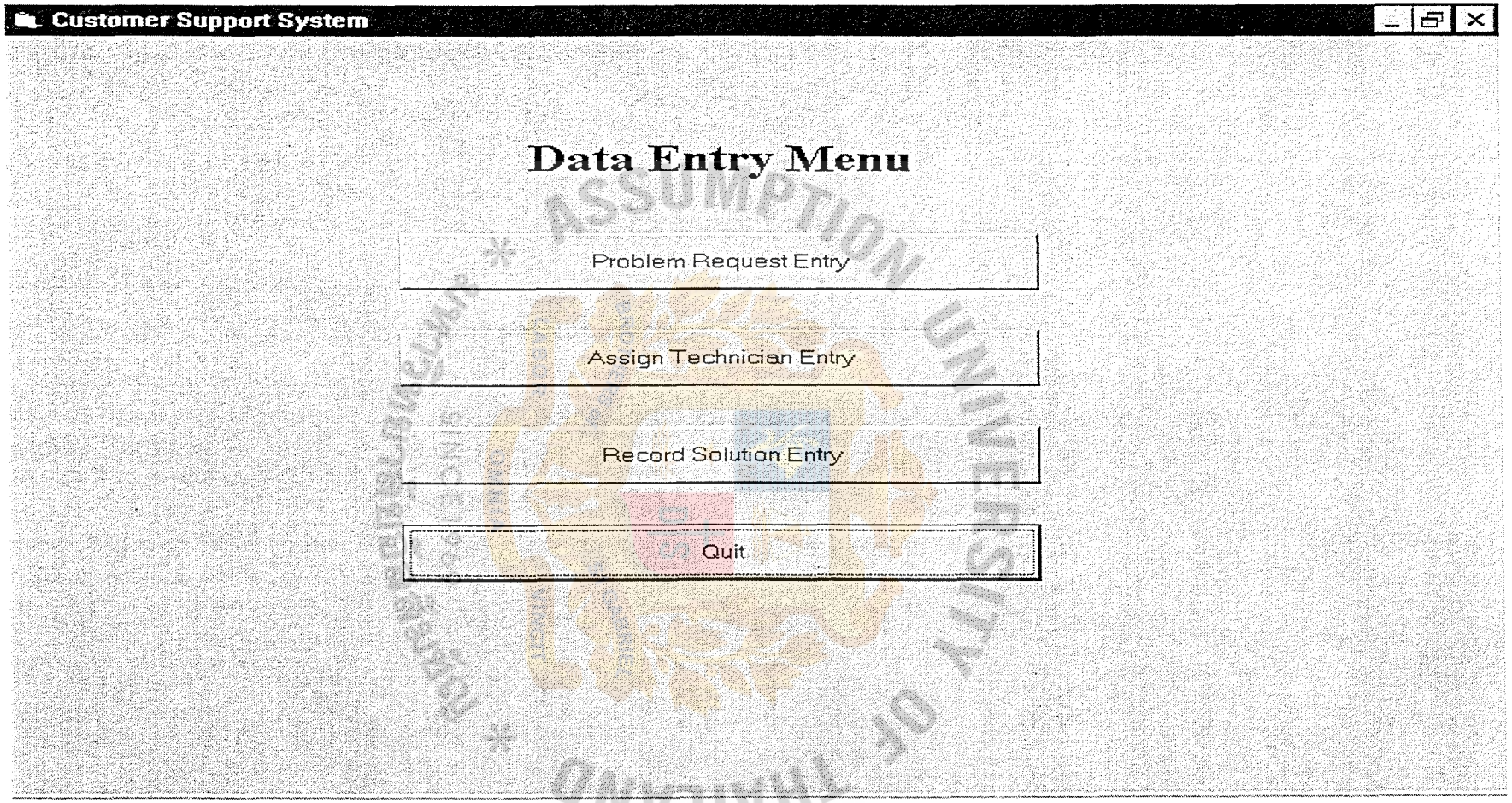

Figure C.3. Data Entry Menu Screen

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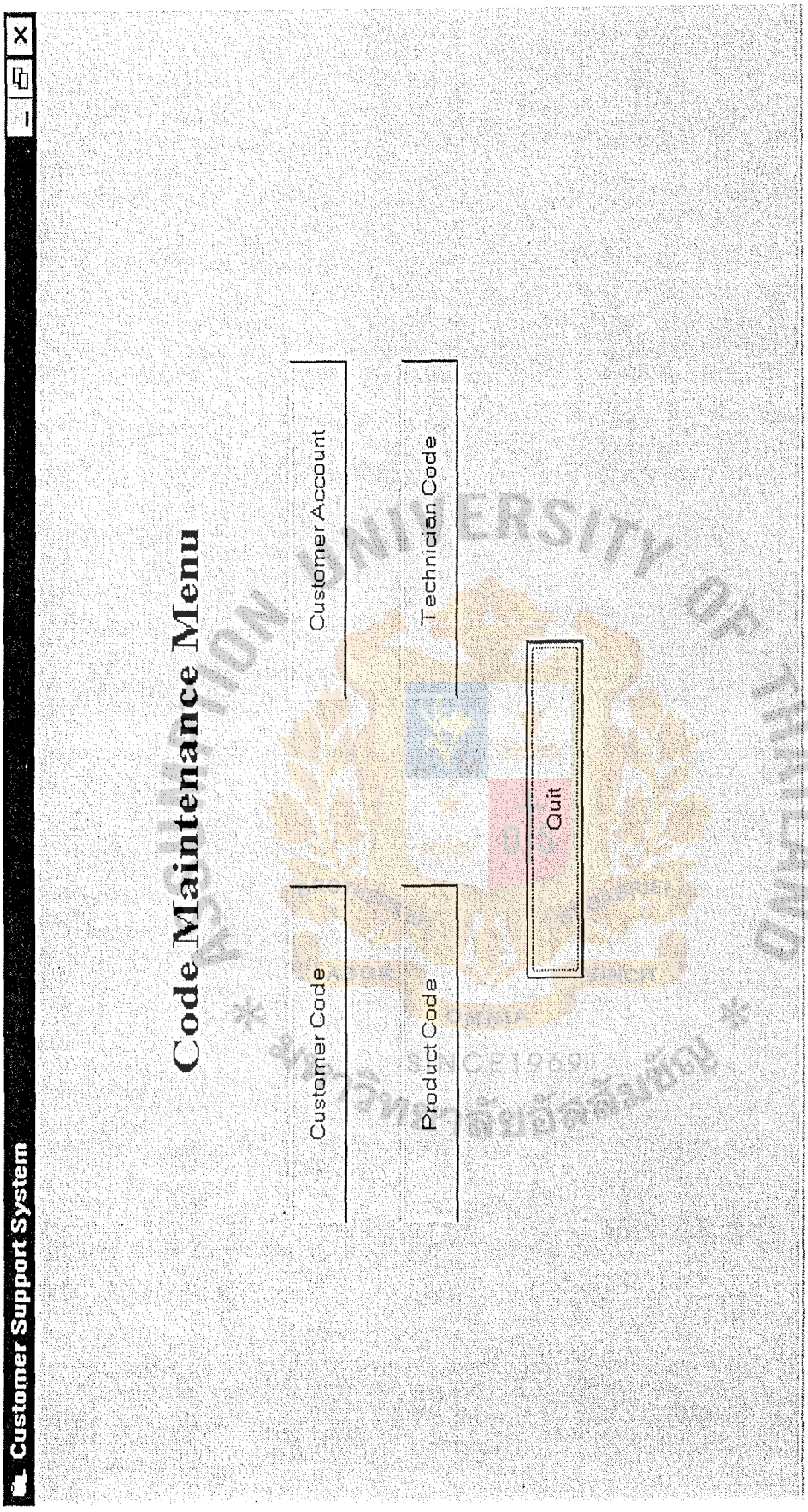

Figure C.4. Code Maintenance Menu Screen

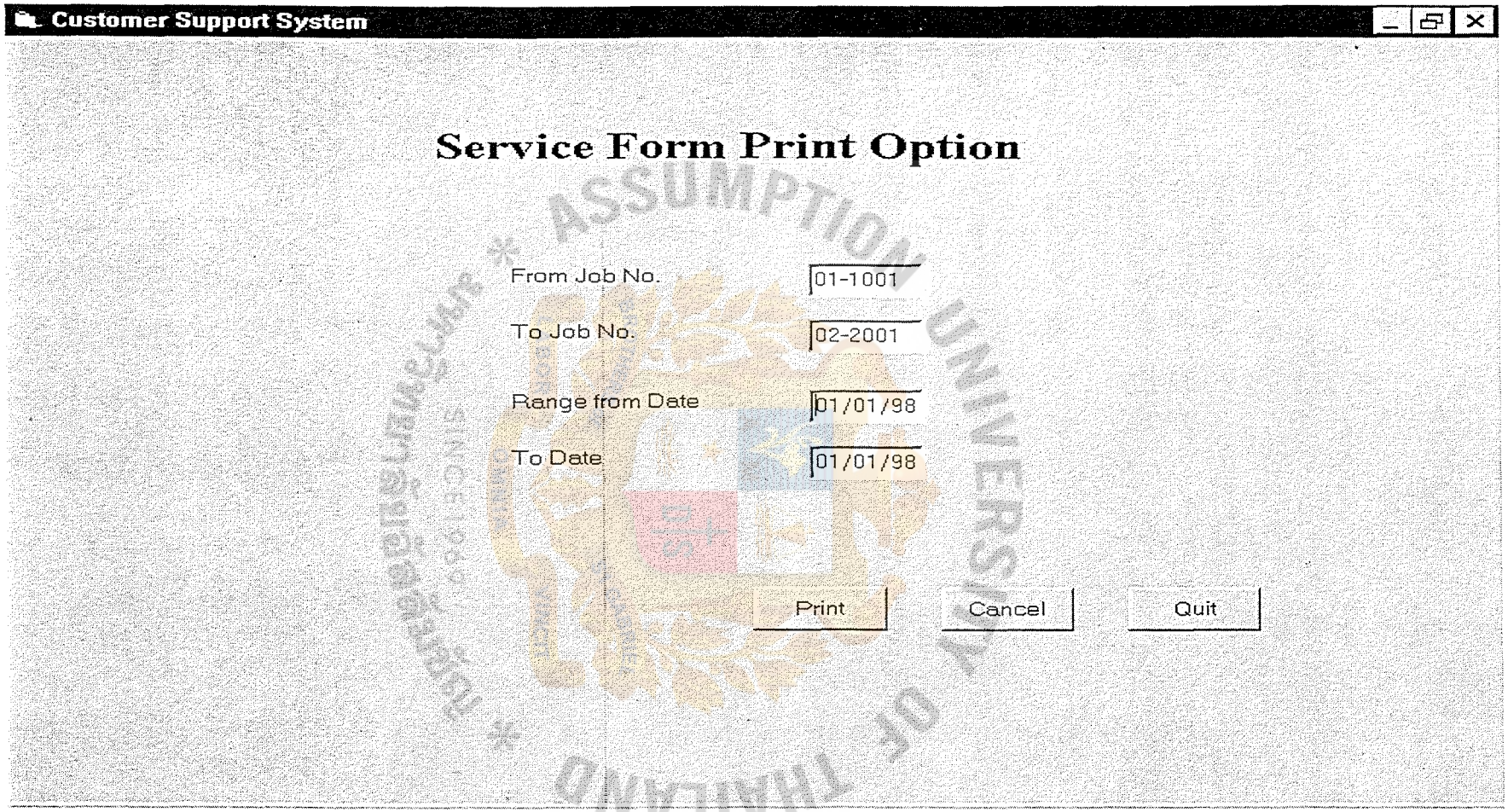

Figure C.5. Print Sevice Form Screen

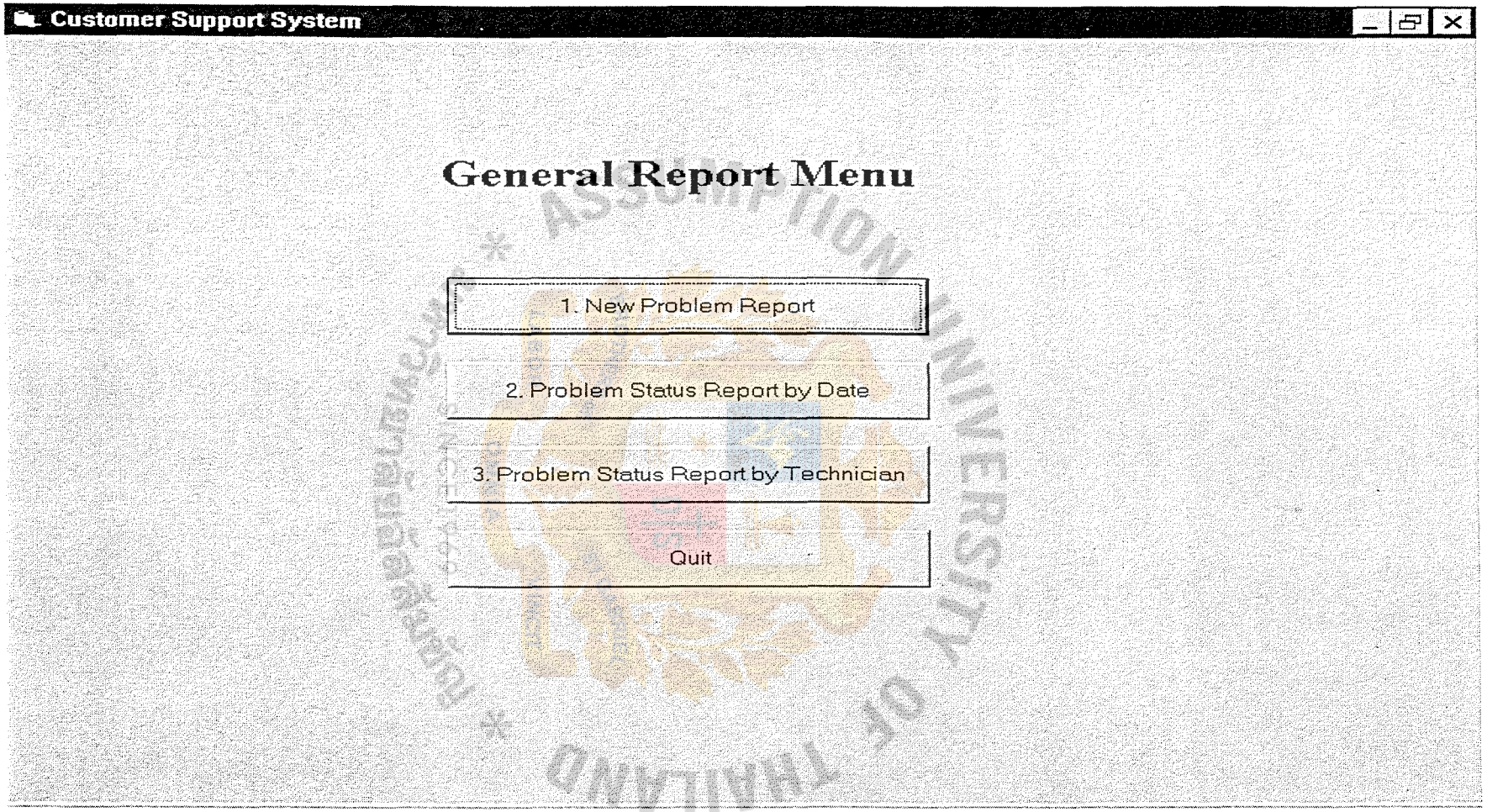

Figure C.6. General Report Menu Screen

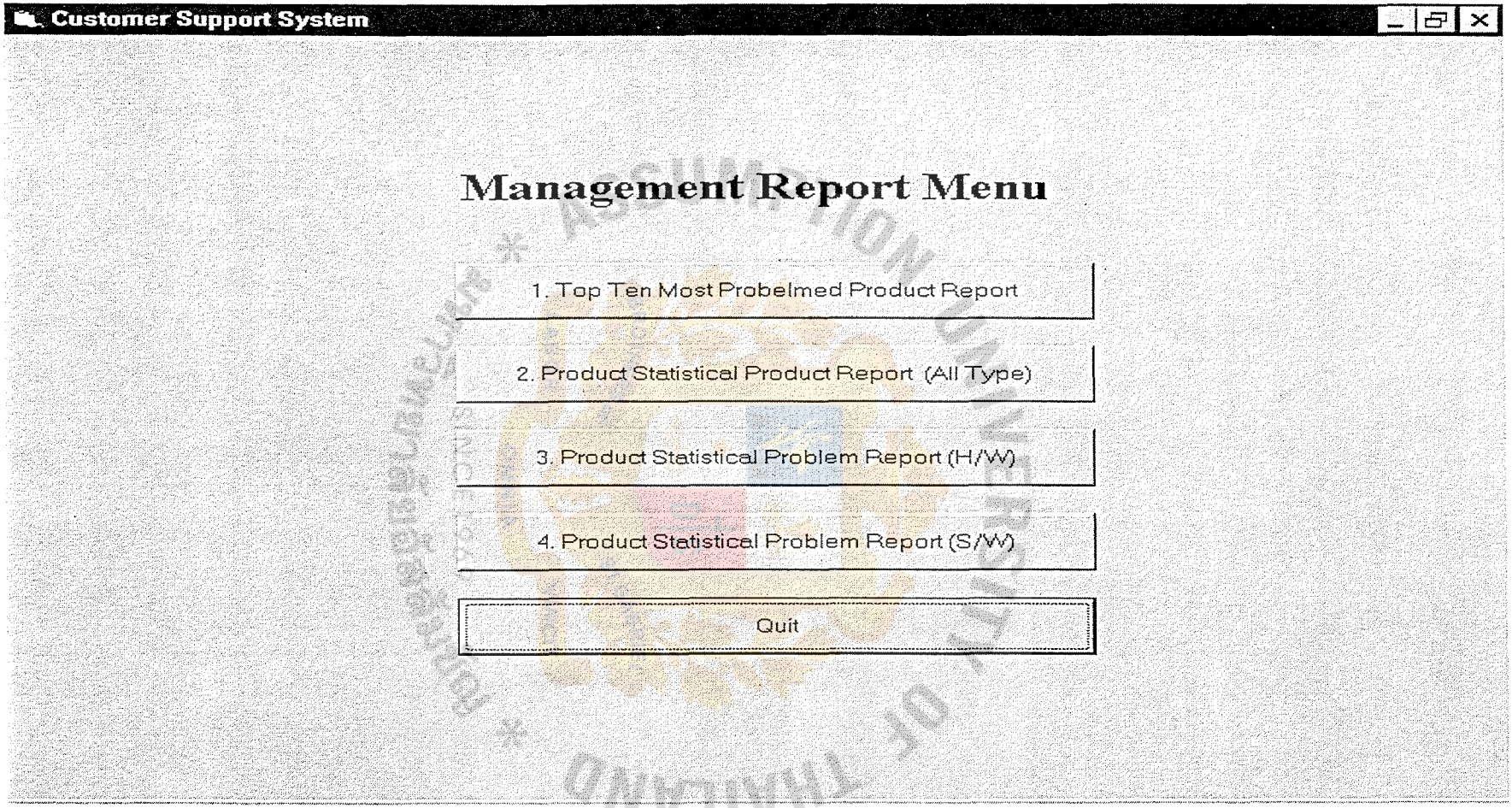

Figure C.7. Management Report Menu Screen

Customer Support System

Problem Request Entry

Job No. 01-1001 Date 01/01/97 Time 12:45

Customer ABC Company Ltd. Product IBM Minicomputer Model Risc 6000

Symptom

After running Accounting System,
The system then be hung suddently!

Service Type ○ H/W ○ S/W

Priority ○ High ○ Medium ◉ Low

Save Cancel Quit

Figure C.8. Problem Request Entry Screen

Customer Support System

Assign Technician Entry

Job No. 01-1001 Date 01/01/97 Time 12:45

Customer ABC Company Ltd. Product IBM Minicomputer Model Risc 6000

Symptom

After running Accounting System,

The system then be hung suddently!

Technician Mr. Narong SangJeum

Service Type ○ H/W ○ S/W

Priority ○ High ○ Medium ◉ Low

Status ○ Pending

○ Progress

○ Complete

Starting Date 01/02/98 Finish Date 01/01/97

Save Cancel Quit

Figure C.9. Assign Technician Entry Screen

Customer Support

Record Solution Entry

Job No. 01-1001 Date 01/01/97 Time 12:45

Customer ABC Company Ltd. Product IBM Minicomputer Model Risc 6000

Symptom

After running Accounting System,

The system then be hung suddently!

Solution

The cause is Virus Attack!

Using Vscan clean the system. Result is O.K.

Technician Mr. Narong SangJeum

Service Type ○ H/W ○ S/W

Priority ○ High ○ Medium ○ Low

Status ○ Pending ○ Progress ○ Complete

Starting Date 01/02/98 Finish Date 01/01/97

Remark Closed

Save Cancel Quit

Figure C.10. Record Solution Entry Screen

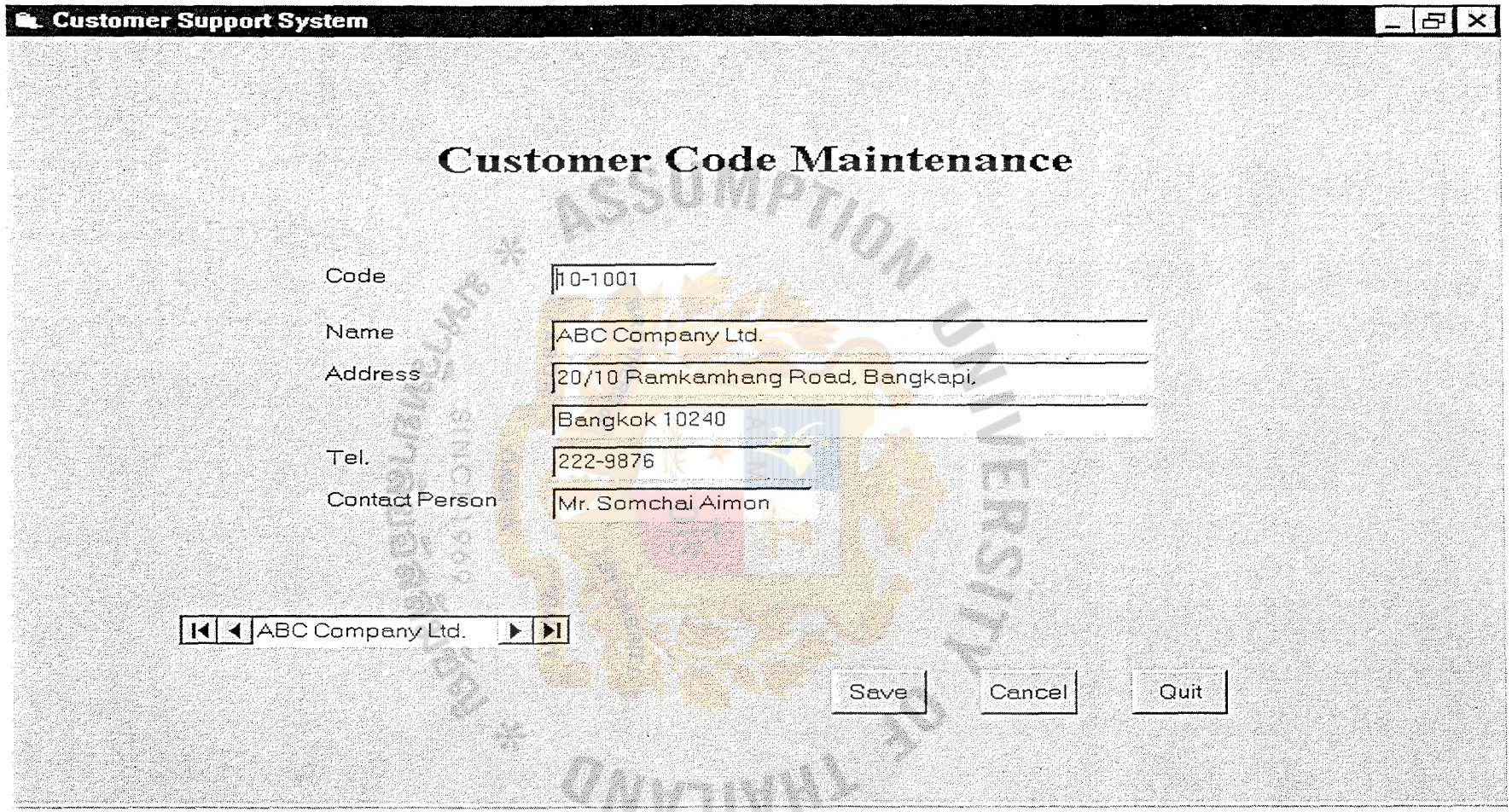

Figure C.11. Customer Code Maintenance Screen

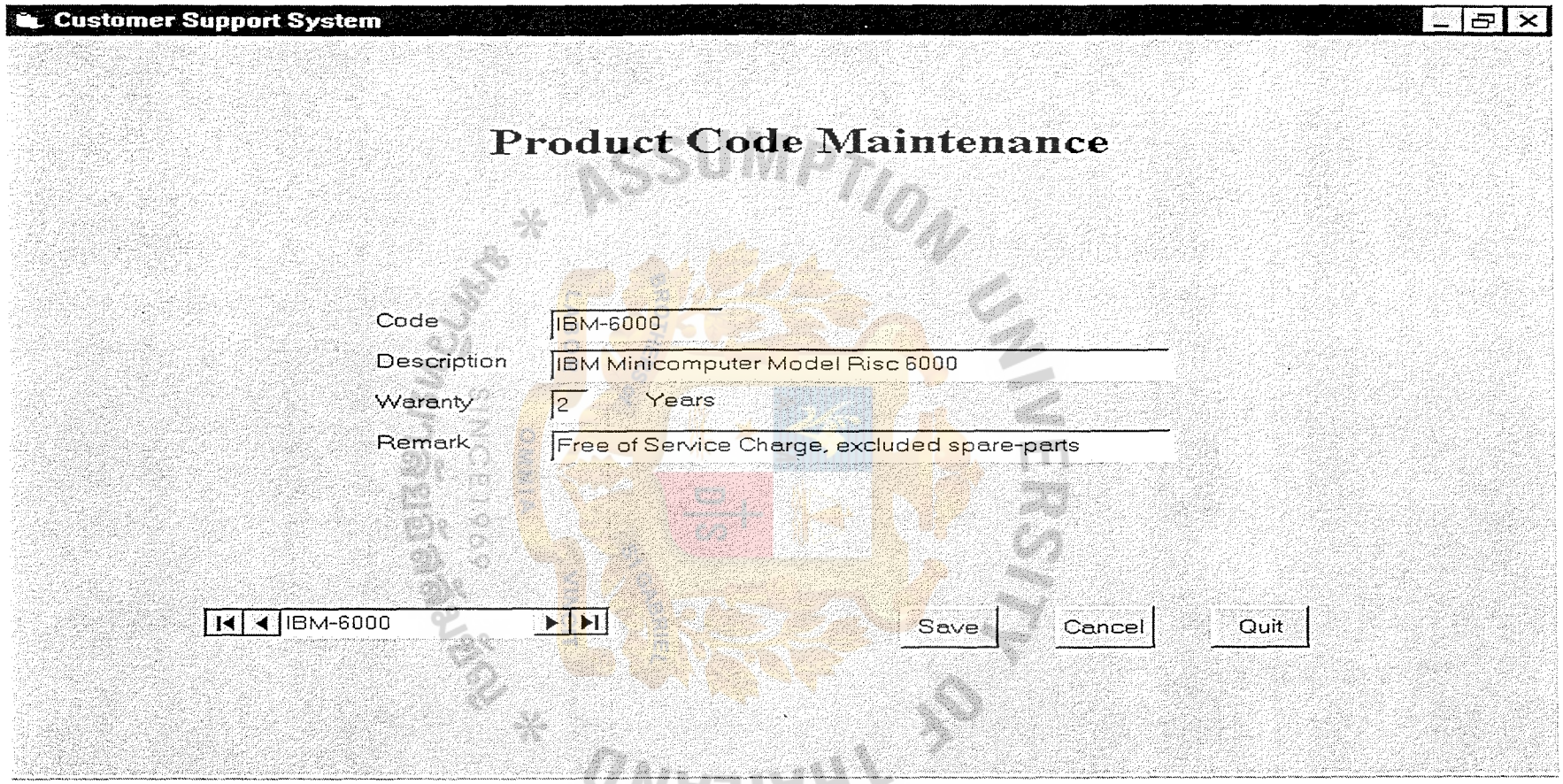

Figure C.12. Product Code Maintenance Screen

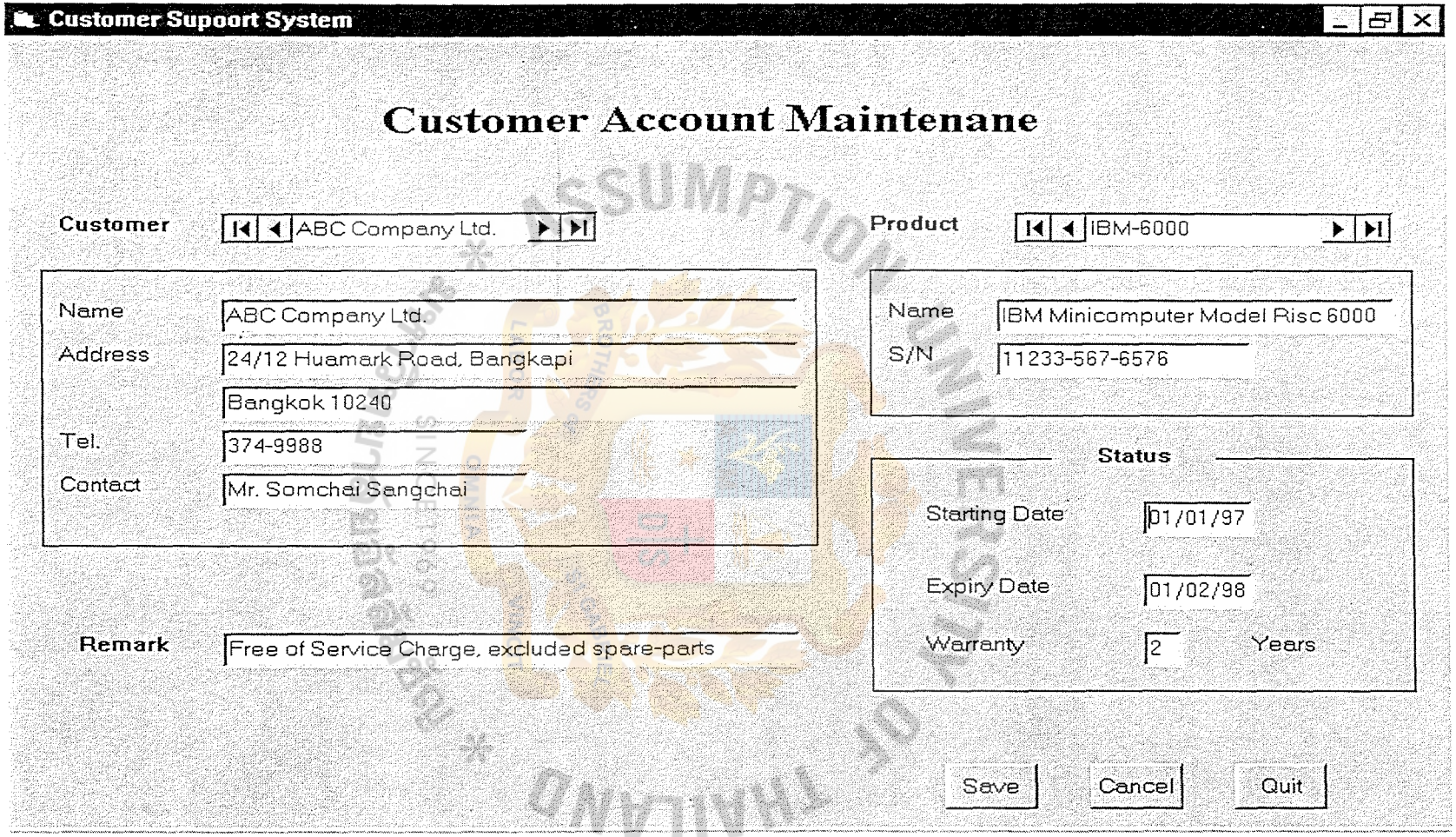

Figure C.13. Customer Account Maintenance

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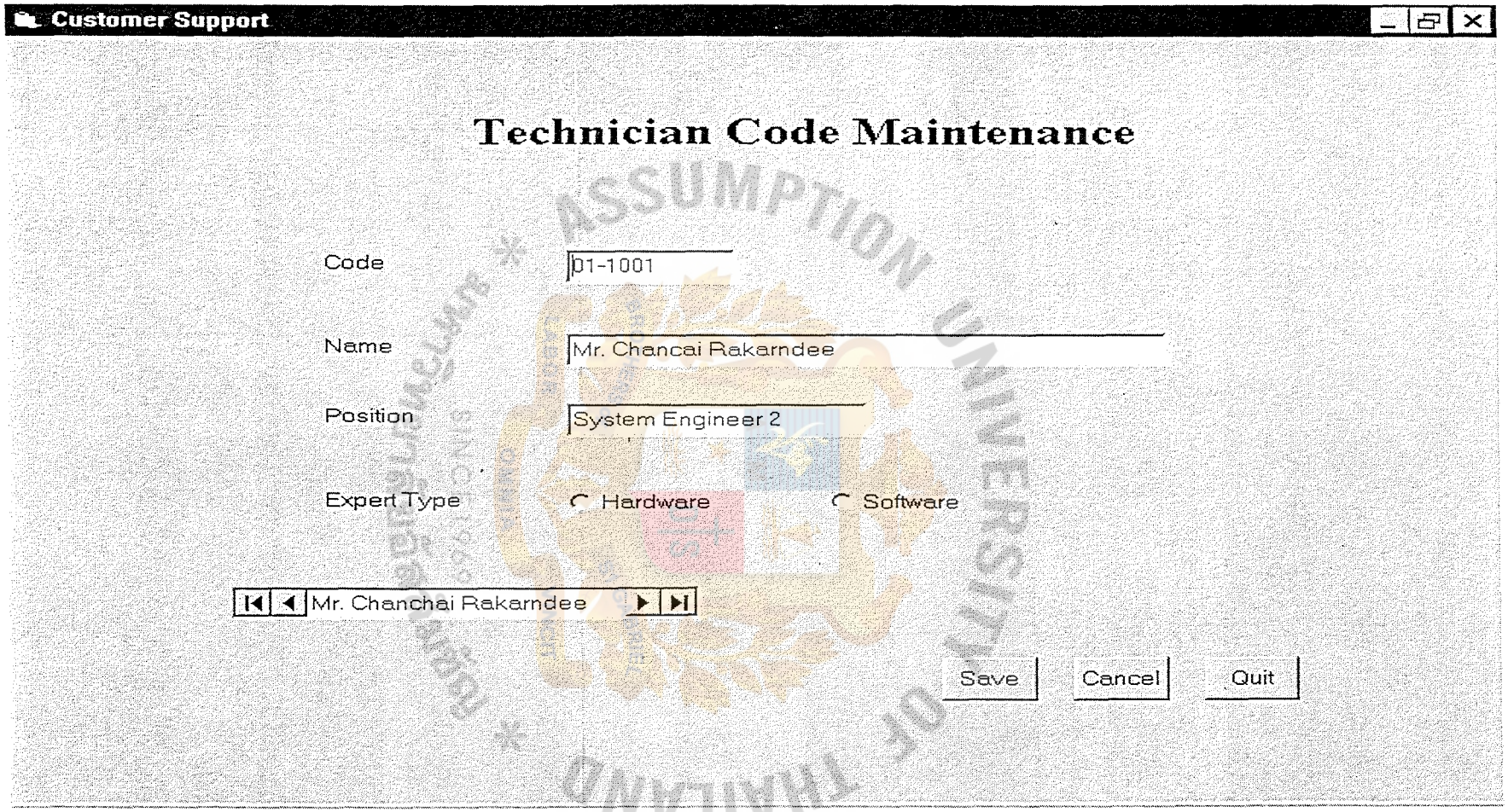

Figure C.14. Technician Code Maintenace Screen

APPENDIX D

Data Dictionary

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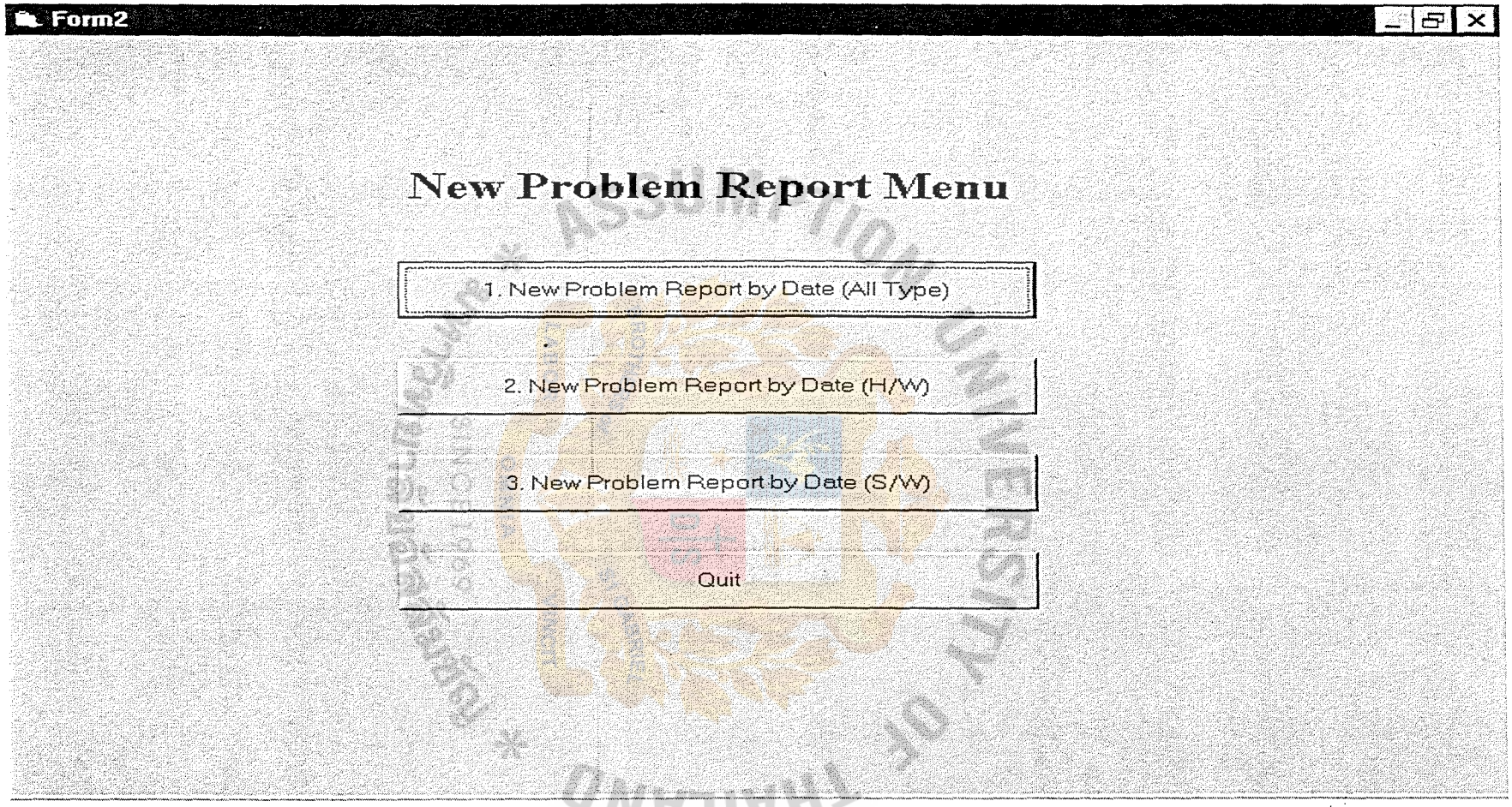

Figure C.15. New Problem Report Menu Screen

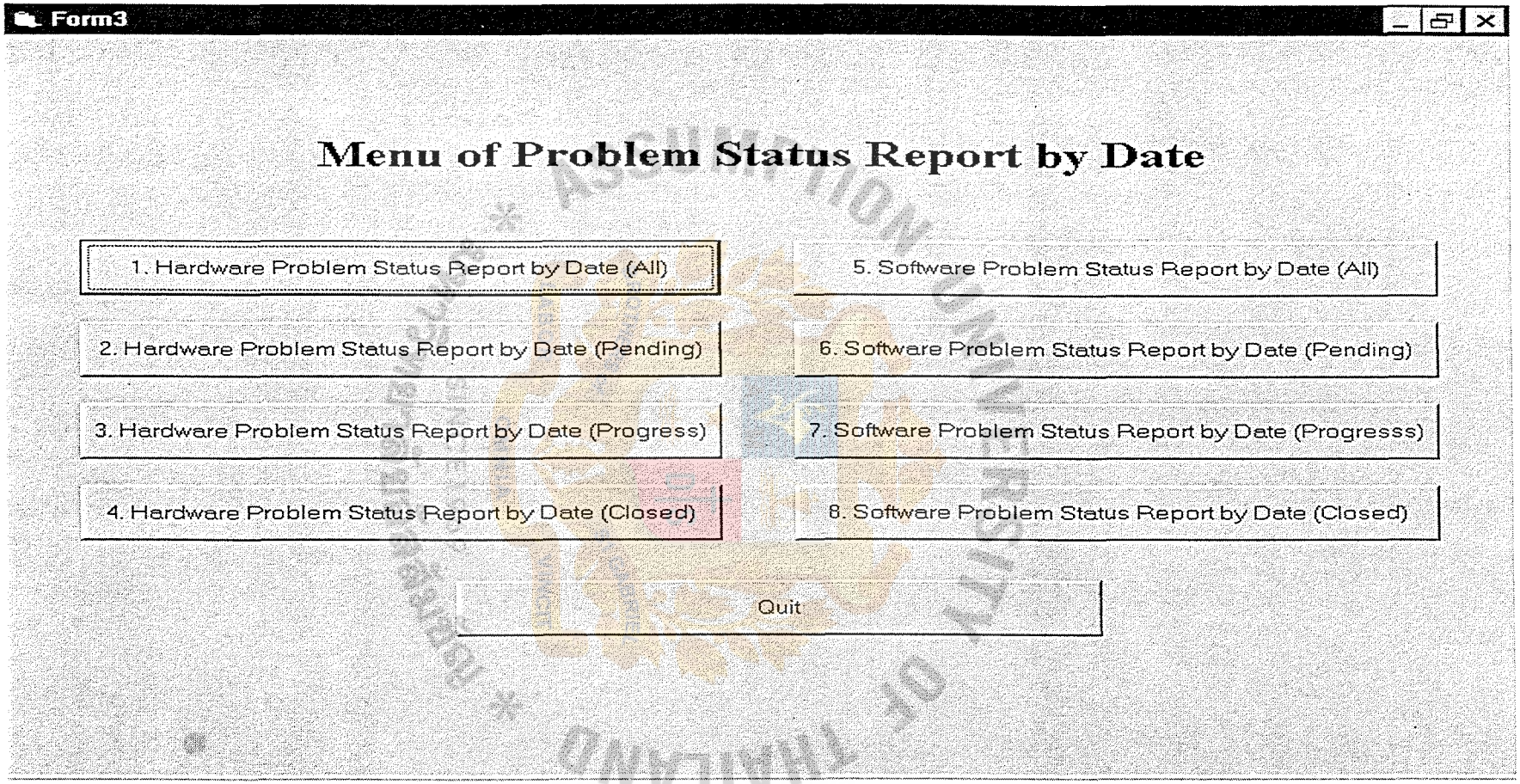

Figure C.16. Problem Status Report by Date Menu Screen

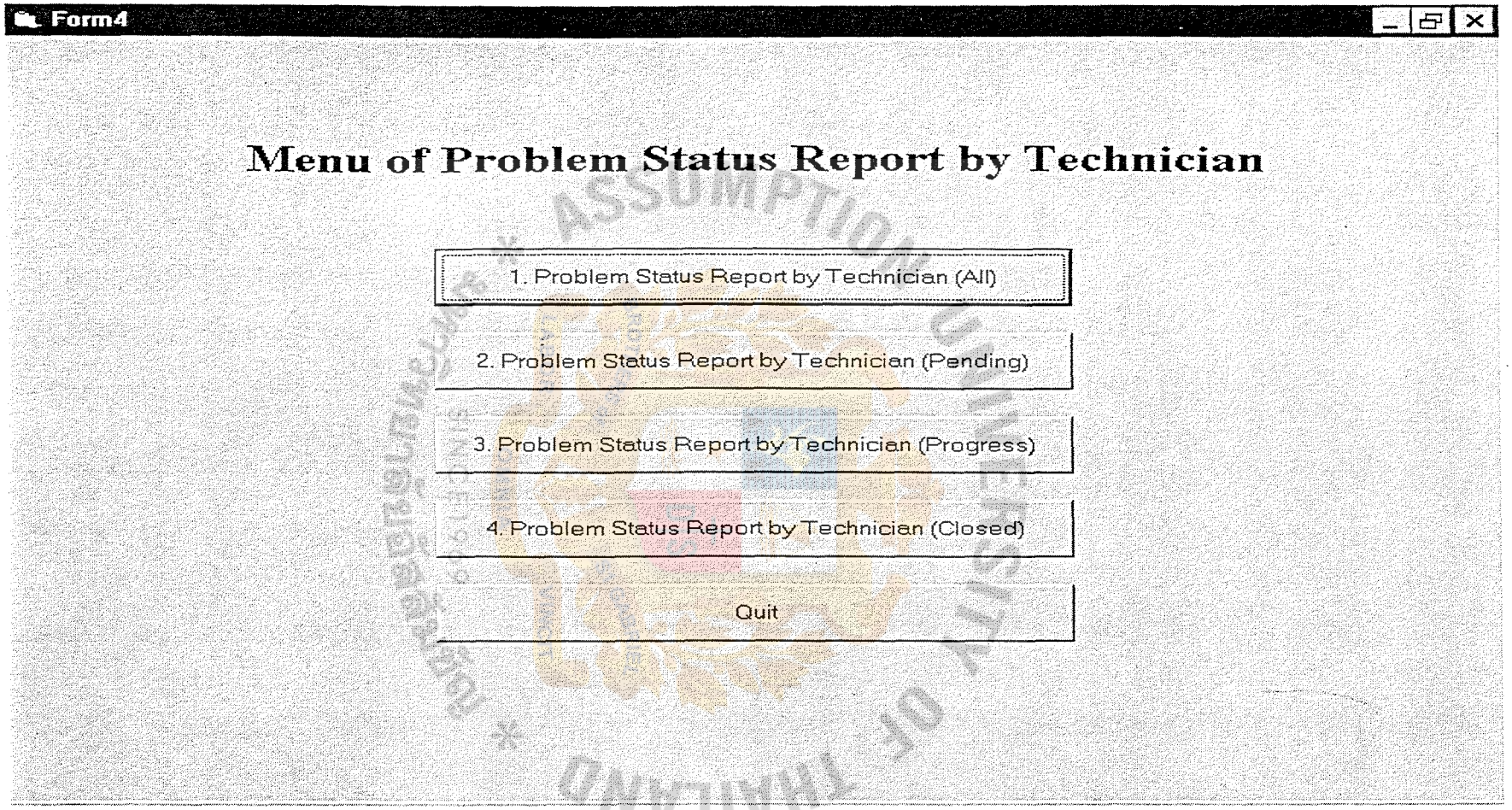

Figure C.17. Problem Status Report by Technician Menu Screen

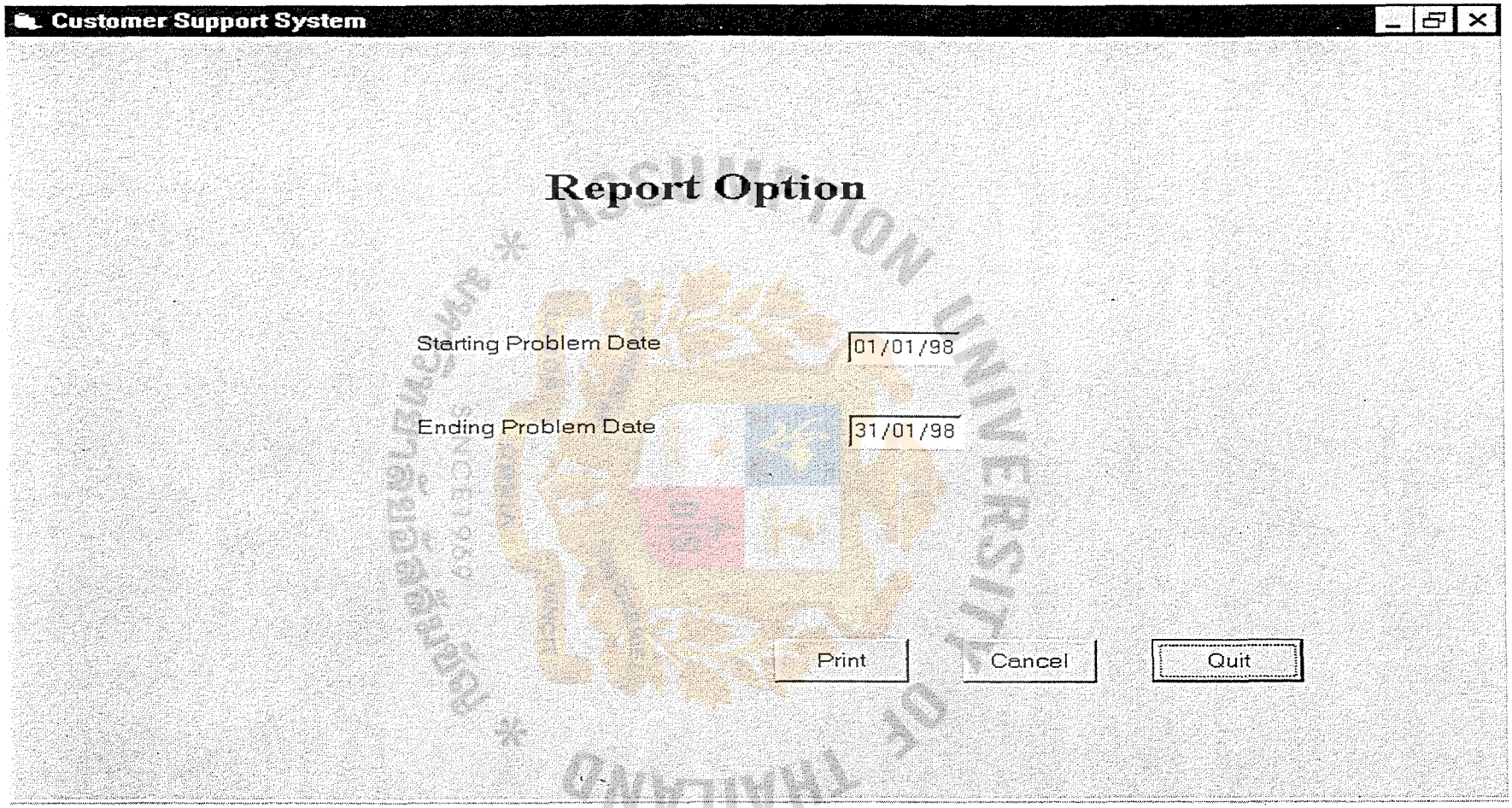

Figure C.18. Report Option by Date Screen

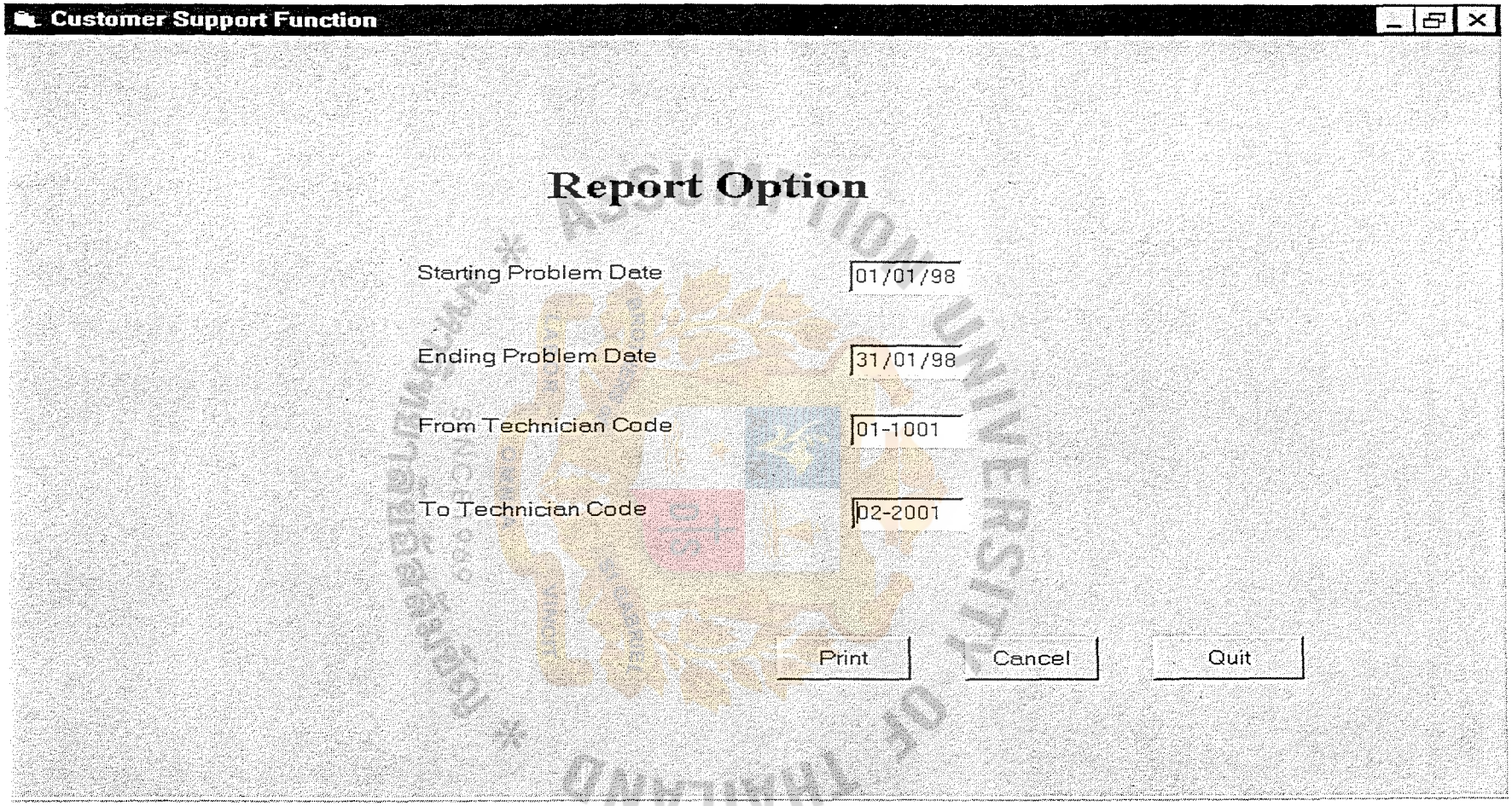

Figure C.19. Report Option by Date and Technician Screen

Table 1: Customer

Name	Description	Type	Length	Remark
CS_ID	Customer Identification	Char.	10	Primary Key
CS_Name	Customer Name	Char	40	
CS_Addr1	Customer Address	Char	40	Line 1
CS_Addr2	Customer Address	Char	40	Line 2
CS_Tel	Call No. and Fax. No.	Char	20	
Cnt_Per	Contact Person	Char	20	
Date	Update Date	Date	8	dd/mm/yy

Table2: Product

Name	Description	Type	Length	Remark
P_ID	Product Identificaiton	Char.	15	Primary Key
P_Name	Product Name	Char.	40	Include product model/version
Warranty	Warranty Time	Numeric	1	Years
Rem	Remark	Char.	40	
Date	Update Date	Date	8	dd/mm/yy

Table3: Technician

Name	Description	Type	Length	Remark
T_ID	Technician Identification	Char.	10	Primary Key
T_Name	Technician Name	Char.	40	Include product model/version
T_Pos	Position Title	Char.	20	
T_Type	Expert Type	Char.	1	1-H/W 2-S/W
Ac_Freq	Total Problem Frequency	Numeric	6	no decimal
HW_Freq	Total Hardwarre Problem Frequency	Numeric	6	no decimal
SW_Freq	Total Software Problem Frequency	Numeric	6	no decimal
Date	Update Date	Date	8	dd/mm/yy

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Table4: Transaction

Name	Description	Type	Length	Remark
Job_No	Job Number	Char.	10	Primary Key
Job_Date	Job Informed Date	Date	8	dd/mm/yy
Job_Time	Job Informed Time	Char.	5	hh:mm
S_Type	Service Type	Char.	1	1-H/W 2-S/W
Priority	Priority	Char.	1	1-High 2-Med 3-Low
Warranty	Warranty	Char.	1	'Y'=Yes 'N'=No
CS_ID	Customer Identification	Char.	10	Secondary Key
P_ID	Product Identification	Char.	15	Secondary Key
T_ID	Technician Identification	Char.	10	Secondary Key
Symt_Ln1	Symptom Description Line 1	Char.	40	
Symt_Ln2	Symptom Description Line 2	Char.	40	
Informer	Customer Informer	Char.	20	
Inf_Call	Customer Informer Call No.	Char.	20	
Operator	Help Desk Operator Name	Char.	20	
Sol_Ln1	Solution Description Line 1	Char.	40	
Sol_Ln2	Solution Description Line 2	Char.	40	
Sol_Date	Solution Date	Date	8	
Status	Job Status	Char.	1	1-Pending 2-In Progress 3-Closed
Remark	Remark	Char.	20	
Date	Update Date	Date	8	

Table5: Customer Account

Name	Description	Type	Length	Remark
CS_ID	Customer Identification	Char.	10	Primary Key
P_ID	Product Identification	Char.	15	Primary Key
Pur_Date	Purchasing Date	Date	8	dd/mm/yy
Warranty	Warranty Time	Numeric	1	Years
Exp_Date	Expired Warranty Date	Date	8	dd/mm/yy
Remark	Remark	Char.	40	
P_Qnty	Product Quantity	Numeric	2	no decimal
Serial_No	Product Serial Number	Char.	15	
Date	Update Date	Date	8	

Table6: Security

Name	Description	Type	Length	Remark
User_Code	User Code	Char.	10	Primary Key
Password	Password Authorization	Char.	10	
Level	Security Level	Char.	1	
Date	Update Date	Date	8	

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APPENDIX E

Process Specification

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- **Process 1000: Prepare Codes**

This process creates new customer, product, technician and customer account codes, provided by Customer Support entity, and recording these information to three data stores. From this process, Customer Support entity will get outputs as printed checking lists.

Input	Output
• New Customer Information	• Customer List
• New Product Information	• Product List
• New Customer Account Information	• Customer Account List
• New Technician Information	• Technician List

- **Process 1100: Prepare Customer Record**

This process creates new customer record by getting new customer information entry from Customer Support entity, then adds to customer data store for new record. Also, existing record is able to be edited and reupdated. From this process, the Customer Support entity will gets Customer List, an output for checking after recording.

Input	Output
• New Customer Information	• Customer List
• Changed Customer Information	• Updated Customer Record

- **Process 1110: Read Customer Record**

This process checks whether valid customer record from customer data store, if it is not a valid customer record, then the information is new record. After checking from data store, new customer record or valid customer record will be sent to process 1120, Update Customer Record, for adding new record and update new change into customer data store.

Input	Output
• New Customer Information	• New Customer Information
• Valid Customer Record	• Valid Customer Record

- **Process 1120: Update Customer Record**

This process gets new customer record or valid customer record form process 1110, Read Customer Record, then perform update process to customer data store. And also, this process will sorts any valid records to process 1130, Prints Customer List, for performing customer list.

Input	Output
• New Customer Record	• Add new customer information into customer data store
• Valid Customer Record	• Update valid customer record into customer data store
	• Sorted valid customer records

- **Process 1130: Print Customer List**

This process gets sorted customer records from process 1120, Update Customer Record. Then performs format detail conforming with those sorted customer records, and prints data out as customer list.

Input	Output
• Sorted Customer Records	• Customer List

- **Process 1200: Prepare Product Record**

This process creates new product record by getting new product information entry from Customer Support entity, then adds to product data store for new record. Also, existing record is able to be edited and reupdated. From this process, the

Customer Support entity will gets Product List, an output for checking after recording.

Input	Output
• New Product Information	• Product List
• Changed Product Record	• Product Updated Record

- **Process 1210: Read Product Record**

This process checks whether valid product record from product data store, if it is not a valid product record, then the information is new record. After checking from data store, new product record or valid product record will be sent to process 1220, Update Product Record, for adding new record and update new change into product data store.

Input	Output
• New Product Information	• New Product Information
• Valid Product Record	• Valid Product Record

- **Process 1220: Update Product Record**

This process gets new product record or valid product record form process 1110, Read Product Record, then perform update process to product data store. And also, this process will sorts any valid records to process 1230, printed Product List, for performing product list.

Input	Output
• New Product Record	• Add new product information into product data store
• Valid Product Record	• Update valid product record into product data store
	• Sorted valid product records

- **Process 1230: Print Product List**

This process gets sorted product records from process 1220, Update Product Record. Then performs format detail conforming with those sorted product records, and prints data out as product list.

Input	Output
• Sorted Product Records	• Product List

- **Process 1300: Prepare Customer Account Record**

This process creates new customer account record by getting new customer account information entry from Customer Support entity, then adds to customer account data store for new record. Also, existing record is able to be edited and reupdated. From this process, the Customer Support entity will gets Customer Account List, an output for checking after recording.

Input	Output
• New Customer Account Information	• Customer Account List
• Changed Customer Account	• Customer Account Updated Record

- **Process 1310: Read Customer Account Record**

This process checks whether valid customer account record from customer account data store, if it is not a valid customer account record, then the information is new record. After checking from data store, new customer account record or valid customer account record will be sent to process 1320, Update Customer Account Record, for adding new record and update new change into customer account data store.

Input	Output
• New Customer Account Information	• New Customer Account Information
• Valid Customer Account Record	• Valid Customer Account Record

- **Process 1320: Update Customer Account Record**

This process gets new customer account record or valid customer account record form process 1310, Read Customer Account Record, then perform update process to customer account data store. And also, this process will sorts any valid records to process 1330, prints Customer Account List, for performing customer account list.

Input	Output
• New Customer Account Record	• Add new customer account information into customer account data store
• Valid Customer Account Record	• Update valid customer account record into customer account data store
	• Sorted valid customer account records

- **Process 1330: Print Customer Account List**

This process gets sorted customer account records from process 1320, Update Customer Acccount Record. Then performs format detail conforming with those sorted customer account records, and prints data out as customer account list.

Input	Output
• Sorted Customer Account Records	• Customer Account List

- **Process 1400: Prepare Technician Record**

This process creates new technician record by getting new tecnician information entry from Customer Support entity, then adds to technician data store for new record. Also, existing record is able to be edited and reupdated. From this

process, the Customer Support entity will gets Technician List, an output for checking after recording.

Input	Output
• New Technician Information	• Technician List
• Changed Technician Record	• Technician Updated Record

- **Process 1410: Read Technician Record**

This process checks whether valid technician record from technician data store, if it is not a valid technician record, then the information is new record. After checking from data store, new technician record or valid technician record will be sent to process 1420, Update Technician Record, for adding new record and update new change into technician data store.

Input	Output
• New Technician Information	• New Technician Information
• Valid Technician Record	• Valid Technician Record

- **Process 1420: Update Technician Record**

This process gets new technician record or valid technician record form process 1410, Read technician Record, then perform update process to technician data store. And also, this process will sorts any valid records to process 1430, prints Technician List, for performing technician list.

Input	Output
• New Technician Record	• Add new technician information into technician data store
• Valid Technician Record	• Update valid technician record into technician data store
	• Sorted valid technician records

- **Process 1430: Print Technician List**

This process gets sorted technician records from process 1420, Update Technician Record. Then performs format detail conforming with those sorted technician records, and prints data out as technician list.

Input	Output
• Sorted Technician Records	• Technician List

- **Process 2000: Record New Problem Request**

This process record new problem request into transaction data store, and counts problem number into product data store. At this stage, customer account must be verified and checking status. Then generates job number before appending new problem request into the file. The job number can be enqired by process 4000, enquiry problem status. This process also send out the job no for input support service information in process 3000.

This process performs by three child processes: read/verify customer account status, input new problem request detail, and update new problem record.

Input	Output
• New Problem Request	• Add New Problem Request to Transaction Data store
• Valid Customer Account	

- **Process 2100: Input New Problem Request**

This process gets new problem request, then sends customer account to be verified at process 2200, Read/Verify Customer Account Status. If the status of customer account is verified, then the new problem request will be sent to update at process 2300, Update New Problem Record, into transaction data store.

Input	Output
• New Problem Request	• Customer Account for checking

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• Valid Customer Account	• New Problem Request Detail to update process

- **Process 2200: Read/Verify Customer Account Status**

This process gets customer account from process 2100, Input New Problem Request, then searchs for valid records from customer account data store. If has valid customer account record, then checks the status to be allowed accepting the new problem request. If it does, then sends valid customer account back with the allowance status to process 2100 to continue entry of problem detail.

Input	Output
• Customer Account	• Valid Customer Account with status

- **Process 2300: Update New Problem Record**

This process received new problem request detail from process 2200, then generates job no. and appends into transaction data store for new record. At this stage, job no. will be input for more support service information at process 3000, and able to enquired at process 4000 also.

Input	Output
• New Problem Request	• Add New Problem Request into transaction data store
	• Generate job no.

- **Process 3000: Record Support Service**

This process received job no. from process 2000, Record New Problem Request, then assignment and solution information will be added here. The assignment process performed by process 3100.

Solution information will be entried after process 3100 has done, this process

for recording solution is named process 3200, producing latest update problem status.

Input	Output
• Job No.	• Updated Status
• Assignment Information	• Update Assignment Information on job no. into transaction data store
• Solution Information	• Update Solution Information on job no. into transaction data store

- **Process 3100: Assign Technician**

This process retrieved job no. from process 2000, Record New Problem Request, then updates with assignment information including assigned technician, starting date and problem status. The output from this stage is printed service form, which is includes of problem request detail and assignment information, for technical entity.

Input	Output
• Job No.	• Updated Status
• Assignment Information	• Update Solution Information on job no. into transaction data store

- **Process 3110: Get Job No.**

This process retrieved job no., then searchs for valid record from transaction data store, if it is valid then sends next to process 3120, for assignment input.

Input	Output
• Job No.	• Valid Job No.

- **Process 3120: Input Assignment**

This process gets valid job no. from process 3110, then checking assigned technician name from technician data store. If valid technician, then input assignment information of technician name, starting date and job/problem status into job.

Input	Output
• Valid Job No.	• Valid Job No.
• Valid Assigned Technician	
• Assignment Information	• Assignment Information

- **Process 3130: Update Job No.**

This process gets assignment information and job no., then updates this information into transaction data store. At this process is also perform format detail for process 3140, to print service form.

Input	Output
• Valid Job No.	• Updated Job No.
• Assignment Information	• Update information on job no. into transaction data store
	• Format Detail

- **Process 3140: Printed Service Form**

This process prints service form for technical entity, by getting job no. then searchs from transaction data store for job detail and information. The job detail will be formated and then printed out.

Input	Output
• Job No and Detail	•
• Format Detail	• Printed Service Form

- **Process 3200: Record Solution**

This process retrieved job no. from process 3100, Assign Technician, then updates with solution information recording and latest status.

Input	Output
• Job No.	• Updated Status
• Solution Information	• Update Solution Information on job no. into transaction data store

- **Process 3210: Get Job No.**

This process retrieved job no., then searchs for valid record from transaction data store, if it is valid then sends next to process 3220, for solution input.

Input	Output
• Job No.	• Valid Job No.

- **Process 3220:Input Solution**

This process gets valid job no. from process 3210, then accepting solution information entry and passed to next process 3230 for update job no. status.

Input	Output
• Valid Job No.	• Valid Job No.
• Solution Information	• Solution Information

- **Process 3230: Update Job No.**

This process gets solution information and job no., then updates this information into transaction data store.

Input	Output
• Valid Job No.	• Updated Job No.
• Solution Information	• Update information on job no. into transaction data store

- **Process 4000: Enquiry Problem Status**

This process provides problem detail and status for enquiry. By getting job no. then searching from transaction data store, if valid then displays job detail with format detail on screen. This process composes of three child processes.

Input	Output
• Job no.	• Problem Detail and Status

- **Process 4100: Get Job No.**

This process gets job no. then searching from transaction data store. If job valids, hence send the valid job no. to next process 4200 to perform format job detail.

Input	Output
• Job no.	• Valid Job No. or Problem Detail

- **Process 4200:Format Job Detail**

This process gets job detail from process 4100, then performs format detail to be display screen format. Next, sends the formatted job detail to process 4300 to display.

Input	Output
• Valid Job No. or Problem Detail	• Formatted Job Detail

- **Process 4300:Display Job Detail**

This process gets formatted job detail from process 4200, then displays the problem detail and status with the designed format on screen.

Input	Output
• Formatted Job Detail	• Problem Status

- **Process 5000:Produce Reports**

This process produces three reports;

- New Problem Reports for Customer Support entity,
- Status Reports for Technical Support entity, and
- Management Reports for Management entity.

The process gets report requests from entity to produce specific report. After getting the request, the process retrieves data from two main data stores; transaction and product data stores, then formats data into required report formats and prints them out. Three child processes are concerned for this parent process.

Input	Output
• Report Request	• New Problem Reports
• Job Records	• Status Reports
	• Management Reports

- **Process 5100:Create New Problem Reports**

This process creates new problem reports for customer support entity, by getting report request and then retrieved problem records from transaction data store, then formats data and prints them out.

Input	Output
• Report Request	
• Job Records	• New Problem Reports

- **Process 5110: Get Problem Request Detail**

This process reads problem records from transaction data store, if record is valid then sends to process 5120 to format job detail.

Input	Output
• Job Records	• Valid Job/Problem Records

- **Process 5120: Format Report**

This process received problem records from process 5110, then performs format details on these data. After finishing the format detail then sends the formatted data to process 5130 to print out.

Input	Output
• Job Records	• Formatted Problem Details

- **Process 5130: Print New Problem Reports**

This process received formatted problem details from process 5120, then print it out. At this stage, the new problem reports are completed.

Input	Output
• Formatted Problem Details	• New Problem Reports

- **Process 5200:Create Status Reports**

This process creates status reports for technical entity, by getting report request from entity, and then retrieved problem records from transaction data store, then formats data and prints them out.

Input	Output
• Report Request	
• Job Records	• Status Reports

- **Process 5210: Get Problem Request Detail**

This process reads problem records from transaction data store, if record is valid then sends to process 5220 to format job detail.

Input	Output
• Job Records	• Valid Job/Problem Records

- **Process 5220: Format Report**

This process received problem records from process 5210, then performs format details on these data. After finishing the format detail then sends the formatted data to process 5230 to print out.

Input	Output
• Job Records	• Formatted Problem Details

- **Process 5230: Print Status Reports**

This process received formatted problem details from process 5220, then print it out. At this stage, the status reports are completed.

Input	Output
• Formatted Problem Details	• Status Reports

- **Process 5300:Create Management Reports**

This process creates management reports for management entity, by getting report request and then retrieved problem records from transaction data store, then formats data and prints them out.

Input	Output
• Report Request	
• Job Records	• Management Reports

- **Process 5310: Get Problem Request Detail**

This process reads problem records from transaction data store, if record is valid then sends to process 5320 to format job detail.

Input	Output
• Job Records	• Valid Job/Problem Records

- **Process 5320: Format Report**

This process received problem records from process 5310, then performs format details on these data. After finishing the format detail then sends the formatted data to process 5330 to print out.

Input	Output
• Job Records	• Formatted Problem Details

- **Process 5330: Print Management Reports**

This process received formatted problem details from process 5320, then print it out. At this stage, the management reports are completed.

Input	Output
• Formatted Problem Details	• Management Reports

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APPENDIX F

Report/Form Design

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New Problem Report (All Type)
Date Range: 02/03/98-06/03/98

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Time	Type	Customer ID	Product ID.	Warnty	Informer	Operator	Job No.	Priority
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx

Figure F.1. New Problem Report (All Type)

New Problem Report (H/W)
Date Range: 02/03/98-06/03/98

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Time	Type	Customer ID	Product ID	Warnty	Informer	Operator	Job No.	Priority
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx

Figure F.2. New Problem Report (H/W)

New Problem Report (S/W)
Date Range: 02/03/98-06/03/98

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Time	Type	Customer ID	Product ID.	Warnty	Informer	Operator	Job No.	Priority
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx
9999	xxxxxxxx	xxxxx	xx	xxxxxxxxxx	xxxxxxxxxxxxxx	xxx	xxxxxxxxxxxxxxx	xxxxxxxxxx	xxxxxxxxxx	xxxx

Figure F.3. New Problem Report (S/W)

Hardware Problem Status Report (All)
Date Range: 01/03/98-31/03/98

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Type	Job No.	Priority	Technician	Starting Date	Estimated Date	Complete Date	Status
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxx

Figure F.4. Hardware Problem Status Report (All)

Hardware Problem Status Report (Pending)
Date Range: 01/03/98-31/03/98

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Type	Job No.	Priority	War.	Technician	Starting Date	Est. Date	Days
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999

Figure F.5. Hardware Problem Status Report (Pending)

Hardware Problem Status Report (Progress)
Date Range: 01/03/98-31/03/98

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Type	Job No.	Priority	War.	Technician	Starting Date	Est. Date	Days
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxx	xxxxxxxxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	999

Figure F.6. Hardware Problem Status Report (Progress)

Hardware Problem Status Report (Closed)
Date Range: 01/03/98-31/03/98

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Type	Job No.	Priority	Technician	Starting Date	Est. Date	Completed Date	Duration
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxxxxxxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999

Figure F.7. Hardware Problem Status Report (Closed)

Problem Status Report by Technician (All)
Date Range: 01/03/98-31/03/98
Selected Technician: 001-Mr. Wiroj N.

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Type	Job No.	Priority	Starting Date	Est. Date	Complete Date	Duration	Status
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxx

Figure F.8. Problem Status Report by Technician (All)

Problem Status Report by Technician (Pending)
Date Range: 01/03/98-31/03/98
Selected Technician: 001-Mr. Wiroj N.

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Type	Job No.	Priority	Starting Date	Est. Date	Days Counted	Remark
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx

Figure F.9. Problem Status Report by Technician (Pending)

Problem Status Report by Technician (Progress)
Date Range: 01/03/98-31/03/98
Selected Technician: 001-Mr. Wiroj N.

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Type	Job No.	Priority	Starting Date	Est. Date	Days Counted	Remark
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx

Figure F.10. Problem Status Report by Technician (Progress)

Problem Status Report (Progress)
Date Range: 01/03/98-31/03/98
Selected Technician: 001-Mr. Wiroj N.

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Type	Job No.	Priority	Starting Date	Est. Date	Days Counted	Remark
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxxxxxxxx

Figure F.11. Problem Status Report (Progress)

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Problem Status Report (Closed)
Date Range: 01/03/98-31/03/98
Selected Technician: 001-Mr. Wiroj N.

Printed Date: 01/03/98 Page 1

Item.	Inf.Date	Type	Job No.	Priority	Starting Date	Estimated Date	Complete Date	Duration	Resolve Method
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx
9999	xxxxxxxx	xx	xxxxxxxxxx	xxxx	xxxxxxxx	xxxxxxxx	xxxxxxxx	999	xxxxxxxxxxxxxx

Figure F.12. Problem Status Report (Closed)

Statistic Problem Report (All)
As of Date: 01/03/98

Printed Date: 01/03/98 Page 1

No.	Type	Product ID	Description	All Freq.	H/W Freq.	S/W Freq.	Last Inf. Date
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx

Figure F.13. Statistic Problem Report (All)

Statistic Problem Report (H/W)
As of Date: 01/03/98

Printed Date: 01/03/98 Page 1

No.	Type	Product ID	Description	All Freq.	H/W Freq.	S/W Freq.	Last Inf. Date
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx

Figure F.14. Statistic Problem Report (H/W)

Statistic Problem Report (S/W)
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No.	Type	Product ID	Description	All Freq.	H/W Freq.	S/W Freq.	Last Inf. Date
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx
9999	xx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	999,999	999,999	999,999	xxxxxxxx

Figure F.15. Statistic Problem Report (S/W)

Customer List
As of Date: 01/03/98

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No.	Customer ID	Name/Address	Tel.	Contact Person
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxx

Figure F.16. Customer List

Product List
As of Date: 01/03/98

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No.	Product ID	Description	Warranty (Yr.)	Remark
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
9999	xxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Figure F.17. Product List

Techician List
As of Date: 01/03/98

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No.	Techician ID	Name	Position	Expert Type
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxxxxx	xx

Figure F.18. Technician List

Customer Account List
As of Date: 01/03/98

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No.	Customer ID	Name/Address	Products	Expired Date
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx
9999	xxxxxxxxxx	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxx	xxxxxxxx

Figure F.19. Customer Account List

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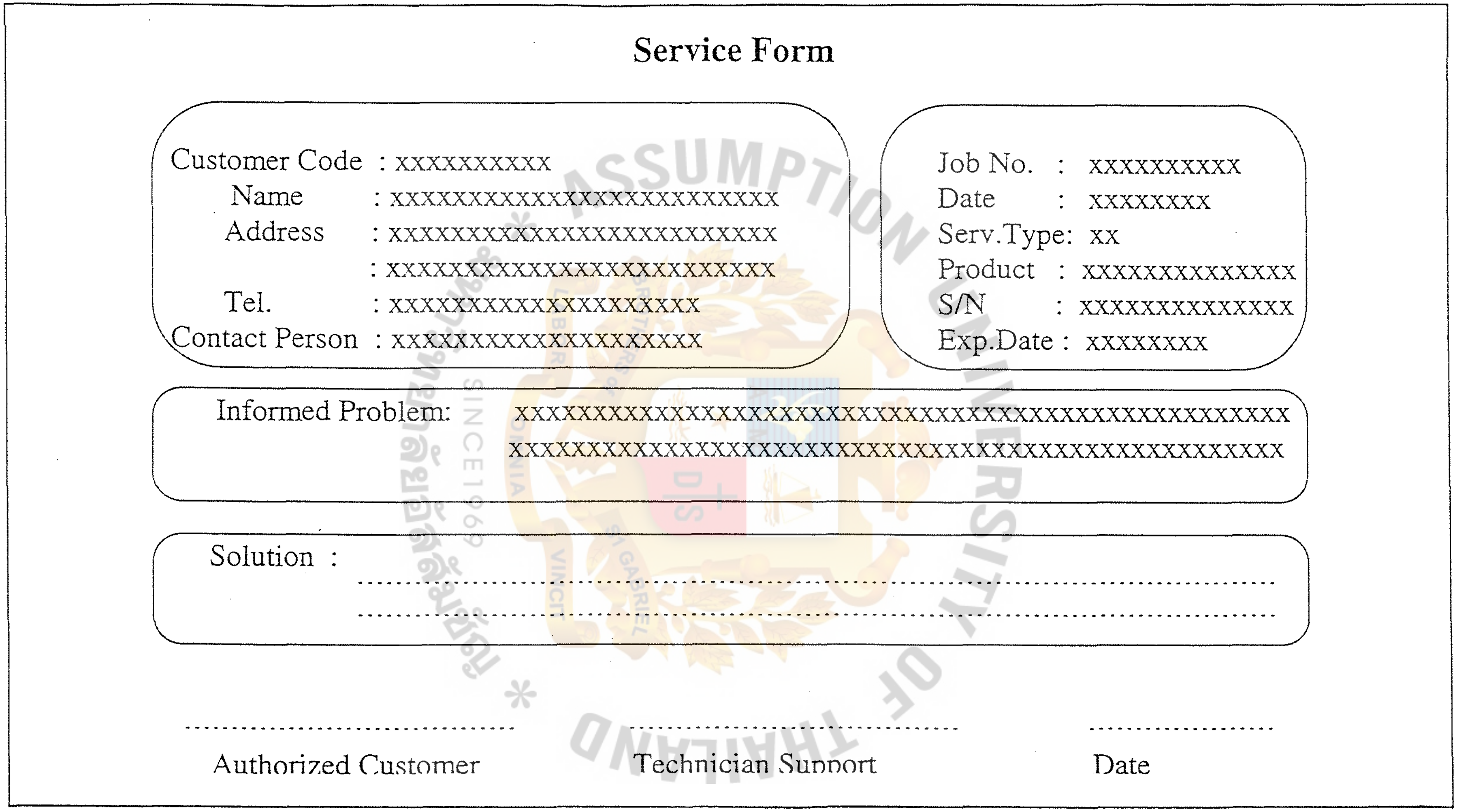

Service Form

Customer Code : xxxxxxxxxx
Name : xxxxxxxxxxxxxxxxxxxxxxxxxx
Address : xxxxxxxxxxxxxxxxxxxxxxxxxx
: xxxxxxxxxxxxxxxxxxxxxxxxxx
Tel. : xxxxxxxxxxxxxxxxxxxx
Contact Person : xxxxxxxxxxxxxxxxxxxx

Job No. : xxxxxxxxxx
Date : xxxxxxxx
Serv.Type: xx
Product : xxxxxxxxxxxxxx
S/N : xxxxxxxxxxxxxx
Exp.Date : xxxxxxxx

Informed Problem: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

Solution : ....
....

.... Authorized Customer
.... Technician Support
.... Date

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Figure F.20. Service Form

APPENDIX G

Pseudocode

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Program: Access Authorization

```
Setting Global Variable 'Mod_Flag', 'User_Name', 'Password'
Set Mod_Falg=char(1)
Set User_Name=char(10)
Set Password=char(10)
Open  Security file
Display Password Authorization Screen
DO WHILE TRUE
    IF CLICK 'User Code' THEN PERFORM Program 'User Verification'
    IF CLICK 'Cancel' THEN LOOP UP
    IF CLICK 'Quit' THEN EXIT
ENDDO
Close Security file
CLEAR SCREEN
RETURN
```

Program: User Verification

```
DO WHILE TRUE
    IF NOT EMPTY 'User Code' THEN
        Get input entry of 'User Code' into 'User_Name' variable
        Seeks availability matching of column 'User_Code' with 'User_Name'
        variable
        IF VALID THEN
            PERFORM Program 'Password Check'
```

```
            ELSE
                DISPLY ERROR MESSAGE
                LOOP UP
            ENDIF
        ENDIF
        IF CLICK 'Cancel' THEN LOOP UP
        IF CLICK 'Quit' THEN EXIT
    ENDDO
RETURN
```

Program: Password Check

```
    DO WHILE TRUE
        IF NOT EMPTY 'Password' TH EN
            Get input entry of 'Password' into 'Password' variable
            Seeks availability matching of column 'Password' with 'Password' variable
            IF VALID THEN
                Get column data into 'Mod_Flag'
                PERFORM Program 'Main Menu'
            ELSE
                DISPLY ERROR MESSAGE
                LOOP UP
            ENDIF
        ENDIF
        IF CLICK 'Cancel' THEN LOOP UP
```

IF CLICK 'Quit' THEN EXIT

ENDDO

RETURN

Program: Main Menu

Set Global Variables

Set value to global variables

Display Main Menu Screen

IF CLICK 'Data Entry' THEN PERFORM Submenu "Data Entry"

IF CLICK 'Code Maintenance' THEN PERFORM Submenu "Code Maintenance"

IF CLICK 'Reports' THEN PERFORM Submenu "Reports"

IF CLICK 'Print Service Form' THEN PERFORM Submenu "Print Service Form"

IF CLICK 'Quit' THEN QUIT THE SYSTEM

RETURN

Program: Submenu "Code Maintenance"

CHECK PERMISSION FOR MOD_FLAG

IF NOT NO PERMISSION THEN RETURN

Display SubMenu "Code Maintenace" Menu Screen

IF CLICK 'Customer Code' THEN PERFORM program "Customer Code"

IF CLICK 'Product Code' THEN PERFORM program "Product Code"

IF CLICK 'Technician Code' THEN PERFORM program "Technician Code"

IF CLICK 'Quit' THEN PERFORM return to main menu

RETURN

Program: "Customer Code"

```
    Set local variables
    Set value to local variables
    Open file "Customer"
    IF CLICK 'Code' TEHN get 'click' variable input
    IF CLICK 'Name' THEN get 'name' variable input
    IF CLICK 'Address' line 1 THEN get 'address1' variable input
    IF CLICK 'Address' line 2 THEN get 'address2' variable input
    IF CLICK 'Tel' THEN get 'tel' variable input
    IF CLICK 'Contact person' THEN get 'contact_person' variable input
    IF CLICK 'Save' THEN update data to 'Customer' file
    IF CLICK 'Cancel' THEN delete the current data record from 'Customer' file
    IF CLICK 'Quit' THEN return to submenu 'Code Maintenance'
    IF CLICK 'Data Browser' THEN
        Go Top Record and Display record
        DO WHILE TRUE
            IF CLICK 'Right End Arrow' THEN Go To Last Record
            IF CLICK 'Left End Arrow' THEN Go To Top Record
            IF CLICK 'Right Arrow' THEN Go To Next Record
            IF CLICK 'Left Arrow' THEN Go To Previous Record
        ENDDO
ENDIF
Close File
RETURN
```

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Program: "Product Code"

```
Set local variables

Set value to local variables

Open file "Product"

IF CLICK 'Code' TEHN get 'click' variable input

IF CLICK 'Name' THEN get 'name' variable input

IF CLICK 'Save' THEN update data to 'Product' file

IF CLICK 'Cancel' THEN delete the current data record from 'Product' file

IF CLICK 'Quit' THEN return to submenu 'Code Maintenance'

IF CLICK 'Data Browser' THEN

   Go Top Record and Display record

   DO WHILE TRUE

      IF CLICK 'Right End Arrow' THEN Go To Last Record

      IF CLICK 'Left End Arrow' THEN Go To Top Record

      IF CLICK 'Right Arrow' THEN Go To Next Record

      IF CLICK 'Left Arrow' THEN Go To Previous Record

   ENDDO

  ENDIF

Close Files

RETURN
```

Program: "Technician Code"

```
Set local variables

Set value to local variables
```

```
Open file "Technician"
IF CLICK 'Code' TEHN get 'click' variable input
IF CLICK 'Name' THEN get 'name' variable input
IF CLICK 'Warranty' THEN get 'Warranty' variable input
IF CLICK 'Remark' THEN get 'Remark' variable input
IF CLICK 'Save' THEN update data to 'Technician' file
IF CLICK 'Cancel' THEN delete the current data record from 'Technician' file
IF CLICK 'Quit' THEN return to submenu 'Code Maintenance'
IF CLICK 'Data Browser' THEN
   Go Top Record and Display record
   DO WHILE TRUE
      IF CLICK 'Right End Arrow' THEN Go To Last Record
      IF CLICK 'Left End Arrow' THEN Go To Top Record
      IF CLICK 'Right Arrow' THEN Go To Next Record
      IF CLICK 'Left Arrow' THEN Go To Previous Record
   ENDDO
ENDIF
Close Files
RETURN
```

Program: Submenu "Data Entry"

```
CHECK PERMISSION FOR MOD_FLAG
IF NOT NO PERMISSION THEN RETURN
Display SubMenu "Data Entry Menu" Menu Screen
```

IF CLICK 'Problem Request Entry' THEN PERFORM program "Problem Request Entry"

IF CLICK 'Assign Technician Entry' THEN PERFORM program "Assign Technician Entry"

IF CLICK 'Record Solution Entry' THEN PERFORM program "Record Solution Entry"

IF CLICK 'Quit' THEN PERFORM return to main menu

RETURN

Program: Submenu "Code Maintenance"

CHECK PERMISSION FOR MOD_FLAG

IF NOT NO PERMISSION THEN RETURN

Display SubMenu "Code Maintenace" Menu Screen

IF CLICK 'Customer Code' THEN PERFORM program "Customer Code"

IF CLICK 'Product Code' THEN PERFORM program "Product Code"

IF CLICK 'Technician Code' THEN PERFORM program "Technician Code"

IF CLICK 'Quit' THEN PERFORM return to main menu

RETURN

Program: "Customer Code"

Set local variables

Set value to local variables

Open file "Customer"

IF CLICK 'Code' TEHN get 'click' variable input

IF CLICK 'Name' THEN get 'name' variable input

IF CLICK 'Address' line 1 THEN get 'address1' variable input

IF CLICK 'Address' line 2 THEN get 'address2' variable input

IF CLICK 'Tel' THEN get 'tel' variable input

IF CLICK 'Contact person' THEN get 'contact_person' variable input

IF CLICK 'Save' THEN update data to 'Customer' file

IF CLICK 'Cancel' THEN delete the current data record from 'Customer' file

IF CLICK 'Quit' THEN return to submenu 'Code Maintenance'

IF CLICK 'Data Browser' THEN

Go Top Record and Display record

DO WHILE TRUE

IF CLICK 'Right End Arrow' THEN Go To Last Record

IF CLICK 'Left End Arrow' THEN Go To Top Record

IF CLICK 'Right Arrow' THEN Go To Next Record

IF CLICK 'Left Arrow' THEN Go To Previous Record

ENDDO

ENDIF

Close File

RETURN

Program: "Product Code"

Set local variables

Set value to local variables

Open file "Product"

IF CLICK 'Code' TEHN get 'click' variable input

IF CLICK 'Name' THEN get 'name' variable input

IF CLICK 'Save' THEN update data to 'Product' file

IF CLICK 'Cancel' THEN delete the current data record from 'Product' file

IF CLICK 'Quit' THEN return to submenu 'Code Maintenance'

IF CLICK 'Data Browser' THEN Go Top Record and Display record

DO WHILE TRUE

IF CLICK 'Right End Arrow' THEN Go To Last Record

IF CLICK 'Left End Arrow' THEN Go To Top Record

IF CLICK 'Right Arrow' THEN Go To Next Record

IF CLICK 'Left Arrow' THEN Go To Previous Record

ENDDO

ENDIF

Close Files

RETURN

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Program: "Technician Code"

Set local variables

Set value to local variables

Open file "Technician"

IF CLICK 'Code' TEHN get 'click' variable input

IF CLICK 'Name' THEN get 'name' variable input

IF CLICK 'Warranty' THEN get 'Warranty' variable input

IF CLICK 'Remark' THEN get 'Remark' variable input

```
    IF CLICK 'Save' THEN update data to 'Technician' file
    IF CLICK 'Cancel' THEN delete the current data record from 'Technician' file
    IF CLICK 'Quit' THEN return to submenu 'Code Maintenance'
    IF CLICK 'Data Browser' THEN  Go Top Record and Display record
    DO WHILE TRUE
        IF CLICK 'Right End Arrow' THEN Go To Last Record
        IF CLICK 'Left End Arrow' THEN Go To Top Record
        IF CLICK 'Right Arrow' THEN Go To Next Record
        IF CLICK 'Left Arrow' THEN Go To Previous Record
    ENDDO
ENDIF
Close Files
RETURN
```

Program: "Problem Request Entry"

```
CHECK PERMISSION FOR MOD_FLAG
IF NOT NO PERMISSION THEN RETURN
Set local variables
Open file 'CS-PROD'
Open file 'Customer'
Open file 'Product'
Open file 'Technician'
Open file 'Trans'
IF CLICK 'Job No.' THEN get 'job_no' variable input
```

IF CLICK 'Date' THEN get 'date' variable input

IF CLICK 'Time' TEHN get 'time' variable input

IF CLICK 'Customer' THEN get 'customer' variable input

IF CLICK 'Product' THEN get 'product' variable input

IF CLICK 'Service Type' THEN get 'Service Type' variable input

IF CLICK 'Priority' THEN get input 'Priority' variable input

IF CLICK 'Symptom' line 1 THEN get 'symptom1' variable input

IF CLICK 'Symptom' line 2 THEN get 'symptom2' variable input

IF CLICK 'Save' THEN update data to 'Trans' file

IF CLICK 'Cancel' THEN delete the current data record from 'Trans' file

IF CLICK 'Quit' THEN return to Main Menu

Close file 'CS-PROD'

Close file 'Customer'

Close file 'Product'

Close file 'Technician'

Close file 'Trans'

RETURN

Program: 'Assign Technician Entry'

CHECK PERMISSION FOR MOD_FLAG

IF NOT NO PERMISSION THEN RETURN

Set local variables

Open file 'CS-PROD'

Open file 'Customer'

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Open file 'Product'

Open file 'Technician'

Open file 'Trans'

CLICK 'Job No.' THEN get 'job_no' variable input

CLICK 'Date' THEN get 'date' variable input

CLICK 'Time' TEHN get 'time' variable input

CLICK 'Customer' THEN get 'customer' variable input

CLICK 'Product' THEN get 'product' variable input

IF CLICK 'Techinician' THEN get input of 'technician name'

IF CLICK 'Service Type' THEN get input of 'Service Type'

IF CLICK 'Status' THEN get input of 'status'

IF CLICK 'Starting Date' THEN get input of 'Starting Date'

IF CLICK 'Finish Date' THEN get input of 'Finish Date'

DISPLAY 'Symptom' line 1

DISPLAY 'Symptom' line 2

IF CLICK 'Save' THEN update data to 'Trans' file

IF CLICK 'Cancel' THEN delete the current data record from 'Trans' file

IF CLICK 'Quit' THEN return to Main Menu

Close Files

RETURN

Program: 'Record Solution Entry'

CHECK PERMISSION FOR MOD_FLAG

IF NOT NO PERMISSION THEN RETURN

Set local variables

Open file 'CS-PROD'

Open file 'Customer'

Open file 'Product'

Open file 'Technician'

Open file 'Trans'

CLICK 'Job No.' THEN get 'job_no' variable input

CLICK 'Date' THEN get 'date' variable input

CLICK 'Time' TEHN get 'time' variable input

CLICK 'Customer' THEN get 'customer' variable input

CLICK 'Product' THEN get 'product' variable input

IF CLICK 'Techinician' THEN get input of 'technician name'

IF CLICK 'Service Type' THEN get input of 'Service Type'

IF CLICK 'Status' THEN get input of 'status'

IF CLICK 'Starting Date' THEN get input of 'Starting Date'

IF CLICK 'Finish Date' THEN get input of 'Finish Date'

DISPLAY 'Symptom' line 1

DISPLAY 'Symptom' line 2

IF CLICK 'Solution' line 1 THEN get input of solution line 1

IF CLICK 'Solution' line 2 THEN get input of solution line 2

IF CLICK 'Save' THEN update data to 'Trans' file

IF CLICK 'Cancel' THEN delete the current data record from 'Trans' file

IF CLICK 'Quit' THEN return to Main Menu

RETURN

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Program: "Customer Account Maintenance"

```
CHECK PERMISSION FOR MOD_FLAG
IF NOT NO PERMISSION THEN RETURN
Set local variables
Open file 'CS-PROD'
Open file 'Customer'
Open file 'Product'
Open file 'Technician'
IF CLICK 'Data Browser' of 'Customer' THEN  Go Top Record and Display
record
    DO WHILE TRUE
        IF CLICK 'Right End Arrow' THEN Go To Last Record
        IF CLICK 'Left End Arrow' THEN Go To Top Record
        IF CLICK 'Right Arrow' THEN Go To Next Record
        IF CLICK 'Left Arrow' THEN Go To Previous Record
    ENDDO
    DISPLAY 'Customer Name'
    DISPLAY 'Address' line 1
    DISPLAY 'Address' line 2
    DISPLAY 'Tel.'
    DISPLAY 'Contact Person'
ENDIF
IF CLICK 'Data Browser' of 'Product' THEN  Go Top Record and Display record
    DO WHILE TRUE
```

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```
            IF CLICK 'Right End Arrow' THEN Go To Last Record
            IF CLICK 'Left End Arrow' THEN Go To Top Record
            IF CLICK 'Right Arrow' THEN Go To Next Record
            IF CLICK 'Left Arrow' THEN Go To Previous Record
        ENDDO
        DISPLAY 'Product Name'
    ENDIF
    IF CLICK 'S/N' THEN get 'serial no' of product to variable
    IF CLICK 'Stating Date' THEN get 'starting date' to variable
    IF CLICK 'Expiry Date' THEN get 'expiry date' to variable
    IF CLICK 'Warranty' THEN get 'warranty' to variable
    IF CLICK 'Remark' THEN get 'remark' to variable
    IF CLICK 'Save' THEN update data to 'CS-PROD' file
    IF CLICK 'Cancel' THEN delete the current data record from 'CS-PROD' file
    IF CLICK 'Quit' THEN return to Main Menu
    Close files
RETURN
```

Program: "Print Service Form"

```
CHECK PERMISSION FOR MOD_FLAG
IF NOT NO PERMISSION THEN RETURN
Set local variables
Display 'Service Form Option' Screen
PERFORM 'PRINT SERVICE FORM1'
```

IF CLICK 'Cancel' THEN cancel printing

IF CLICK 'Quit' THEN return to Previous Menu

RETURN

Program: "Print Service Form1"

Set local variables

Open file 'Customer'

Open file 'Technician'

Open file 'Product'

Open file 'Trans'

IF CLICK 'From Job No.' THEN get 'from job no' variable

IF CLICK 'To Job No.' THEN get 'to job no' variable

IF CLICK 'Range from Date' THEN get 'Range from date' variable

IF CLICK 'To date' THEN get 'To date' variable

IF CLICK 'Print' THEN PERFORM print out

IF CLICK 'Cancel' THEN cancel printing

IF CLICK 'Quit' THEN return to Main Menu

Close files

RETURN

Program: Submenu "Management Reports"

CHECK PERMISSION FOR MOD_FLAG

IF NOT NO PERMISSION THEN RETURN

Display SubMenu "Management Reports"

IF CLICK 'Management Reports' THEN PERFORM submenu "Management Reports"

IF CLICK 'Quit' THEN return to main menu

RETURN

Program: Submenu "General Reports"

CHECK PERMISSION FOR MOD_FLAG

IF NOT NO PERMISSION THEN RETURN

Display SubMenu "General Reports"

IF CLICK 'New Problem Reports' THEN PERFORM submenu "New Problem Reports"

IF CLICK 'Problem Status Reports' THEN PERFORM Submenu "Problem Status Reports"

IF CLICK 'Quit' THEN return to main menu

RETURN

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Program: Submenu "New Problem Reports"

CHECK PERMISSION FOR MOD_FLAG

IF NOT NO PERMISSION THEN RETURN

Set local variables

Display "New Problem Reports"

IF CLICK 'New Problem Report by Date (All Type)' THEN PERFORM program 'report date option' with parameter "New Problem Reports by Date (All Type)"

Set local variables

Display 'Report Date Option' Screen

IF CLICK 'Starting Problem Date' THEN get input of 'starting problem date'

IF CLICK 'Ending Problem Date' THEN get input of 'ending problem date'

IF CLICK 'Print' THEN print out

IF CLICK 'Cancel' THEN cancel printing

IF CLICK 'Quit' THEN return to Previous Menu

RETURN

Program: Report Option by Date/Technician

Set local variables

Display 'Report Option' Screen

IF CLICK 'Starting Problem Date' THEN get input of 'starting problem date'

IF CLICK 'Ending Problem Date' THEN get input of 'ending problem date'

IF CLICK 'From Technician Code' THEN get input of 'from technician code'

IF CLICK 'To Technician Code' THEN get input of 'to technician code'

IF CLICK 'Print' THEN print out

IF CLICK 'Cancel' THEN cancel printing

IF CLICK 'Quit' THEN return to Previous Menu

RETURN

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