INFORMATION SYSTEM FOR GOVERNMENT INVENTORY MANAGEMENT : A CASE STUDY OF LAND DEVELOPMENT DEPARTMENT

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Inventory management is an important factor of success or failure in organization. As the amount of inventory increases and as the rate of hardware flow into and out of stock increases, it becomes more and more difficult for a human to remember even approximate inventory balances. An information system is needed to supplement the human mind. This research introduces an information system for government inventory management: a case study of Land Development Department, which reduces access time, increases accuracy and consistent data. The information system was designed and developed using data flow analysis, relational database (Sybase SQL anywhere 5.0 as DBMS) and Object-Oriented programming (Powersolf Powerbuilder Enterprise/32 Version 6.0).

The information system consists of three major processes: 1) Data manipulation: Manipulate relative data; 2) Transaction processing: Suppor operation management, which are registration, distribution, borrowing, return, repair and disposal; 3) Query and report: Process pre-defined outputs and preplanned printed reports. Since the information system works on client/server network, users are divided into 3 levels: database administrator, operator and general user. Moreover, the information system used in many places, may no support an online system. For this reason, it has an extra function to make the database up to date and consistent.

The information system solves and improves the inefficiency of government inventory management. Furthermore, the information system can develop functions of privileged operation to discard requested documents, applied to Internet/Intranet or OLAP application. In addition the information system can be linked to another relative system such as purchasing, procurement, budge planning and so on for a complete inventory management and control system, which can be applied to DSS or EIS.

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การบริหารครุภัณฑ์เป็นปัจจัยสำคัญต่อความสำเร็จในองค์กร ระบบสารสนเทศเป็นสิ่งจำเป็นเพื่อช่วยการทำงานแบบเดิม งานวิจัยนี้เสนอระบบสารสนเทศเพื่อการบริหารครุภัณฑ์ของส่วนราชการ กรณีศึกษาของกรมพัฒนาที่ดิน ที่ช่วยลดเวลาการเข้าถึงข้อมูล เพิ่มความถูกต้องและสอดคล้องของข้อมูล ระบบสารสนเทศออกแบบและพัฒนาด้วยวิธีวิเคราะห์กระแสข้อมูล (Data flow analysis), ฐานข้อมูลเชิงสัมพันธ์ (relational database ใช้ Sybase SQL anywhere 5.0 เป็น DBMS) และการเขียนโปรแกรมเชิงวัตถุ (Object-Oriented programming ใช้ Powersolf Powerbuilder Enterprise/32 Version 6.0).

ระบบบริหารครุภัณฑ์ประกอบด้วย 3 ส่วนคือ 1) การจัดการฐานข้อมูล: จัดการข้อมูลพื้นฐานที่เกี่ยวข้องในระบบ 2) การประมวลผลรายการเปลี่ยนแปลง: สนับสนุนงานบริหารครุภัณฑ์ ได้แก่ ลงทะเบียน, เบิก-จ่าย, ยืม, คือ, ซ่อม และ จำหน่าย 3) การสอบถามและรายงาน: ประมวลการสอบถามและรายงาน เนื่องจากระบบบริหารครุภัณฑ์นี้ทำงานบนระบบไคเอนต์เซิฟเวอร์ จึงแบ่งผู้ใช้ออกเป็น 3 ระดับคือ ผู้บริหารฐานข้อมูล, เจ้าหน้าที่ปฏิบัติงาน และ ผู้ใช้ทั่วไป นอกจากนี้ระบบบริหารครุภัณฑ์ใช้ในหลายแห่ง ซึ่งบางแห่งไม่รองรับการทำงานแบบออนไลน์ทำให้มีส่วนเพิ่มขึ้นมาสำหรับปรับปรุงฐานข้อมูลให้ถูกต้องและสอดคล้องกัน ระบบบริหารครุภัณฑ์ช่วยแก้ปัญหาและปรับปรุงการดำเนินงานที่ไม่มีประสิทธิภาพของการบริหารครุภัณฑ์ในส่วนราชการ และสามารถนำไปพัฒนาฟังก์ชั่นควบคุมสิทธิอำนาจในการปฏิบัติงานเพื่อลดเอกสารคำร้อง หรือประยุกต์เป็นโปรแกรมประยุกต์บนอินเตอร์เน็ตหรืออินทราเน็ต หรือนำไปเชื่อมต่อกับระบบที่เกี่ยวข้อง เช่น การจัดซื้อ, การจัดหา, การวางแผนงบประมาณ เป็นต้น เพื่อให้ได้ระบบควบคุมและจัดการครุภัณฑ์ที่สมบูรณ์ ซึ่งระบบใหม่ที่รวมขึ้นยังสามารถพัฒนาต่อเป็นระบบสนับสนุนการตัดสินใจ(DSS) หรือ ระบบสนับสนุนสารสนเทศสำหรับผู้บริหาร(EIS)

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CHAPTER I

INTRODUCTION

1.1 Background and Statement of Problems

Inventory management is an important factor of success or failure in organization. Inventory management involves almost all section in organization and is responsible for controlling and auditing inventory. The main functions of inventory management are registration, distribution, borrowing, repair, disposal, annual audit, and reporting. As the amount of inventory increases and as the rate of hardware flow into and out of stock increases, it becomes more and more difficult for a human to remember even approximate inventory balances. Some form of record keeping is needed to supplement the human mind, Regardless of whether the records are operated by information system. The problems of inefficient operation are as follows:

1. Nonstandard data store.

   Each section differently keeps data of hardware; consequently hardware management cannot retrieve entire department data.

2. Incorrect and inconsistent data.

   Manipulation data is analog operation; officer must manipulate each file by himself so rate of incorrect and inconsistent data is higher than electronic operation. Updating data is the biggest factor of inconsistent data because officer may forget to update some files.

3. Difficult and slow data searching.

   In case of a lot of data; officer takes his time with manual searching and may not discover data in time.

4. Difficult data checking.

   Checking data of hardware (such as status, location), officer must use hardware number (or registration number) to check the data. If he does not know the number, this operation will spend a lot of time. Comparison with information system, he can use drill-down technique or entity relationship to discover the hardware material.

5. Incorrect result.

   There are many queries in inventory control, some queries use arithmetic, searching and checking to calculate and summarize the result. So, it is possible to get incorrect result.

6. Inconsistent report.

   It's the same query process, the process may produce inconsistent and incorrect reports.

7. Difficult operation.

   Inventory control operation has many constraints and steps. Studying these steps is hard for new officer.

The problems of inefficiency operation can be solved and improved by information system. The information system changes operation from analog to electronics, search from manual to digital and database from analog to digital. The

information system introduces online operation, which reduces access time, increases accuracy and consistent data.

The Land Development Department was established on 23 May 1963 within the Ministry of National Development. Some years after their establishment, the government agencies were restructured, and as from 29 September 1972 the Land Development Department was transferred to the Ministry of Agriculture and Cooperatives. Land Development Department is responsible for:

- Soil survey, classification, and analysis and land use planning.
- Conduct experiments and carry out research on various aspects of land development.
- Assist farmers in soil and water conservation and soil improvement, the production of seeds for cover crops and the production of soil improvement materials.
- Transfer knowledge of soil development and soil science for multiple purpose use (1).

From its responsibility, the Land Development Department has a lot of hardware's data. At present, an inventory management operation of Land Development Department has not information system to manage these data.

1.2 Objectives

To analyze and design information system for government inventory management system.

To create database and implementing information system for government inventory management for a case study of Land Development Department.

1.3 Scope of Work

The information system for government inventory management of Land Development Department is developed by Powersoft PowerBuilder Enterprise/32 version 6.0. The information system works on client/server network, which supports operation management and has functions as follows:

- Hardware registration: It records data of receipt hardware for example hardware description, procurement method.
- Hardware distribution: This is a distribution control, updating status and hardware used place.
- Hardware borrowing: It's the same as distribution but it has return date data.
- Hardware repair: It records data of repair.
- Hardware disposal: After unused hardware is disposed, officer will use this function to update data of disposed hardware from hardware registration file.
- Inquiry and Report: The outputs of this function are report and result for operational manger (head of material section) such as status and used place of hardware, quantity of hardware, hardware detail.

This information system has central relational database model that is created by Sybase SQL anywhere 5.0. The database consists of 3 parts as follows:

- Historical record of standard hardware detail such as type, characteristic.
- Historical record of hardware purchasing has detail about receptive date, supplier and purchasing detail.
- Historical records of hardware operation (e.g. distribute, borrow, and repair) keeps data that can tell us where is the hardware.

1.4 Expected Results

The work should results information system for government inventory management, which consists of

1. Hardware registration module;
2. Hardware distribution module;
3. Hardware borrowing module;
4. Hardware repair module;
5. Hardware disposal module; and
6. Inquiry and report module.

Which have the capability of tracking hardware management operation and improving inefficient operation.

CHAPTER II

LITERATURE SURVEY

In this chapter, "Material" and "Hardware" are the same meaning.

2.1 Material Management and Inventory Control

Materials management is a coordinate function responsible for planning and controlling materials flow. Its objectives are as follows(2):

- Maximize the use of the firm's resources.
- Provide the required level of customer service.

Inventory management is responsible for planning and controlling inventory from the raw material stage to the customer. Inventory must be considered at each of the planning levels and is thus part of production planning, master production scheduling, and material requirements planning(2).

The term *Inventory* can be used to mean several different things, such as (3);

1. The stock on hand of materials at a given time (a tangible asset which can be seen, measured, and counted);
2. an itemized list of all physical assets;
3. (as a verb) to determine the quantity of items on hand;
4. (for financial and accounting records) the value of the stock of goods owned by an organization at particular time.

2.1.1 Material Management Functions and Responsibility

1. Procurement and Purchasing

Purchasing is the "process of buying", Purchasing is solely the responsibility of the purchasing department. Obtaining the right material, in the right quantities, with the right delivery (time and place), from the right resource, and at the right price are all purchasing functions(2).

2. Receiving

Responsibilities of material receiving are checking quantity and quality of receipt material, which justify purchasing order, storage area selection and providing tools and people for transfer. The main functions are (4).

After Materials have been received, receiving report will generate. The report has an important supplier data for example, transport date, decayed materials, percentage of returned materials, and so on. In addition, this report is useful for summarizing purchase order and negotiating of supply agreement in future(5,6).

3. Supervision and protection

This section has to plan appropriate storage location and method, provide security, protect materials from damage and lost. These tasks are convenient for easy and quick material identification (4).

Closed stores system stores materials in closed or controlled area, which does not allow anyone to go into there except officer. Materials are distributed and kept when there are requisition or receipt report. The objective of this system is best material safety. It has strict accounting control, furthermore receiving record and inventory identification are important activities (5,6).

4. Distribution

Main responsibilities of distribution are authorization verification; distributing materials follow requisition, checking characteristic of distributed materials (4).

5. Inventory control

It sets inventory control system, which suits for each type of materials and controls material quantity (4).

Since recording and keeping are separated, sometimes the quantity of on hand material may not equal to the quantity of material balance on report. So, it should check the quantity of material in period , which has 3 methods as follows; Fixed Annual Inventory, Continuous Inventory and Low-Point Inventory (5,6).

6. Record and report.

It has to record of receipt, distribution, control and quantity on hand of materials, update data, collect purchasing data and statistical data, create report such as receipt report, annual reports and stock checking(4).

7. Unused Disposal

This section has to find unused materials, report list of unused materials to every section, distinguish unused materials from stock and propose effective unused disposal method (4).

8. Transportation

Transportation has to prepare and pack materials, identify transportation method and send them to destination on time. The destination must get good material in the right quantity (4).

9. Cooperation to other departments (4)

2.1.2 Material Management in the Government

Material Management in the government need to have predefine project plan. Planning of material need historical data from one of these:

1. Statistical of material withdrawing ; This data collect form "requisition".
2. Statistical of material distributing ; The quantity distributed may not equal to the quantity material withdrawn.
3. Statistical of material use of sections; It is calculated by subtracting the quantity on hand from the receipt quantity (4).

Definition of hardware

Hardware expense is expense of purchasing or exchange thing, which is permanent and long life. It includes expense from modification and direct abroad purchasing. Hardware is classified into 2 types as follows :

1. Limited life hardware is anything that is permanent but it is not forever such as a car with a life of 10 years, an air-condition with a life of 5 years.
2. Unlimited life hardware is anything that is permanent use such as iron cabinet, table, chair (4).

Government inventory management

Government inventory management has 4 main functions; control, borrowing, repair and disposal. This shows in Figure 2.1.

Storekeeping has receiving, hardware registration. When distribution occurs, officer has to update status and used place. Borrowing and repair are the same distribution. These are routine function. Before the end of September, head of material inventory section will appoint committee to audit past operation from October 1st to

September 30th. After annual audit has finished, officer will create report of unused hardware to dispose. Unused hardware is sold, exchanged, given to other sections or destroyed. If unused hardware cannot dispose by these methods, officer will dispose the hardware as lose hardware. Then officer deletes data of disposed hardware from hardware registration (5,7,8).

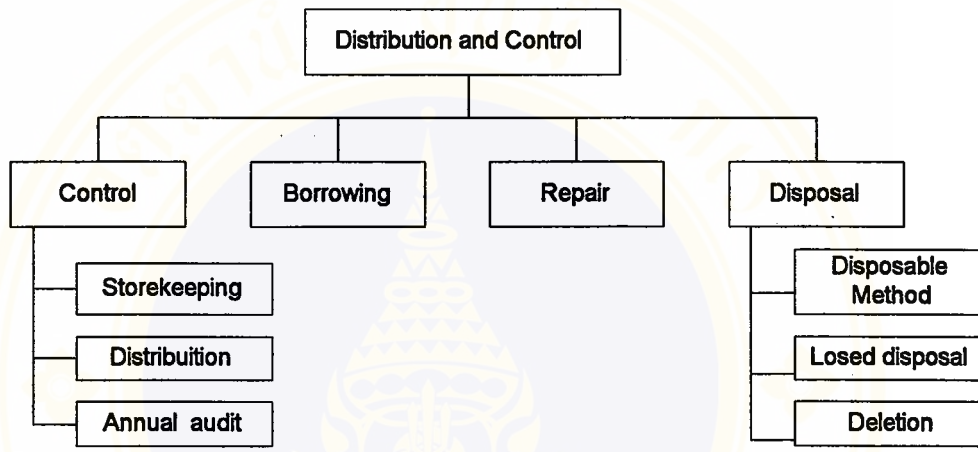


Figure 2.1 Government inventory management function

2.2 Material Classification

Catalogue of product is a tools for material classification because it has exactly cost and specification detail ,which help in classify. Hence, some suppliers precisely classify component or material number. However organization purchase material from many suppliers, there are problem in confusing or too many number. So , development of material classification is thing, that should do and supplier's material number should not be thrown away but use it for reference (5,6).

2.2.1 Material Classification Principle

1. Classification system bases on pre-defined plans of organization, which is stable and standard concept.

2. The system concludes all lists of material classification and has space for materials in the future.
3. Each of material lists must have especially characteristic, which differ from another. User can find material from main class to sub class and finally discover the material.
4. It is simple system, general officers and non-expert can use it. It is convenient for internal communication.
5. It has a complicate order such as order by size (big size to small size), order by cost(cheap cost to expensive cost) (4).

2.2.2 FSN Material Classification

Material Classification of Thailand uses FSN system (Federal Stock Number). This system has 11 digits as following:

1. First part has 4 digits; it means group class.
2. Second part has 3 digits; it means type.
3. Third part has 4 digits; it means description.

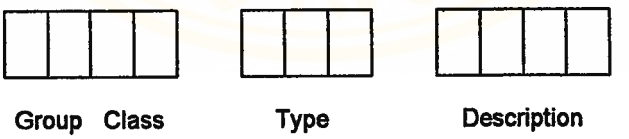


Figure 2.2 FSN material classification

Example: 7110-002-0001 is a chest of 4 drawers

1. 7110: '71' is group of furniture and '10' is class of office decoration.
2. '002' is type of chest of drawers.
3. '0001' is description or specification of material. The third part has not certain number but it should order by material's specification. The numbers are unique and

start from 0001 to 9999. For example 7110-002-0001 is a chest of 4 drawers, 7110-002-0002 is a chest of 5 drawers (9).

2.3 Management Information Systems

Management positions in a firm are often broken into three levels: upper management (the president and vice-presidents), middle management (the people responsible for anything between upper and lower management), and lower management (the people directly responsible for managing those who produce the firm's outputs). The roles of these levels of management are summarized in the pyramid in Figure 2.3

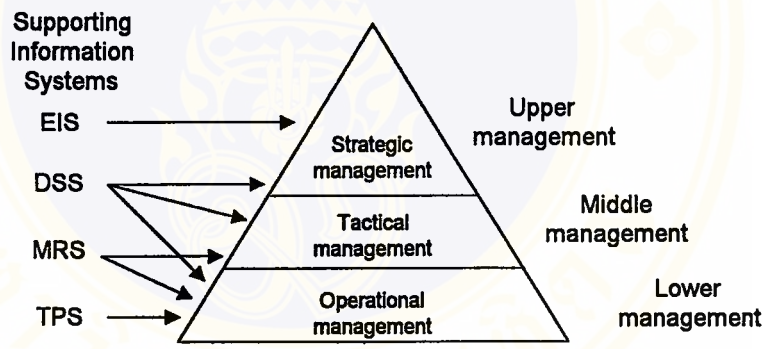


Figure 2.3 The three levels of management

Management information system (MIS) is any system that provides people with either data or information relating to an organization's operation. The systems provide routine information to managers and decision-maker. The focus of a MIS is on operation efficiency (10,11).

The MIS effort in an organization as composed of the following four subsystems. (See Figure 2.4) Knowledge-based systems such as artificial intelligence (AI) and expert systems (ES) are also information system, but are not depicted as separated as subsystems because they may be used in conjunction with a TPS, MRS, DSS and OIS.

- *Transaction processing systems* (TPS) comprise the routine, day-to-day accounting operations that have been an important part of most firms' computer processing. Transaction processing cycle consists of five major segments: data entry, transaction processing, file/database updating, report/document generation, and inquiry/response processing.

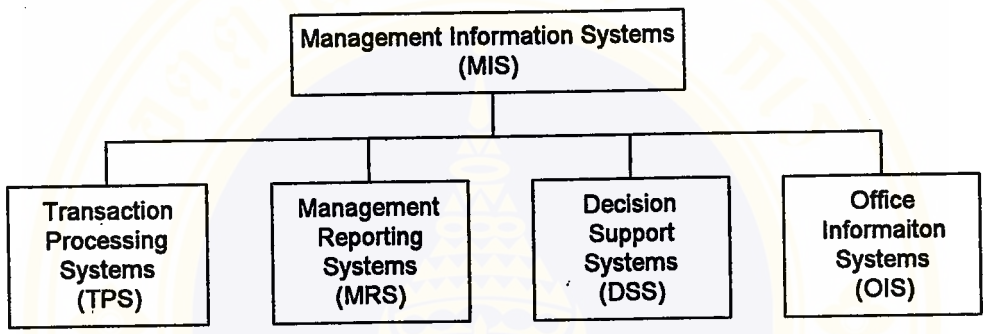


Figure 2.4 MIS subsystems

- *Management reporting systems* (MRS) generates the preplanned printed reports for decision-making purposes. MRP are used for both management planning and management control functions. Properties of management reporting systems:
  - Support structure and semi-structured decisions, primarily at the middle- and lower- management levels.
  - Provide fixed types of information, in an established format; the information requirements of users are normally known and stable
  - Often implemented with voluminous, hardcopy reports, requiring each user to search specifically for key information.
  - Usually require a formal request to be submitted; formal systems development may be required to approve
  - Often require a formal run schedule

- Usually consist of internal operational data, rather than data about the external environment
- Usually more concerned with data about the past than relating to the future
- Often oriented to summary and exception reporting.

- *Decision support systems* (DSS) provide a set of easy-to-use modeling, retrieving, and reporting capabilities so that people can generate the information they feel will be useful to them when making decisions.
- *Office information systems* (OIS) include the use of such computer-based, office-oriented technologies as word processing, desktop publishing, electronic-mail, video teleconferencing, and so on (10).

Form these definitions, The Information System for Government Inventory System combines between TPS and MRS.

2.4 The Client/Server Model

The client/server model is based on the concept that each application consists of two functional parts: one that initiates communication and another that responds to it. The server waits for incoming communication requests from a client, performs the requested actions for the client, and returns the result to the client. The client then retrieves data from the server (12).

The fundamental client/server application structure consists of three physical components:

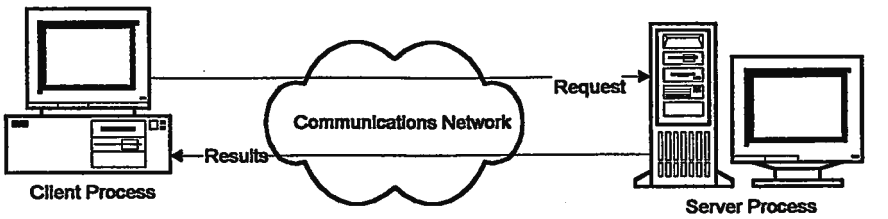


Figure 2.5 Client/server computing Client/server computing

- *Client Machine.* This is the computing system that runs the client component of the application . It makes one or more requests for services.
- *Server Machine.* This is the computing system that runs the server component of the application. It satisfies a client's request for a service and returns results to the client component.
- *Communication Network.* These are the communication facilities that allow one or more message making up a request to be passed from client to the server and that allow one or more messages containing results to be passed from the server back to the client.(13)

2.4.1 Client/server Database Model

In the true client/server database model, shown in Figure 2.6, the database again resides on a machine other than those that run the application processing components. But the database software is split between the client system that runs the application program and the server system that stores the database.

In this model, the application processing components on the client system make requests of the local database software. The local database software component in the client machine then communicates with the complementary database software running

on the server. The server database software makes requests for accesses to the database and passes results back to the client machine.

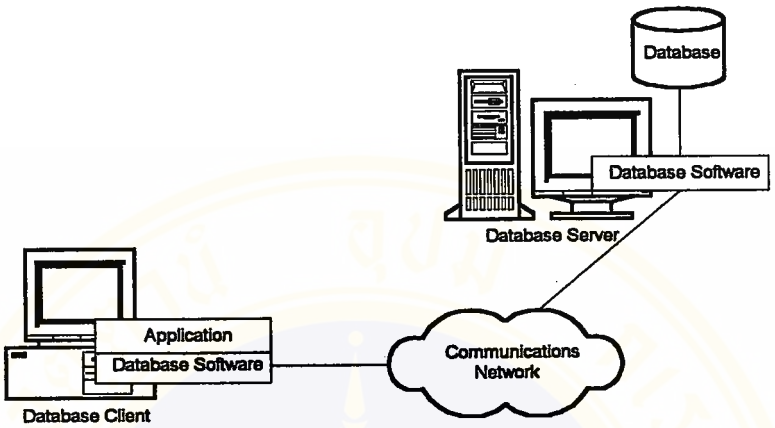


Figure 2.6 The Client/server database model

In the client/server database model, it is common to refer front-end software and back-end software. *Front-end software* typically runs on a personal computer or desktop workstation and serves the computing needs of a single individual. The front-end software typically plays the role of the client in a client/sever database application and performs functions that are oriented to the needs of the end user.

Back-end software consists of the client/server database software and network software that runs on a machine playing the role of database server (13).

2.4.2 Distributed Database

Distributed database – a database in which the actual data may be spread across several smaller databases connected via telecommunications devices. Distributed databases give corporations more flexibility in now databases are organized and used.

Distributed databases allow more users direct access at different user site. To reduce the demand on telecommunications lines, some organizations will build a replicate database. A replicated database is a database that holds a duplicate set of

frequently used data. At the beginning of the data, a company will send a copy of important data to each distributed processing location. At the end of the day, the different sites will send the changed data back to be stored in the main database (10,11).

Database Extraction and Replication

With extraction and replication, certain data element values from the database are stored in multiple location, possibly to make the database more available and resistant to failures or to enhance performance.

- *Extraction.* A database copy is called an *extract* when the copy is intended to be used on a read-only basis. Data element values in a extract are not intended to be updated.
- *Replication.* A database copy is called a *replica* when data element values in the copy can be updated (13).

Lock Types

The two types of locks that are the most commonly implemented are:

- *Shared-Access Locks.* A shared-access lock owner to read the locked data but not to change it. A user can acquire a shared-access lock on data after one or more other users have also acquired a shared access lock on it.
- *Exclusive-Access Locks.* An exclusive-access lock allows the lock owner to read and change the locked data in any desired way. No other user can access the locked data or acquire a lock on it while an exclusive-access lock is in effect, On the other hand, no user can acquire an exclusive-access lock on data that already has a shared-access lock on it (13).

2.5 Relational Data Model

Relational databases have been extensively used for well over a decade.The relational data model is based on a relation, a two-dimensional table. Each row of a table, called a tuple represents a record or collection of related facts. The columns of the table are called attribute. Each attribute can take on only certain values. Creation of these tables and their columns is done using SQL. Similarly storage and retrieval of data is also done using SQL (Structured Query Language). (14,11) As such SQL is one of the primary factors in the explosion of client/server development activity (15).

Dept. number	Dept. name	Manager SSN
257	Accounting	421-55-9993
632	Manufacturing	765-00-3192
598	Marketing	098-40-1370

Figure2.7 Relational data model

2.5.1 Normalization

Normalization is a process of simplifying the relationship between data elements in a record. Through normalization a collection of data in a record structure is replaced by successive record structures that are simpler and more predictable and therefor more manageable. Normalization is carried out of four reasons:

- To structure the data so that any pertinent relationships between entities can be represented.
- To permit simple retrieval of data in response to query and report requests.
- To simplify the maintenance of the data through updates, insertions, and deletions
- To reduce the need to restructure or reorganize data when new application requirements arise (14).

First normal form:

A relational table, by definition, is in first normal form. All values of the columns are atomic. That is, they contain no repeating values. Figure 2.8 shows the table FIRST in 1NF.

FIRST

s#	status	city	p#	qty
s1	20	London	p1	300
s1	20	London	p2	200
s1	20	London	p3	400
s1	20	London	p4	200
s1	20	London	p5	100
s1	20	London	p6	100
s2	10	Paris	p1	300
s2	10	Paris	p2	400
s3	10	Paris	p2	200
s4	20	London	p2	200
s4	20	London	p4	300
s4	20	London	p5	400

Figure 2.8 Table in 1NF

Although the table FIRST is in 1NF it contains redundant data. For example, information about the supplier's location and the location's status has to be repeated for every part supplied. Redundancy causes what are called update

Second normal form:

The definition of second normal form states that only tables with composite primary keys can be in 1NF but not in 2NF.

A relational table is in second normal form 2NF if it is in 1NF and every non-key column is fully dependent upon the primary key. That is, every non-key column must be dependent upon the entire primary key.

The process for transforming a 1NF table to 2NF is:

1. Identify any determinants, other the composite key, and the columns they determine.

2. Create and name a new table for each determinant and the unique columns it determines.
3. Move the determined columns from the original table to the new table. The determinate becomes the primary key of the new table.
4. Delete the columns you just moved from the original table except for the determinate, which will serve as a foreign key.
5. The original table may be renamed to maintain semantic meaning.

SECOND

s#	status	city
s1	20	London
s2	10	Paris
s3	10	Paris
s4	20	London
s5	30	Athens

PARTS

s#	p#	qty
s1	p1	300
s1	p2	200
s1	p3	400
s1	p4	200
s1	p5	100
s1	p6	100
s2	p1	300
s2	p2	400
s3	p2	200
s4	p2	200
s4	p4	300
s4	p5	400

Figure 2.9 Table in 2NF

Third normal form

The third normal form requires that all columns in a relational table are dependent only upon the primary key. A more formal definition is:

A relational table is in third normal form (3NF) if it is already in 2NF and every non-key column is non-transitively dependent upon its primary key. In other words, all non-key attributes are functionally dependent only upon the primary key.

The process of transforming a table into 3NF is:

1. Identify any determinants, other the primary key, and the columns they determine.

2. Create and name a new table for each determinant and the unique columns it determines.
3. Move the determined columns from the original table to the new table. The determinate becomes the primary key of the new table.
4. Delete the columns you just moved from the original table except for the determinate, which will serve as a foreign key.
5. The original table may be renamed to maintain semantic meaning (16).

SUPPLIER_CITY

s#	city
s1	London
s2	Paris
s3	Paris
s4	London
s5	Athens

CITY_STATUS

city	status
London	20
Paris	10
Athens	30
Rome	50

Figure 2.10 Table in 3NF

2.6 Data Flow Analysis

Data flow analysis examines the use of data to carry out specific business processes within the scope of a systems investigation. The components of data flow strategy span both requirements determination and system design. A prescribed notation facilitates the documentation of the current system and its analysis by all participants in the process of determining system requirement

Tools of Data Flow strategy.

1. Data Flow Diagram.

   The graphic tool used to describe and analyze the movement of data through a system – manual or automated – including the processes, stores of data, and delays in the system.

2. Data Dictionary.

The logical characteristics of current systems data stores, including name, description, aliases, contents, and organization. Identifies processes where the data used and where immediate access to information is needed. Serves as the basic for identifying database requirements during system design.

3. Data Structure Diagram.

A pictorial description of the relation between entities (people, places, events, and things) in a system and the set of information about the entity. Does not deal with physical data store.

4. Structure Chart.

A design tool that pictorially shows the relation between processing modules in computer software. Describes the hierarchy of component modules and the data that are transmitted between them. Includes analysis of input-to-output transformations and analysis of transactions.

The first two are developed during requirements determination while the later two most useful during systems design (14).

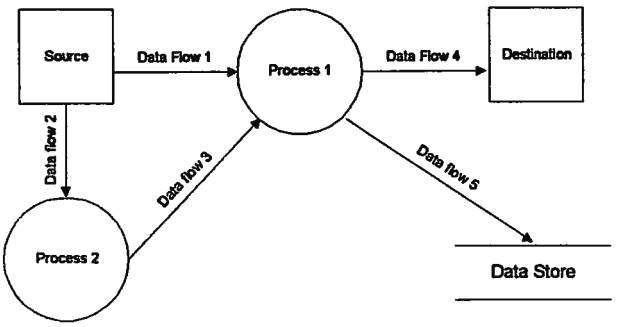


Figure 2.11 Data Flow Diagram using Yourdon notation

2.7 Testing

Back-box testing attempts to find errors in the following categories: 1) incorrect or missing functions, 2) interface errors, 3) errors in data structures or external database access, 4) performance errors, and 5) initialization and termination errors.

Back-box testing are designed to uncover errors in functional requirements without regard to the internal working of program.

Boundary value analysis (BVA) has been developed as a technique Boundary value analysis leads to a selection of test cases that exercise bounding values. Guidelines for BVA are as following

1. If an input condition specifies a range bounded by value a and b, test cases should be designed with values a and b, just above and just below a and b respectively.
2. If an input condition specifies a number of values, test cases should be developed that exercise the minimum and maximum numbers. Values just above and below minimum and maximum are also tested.
3. Guidelines 1 and 2 are applied to output conditions. For example, assume that a temperature vs. pressure table is required as output from an engineering analysis program. Test cased should be designed to create and output report that produces the maximum (and minimum) allowable number of table entries.
4. If internal program data structures have prescribed boundaries (e.g., an array has a defined limit of 100 entries), be certain to design a test case to exercise the data structure at its boundary (17).

2.8 Software Development Tools

The 4GLs provide users with the ability to develop GUI applications quickly and painlessly. To be productive, and application programmer must be able to build GUI applications in a very short among of time, even if some flexibility and efficiency must be given up. Powersoft's Powerbuilder has become a very popular database front end building tool. It has developed a reputation for ease of use and robustness (12).

PowerBuilder's Technical Strengths

DataWindow: It is the primary means by which a PowerBuilder application talks to the database. It has built-in features to format data for display, allow different edit-styles, validate data entered by user, generate appropriate SQL based on the changes made by a user and also the RDBMS it is talking to and scores of other such invaluable features.

Object-Oriented (OO): PowerBuilder is an object-oriented language. Though it is not a pure object-oriented language, it supports inheritance in most of the areas, permits encapsulation and enables polymorphism. Because of these reasons, it is possible to architect your applications in such a way as to reuse code within and across applications. If you make use of OO features, it also makes it simpler to maintain that application.

Native Drivers: Though ODBC (Open Database Connectivity) is good for accessing multiple databases through a common gateway, it covers only the common minimum features of these databases. PowerBuilder provides native drivers for all the major RDBMSs, such as Oracle, Sybase, Informix, DB2, MS SQLServer, etc., so that you can take advantage of the power of these.

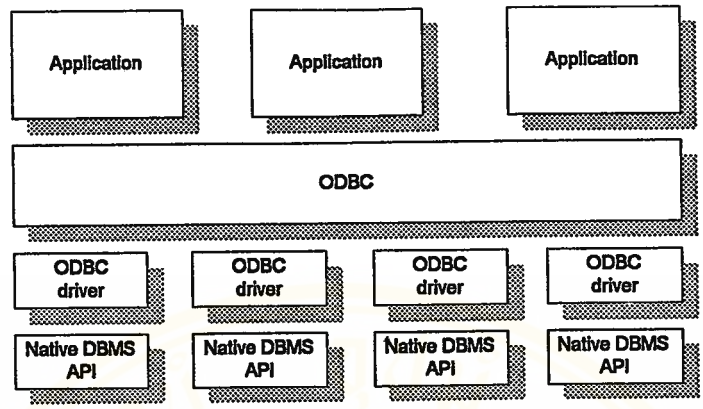


Figure 2.12 ODBC

Cross Platform: You can write code once and run that application on all the flavors of Windows, namely Windows 3.1, Windows for workgroups, Win95 and Windows NT. You can also use the same code to run the application on Mac and Sun Solaris UNIX.

Web-enabled: With PowerBuilder 5.0 and the Internet add-ons, you can build an application which can access data in an RDBMS through a browser, whether it is on the corporate intranet or on the internet (12,18).

Sybase

Sybase is an increasingly popular database. The databases can execute miscellaneous transaction processing logic. Data consistency and integrity checks don't have to be coded into each different client application. Instead it can be enforced centrally in the server. The feature of Sybase is follow:

- Run on a wide range of computer architectures such as Sun's Solaris, DEC's VMS, IBM's AIX, HP's HPUX, IBM's OS2, Novell's NLM and Windows NT.
- Support variety of networking protocols. These networking protocols such as TCP/IP, Decnet, Novell IPX, and LAN Manager.

- Programs supplied by independent software vendors, or user written programs.
- Support Client/Server Architecture.
- Other Sybase produces called gateways to give clients and servers on line access to non-Sybase data.
- Transact-SQL is Sybase's extension to SQL. Transact-SQL permits procedural processing with control statements.
- Sybase servers also include the ability to communicate directly between each other without going through a client. The inter-server communication is implemented as an easy to write procedure call. RPC's can be called in stored procedure or triggers so that the client program doesn't have to know or care about other sources of data (19,20).

Windows NT

Windows NT optimizations include:

- Implementation of virtual processors and client requests as Windows/NT threads to take advantage of DSA's inherent multithreading capability;
- The effective handling of disk I/O and network I/O through the use of the Win32 API.
- Using Microsoft's advanced operating system technologies, such as preemptive multitasking, to optimize resource utilization.
- Implementation as a Windows NT Service for integrated control with the operating system.
- Integration with, and full support for, the Windows 95/NT Registry (19).

2.9 Related Research

Wijada Rattamanee (8) analyzed and designed inventory control system of KMITL, in particular controlling and auditing models. The design was intended to be easy and speed up the operation procedure. The system was analyzed and designed by data flow diagram using Gane and Sarson notation. The new systems included database design, prototype design and report design.

Nathavipa Phasuk, Voramon Uronkarn (21) did computer program that was able to collect equipment data, academic equipment and office equipment in Industrial Engineering Department factory of Engineering Mahidol University. The program was designed and developed using Microsoft Access version 2.0, which can run on Windows 3.11 and Windows 95 platform. It can be added data, edited data, listing and reported in formal forms.

Wilert Lertbudikul (22) designed and developed medical supply inventory information system for a large hospital. The research followed these steps; current system feasibility study, system analysis, system design and system development. The system was designed and developed into 2 types, which were online interactive using CICS/VS communication control system and batch using OS/VS1 operating system. The system focused on high data quantity, high-speed data searching, collecting and summarizing the important information for management. The system consisted of 4 subsystems; initial and security subsystem, basic database recording subsystem, daily transaction subsystem and query and statistical subsystem. This developed system was suitable for a large hospital.

CHAPTER III

MATERIALS AND METHODS

3.1 Materials

- Hardware
  - Computer (Minimum)

    Server: Intel Pentium 166 MHz

    RAM 32 MB

    Hard disk 1.2 GB
  - Client: Intel 486DX.

    RAM 16 MB

    Hard disk 1.2 GB
  - Communication equipment: LAN card, Wire, Hub
  - Printer.
- Software

  Database : Sybase SQL anywhere 5.0

  Application development tools: Powersolf PowerBuilder Enterprise/32 Ver. 6.0

  Operating System : Windows NT 4.0, Window95

  Help authoring tools : Oasis SE Version 1.3.6.0

3.2 Methods

1. Study operation of inventory management system

   1.1. Review data of government inventory management system from books and researches such as steps of operation, function and material classification system.

   1.2. Identify problems of inventory management system.

   1.3. Scope problem solving by information technology.

2. Collect data and identify system requirement of Land Development Department

   2.1. Review existing system documents. General document should be reviewed first. General documentation includes management overviews, description of the organization's structure, and functional task. List of the existing system documents are as follows:

   - Organization chart
   - Registration document
   - Registration document of each hardware
   - Summary of hardware quantity in department
   - Summary of hardware quantity in requested budget year
   - Summary of hardware registration
   - Summary of hardware quantity
   - Summary of hardware quantity in requested budget year and section

2.2. Observe in operating environment, it can indicate how individuals participate in the operation of system. Interview user and related officer, whom tell requirement and operation problem.

3. Analyze and design system

Use data flow analysis to analyze the system. The components of data flow strategy span both requirement determination and system design. Following the flow of data through processes tells how data are input, processed, stored, retrieved, used, changed and output.

3.1 Design of input and output

Design input/output screens. These screens are user-friendly with GUI (graphic user interface). The input screens must have input controls, which provides way to ensure that 1) only authorize users can access the system, 2) guarantee the transactions are acceptable, 3) the data are validated for accuracy, and 4) There is the determination whether any necessary data have been omitted.

Design output reports, which support the activity of the operation and management. The outputs are generated in tubular form.

3.2 Design of procedure

Distinguish between manual and computer processes. The computer processes are to identify constraints such as authorization, volume, process timing, input method, output method and so on.

Design procedure and process specification. Formal statements using techniques and languages that enable analysts to describe important activities that make up the system

3.3 Design of database

Identify data used and information produced.

Select and identify data from collected data and system requirement, it gets related entities, attributes and constraints.

Identify relationships between those entities and design database with relational database concept.

4. Develop system

4.1. Create database. Transform designed data structure diagram to database.

4.2. Develop application to connect database and support operations. This step has unit testing.

4.3. Create help file.

5. Test software

Verify and validate software.

Check if the software conforms to its specification and if the software meets the expectation of the software requirement by black-box testing. Uncover errors and ensure that the software performs properly. Test cases are designed by boundary value analysis method.

6. Summarize and create document

This document includes detail, methodology, conclusion and recommendation of the research.

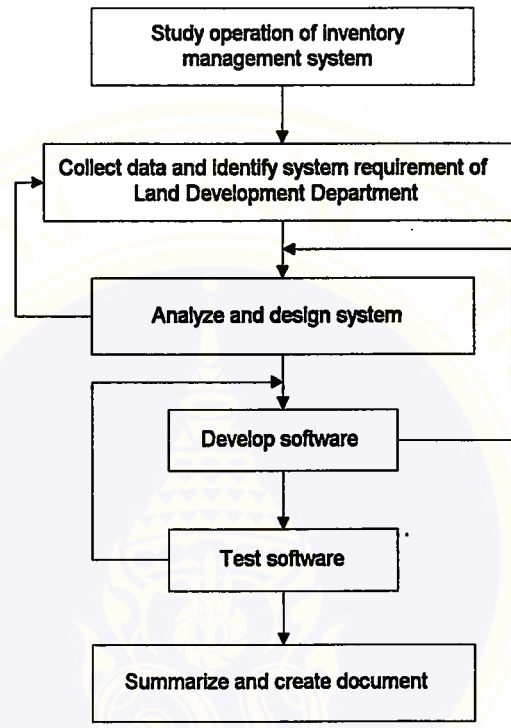


Figure 3.1 Steps and research methodology

CHAPTER IV

RESULTS

The result of study for this research is the information system for government inventory management: a case study of Land Development Department. The information system is designed and developed using data flow analysis, relational database and Object-Oriented programming.

4.1 Current System

The combination of step 1 and 2 in chapter 3 produces current government inventory system in graph presentation style, which may be more effective to describing the system since the standard symbols, may limit communication.

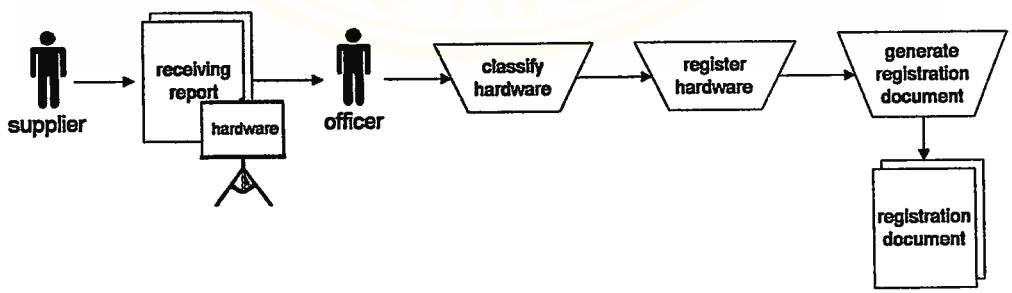


Figure 4.1 Graphic presentation of current storekeeping process

Figure 4.1 describes storekeeping process, supplier submits hardware and receiving report to officer The receiving report consists of supplier detail (e.g. name, address, and telephone number), transport date, specification, quantity and cost per unit

of hardware. Next, officer will classify hardware by group, class, type and specification with precedence. After hardware has been classified, officer will generate hardware ID and register the hardware. Registration data is kept in registration document, which is shown in appendix A.

Figure 4.2 illustrates distribution process. Then approval requisition form is sent to officer, officer will update distributor name and recipient name in registration document. Borrow process (Figure 4.3) is the same as distribution process but it adds return date in registration document.

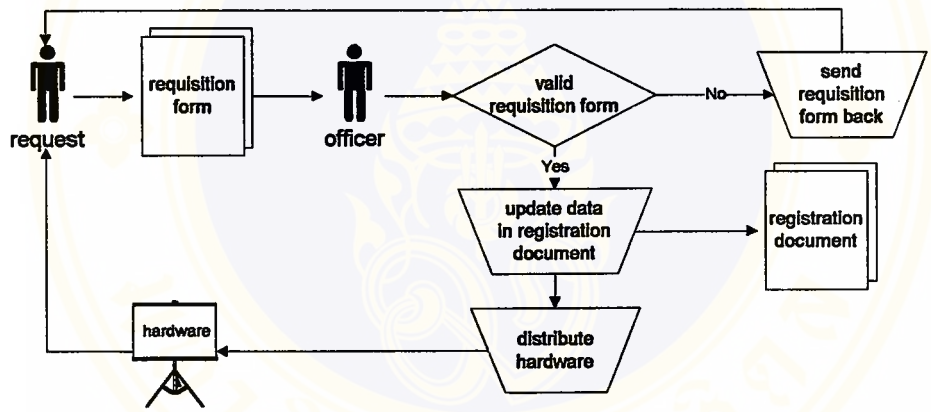


Figure 4.2 Graphic presentation of current distribution process

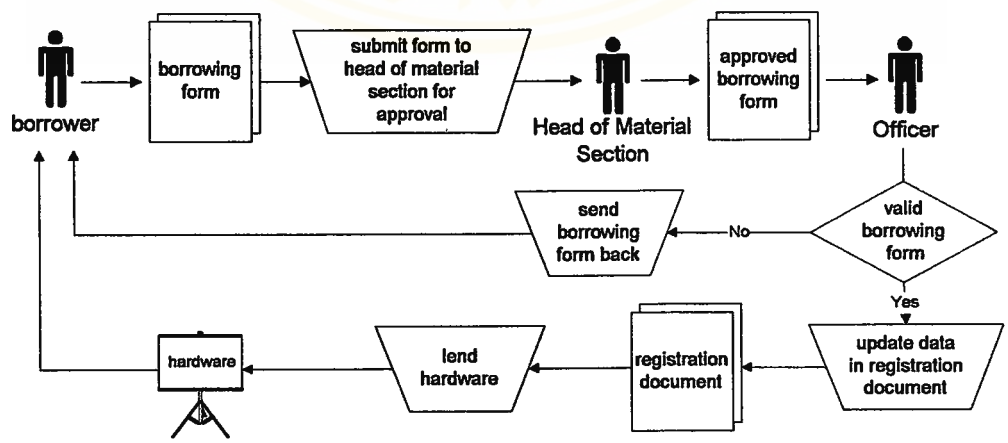


Figure 4.3 Graphic presentation of curent borrow process

In case of there is out of order hardware, user will give its ID, name for validation. Valid hardware is collected and generated to repair report. This report is sent to purchasing department, who contacts to supplier and tracks repair as shown in Figure 4.4.

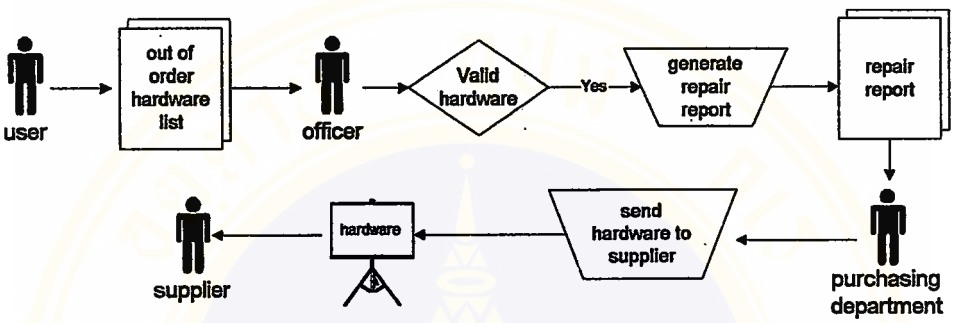


Figure 4.4 Graphic presentation of current repair process

Before the end of September head of material inventory section will appoint committee to audit past operation from October 1st to September 30th. After annual audit has finished, officer will create report of unused hardware to dispose as shown in Figure 4.5.

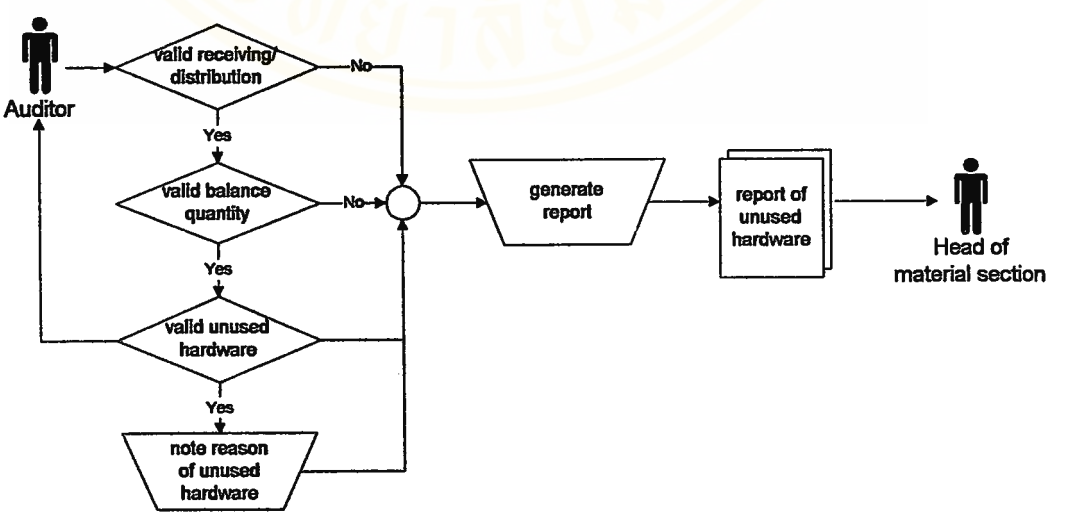


Figure 4.5 Graphic presentation of current annual audit process

Figure 4.6 shows disposal process, unused hardware is sold, exchanged, given to other sections or destroyed. If unused hardware cannot dispose by these methods, officer will dispose the hardware as lose hardware. Then officer removes data of disposed hardware from registration document

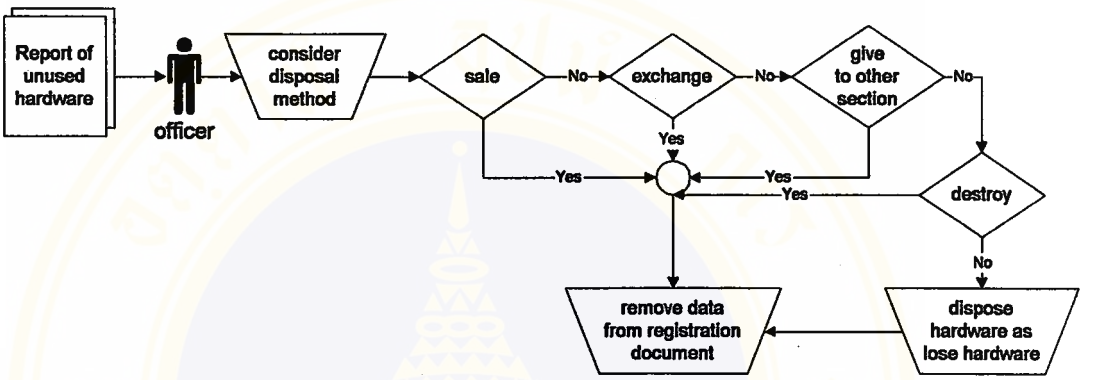


Figure 4.6 Graphic presentation of current disposal process

4.2 Results from System Analysis and Design

The results from system analysis and design consist of data flow diagram (describes and analyzes the movement of data through system), data dictionary (defines systems elements), data structure diagram (describes relation between entities), structure charts, input, output and program specification.

4.2.1 Data Flow Diagram

In Figure 4.7, The presentation graphs of current system are converted to new system, which consists of the following entities: section, head of material section, officer, purchasing department

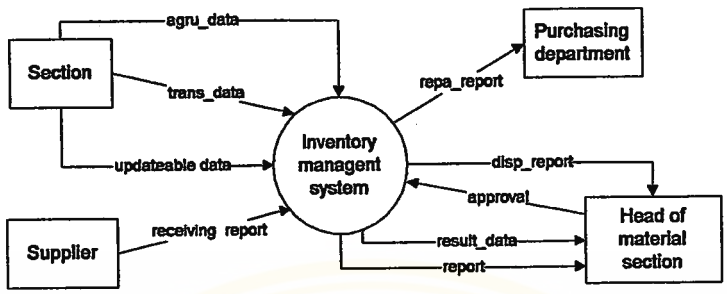


Figure 4.7 Context diagram of government

The new system revealed 4 major processes: data manipulation, transaction process, queries process and report generation. The overall system, consisting of these processes, is shown in Figure 4.8

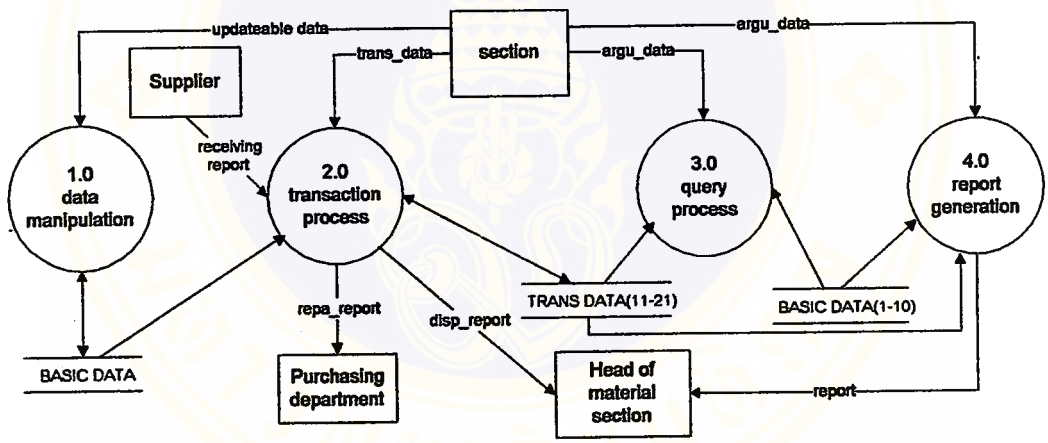


Figure 4.8 DFD Level 1: Government inventory management system

This data flow analysis also shows that the system use 21 data stores, which are divided into 2 categories:

1. "Basic data": It consists of 10 data stores, which are HW, HW_GROUP, HW_CLASS, HW_TYPE, SUPPLIER, DIVISION, SECTION, SECURITY, STAFF and PROJECT. These data stores are not usually modified. The system fetch read-only data to display and reference.

2. "Trans data": It consists of 11 data stores, which are CONTROL, CONT_DETAIL, HW_REGI, DISTRIBUTE, DIST_DETAIL, RETURN, RETU_DETAIL, DISTPOSE, DISP_DETAIL, REPAIR and REPA_DETAIL. These data stores are modified in each transaction process (registration, distribution, return, repair and disposal process)

The details of "basic data" and "transaction data" data stores are described in section 4.2.4. Database Design. The system is explained in detail through the lower-level subsystem diagram, that developed to understand the activities associated with the system.

Level 2: 1. Data Manipulation

Data manipulation consists of the activities of adding, deleting and editing data. These activities manipulate data in "Basic data" data store. Some data store has one-to-many relationship with another one consequently; its activities have a little different detail.

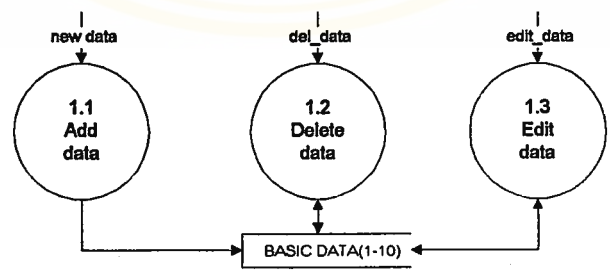


Figure 4.9 DFD Level 2: 1 Data manipulation

The downward explosion of the data manipulation process maintains the numbering scheme introduced at the system level 3 in Figure 4.10.

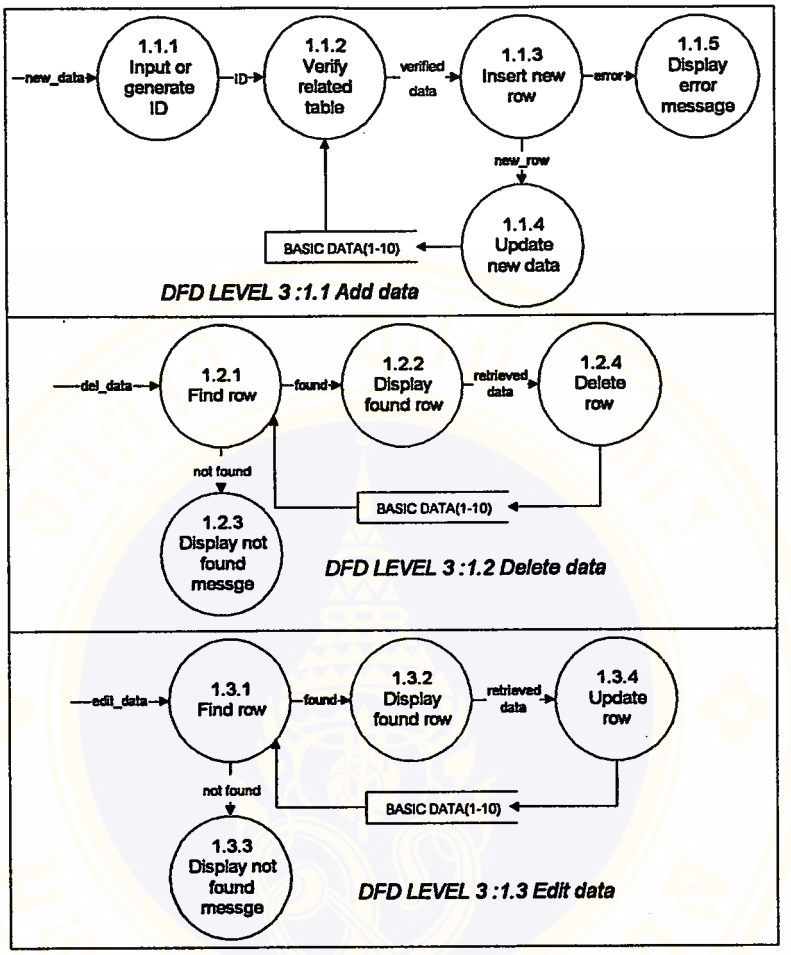


Figure 4.10 DFD Level 3: Data manipulation

Level 2: 2. Transaction Process

Transaction process consists of 6 activities: "register hardware", "distribute hardware", "return hardware", "repair hardware", "receive repaired hardware" and "dispose hardware", which are shown in Figure 4.11. In Figure 4.8 DFD Level 1 mentions that the activities use "Basic data" and "Trans data", but it does not explain. This level explains details of related data stores in each activity. In addition, DFD level 3 are show in Figure 4.12 -4.14 to clarify the activities.

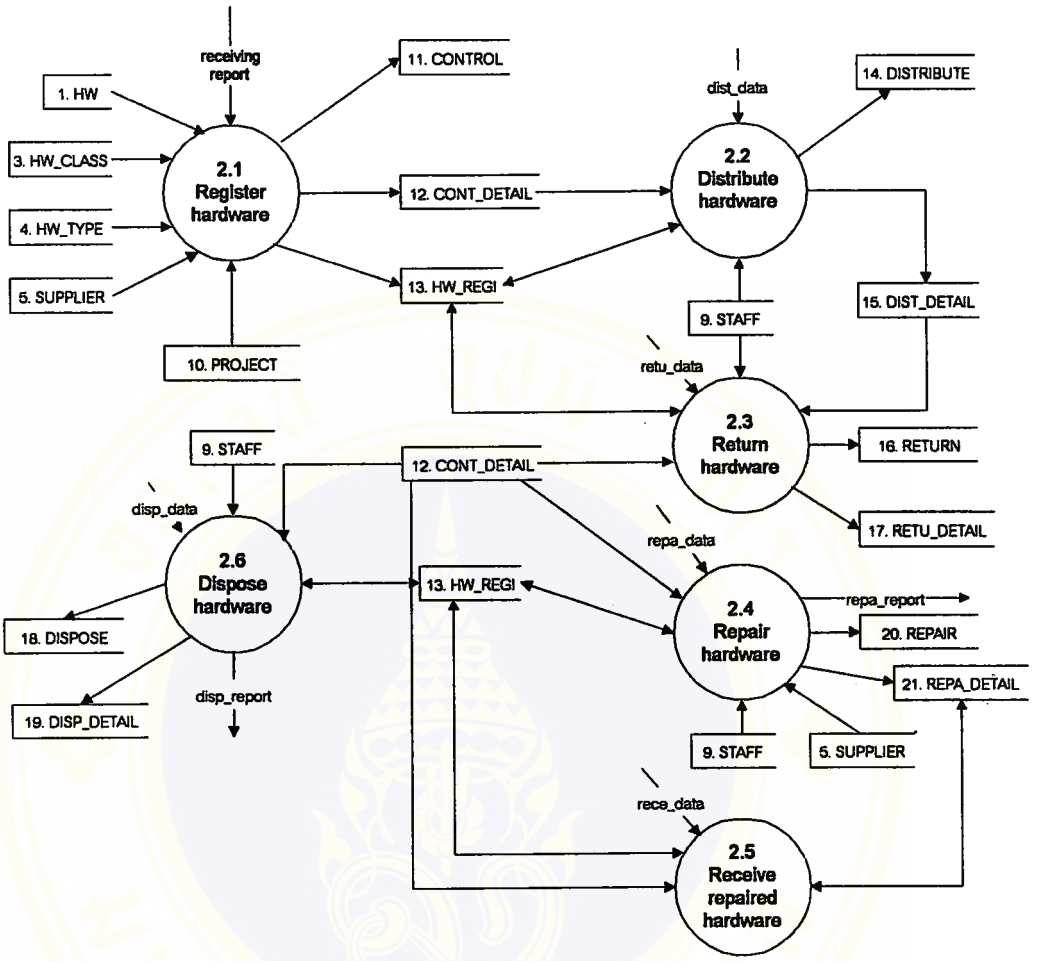


Figure 4.11 DFD Level 2: 2. Transaction process

"Register hardware" activity involves 4 subactivities, "enter h/w register data" subactivity retrieves data from 5 data stores; HW_CLASS, HW_TYPE, HW, SUPPLIER and PROJECT, which have related data in registration activity. Not only that the subactivity gets "receiving report" data that has useful hardware data such as description, cost per unit, quantity and so on.

After "enter h/w register data" subactivity has finished, "assign HW_ID" subactivity will assign HW_ID to represent each hardware. "Generate registration document" subactivity transforms data into printed report. Finally, "add register data"

subactivity stores registration data into 3 data stores: CONTROL, CONT_DETAIL and HW_REGI.

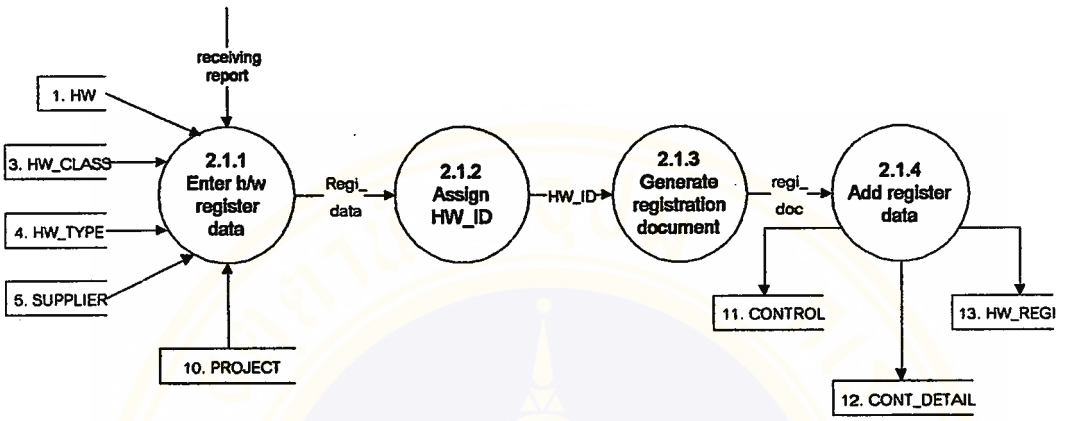


Figure 4.12 DFD Level 3: 2.1 Register hardware

"Distribute hardware" activity involves 6 subactivities. "Enter distribution data" subactivity gets one of important data is HW_ID, which is verified in 2 subactivities, "verify HW_ID": to ensure that there is the HW_ID in data store and "verify h/w status": to ensure that the hardware can be distributed (status = WAIT).

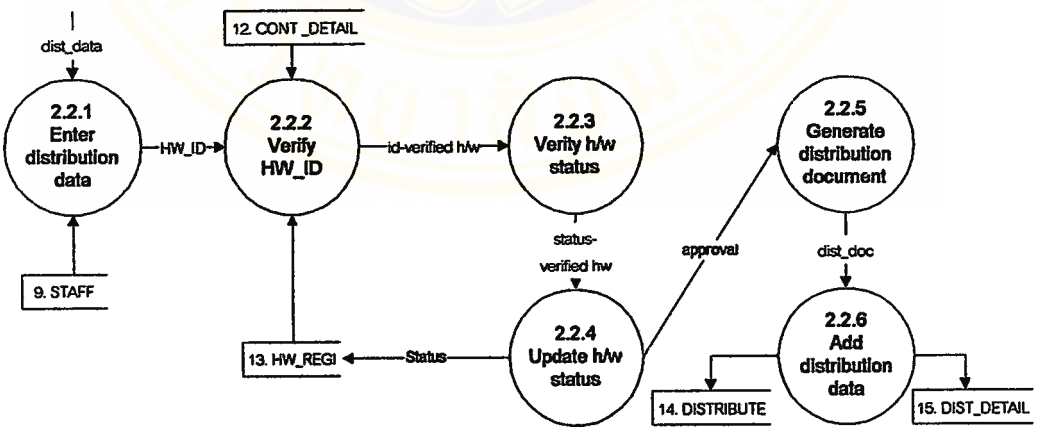


Figure 4.13 DFD Level 3: 2.2 Distribute hardware

When the HW_ID pass the verification "update h/w status" subactivity changes status value in HW_REGI to distributed or borrowed status (status = USE or status = BORROW). "Generate distribution document" subactivity transform data into printed report. Finally, "add distribution data" subactivity stores distribution data into

DISTRIBUTE and DIST_DETAIL data store. Other activities in transaction process are similar to "distribute hardware" activity, hence their description are skipped

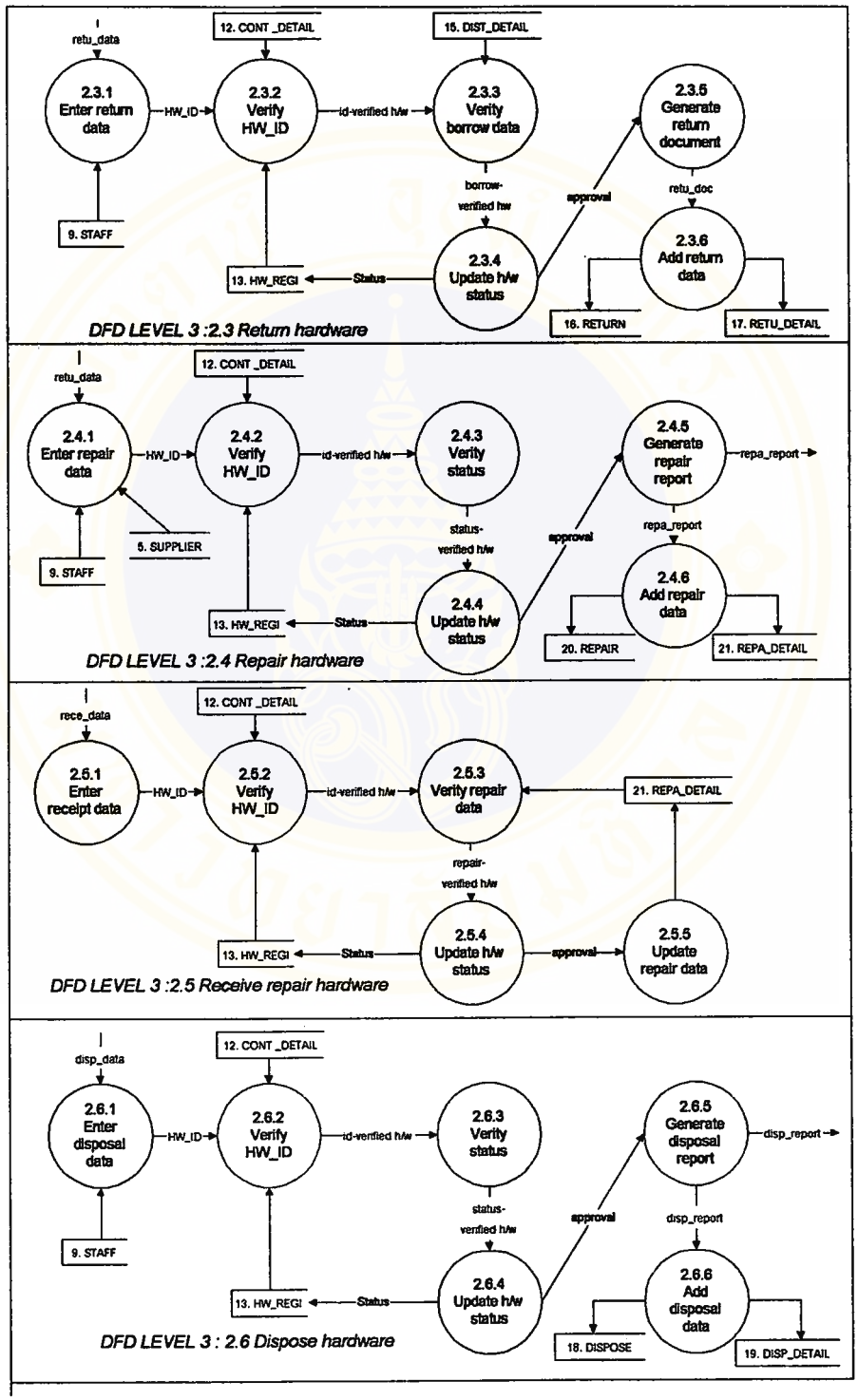


Figure 4.14 DFD Level 3: Transaction process

Level 2: 3. Query process

Query process consists of 4 activities, which use all data stores to process data. Result data has 2 types: tabular and graph, which have individual processing. See list of result data in section 4.2.2 data dictionary. "Process data" activity is calculation, summary and comparative analysis.

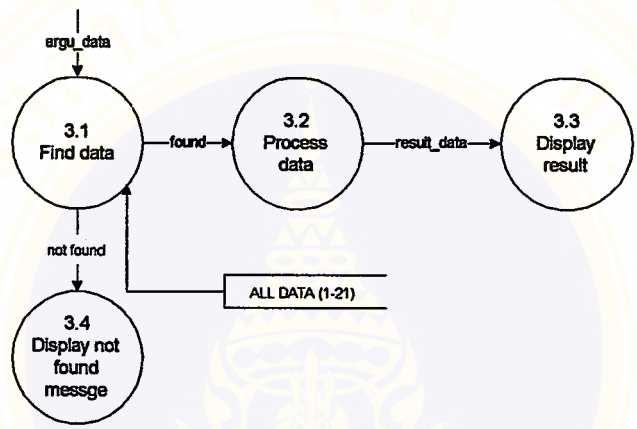


Figure 4.15 DFD Level 2: 3. Query Process

Level 2: 4. Report generation

Report generation consists of 4 activities, which use all data stores to process printable reports. See list of printable reports in 4.2.2 data dictionary. " Process data" activity is calculation and summary data.

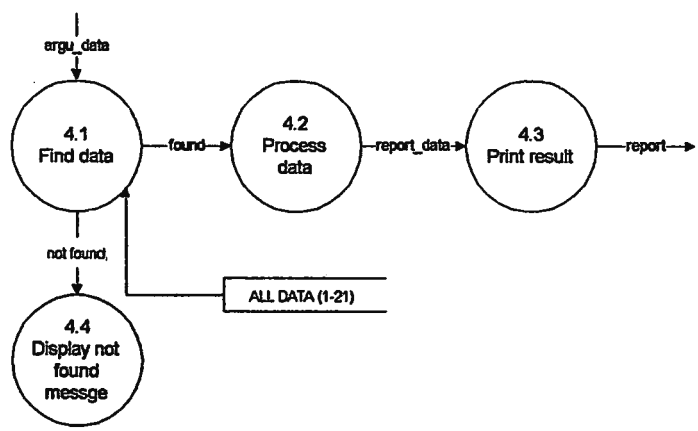


Figure 4.16 DFD Level 2: 4. Report generation

4.2.2 Data Dictionary

The data dictionary elements developed for government inventory management system consists of process, procedure, data flow and data structure. The process of developing the data dictionary itself forces analysis to clarity their understanding of the data in the system

Figure 4.17 identifies each of the processes included in the DFD level 1. Each process is briefly described to clarify its purpose. The inbound and outbound data flows for each of the five processes are also shown.

PROCESS NAME:	1. Data manipulation
DESCRIPTION:	Data of "BASIC DATA" is added, edited or deleted and stored in database.
INBOUND DATA FLOWS:	updateable_data
OUTBOUND DATA FLOWS:	data of "BASIC DATA" data store
PROCESS NAME:	2.Transaction process
DESCRIPTION:	Receiving report is received and generated to registration data. The registration data is stored in data store. After that every activities with registered hardware will be recorded in "TRANS DATA" data store.
INBOUND DATA FLOWS:	In: trans_data
OUTBOUND DATA FLOWS:	data of "TRANS DATA" data store.
PROCESS NAME:	3. Query process
DESCRIPTION:	User can select question to query by identifying argument, system will process result data in graph or tabular format of display screen.
INBOUND DATA FLOWS:	argu_data data of "BASIC DATA" data store data of "TRANS DATA" data store
OUTBOUND DATA FLOWS:	
PROCESS NAME:	4.Report generation
DESCRIPTION:	User can select question to generate report by identifying argument, system will process printed report.
INBOUND DATA FLOWS:	argu_data data of "BASIC DATA" data store data of "TRANS DATA" data store
OUTBOUND DATA FLOWS:	report

Figure 4.17 First level process descriptions.

Figure 4.18 through 4.19 identify processes that take place in the DFD level 3 of transaction process. The processing logic is summarized. Some process has alias name and procedure. The logic summary of procedure is shown in Figure 4.20.

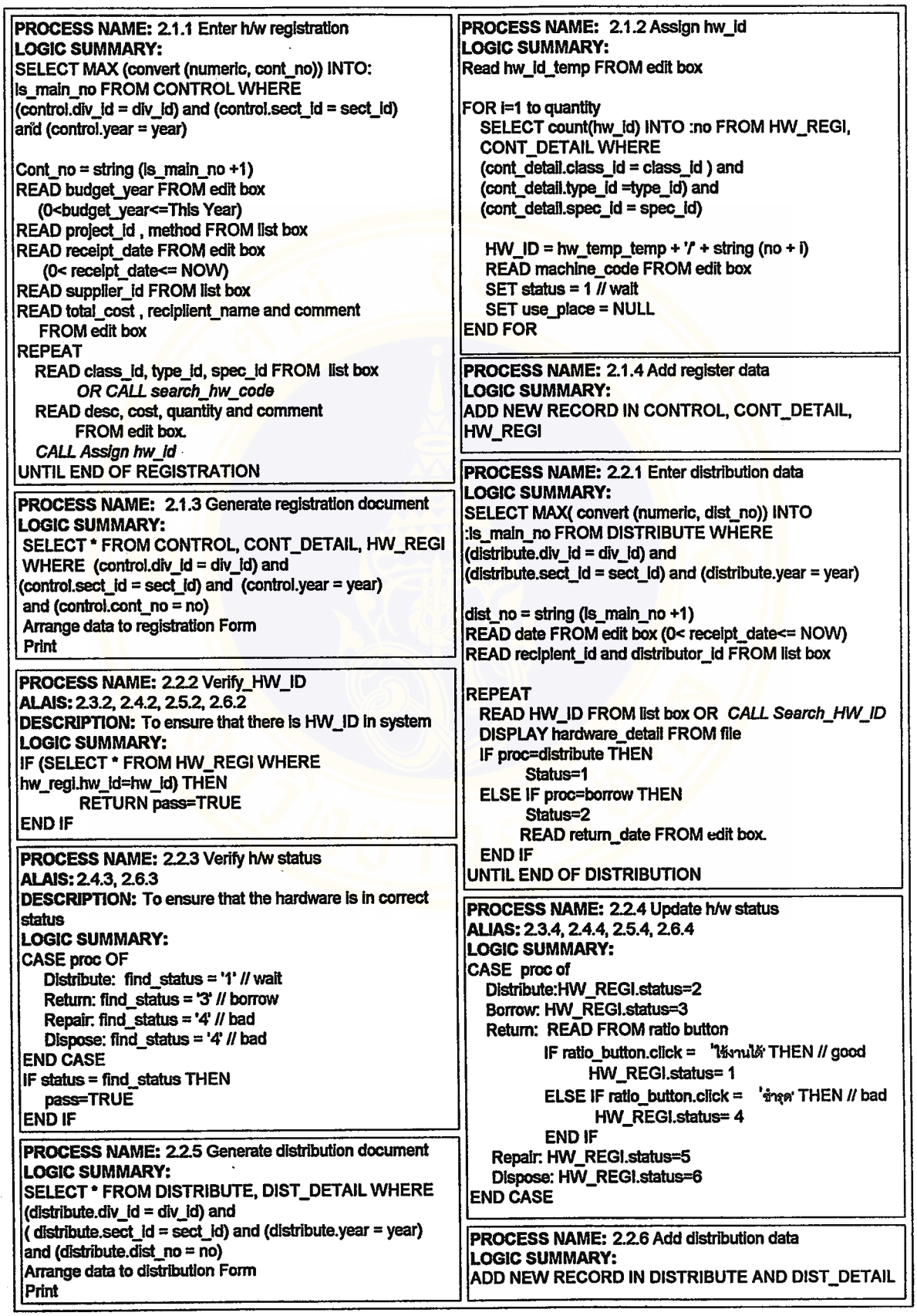


Figure 4.18 Third level process descriptions

PROCESS NAME: 2.3.1 Enter return data
LOGIC SUMMARY:
SELECT MAX(convert (numeric, retu_no)) INTO
:ls_main_no FROM RETURN WHERE
(return.div_id = div_id) and (return.sect_id = sect_id)
and (return.year = year)

retu_no= string (ls_main_no +1)
READ date FROM edit box (0< receipt_date<= NOW)
READ return_id and recipient_id FROM list box
REPEAT
  READ HW_ID from list box OR CALL
Search_HW_ID
  DISPLAY hardware_detail FROM file
UNTIL END OF RETURN

PROCESS NAME: 2.3.5 Generate return document
LOGIC SUMMARY:
SELECT * FROM RETURN, RETU_DETAIL
WHERE (return.div_id = div_id) and
(return.sect_id = sect_id) and (return.year = year)
and (return.retu_no = no)
Arrange data to return Form
Print

PROCESS NAME: 2.4.1 Enter repair data
LOGIC SUMMARY:
SELECT MAX(convert (numeric, repa_no)) INTO
:ls_main_no FROM REPAIR WHERE
(repair.div_id = div_id) and (repair.sect_id = sect_id)
and (repair.year = year)

repa_no= string (ls_main_no +1)
READ date FROM edit box (0< receipt_date<= NOW)
READ supp_id FROM list box
REPEAT
  READ HW_ID from list box OR CALL
    Search_HW_ID
  DISPLAY hardware_detail FROM file
  READ cause,cost,repa_date,retu_date
    FROM edit box
UNTIL END OF REPAIR

PROCESS NAME: 2.5.1 Enter receipt data
LOGIC SUMMARY:
REPEAT
    READ HW_ID FROM edit box OR
        CALL Search_HW_ID
    CALL Verify repair data
    DISPLAY repair_detail from file
    READ comment FROM listbox
UNTIL END OF RECEIPT DATA

PROCESS NAME: 2.5.5 Update repair data
LOGIC SUMMARY:
Update comment = '*'+ comment To REPA_DETAIL

PROCESS NAME: 2.6.5 Generate disposal report
LOGIC SUMMARY:
SELECT * FROM DISPOSE, DISP_DETAIL
WHERE (dispose.div_id = div_id) and
(dispose.sect_id = sect_id) and (dispose .year = year)
and (dispose .disp_no = no)
Arrange data to disposal Form
Print

PROCESS NAME: 2.6.6 Add disposal data
LOGIC SUMMARY:
ADD NEW RECORD IN DISPOSE AND DISP_DETAIL

PROCESS NAME: 2.3.3 Verity_borrow
LOGIC SUMMARY:
SELECT status FROM HW_REGI WHERE
  hw_reig.hw_id= hw_id
IF (status=3) THEN
  SELECT dis_detail.dist_no, distribute.year,
  dist_detail.return_date FROM DIST_DETAIL,
  DISTRIBUTE WHERE (dist_detail.hw_id =hw_id)
  and (dist_detail.div_id =div_id) and
  (dist_detail.sect_id=sect_id) and
  (dist_detail.status=2)
  ORDER BY distribute.date DESC;

  DISPLAY div_id+sect_id +'/'+dist_year+'/'+dist_no
  IF return_date< NOW THEN
      DISPLAY message "เกินกำหนดคืน"
  ELSE   DISPLAY "รหัสครุภัณฑ์ไม่ได้ถูกยืม"
  END IF
END IF

PROCESS NAME: 2.3.6 Add_return data
LOGIC SUMMARY:
ADD NEW RECORD IN RETURN AND RETU_DETAIL

PROCESS NAME: 2.4.5 Generate repair report
LOGIC SUMMARY:
SELECT * FROM REPAIR, REPA_DETAIL WHERE
(repair.div_id = div_id) and (repair.sect_id = sect_id)
and (repair.year = year) and (repair.repa_no = no)
Arrange data to repair Form
Print

PROCESS NAME: 2.4.6 Add repair data
LOGIC SUMMARY:
ADD NEW RECORD IN REPAIR AND REPA_DETAIL

PROCESS NAME: 2.5.3 Verify repair data
LOGIC SUMMARY:
SELECT status FROM HW_REGI
WHERE hw_regi.hw_id= hw_id
IF (status=5) THEN
    SELECT * FROM REPA_DETAIL, REPAIR
WHERE
    (repa_detail.hw_id =hw_id)
and(repa_detail.div_id=div_id)
    and (repa_detail.sect_id=sect_id)
    ORDER BY repa.date DESC;

    DISPLAY repair_detail
    Pass = TRUE
END IF

PROCESS NAME: 2.6.1 Enter disposal data
LOGIC SUMMARY:
SELECT MAX(convert (numeric, dist_no)) INTO
:ls_main_no FROM DISPOSE WHERE
(dispose.div_id = div_id) and
(dispose.sect_id = sect_id) and (dispose.year = year)

disp_no= string (ls_main_no +1)
READ date FROM edit box (0< receipt_date<= NOW)
REPEAT
    READ HW_ID from list box OR CALL
Search_HW_ID
    DISPLAY hardware_detail FROM file
    READ method FROM listbox
    READ cause,cost,comment FROM editbox
UNTIL END OF DISPOSE

Figure 4.19 Third level process description (continued)

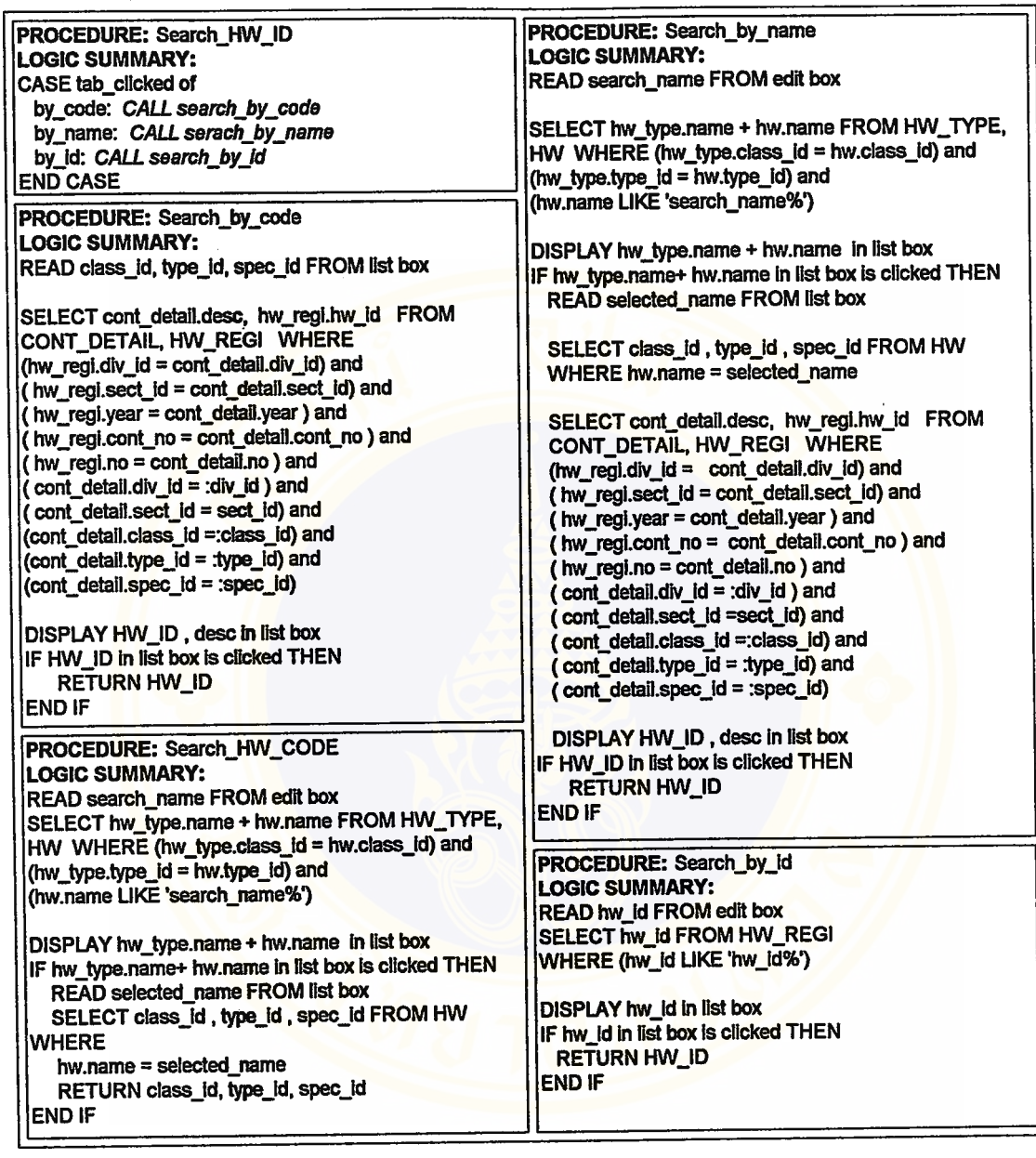


Figure 4.20 Logic summary of procedure

The other processes in data manipulation, query process and report generation are not included in process description because the low-level of its DFD are sufficient explanation.

Figure 4.21 through 4.22 define 35 data flows that are included in the system. The processes that data flows originate from and into are also identified by number and name. Each data flow is also described by the data structures it contains. The data

structures that are part of this system are describe in Table 4.1. Unnamed data flows mean all data of data stores, which see detail in section 4.2.4 Database design.

Table 4.1 Data dictionary for data structure

Data Structure	Description
HW_CODE	Class_id + type_Id + spec_id
HW_data	*see 1. HW data store*
Hw_disp_list	HW_ID + disposal_method + disposal_cause + (sale_cost)
Hw_dist_list	(HW_CODE) + HW_ID + (return_date)
Hw_list	Hw_name + (hw_specification) + cost per unit + quantity + (comment)
Hw_repa_list	HW_ID + cause + cost + repair_date + receive_date
Hw_retu_list	(HW_CODE) + HW_ID + (dist_no)
Supplier_data	*see 7.SUPPLIER data store*

4.2.3 Input and Output Design

Output reports, which support the activity of the operation and management. The outputs are generated in tubular form. See designed output reports in appendix B.

Input and output screens are user-friendly with GUI (graphic user interface, they are MDI window. An MDI window is a frame window in which you can open multiple document windows (sheets) and move among the sheets. The input screens have input validation. Some output screens, especially in the query process have a characteristic of drill down. A user can choose to access between a particular data, which is deep in detail, or just overall data, which is convenient for comparative analysis. See designed screens in Appendix C.

DATA FLOW NAME: approval
DESCRIPTION: result that there is no error after system has updated hardware status in "HW_REGI" data store
FROM PROCESS:
2.2.4, 2.4.4, 2.6.4 update h/w status
TO PROCESS:
2.2.5 Generate distribution document
2.3.5 Generate return document
2.4.5 Generate repair report
2.5.5 Update repair data
2.6.5 Generate disposal report
DATA STRUCTURE:
[dist_data, retu_data, repa_data, disp_data]
+ id_verified h/w

DATA FLOW NAME: argu_data
DESCRIPTION: Retrieved argument of query process and report generation that is identified by user
FROM PROCESS:
TO PROCESS:
3.0 query process
3.1 find data
4.0 report generation
4.1 find data
DATA STRUCTURE:
(div_id + sect_id) + ([year, budget year]) + (HW_CODE)
+ ([today, start date + stop date])

DATA FLOW NAME: borrow_verified h/w
DESCRIPTION: system verifies that hardware was borrowed
FROM PROCESS: 2.3.3 Verify borrow data
TO PROCESS: 2.3.4 update h/w status
DATA STRUCTURE:
dist_no + return_date

DATA FLOW NAME: del_data
DESCRIPTION: ID or name that can address row
FROM PROCESS:
TO PROCESS: 1.2 delete data
1.2.1 find row
DATA STRUCTURE:
[ID, name] *depend on each data store*

DATA FLOW NAME: disp_data
DESCRIPTION: data of disposed hardware that is given from auditor in annual audit
FROM PROCESS:
TO PROCESS: 2.6 dispose hardware
2.61 enter disposal data
DATA STRUCTURE:
div_id + sect_id + year + disp_no + disp_date
+ {disp_hw_list}

DATA FLOW NAME: dist_data
DESCRIPTION: data in approval requisition form
FROM PROCESS:
TO PROCESS: 2.2 distribute hardware
2.2.1 enter distribution data
DATA STRUCTURE:
Div_id + sect_id + year + dist_no + dist_date
+ [recipient ID, recipient name]
+ [distributor ID, distributor name] + {hw_dist_list}

DATA FLOW NAME: disp_report
DESCRIPTION: Report of unused hardware that has been considered disposal method. This report has 2 copies, one is sent to head of material section and other keeps in system
FROM PROCESS: 2.0 transaction process
2.6 dispose hardware
2.6.5 generate disposal report
TO PROCESS: 2.6.6 add disposal data
DATA STRUCTURE:
Div_id + sect_id + year + disp_no + disposal date
+ {hw_disp_list}

DATA FLOW NAME: dist_doc
DESCRIPTION: distribution document for checking
FROM PROCESS:
2.2.5 Generate distribution document
TO PROCESS: 2.2.6 Add distribution data
DATA STRUCTURE:
see report in appendix B

DATA FLOW NAME: error
DESCRIPTION: Error message from system that respond to user
FROM PROCESS: 1.1.3 insert new row
TO PROCESS: 1.1.5 display error message
DATA STRUCTURE:
string of error statement

DATA FLOW NAME: edit_data
DESCRIPTION: ID or name that can address row and new data for updates the row
FROM PROCESS:
TO PROCESS: 1.3 edit data
1.3.1 find row
DATA STRUCTURE:
[ID, name]+ new_data

DATA FLOW NAME: found
DESCRIPTION: result that system can find requested row
FROM PROCESS: 1.2.1 find row
1.3.1 find row
TO PROCESS: 1.2.1 display found row
1.3.2 display found row
DATA STRUCTURE:
row number of found row

DATA FLOW NAME: HW_ID
DESCRIPTION: Unique ID that represents registered hardware, last digit is generated by system to protect redundant data
FROM PROCESS: 2.1.1 Enter h/w register data
2.2.1 Enter distribution data
2.3.1 Enter return data
2.4.1 Enter repair data
2.5.1 Enter receipt data
2.6.1 Enter disposal data
TO PROCESS:
2.1.3 Generate registration documentation
2.2.2, 2.3.2, 2.4.2, 2.5.2, 2.6.2 Verify HW_ID
DATA STRUCTURE:
*string that usually consists of section_code + class_id
+ type_id + spec + year*

Figure 4.21 Data dictionary entries for data flows

DATA FLOW NAME: ID
DESCRIPTION: Unique code that is primary key in data store and is generated by system or user input
FROM PROCESS: 1.1.1 input or generate ID
TO PROCESS: 1.1.2 verify related table
DATA STRUCTURE:
primary key in data store

DATA FLOW NAME: new_data
DESCRIPTION: Data of 10 data stores ("BASIC DATA") that pass validation rule
FROM PROCESS:
TO PROCESS: 1.1 add data
1.1.1 input or generate ID
DATA STRUCTURE:
data of data store

DATA FLOW NAME: not found
DESCRIPTION: result that system cannot find requested row
FROM PROCESS: 1.2.1 find row
1.3.1 find row
TO PROCESS:
1.2.3 display not found message
1.3.3 display not found message
DATA STRUCTURE:
0

DATA FLOW NAME: receiving report
DESCRIPTION: receipt hardware list and supplier data from supplier
FROM PROCESS:
TO PROCESS: 2.0 Transaction process
2.1 Registration hardware
2.1.1 Enter h/w register data
DATA STRUCTURE:
Ship_id + supplier_data + receive_data + {hw_list}

DATA FLOW NAME: regi_doc
DESCRIPTION: new registration document for checking
FROM PROCESS:
2.1.3 Generate registration document
TO PROCESS: 2.1.4 Add register data
DATA STRUCTURE:
* see report in appendix B*

DATA FLOW NAME: repa_report
DESCRIPTION: Report of repair hardware that has been verified for adjustment of the supplier data and hardware data. This report has 2 copies, one is sent to purchasing department and other keeps in system.
FROM PROCESS: 2.0 transaction process
2.4 repair hardware
2.4.5 generate repair report
TO PROCESS: 2.4.6 add repair report
DATA STRUCTURE:
div_id + sect_id + year + Repa_no + repair date
+ supplier_data + {hw_repa_list}

DATA FLOW NAME: id_verified h/w
DESCRIPTION: system verifies that hardware was registered
FROM PROCESS:
2.2.2, 2.3.2, 2.4.2, 2.5.2, 2.6.2 Verify HW_ID
TO PROCESS: 2.2.3, 2.4.3, 2.6.3 verify status
2.3.3 verify borrow data
2.5.3 verify repair data
DATA STRUCTURE:
data in HW_REGI and CONT_DETAIL data store

DATA FLOW NAME: new_row
DESCRIPTION: approval data that is inserted into data store
FROM PROCESS: 1.1.3 insert new row
TO PROCESS: 1.1.4 update new data
DATA STRUCTURE:
alias: verified data

DATA FLOW NAME: rece_data
DESCRIPTION: data of repaired hardware
FROM PROCESS:
TO PROCESS: 2.5 receive repaired hardware
2.5.1 enter receipt data
DATA STRUCTURE:
[supplier ID, supplier name]
+ [hardware id, hardware name] + (cost) + (comment)

DATA FLOW NAME: regi_data
DESCRIPTION: data in approval receiving report and classified hardware list
FROM PROCESS:
TO PROCESS: 2.1.1 enter h/w register data
2.1.2 assign HW_ID
DATA STRUCTURE:
Receiving report + supplier_data + hw_data

DATA FLOW NAME: repa_data
DESCRIPTION: out of order hardware data
FROM PROCESS:
TO PROCESS: 2.4 repair hardware
2.4.1 enter repair data
DATA STRUCTURE:
div_id + sect_id + year + repa_no + repa_date
+ [supplier ID, supplier name] + {hw_repa_list}

DATA FLOW NAME: repair_verified h/w
DESCRIPTION: system verified that hardware was repaired
FROM PROCESS: 2.5.3 Verify repair data
TO PROCESS: 2.5.4 Update h/w status
DATA STRUCTURE:
* alias: id_verified h/w*

DATA FLOW NAME: report_data
DESCRIPTION: data from report generation
FROM PROCESS: 4.2 process data
TO PROCESS: 4.3 print result
DATA STRUCTURE:
*same as the "report" but it is not printed output *

Figure 4.22 Data dictionary entries for data flows (continued)

DATA FLOW NAME: report
DESCRIPTION: report is generated by system that has varies style
FROM PROCESS: 4.0 report generation
4.3 print result
TO PROCESS:
DATA STRUCTURE:
[hardware report,
supplier report,
division report,
section report,
summary of hardware registration in requested budget year,
summary of repair hardware,
summary of disposal hardware,
summary of hardware quantity in department,
summary of hardware quantity in requested budget year
summary of hardware quantity in section]

DATA FLOW NAME: result_data
DESCRIPTION: data from query process
FROM PROCESS: 3.2 process data
TO PROCESS: 3.3 display result
DATA STRUCTURE:
[hardware data and status of requested HW_ID
hardware data of requested specification and section
Hardward list in requested status, section and specification,
List of all/specific borrowed hardware in requested return date,
List of all/ specific repaired hardware in requested return date,
summary graph of hardware quantity in department or division,
summary graph of hardware quantity that is distinguished by status,
drill down graph of hardware quantity in section]

DATA FLOW NAME: retu_data
DESCRIPTION: borrowed hardware data from borrower that is about hardware, status and so on
FROM PROCESS:
TO PROCESS: 2.3 return hardware
2.3.1 enter return data
DATA STRUCTURE:
div_id + sect_id + year + retu_no + retu_date
+ [return ID, return name] + [recipient ID, recipient name]
+ {hw_retu_list}

DATA FLOW NAME: retu_doc
DESCRIPTION: return document for checking
FROM PROCESS: 2.3.5 Generate return document
TO PROCESS: 2.3.6 Add return data
DATA STRUCTURE:
see report in appendix B

DATA FLOW NAME: retrieved data
DESCRIPTION: data that is retrieved from data store when system get row number
FROM PROCESS: 1.2.2 display found row
1.3.2 display found row
TO PROCESS:
DATA STRUCTURE:
data in data store

DATA FLOW NAME: status
DESCRIPTION: status of hardware that store in HW_REGI data store
FROM PROCESS:
2.2.4, 2.3.4, 2.4.4,2.5.4, 2.6.4 update h/w status
TO PROCESS:
DATA STRUCTURE:
[wait, use, borrow, bad, repair, dispose]

DATA FLOW NAME: status_verified h/w
DESCRIPTION: system verifies that hardware is in valid status
FROM PROCESS: 2.2.3, 2.4.3, 2.6.3 verify status
TO PROCESS:
2.2.4, 2.4.4, 2.6.4 update h/w status
DATA STRUCTURE:
alias: id_verified h/w

DATA FLOW NAME: trans_data
DESCRIPTION: Transaction data from section, that would like to distribute, borrow, return, repair or dispose hardware.
FROM PROCESS:
TO PROCESS: 2.0 transaction process
DATA STRUCTURE:
[dist_data, retu_data, repa_data, rece_data, disp_data]

DATA FLOW NAME: Updateable data
DESCRIPTION: Data of 10 data stores, which can add, edit or delete. The data must pass validation rule.
FROM PROCESS:
TO PROCESS: 1.0 data manipulation
DATA STRUCTURE:
[new_data, del_data, edit_data]

DATA FLOW NAME: Verified data
DESCRIPTION: Data of basic data is verified with validation rule
FROM PROCESS: 1.1.2 verity related table
TO PROCESS: 1.1.3 insert new row
DATA STRUCTURE:
(ID) + new_data *verified data*

Figure 4.23 Data dictionary entries for data flows (continued)

4.2.4 Database Design

Selecting and identifying data from collected data and system requirement, it gets related entities, attributes and constraints. These entities are identified relationships and designed by relational database concept. Through normalization a collection of data in a record structure is refined and shown in Figure 4.24 data structure diagram. The designed database is central database, which works as back office database. In addition, the information system uses in many places, somewhere may not support online system. For this reason, it has an extra data store to store SQL commands of transaction process. The data store is sent to database center and executed, then "Trans data" has consistent data. Descriptions of data stores are shown as following.

1. Table: HW

PK	FK	Field Name	Data Type	Description
✓	✓	Class_ID	Char(4)	Hardware class ID
✓	✓	Type_ID	Char(3)	Hardware type ID
✓		Spec_ID	Char(4)	Hardware specification ID
		Name	Char(40)	Hardware specification name
		Unit	Char(10)	Hardware unit e.g. box, dozen
		Cost	Real	Average cost that is set by Bureau Of Budget
		Comment	Char(250)	Comment

2. Table: HW_GROUP

PK	FK	Field Name	Data Type	Description
✓		Group_ID	Char(2)	Hardware group ID
		Name	Char(40)	Hardware group name
		Desc	Char(68)	Description

3. Table: HW_CLASS

PK	FK	Field Name	Data Type	Description
✓		Class_ID	Char(4)	Hardware class ID
		Name1	Char(68)	Hardware class name
		Name2	Char(40)	Short name
	✓	Group_ID	Char(2)	Hardware group ID

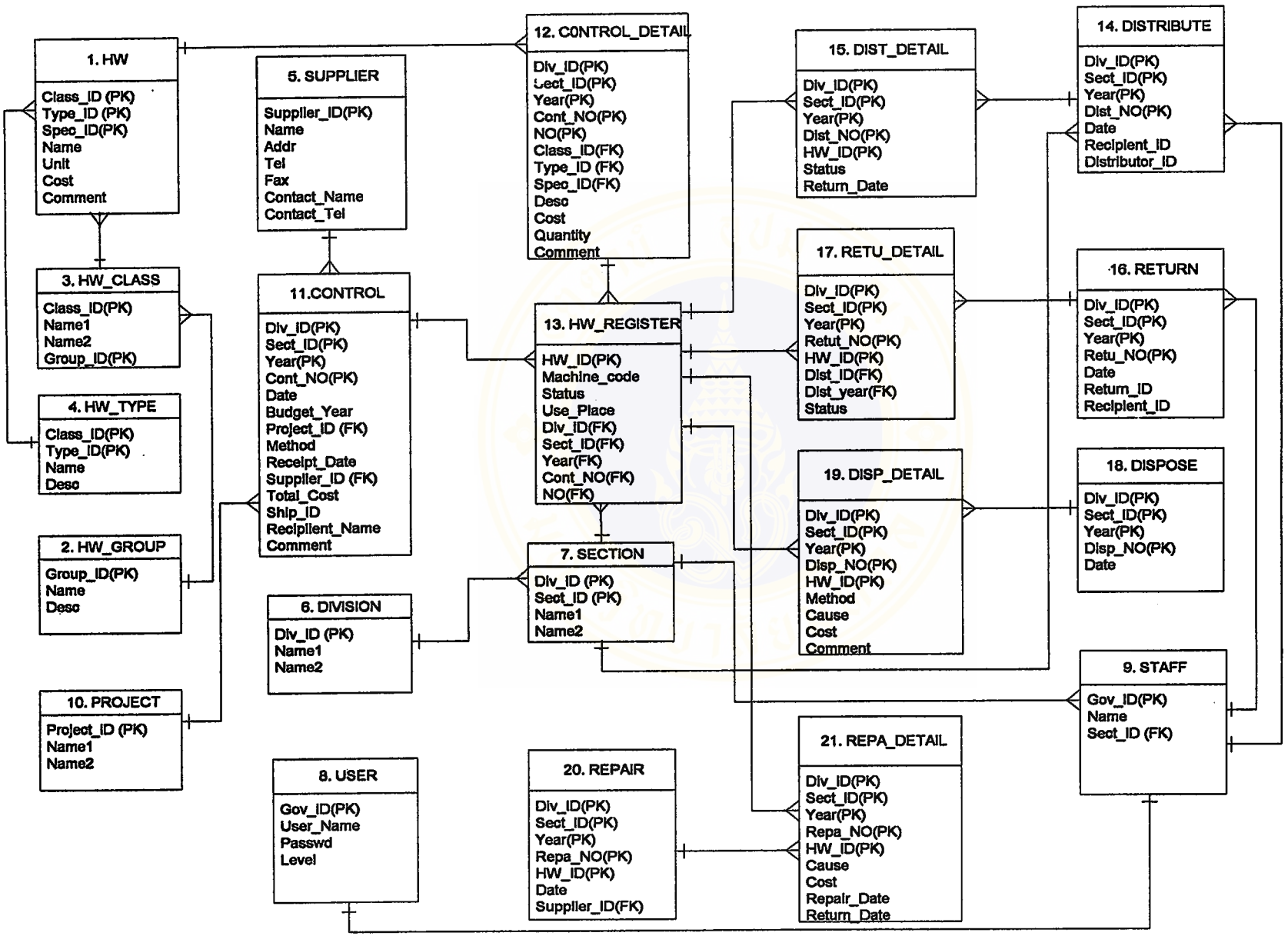


Figure 4.24 Data structure diagram

4. Table: HW_TYPE

PK	FK	Field Name	Data Type	Description
✓		Class_ID	Char(4)	Hardware class ID
✓		Type_ID	Char(3)	Hardware type ID
		Name	Char(40)	Hardware type name
		Desc	Char(68)	Hardware type description

5. Table: SUPPLIER

PK	FK	Field Name	Data Type	Description
✓		Supplier_ID	Char(4)	Supplier ID
		Name	Char(68)	Supplier name
		Addr	Char(100)	Address
		Tel	Char(20)	Telephone number
		Fax	Char(20)	Facsimile number
		Contact_Name	Char(68)	Contact name
		Contact_Tel	Char(20)	Contact telephone number

6. Table: DIVISION

PK	FK	Field Name	Data Type	Description
✓		Div_ID	Char(3)	Division ID
		Name1	Char(68)	Division Name
		Name2	Char(40)	Division short name

7. Table: SECTION

PK	FK	Field Name	Data Type	Description
✓	✓	Div_ID	Char(3)	Division ID
✓		Sect_ID	Char(3)	Section ID
		Name1	Char(68)	Section name
		Name2	Char(40)	Section short name

8. Table: SECURITY

PK	FK	Field Name	Data Type	Description
✓		Gov_ID	Char(6)	Government official ID
		User_ID	Char(10)	User ID for enter system
		Passwd	Char(10)	Password
		Level	Char(1)	Authorization(1= DBA/ system administrator, 2= operator, 3=general user)

9. Table: STAFF

PK	FK	Field Name	Data Type	Description
✓		Gov_ID	Char(6)	Government official ID
		Name	Char(68)	Official name
	✓	Div_ID	Char(3)	Division ID
	✓	Sect_ID	Char(3)	Section ID

10. Table: PROJECT

PK	FK	Field Name	Data Type	Description
✓		Project_ID	Char(6)	Project ID
		Name1	Char(100)	Project name
		Name2	Char(80)	Project short name

11. Table: CONTROL

PK	FK	Field Name	Data Type	Description
✓	✓	Div_ID	Char(3)	Division ID
✓	✓	Sect_ID	Char(3)	Section ID
✓		Year	Char(2)	Record year
✓		Cont_NO	Char(4)	Running number of control table
		Date	Date	Registration date
		Budget_Year	Char(4)	Budget year
	✓	Project_ID	Char(6)	Project ID
		Method	Char(1)	Receiving method (buy=1, donate=2, receive from other section=3)
		Receipt_Date	Date	Receipt date
	✓	Supplier_ID	Char(4)	Supplier ID
		Total_Cost	Real	Total cost of receiving report
		Ship_ID	Char(10)	Ship ID
		Recipient_Name	Char(68)	Recipient name
		Comment	Char(150)	Comment e.g. donor name

12. Table: CONT_DETAIL

PK	FK	Field Name	Data Type	Description
✓	✓	Div_ID	Char(3)	Division ID
✓	✓	Sect_ID	Char(3)	Section ID
✓	✓	Year	Char(2)	Record year
✓	✓	Cont_NO	Char(4)	Running number of CONTROL table
✓		NO(PK)	Char(4)	Running number of hardware list
	✓	Class_ID	Char(4)	Hardware class ID
	✓	Type_ID	Char(3)	Hardware type ID
	✓	Spec_ID	Char(4)	Hardware specification ID
		Desc	Char(40)	Hardware specification description ,trademark , size and the like
		Cost	Real	Cost per unit
		Quantity	Number	Quantity
		Comment	Char(68)	Comment

13. Table: HW_REGI

PK	FK	Field Name	Data Type	Description
✓		HW_ID	Char(30)	Hardware ID
		Machine_code	Char(20)	Machine code that screen on hardware
		Status	Char(1)	Hardware status(wait=1, use=2, borrow = 3, bad =4, repair=5,dispose=6)
		Use_Place	Char(68)	Use place e.g. section /building name
	✓	Div_ID	Char(3)	Division ID
	✓	Sect_ID	Char(3)	Section ID
	✓	Year	Char(2)	Record year
	✓	Cont_NO	Char(4)	Running number of CONTROL table
	✓	NO	Char(4)	Running number of hardware list

14. Table: DISTRIBUTE

PK	FK	Field Name	Data Type	Description
✓		Div_ID	Char(3)	Division ID
✓		Sect_ID	Char(3)	Section ID
✓		Year	Char(2)	Record year
✓		Dist_NO	Char(4)	Running number of DISTRIBUTE table
		Date	Date	Distribution date
	✓	Recipient_ID	Char(6)	Recipient ID (Gov_ID)
	✓	Distributor_ID	Char(6)	Distributor ID (Gov_ID)

15. Table: DIST_DETAIL

PK	FK	Field Name	Data Type	Description
✓	✓	Div_ID	Char(3)	Division ID
✓	✓	Sect_ID	Char(3)	Section ID
✓	✓	Year	Char(2)	Record year
✓	✓	Dist_NO	Char(4)	Running number of DISTRIBUTE table
✓		HW_ID	Char(20)	Hardware ID
		Status	Char(1)	Distribution status (distribute=1, borrow =2)
		Return_Date	Date	Return date, In case of distribution return date can be none

16. Table: RETURN

PK	FK	Field Name	Data Type	Description
✓		Div_ID	Char(3)	Division ID
✓		Sect_ID	Char(3)	Section ID
✓		Year	Char(2)	Record year
✓		Retu_NO	Char(4)	Running number of RETURN table
		Date	Date	Return date
	✓	Return_ID	Char(6)	Return ID (Gov_ID)
	✓	Recipient_ID	Char(6)	Recipient ID (Gov_ID)

17. Table: RETU_DETAIL

PK	FK	Field Name	Data Type	Description
✓	✓	Div_ID	Char(3)	Division ID
✓	✓	Sect_ID	Char(3)	Section ID
✓	✓	Year	Char(2)	Record year
✓	✓	Retu_NO	Char(4)	Running number of RETURN table
✓		HW_ID	Char(20)	Hardware ID
	✓	Dist_ID	Char(4)	Distribute ID
	✓	Dist_Year	Char(2)	Distribute record year
		Status	Char(1)	returned hardware status(good=1, bad =2)

18. Table: DISPOSE

PK	FK	Field Name	Data Type	Description
✓		Div_ID	Char(3)	Division ID
✓		Sect_ID	Char(3)	Section ID
✓		Year	Char(2)	Record year
✓		Disp_NO	Char(4)	Running number of DISPOSE table
		Date	Date	Disposal date

19. Table: DISP_DETAIL

PK	FK	Field Name	Data Type	Description
✓	✓	Div_ID	Char(3)	Division ID
✓	✓	Sect_ID	Char(3)	Section ID
✓	✓	Year	Char(2)	Record year
✓	✓	Disp_NO	Char(4)	Running number of DISPOSE table
✓		HW_ID	Char(20)	Hardware ID
		Method	Char(1)	Disposal method (sell=1, exchange =2, give to other section=3, destroy=4, lost =5)
		Cause	Char(68)	Disposal cost
		Cost	Real	Sell cost (if disposal method is "sell")
		Comment	Char(120)	Comment

20. Table: REPAIR

PK	FK	Field Name	Data Type	Description
✓		Div_ID	Char(3)	Division ID
✓		Sect_ID	Char(3)	Section ID
✓		Year	Char(2)	Record year
✓		Repa_NO	Char(4)	Running number of REPAIR table
		HW_ID	Char(20)	Hardware ID
		Date	Date	Record date
	✓	Supplier_ID	Char(4)	Supplier ID that repair hardware

21. Table: REPA_DETAIL

PK	FK	Field Name	Data Type	Description
✓	✓	Div_ID	Char(3)	Division ID
✓	✓	Sect_ID	Char(3)	Section ID
✓	✓	Year	Char(2)	Record year
✓	✓	Repa_NO	Char(4)	Running number of REPAIR table
✓		HW_ID	Char(20)	Hardware ID
		Cause	Char(68)	Repair cause
		Cost	Real	Repair cost
		Repair_Date	Date	Repair date
		Return_Date	Date	Return repaired hardware date

22. Table: SQL_TRANS

PK	FK	Field Name	Data Type	Description
✓		NO	Double	Auto running key
		Sql_text	Char(32767)	SQL statement
		Date_time	TimeStamp	Date & time of recording
		Done	Char(1)	If 'Y' this record was sent to update.

4.2.5 Procedure Design

PowerBuilder is object- oriented programming, which each created menu or window with PowerBuilder is a self-contained module called an object. The basic building blocks of a PowerBuilder application are the created objects. Each object contains the particular characteristics and behaviors (properties, events, and functions) that are appropriate to it. By taking advantage of object-oriented programming techniques such as encapsulation, inheritance, and polymorphism, the processes in DFD are refine and adjusted as following:

1. Transform the processes in DFD into structure chart, which is easier to maintain and reduce complexity.

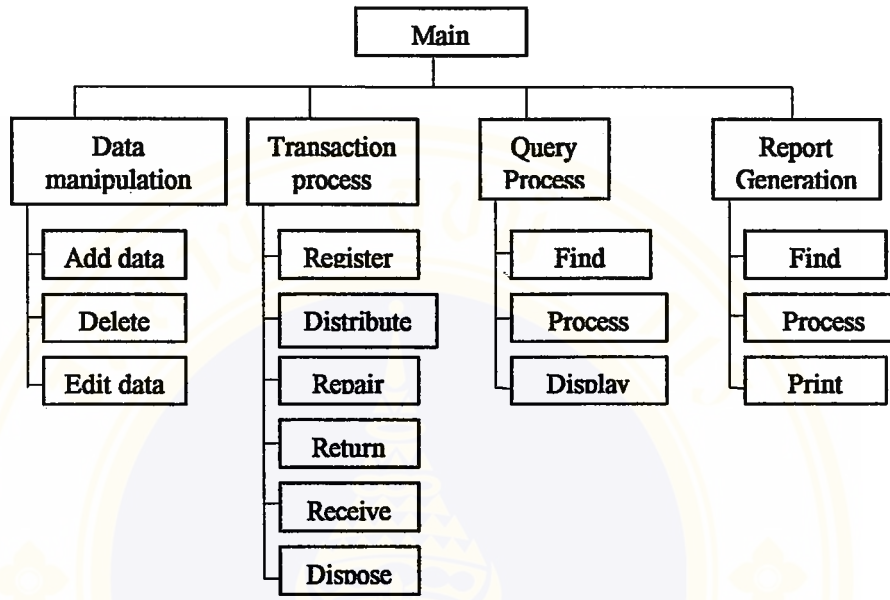


Figure 4.25 Structure Chart

2. Boxes in structure chart are grouped and designed to window objects. These window objects have some common functions and events, which can design to ancestor window objects for inheritance and reuse.

Table 4.2 Characteristic of process

Process	Characteristic
Data manipulation	- All windows can inherit
Transaction process	- Receive repaired hardware window can not inherit - Registration has a additional window for adding hardware registration ID
Query process	- Distinguish tabular and graph output window - Tabular window can not inherit because they have too different function. - Graph window can inherit
Report generation	- All windows use the same window but use different display data (data window object)

3. Design additional events to ease of use in window operations style and convenient operation such as open, close and so on.

Table 4.3 Ancestor window objects

Process	Event group	Event
Data manipulation	Window	Open Close
	Navigation	First Previous Next Last Search
	Data	Add Delete Update Undo Undelete Cancel
Transaction process	Window	Open Close
	Data	Update master Insert detail Update detail Search Print
Query process (graph)	Window	Open Close
	Data	Set argument Process data
	Convenient	Set graph type Set graph spacing
Report generation	Window	Open Close
	Data	Set argument Process data
	Convenient	Zoom Page Save as Printer setup Print

4. Consider shared functions to distribute and create new window object.

Table 4.4 Shared window object

Process	Function	Description
Data manipulation	Search	Search data by name
Transaction process	Search	Search hw_code Search hw_id by name Search hw_id by hw_code Search hw_id by hw_id
	Print	Print output document
Query process	Display Graph	Set graph type Set graph spacing
Query process and report generation	Set argument	Set section Set hardware specification Set date Set year
Share	Calendar About	Calendar About the system

5. Design program specification of each window that is shown in Appendix D.

4.3 Information System for Government Inventory Management

Using the Database painter of Sybase SQL anywhere 5.0 to create database. Powersolf PowerBuilder Enterprise/32 Version 6.0 is graphical application development tools and Oasis SE Version 1.3.6.0 is help authoring tools for government inventory management system, which implements under microcomputer Pentium II 350 MHz CPU, Windows98 operating system. The information system consists of 3 major processes: 1) Data Manipulation 2)Transaction Processing, 3) Query and Report. The capability of processes is show in Table 4.5

Table 4.5 Capability of process

Process	Capability
Data manipulation	Manipulate data in these data store 1. Hardware group 2. Hardware class 3. Hardware type 4. Hardware (specification)

Process	Capability
	5. Supplier 6. Division 7. Section 8. Staff 9. Security 10. Project
Transaction process	1. Register hardware 2. Distribute / borrow hardware 3. Return hardware 4. Repair hardware 5. Receive repaired hardware 6. Dispose hardware
Query and report	*A. Tabular result* 1. Hardware data and status of requested HW_ID 2. Hardware data of requested specification and section 3. Hardware list in requested status , section and specification 4. List of all/specific borrowed hardware in requested return date 5. List of all/specific repaired hardware in requested return date *B. Graph result* 1. Summary graph of hardware quantity in department or division 2. Summary graph of hardware quantity that is distinguished by status 3. Drill down graph of hardware quantity in section *C. Report* 1. Hardware report (group, class, type, specification) 2. Supplier report 3. Division and section report 4. Summary of hardware registration in requested budget year 5. Summary of repair hardware 6. Summary of disposal hardware 7. Summary of hardware quantity in section 8. Summary of hardware quantity in department 9. Summary of hardware quantity in requested budget year 10. Summary of hardware quantity in requested budget year and section

Since the information system works on client/server network, many users can use it. The users are divided into 3 levels: Database Administrator, operator and general user. The privilege of each user group is shown in Table 4.6.

Table 4.6 Privilege of users

Process / User	Data Manipulation	Transaction Processing	Query And report
DBA	✓		✓
Operator		✓	✓
General user			✓

Users access the information system through login window, which verifies user ID, password and accessible level. In addition, operator can access data of transaction processing in division and section that user are under.

By the way, the information system has an additional process for data access of branch office, which cannot communicate database server across network. The process keeps SQL commands of each transaction process, then user (operator) uses the information system to gets the SQL command into text file, which is sent to database center by electronic mail or file transfer process. DBA uses Interactive SQL to execute the text file, then "Trans data" will be updated and database has consistent data.

CHAPTER V

DISCUSSION

The information system for government inventory management for a case study of Land Development Department works on client/server network. The system consists of three major processes as follows:

- Data manipulation: Manipulate relative data such as supplier, hardware, staff, section and so on.
- Transaction processing: Support operation management, which are registration, distribution, borrowing, repair and disposal.
- Query and report: Process pre-defined outputs and preplanned printed reports. A user can choose to access between a particular data, which is deep in detail, or just overall data, which is convenient for comparative analysis.

Users of the information system are divided into 3 levels: Database administrator, operator and general user. All levels can access query and report menu, data manipulation menu can be accessed by database administrator level and transaction processing menu can be accessed by operator level. They access the information system through login window, which verifies user ID, password and accessible level. In addition, operator can access data of transaction processing in division and section in which user is under.

Moreover, the information system uses in many places, somewhere may not support online system. For this reason, it has an extra function to store SQL commands of transaction process into file. The file is sent and executed at database center, then the database center has up to date and consistent data.

The information system is designed and developed using data flow analysis, relational database and Object-Oriented programming. It uses the Database painter of Sybase SQL anywhere 5.0 to create database, Powersolf PowerBuilder Enterprise/32 Version 6.0 to develop application and Oasis SE Version 1.3.6.0 to create help file.

The advantages of the information system for government inventory management for a case study of Land Development Department are as follows:

- The problems of inefficiency government inventory management can be solved and improved. The information system changes operation from analog to electronics, searching from manual to digital and database from analog to digital. The information system introduces online operation and standard database, which reduces access time, increases accuracy and provides consistent data.
- There is database and information system for government inventory management.
- Material section of Land Development Department and other government organizations have information system for government inventory management to apply their inventory management system

CHAPTER VI

CONCLUSION

Increasing important role of information system in most organizations makes information system is critical to the success of every business. Land Development Department has an advantage to develop information system for government inventory management because of its computer network system. Not only Land Development Department but also other government organizations can use the information system to improve their ineffective operation of government inventory management.

In addition, the possibility of a new software development style, in which programmers stop coding everything from scratch and begin assembling applications from well-stocked catalogs of reusable software components. Object-oriented programming has clearly been accepted by the new software development style because of the benefits as follows:

- Object-oriented programs can be more easily maintained and adapted than procedural languages.
- More code can be reused from project to project when the code is object-oriented, rather than procedural.
- Object-oriented programs scale well in regard to the amount of complexity that the developer must face compared to procedural programs.

Consequently, the information system for government inventory management for a case study of Land Development Department was developed by PowerBuilder that is object-oriented programming tool. This research shows that the information system supports all above benefits especially in inheritance and encapsulation.

Data flow analysis was used in this research, it was a valuable for performing process analysis although it had to be adjusted and refined in design process. Beside, as data flow analysis have been used for a long time, this research may be guideline for developer who would like to move his old data flow diagram and structure programming to object-oriented programming. But objects in this research focus on replacing process in data flow diagram with window object.

By the way, data in the information system was designed by relational database model. Relational database is adequate for database model in this research because information needs are two-dimensional and not complex data, which can be normalized. Additional SQL-based relational database is more important characteristics that should be considered.

Recommendation

1. Develop functions of privileged operation to discard requested document, which are requisition form, borrowing form, out of order hardware list. The functions can control authorization to let the information system know who can distribute, borrow, or approve. In addition, the functions have to support electronic signature.

2. Develop this information system to OLAP (Online Analytical Processing) system that is designed for live data access and analysis. In this information system, most results in query process are summary and comparative analysis model. Developer can add statistical analysis model for viewing trends and required historical data. The OLAP system is used by analysts and managers who frequently want a higher-level aggregated view of the data.
3. Develop and link this information system to another relative system such purchasing, procurement, budget planning and so on. The combinations of systems make complete inventory management and control system, which can be developed to DSS or EIS.
4. Apply this information system to Internet/ Intranet application. PowerBuilder version 7.0 offers significant productivity enhancements and broad support for Web-based component standards, web.pb ´access Distributed PowerBuilder DPB objects as part of an HTTP application.

REFERENCES

1. Land Development Department (1996). Introduction to Land Development Department. Available from: http://www.ldd.go.th. [Accessed 1999 Apr 24].
2. Arnold J.R. Introduction to materials management. 3rd ed. USA: Prentice Hall PTR; 1998.
3. Tersine Richard J. Principles of inventory and materials management. 4th ed. USA: Prentice Hall PTR; 1994.
4. มหาวิทยาลัยสุโขทัยธรรมธิราช. การบริหารวัสดุและการจัดซื้อ. พิมพ์ครั้งที่ 5. กรุงเทพ: สำนักพิมพ์มหาวิทยาลัยสุโขทัยธรรมธิราช; 2533.
5. สุมนา อยู่โพธิ์. การจัดซื้อและบริหารพัสดุ. กรุงเทพ : โรงพิมพ์ชวนพิมพ์; 2539.
6. อดุลย์ จาตุรงคกุล. การจัดซื้อ. พิมพ์ครั้งที่ 2. กรุงเทพ: โรงพิมพ์มหาวิทยาลัยธรรมศาสตร์;2538.
7. ศิริจันทร์ ทองประเสริฐ. ระบบพัสดุคงคลัง. กรุงเทพ: ภาควิชาวิศวกรรมอุตสาหการ จุฬาลงกรณ์มหาวิทยาลัย; 2538.
8. วิจดา รัตตะมณี. โครงการวิเคราะห์และออกแบบระบบงานควบคุมและตรวจสอบพัสดุ. กรุงเทพฯ: ภาควิชาเทคโนโลยีสารสนเทศ คณะเทคโนโลยีสารสนเทศ สถาบันเทคโนโลยีพระจอมเกล้าเจ้าคุณทหารลาดกระบัง; 2540.
9. สำนักงบประมาณ. คู่มือการกำหนดหมายเลขพัสดุ. กรุงเทพ; 2537.
10. Charles Parker. Management information systems: strategy and action. 2nd ed. Singapore: McGraw-Hill; 1993.

11. Ralph M. Stair. Principles of information systems: a managerial approach. 2nd ed. USA: boyd&fraser publishing company; 1996.

12. Bakman Alex. How to deliver client/server applications that work. USA: Prentice Hall PTR; 1995.

13. Martin, James. Client/server database : enterprise computing / James Martin, Joe Leben. USA: Prentice Hall PTR; 1995.

14. James A. Senn. Analysis and design of information systems. 2nd ed., Singapore: McGraw-Hill; 1989.

15. Larry T. Vaughn. Client/server system design and implementation. Singapore: McGraw-Hill; 1994.

16. The University of Texas at Austin(1996). Normalization. Available from: http://www.utexas.edu/cc/dbms/utinfo/relmode/normal1.html. [Accessed 1999 Apr 22].

17. Roger S. Pressman. Software engineering a practitioner's approach. 4th ed. Singapore : McGraw-Hill; 1997.

18. Ashok Ramachandran (1998). PowerBuilder Primers. Available from: http://www.ashok.pair.com/pbrimer.html. [Accessed 1999 Apr 22].

19. Informix Software Inc.(1999). Informix. Available from: http://www.informix.com. [Accessed 1999,Apr,23].

20. Sybase Inc.(1999). Sybase Available from: http://www.sybase.com. [Accessed 1999,Apr,23].

21. Nathavipa Phasuk, Voramon Uronkarn. Management of equipment data of Industrial Engineering Department by Microsoft Access. Bangkok: Factory of Engineering, Mahidol University; 1996.

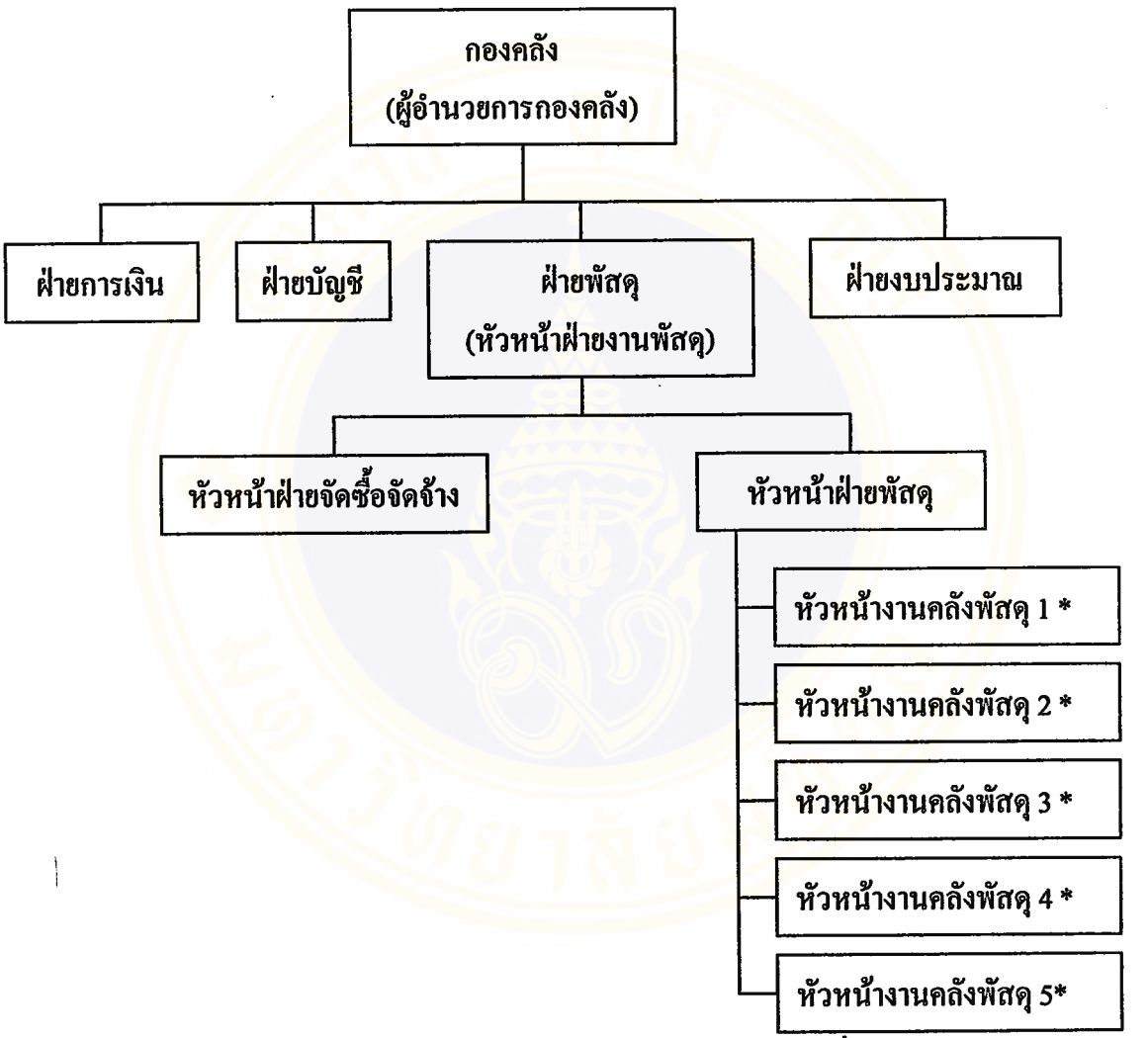
22. วิเลิศ เลิศบัณฑิตกุล. ระบบสารสนเทศสำหรับคลังยาและเวชภัณฑ์ของโรงพยาบาลขนาดใหญ่ [วิทยานิพนธ์ปริญญาวิทยาศาสตรมหาบัณฑิต สาขาวิทยาศาสตร์คอมพิวเตอร์].

APPENDIX A

EXSISTING REPORT

ฝ่ายพัสดุของกรมพัฒนาที่ดินแบ่งออกเป็น 2 ประเภทคือ

1. ส่วนกลาง แสดงดังแผนผังด้านล่าง
2. ส่วนต่างจังหวัด จะเป็นส่วนหนึ่งของฝ่ายบริหารทั่วไป



* มีการแบ่งส่วนรับผิดชอบกองที่ดูแลคนละ 1-2 กอง

แผนผังกองคลังของกรมพัฒนาทีดิน (ส่วนกลาง)

ทะเบียนครุภัณฑ์

ส่วนราชการ.....

หน่วยงาน.....

แผนที่.....

ประเภท.....ชื่อหรือชนิดครุภัณฑ์.....

วัน เดือน ปี	เลขที่ หรือรหัส	ยี่ห้อ ชนิด แบบ ขนาด และ ลักษณะ	หมายเลข และ ทะเบียน	ราคา ต่อ หน่วย (บาท)	วิธี การได้ มา	เลขที่ เอกสาร	ใช้ ประจำ ที่	หลัก ฐาน การ จ่าย	รายการ เปลี่ยน แปลง	เลขที่ เอกสาร	หมาย เหตุ

Registration document

ครุภัณฑ์

รหัส.....

ชื่อสิ่งของ.....

ขนาดลักษณะ.....

บริษัทที่ขาย.....

หมายเลขประจำครุภัณฑ์

ลำดับที่		รายการยืม				รายการส่งคืน		หมายเหตุ
	วัน เดือน ปี	ชื่อผู้ยืม	ชื่อผู้จ่าย	ชื่อผู้รับของ	วัน เดือน ปี	ชื่อผู้ส่งคืน	ชื่อผู้รับคืน	

Registration document of each hardware

สรุปบัญชีหมวดค่าครุภัณฑ์ จำแนกตามหน่วยงาน

กรมพัฒนาที่ดิน

กอง สำนักงานพัฒนาที่ดินเขต 1

พิมพ์วันที่ 12/10/41

ลำดับ	ฝ่าย	รายการ	จำนวนที่ควรจะมี	จำนวนที่ได้รับทั้งหมด	ยังขาด	หมายเหตุ
1	สำนักงานเขต	รถบรรทุก น้ำหนักบรรทุกไม่ต่ำกว่า 1 ตัน เครื่องยนต์ดีเซลช่วงยาว	0	4	-4	
2	ฝ่ายวิชาการ	ตู้เหล็กเก็บเอกสาร 2 บาน	0	8	-8	
		ตู้เหล็กเก็บเอกสาร 4 ลิ้นชัก	0	4	-4	
		เครื่องพ่นยาแบบใช้แรงลม ขนาดเครื่องยนต์ไม่ต่ำกว่า 3 แรงม้า	0	4	-4	
		เครื่องสูบน้ำใช้เครื่องเบนซิน สูบน้ำไม่น้อยกว่า 1,100 ลิตร/นาที	0	2	-2	
		เทปวัดระยะขนาดกว้าง 13 มม. ความยาวไม่น้อยกว่า 50 เมตร	0	4	-4	
3	สถานีพัฒนาที่ดินปทุมธานี	กล้องระดับ ชนิดอัตโนมัติพร้อมขาตั้ง	0	4	-4	
		กล้องวัดมุมชนิดธรรมดา	0	4	-4	
		ตู้เหล็กเก็บเอกสาร 2 บาน	0	8	-8	
		...	...	...	...	
		รวม		332	-332	

Summary of hardware quantity in department

สรุปบัญชีหมวดค่าครุภัณฑ์ ที่ดินและสิ่งก่อสร้าง จำแนกตามปีงบประมาณ

กรมพัฒนาที่ดิน หน้าที่ 1

ประจำปีงบประมาณ 2540 พิมพ์วันที่ 12/10/41

หน่วยงาน(กอง)	ฝ่าย	หมวด	รายการ	จำนวน
สำนักงานพัฒนาที่ดินเขต 1	สถานีพัฒนาที่ดินจังหวัดนครปฐม	หมวดค่าครุภัณฑ์	ครุภัณฑ์สำนักงาน	
			ตู้เหล็กเก็บเอกสาร 2 บาน	2
			ตู้เหล็กเก็บเอกสาร 4 ลิ้นชัก	4
			พัดลมแบบตั้งพื้น ขนาด 16 นิ้ว(400 มม.)	3
			โต๊ะทำงานพร้อมเก้าอี้ ระดับ 3-6	3
สำนักงานพัฒนาที่ดินเขต 1	สถานีพัฒนาที่ดินนครนายก	หมวดค่าครุภัณฑ์	ครุภัณฑ์สำนักงาน	
			ตู้เหล็กเก็บเอกสาร 4 ลิ้นชัก	1
			โต๊ะทำงานพร้อมเก้าอี้ ระดับ 3 -6	2
สำนักงานพัฒนาที่ดินเขต 1	สถานีพัฒนาที่ดินปทุมธานี	หมวดค่าครุภัณฑ์	ครุภัณฑ์ยานพาหนะและขนส่ง	
			รถบรรทุก น้ำหนักบรรทุกไม่ต่ำกว่า 1 ตัน เครื่องยนต์ดีเซลช่วงยาว	1
สำนักงานพัฒนาที่ดินเขต 1	สถานีพัฒนาที่ดินปทุมธานี	หมวดค่าครุภัณฑ์	ครุภัณฑ์สำนักงาน	
			ตู้เหล็กเก็บเอกสาร 2 บาน	4
			ตู้เหล็กเก็บเอกสาร 4 ลิ้นชัก	3
			โต๊ะทำงานพร้อมเก้าอี้ ระดับ 1-2	2
			โต๊ะทำงานพร้อมเก้าอี้ ระดับ 3-6	2

Summary of hardware quantity in requested budget year

รายงานตรวจนับครุภัณฑ์คงเหลือประจำปี 2541
เพียงวันที่ 30 กันยายน 2541 สำนักงานพัฒนาที่ดินเขต 11

ฝ่ายบริหารทั่วไป

พิมพ์วันที่ 12/10/41

ลำดับที่	ประเภทครุภัณฑ์	ยี่ห้อ	แบบ ชนิด ขนาด	หมายเลขเครื่อง	หมายเลขทะเบียน	วัน เดือน ปี	ยอดคงเหลือ	บันทึกคณะกรรมการ			หมายเหตุ	รหัสกอง	รหัสครุภัณฑ์
								นับได้	เกิน	ขาด			
	ครุภัณฑ์ยานพาหนะและขนส่ง												
	(รถยนต์นั่ง)												
1	รถยนต์นั่ง	TOYOTA	โฟร์วิล	8ย.3303		18 กย.41	1 คัน	1 คัน	-	-			
2	รถยนต์นั่ง		แลนด์โรเวอร์	6ม-4116		18 กย.41	1 คัน	1 คัน	-	-			
3	รถยนต์นั่ง		แลนด์โรเวอร์	9ม-0871		18 กย.41	1 คัน	1 คัน	-	-			
	ครุภัณฑ์สำนักงาน												
1	โต๊ะทำงานพร้อมเก้าอี้ ระดับ1-2	-	60x1.20x75	-		28 กค.27	1 ชุด	1 ชุด	-	-	ชำรุดใช้การไม่ได้		
2	โต๊ะทำงานพร้อมเก้าอี้ ระดับ1-2	-	60x1.20x75	-		28 กค.27	1 ชุด	1 ชุด	-	-	ชำรุดใช้การไม่ได้		
3	โต๊ะทำงานพร้อมเก้าอี้ ระดับ1-2	-	1.5x2	-		4 เมย.32	1 ชุด	1 ชุด	-	-			
4	โต๊ะตั้งวิทยุ	-	-	-		23 ธค.31	1 ชุด	1 ชุด	-	-			
5	โต๊ะพิมพ์ดีด พร้อมเก้าอี้	-	.05x1.20x60	-		23 ธค.31	1 ชุด	1 ชุด	-	-	ชำรุดใช้การไม่ได้		
6	โต๊ะหมู่บูชา		ชนิดหมู่ 9 หน้า 8"		-	30 ธค.30	1 ชุด	1 ชุด	-	-			
7	โต๊ะพิมพ์ดีด พร้อมเก้าอี้	-	-			5 มค.31	1 ชุด	1 ชุด	-	-			

Summary of hardware registration

รายงานตรวจนับครุภัณฑ์คงเหลือประจำปี 2539

เพียงวันที่ 30 กันยายน 2539 สถานีพัฒนาที่ดินเชียงราย สำนักงานพัฒนาที่ดินเขต 7

พิมพ์วันที่ 12/10/41

ครุภัณฑ์โฆษณาและเผยแพร่

ลำดับที่	ประเภทครุภัณฑ์	ยี่ห้อ	แบบ ชนิด ขนาด	หมายเลขเครื่อง	หมายเลขทะเบียน	วัน เดือน ปี	ยอดคงเหลือ	บันทึกคณะกรรมการ			หมายเหตุ	รหัสกอง	รหัสครุภัณฑ์
								นับได้	เกิน	ขาด			
1	เครื่องฉายภาพยนตร์	โอดูชิน	รุ่น 3C 10 เอ็นเสียง 16 มม.	54579	6730-003-0026สพด.ชร.01	15 สค.26	1 เครื่อง	1	-	-			
2	เครื่องฉายข้ามศรีษะ	เคบิน	แบบใช้แท่นฉายขนาด 10x10 ใช้ไฟ AC	03533712	6730-001-0026สพด.ชร.01	15 สค.26	1 ชุด	1	-	-			
3	กล้องถ่ายรูป	ยาชิก้า	ขนาดเลนส์ 1:1:8FX	1075582	5720-005-0028สพด.ชร.01	24 กย.28	1 ชุด	1	-	-			
4	กล้องถ่ายรูป	แคนนอล	AF MII	4754439	6720-005-0029สพด.ชร.01	29 เมย.29	1 ชุด	1	-	-			
5	เครื่องบันทึกเสียง	มิตซูบิชิ	แบบตลับตั้งโต๊ะระบบเสตอริโอเล่นเทปได้	8931	7450-001-0026สพด.ชร.02	15 สค.26	1 เครื่อง	1	-	-			
6	ไมโครโฟน	NEC	-		7450-008-0026สพด.ชร.01-06	15 สค.26	6 ชุด	6	-	-			
7	ไมโครโฟน	ไดนามิกส์	ชนิดตั้งโต๊ะ		7450-007-0026สพด.ชร.07-09	15 สค.26	3 ชุด	3	-	-			
8	เครื่องขยายเสียง	รอแยล	ขนาดกำลังส่ง 50 W	6615	7450-007-0026สพด.ชร.01-04	15 สค.26	1 เครื่อง	1	-	-			
9	โทรโข่ง		แบบสะพายไหล่ มีไมโครโฟนในตัว		7450-007-0035สพด.ชร.07-10	29 กย.35	4 ชุด	4	-	-			

Summary of hardware registration(other section)

สรุปบัญชีครุภัณฑ์ ที่ดินและสิ่งก่อสร้าง

กรมพัฒนาที่ดิน หน้าที่ 1

พิมพ์วันที่ 12/10/41

ลำดับ	รายการ	จำนวนที่มีอยู่	หมายเหตุ
1	รถฟาร์มแทรกเตอร์ขนาดเครื่องยนต์ไม่ต่ำกว่า 75 แรงม้า	3	
2	รถฟาร์มฯ เครื่องยนต์ไม่ต่ำกว่า 85 แรงม้า ชนิดขับเคลื่อน 2 ล้อ	3	
3	รถฟาร์มฯ เครื่องยนต์ไม่ต่ำกว่า 85 แรงม้า ชนิดขับเคลื่อน 4 ล้อ	3	
4	รถไถ	3	
5	รถไถชนิดเดินตาม ขนาดเครื่องยนต์ไม่ต่ำกว่า 10 แรงม้า	3	
6	เครื่องพ่นยา	1	
7	เครื่องพ่นยาแบบสูบโยก ขนาดถังจุน้ำยาได้ไม่น้อยกว่า 16	4	
8	เครื่องพ่นยาแบบใช้แรงลม ขนาดเครื่องยนต์ไม่ต่ำกว่า 3 แรงม้า	19	
9	เครื่องพ่นยาแบบใช้แรงดันของเหลวขนาดไม่ต่ำกว่า 1.50 แรงม้า	9	
10	เครื่องชั่ง	2	
11	เครื่องชั่งชนิดที่ 4 แบบมีตุ้มถ่วงชนิดเสากลมขนาดพิกัด 200 กก.	1	
12	เครื่องชั่งชนิดที่ 4 แบบมีตุ้มถ่วงชนิดเสาเหลี่ยมขนาดพิกัด 200 กก.	1	
13	เครื่องสูบน้ำ	3	
14	เครื่องสูบน้ำชนิดเครื่องเบนซิน สูบน้ำได้ไม่น้อยกว่า 450 ลิตร/นาที	3	
15	เครื่องสูบน้ำชนิดเครื่องเบนซินสูบน้ำได้ไม่น้อยกว่า 1,100 ลิตร/นาที	5	
16	เครื่องสูบน้ำใช้เครื่องยนต์ดีเซลสูบน้ำได้ 1,750 ลิตร/นาที	6	
17	เครื่องสูบน้ำใช้มอเตอร์ไฟฟ้าสูบน้ำได้ 450 ลิตร/นาที	1	
18	เครื่องสูบน้ำใช้มอเตอร์ไฟฟ้าสูบน้ำได้ 1,130 ลิตร/นาที	6	
19	ใบมีดหน้า	2	
20	จอรับภาพ	2	
21	จอรับภาพ ขนาด 125*125 นิ้ว	14	
22	จอรับภาพ ขนาด 175*175 นิ้ว	6	
23	เครื่องฉายสไลด์แบบถาดกลมแนวนอน	8	
24	เครื่องฉายภาพข้ามศีรษะ	30	
	...	...	
	รวม	XXX	

Summary of hardware quantity

สรุปบัญชีหมวดค่าครุภัณฑ์ จำแนกตามหน่วยงาน/รายการ

กรมพัฒนาที่ดิน หน้าที่ 1

พิมพ์วันที่ 12/10/41

กอง สำนักงานพัฒนาที่ดินเขต 1 ฝ่าย สถานีพัฒนาที่ดินปทุมธานี

ลำดับ	รายการ	ปีที่ได้รับ	จำนวน	รวม	หมายเหตุ
1	รถบรรทุก				
		2537	1		
	รวม			1	
2	รถบรรทุกน้ำหนักไม่ต่ำกว่า 1 ตัน เครื่องยนต์ดีเซลช่วงยาว				
		2537	1		
		2538	1		
	รวม			2	
	รวมครุภัณฑ์ยานพาหนะและขนส่งทั้งสิ้น			3	
3	โต๊ะทำงานพร้อมเก้าอี้ ระดับ 1-2				
		2538	2		
				2	
4	โต๊ะทำงานพร้อมเก้าอี้ระดับ 3-6				
		2538	2		
		2540	4		
				6	
5	ตู้เหล็กเก็บเอกสาร 2 บาน				
		2538	4		
				4	
6	ตู้เหล็กเก็บเอกสาร 4 ลิ้นชัก				
		2538	3		
				3	
...	...	...	...	...	...

Summary of hardware quantity in requested budget year and section

APPENDIX B

DESIGNED REPORT

รับที่พิมพ์ 07/02/2543

รายงานกลุ่มครุภัณฑ์

รหัสกลุ่มครุภัณฑ์	ชื่อกลุ่มครุภัณฑ์	คำอธิบายเพิ่มเติม
10	ครุภัณฑ์อาวุธ	
23	ครุภัณฑ์ยานพาหนะและขนส่ง	ยานพาหนะพื้นดิน ยานยนต์ รถพ่วง และจักรยาน
38	ครุภัณฑ์ก่อสร้าง	อุปกรณ์ก่อสร้าง การเหมืองแร่ การขุดดินและการซ่อมบำ
65	ครุภัณฑ์การแพทย์	
66	ครุภัณฑ์สำรวจ	
67	ครุภัณฑ์โฆษณาและเผยแพร่	
71	ครุภัณฑ์สำนักงาน	
73	ครุภัณฑ์งานบ้านงานครัว	

Hardware group report

วันที่พิมพ์ 07/02/2543

รายงานประเภทครุภัณฑ์แยกตามกลุ่ม

รหัสประเภทครุภัณฑ์	ชื่อ	ชื่อที่ใช้เรียกแทน
รหัสกลุ่มครุภัณฑ์ 10	ครุภัณฑ์จราจร	
1010	ป้ายที่มีขนาดเกินกว่า 30 มม ถึง 76 มม	ป้าย 30-76 มม
1005	ป้ายที่มีขนาดถึง 30 มม	ป้าย 30 มม
รหัสกลุ่มครุภัณฑ์ 23	ครุภัณฑ์ยานพาหนะและขนส่ง	
2330	รถพ่วง	รถพ่วงเครื่องพร้อมและแคร่รถ
2320	รถบรรทุกและรถลากจูงใช้ล้อ	
2305	ยานพาหนะใช้บนพื้นดิน	
2340	รถจักรยานยนต์ รถจักรยาน	

Hardware class report

วันที่พิมพ์ 07/02/2543

รายงานชนิดครุภัณฑ์แยกตามประเภท

รหัสชนิดครุภัณฑ์	ชื่อชนิดครุภัณฑ์	คำอธิบายเพิ่มเติม
กลุ่มครุภัณฑ์ 10	ครุภัณฑ์อาวุธ	
ประเภทครุภัณฑ์ 1005	ปืนที่มีขนาดถึง 30 มม	
002	ปืนพกลูกโม่	
001	ปืนพกอัตโนมัติ	
กลุ่มครุภัณฑ์ 23	ครุภัณฑ์ยานพาหนะและขนส่ง	
ประเภทครุภัณฑ์ 2305	ยานพาหนะใช้บนพื้นดิน	

Hardware type report

รายงานครุภัณฑ์แยกตามชนิด				วันที่พิมพ์ 07/02/2543
ชนิดครุภัณฑ์	ชื่อ/ชนิด รหัสครุภัณฑ์	หน่วยนับ	ราคา	หมายเหตุ
กลุ่มครุภัณฑ์ 23 ครุภัณฑ์ยานพาหนะและขนส่ง				
<u>ยานยนต์โดยสาร</u>				
รถโดยสารตู้				
	ขนาด 12 ที่นั่ง (ดีเซล) 2310-004-0001	คัน	700,000.00	
รถยนต์นั่งเก๋ง				
	รถประจำตำแหน่งอธิบดี 2310-002-0002	คัน	1,200,000.00	รองปลัดกระทรวง, เอกอัครราชทูตประจำกร รองเลขาธิการนายกรัฐมนตรีฝ่ายการเมือง, เ
...			-	- - -

Hardware specification report

วันที่พิมพ์ 07/02/2543

รายงานกอง/สำนักงาน

รหัส	ชื่อ	ชื่อย่อ
000	ส่วนกลาง	ส่วนกลาง
101	สำนักงานเลขานุการกรม	สลก.
102	กองคลัง	กค.
103	กองการเจ้าหน้าที่	กกจ.
104	กองช่าง	กช.
105	กองแผนงาน	กผง.
106	กองแผนที่และการพิมพ์	กผพ.
107	กองวางแผนการใช้ที่ดิน	กวผ.

Division report

วันที่พิมพ์ 07/02/2543

รายงานหน่วยงานแบ่งตามกองสำนักงาน

รหัสหน่วยงาน	ชื่อหน่วยงาน	ชื่อย่อ
กองสำนักงาน 000	ส่วนกลาง	
000	ส่วนกลาง	ส่วนกลาง
001	หน่วยงานตรวจสอบภายใน	หน่วยงานตรวจสอบภายใน
กองสำนักงาน 101	สำนักงานเลขานุการกรม	
000	สำนักงานเลขานุการกรม	สลก.
001	ฝ่ายสารบรรณ	ฝ่ายสารบรรณ
002	ฝ่ายนิติการ	ฝ่ายนิติการ
003	ฝ่ายช่วยอำนวยการและประสานราชการ	ฝ่ายช่วยอำนวยการฯ
004	ฝ่ายเผยแพร่และประชาสัมพันธ์	ฝ่ายเผยแพร่ฯ

Section report

พิมพ์วันที่ 07/02/2543

รายชื่อผู้ประกอบการ/บริษัทผู้จำหน่าย

รหัส	ชื่อ	ที่อยู่	โทรศัพท์ โทรสาร	ชื่อตัวแทนการติดต่อ โทรศัพท์ตัวแทนติดต่อ
0001	คลองเตย	3658 อาคาร 7 ชั้น ถ.เพชรบุรี 4 แขวงคลองเตย เขตพระโขนง กรุงเทพฯ 10110	2495050	หลอดบ 123544
0002	งามวงศ์วาน	อาคารชุมสายโทรศัพท์งามวงศ์วาน ถ.งามวงศ์วาน อ.เมือง นนทบุรี กทม 11000	5890110	หลอดบ 1234567
0003	แจ้งวัฒนะ	688/123 หลักสี่สแควร์ ซ.3 ถ.แจ้งวัฒนะ คลองถนน บางเขน กทม 10220	5212597	หลอดบ 1111111
0004	บางแค	365/61-63 อาคารศาลีดุปลี ถ.เพชรเกษม แขวงห่วยระเขบางกอกใหญ่ กทม 10600	4570711	หลอดบ 11111
0005	บางนา	119/5 หมู่ 6 อาคารบางนาธานี ตรงข้ามเซนทรัลบีบี้บางนา ถ.บางนา-ตราด กม 3 กทม 10260	3990428-9	หลอดบ 11111111

Supplier report

วันที่พิมพ์ 07/02/25

รายการทะเบียนครุภัณฑ์ประจำปีงบประมาณ 2541

กอง/สำนักงาน กองคลัง ฝ่าย/สถานีงาน งานธุรการ

ประเภทครุภัณฑ์	คุณลักษณะ/ยี่ห้อ/แบบ/ขนาด	หน่วยนับ	เลขทะเบียนครุภัณฑ์ หมายเลขเครื่อง	วันที่ขึ้นทะเบียน	ราคา/หน่วย	วิธีการที่ได้มา	ใช้ประจำที่
กลุ่มครุภัณฑ์ ครุภัณฑ์สำนักงาน							
<u>เครื่องตกแต่งสำนักงาน</u>							
เก้าอี้ชนิดต่างๆ	เก้าอี้ผู้มาติดต่อ เก้าอี้ไม้ขาเหล็ก	ตัว	7110-006-41-ธก-2/24 ไม่มี	29/10/2542	250.00	ซื้อ	ห้องธุรการ
		ตัว	7110-006-41-ธก-2/25 ไม่มี	29/10/2542	250.00	ซื้อ	
		ตัว	7110-006-41-ธก-2/26 ไม่มี	29/10/2542	250.00	ซื้อ	ฟฟฟ

Summary of hardware registration in request budget year

รายการครุภัณฑ์ส่งซ่อมแยกตามหน่วยงานประจำปี 42 วันที่พิมพ์ 07/02/2543

กอง/สำนักงาน กองคลัง ฝ่าย/สถานีงาน งานธุรการ

ประเภทครุภัณฑ์	คุณลักษณะ/ยี่ห้อ/แบบ/ขนาด	หมายเลขครุภัณฑ์ หมายเลขเครื่อง	วันที่ออกใบส่งซ่อม	บริษัท/หน่วยงานที่ซ่อม สาเหตุการซ่อม	ราคาซ่อม	วันที่ส่งซ่อม กำหนดวันรับ
กลุ่มครุภัณฑ์ ครุภัณฑ์สำนักงาน						
เครื่องตกแต่งสำนักงาน						
เก้าอี้ชนิดต่างๆ	เก้าอี้ผู้มาติดต่อ	7110-006-41-ธก-1/4	21/12/42	ดลองเดย	20.00	21/12/2542
	เก้าอี้ขาเหล็กเบาะนวมสีเขียว	ไม่มี		ขาชำรุด		29/12/2542
เก้าอี้ชนิดต่างๆ	เก้าอี้ผู้มาติดต่อ	7110-006-41-ธก-2/21		ดลองเดย	20.00	20/12/2542
	เก้าอี้ไม้ขาเหล็ก	ไม่มี		* ขาชำรุด		23/12/2542
เก้าอี้ชนิดต่างๆ	เก้าอี้ผู้มาติดต่อ	7110-006-41-ธก-2/24		ดลองเดย	20.00	20/12/2542
	เก้าอี้ไม้ขาเหล็ก	ไม่มี		* ขาชำรุด		23/12/2542

Summary of repair hardware

รายงานครุภัณฑ์ที่จำหน่ายประจำปี 42

กอง/สำนักงาน กองคลัง ฝ่าย/สถานีงาน งานธุรการ

ประเภทครุภัณฑ์	คุณลักษณะ/ยี่ห้อ/แบบ/ขนาด	เลขทะเบียนครุภัณฑ์ หมายเลขเครื่อง	วันที่จำหน่าย วิธีการจำหน่าย	สาเหตุการจำหน่าย ราคาจำหน่าย
กลุ่มครุภัณฑ์ ครุภัณฑ์สำนักงาน				
เครื่องตกแต่งสำนักงาน				
เก้าอี้ชนิดต่างๆ	เก้าอี้ผู้มาติดต่อ	7110-006-41-ธก-1/3	15/11/2542 ชำรุดมาก	
	เก้าอี้ขาเหล็กเบาะแวมสีเขียว	ไม่มี	แปรสภาพ/ทำลาย	0.00
			รวมราคาจำหน่าย	0.00
			รวมราคาจำหน่ายทั้งหมด	0.00

Summary of disposal hardware

สรุปบัญชีครุภัณฑ์ วันที่พิมพ์ 07/02/2543

ประเภทครุภัณฑ์	แบบ ชนิด ขนาด	จำนวนที่มีอยู่	หน่วยนับ
ครุภัณฑ์ยานพาหนะและขนส่ง		12	
รถจักรยาน 2 ล้อ	ขนาดวงล้อ 26 นิ้ว	6	คัน
รถจักรยานยนต์	ขนาด 90 ซีซี	3	คัน
รถจักรยานยนต์	ขนาด 110 ซีซี	3	คัน
ครุภัณฑ์งานบ้านงานครัว		2	
ตู้เย็น	ขนาด 6 คิวบิกฟุต	1	ตู้
เครื่องกรองน้ำแบบต่างๆ	ไส้กรองเซรามิค	1	เครื่อง
ครุภัณฑ์โฆษณาและเผยแพร่		2	
กล้องถ่ายรูป	รรมดาขนาดเลนส์ 1:1.8	1	กล้อง
จอรับภาพ	ขนาด 125*125 ซม	1	จอ
โทรทัศน์สี	ขนาด 20 นิ้ว	1	เครื่อง
	รวม	81	

Summary of hardware quantity in department

สรุปบัญชีครุภัณฑ์จำแนกตามหน่วยงาน วันที่พิมพ์ 07/02/2543

กอง/สำนักงาน กองคลัง

ฝ่าย/ประเภทครุภัณฑ์	แบบ ชนิด ขนาด	จำนวนที่มีอยู่	หน่วยนับ
งานธุรการ			
ครุภัณฑ์สำนักงาน		49	
ตู้เก็บแผนที่	ตู้เก็บแผนที่	1	ตู้
โต๊ะชนิดต่างๆ	โต๊ะทำงานระดับ 1-2	3	ชุด
เก้าอี้ชนิดต่างๆ	เก้าอี้ผู้มาติดต่อ	45	ตัว
ครุภัณฑ์สำนักงาน		4	
ตู้เสื้อผ้า	ขนาด 2 บาน	2	ตู้
ตู้เหล็ก	ขนาด 2 บาน	2	ตู้
ครุภัณฑ์โฆษณาและเผยแพร่		1	
โทรทัศน์สี	ขนาด 20 นิ้ว	1	เครื่อง
ครุภัณฑ์งานบ้านงานครัว		2	
ตู้เย็น	ขนาด 6 คิวบิกฟุต	2	ตู้

Summary of hardware quantity in section

วันที่พิมพ์ 07/02/2543

สรุปบัญชีครุภัณฑ์จำแนกตามปีงบประมาณ

ประจำปีงบประมาณ 2542

ฝ่าย	หมวดย่อย/รายการ	จำนวนที่มีอยู่	หน่วยนับ
กอง กองคลัง			
งานธุรการ		14	
	ครุภัณฑ์สำนักงาน	3	
	ตู้เก็บแผนที่ ตู้เก็บแผนที่	1	ตู้
	โต๊ะชนิดต่างๆ โต๊ะทำงานระดับ 1-2	2	ชุด
	ครุภัณฑ์ยานพาหนะและขนส่ง	3	
	รถจักรยานยนต์ ขนาด 110 ซีซี	3	คัน
	ครุภัณฑ์สำนักงาน	2	
	ตู้เหล็ก ขนาด 2 บาน	2	ตู้
	ครุภัณฑ์ยานพาหนะและขนส่ง	1	
	รถจักรยานยนต์ ขนาด 90 ซีซี	1	คัน
	ครุภัณฑ์สำนักงาน	5	
	เครื่องโทรศัพท์ แบบ single line	5	เครื่อง
	รวม	14	

Summary of hardware quantity in requested budget year

สรุปบัญชีครุภัณฑ์จำแนกตามหน่วยงาน วันที่พิมพ์ 07/02/2543

กอง/สำนักงาน กองคลัง ฝ่าย งานธุรการ

ประเภทครุภัณฑ์	แบบ ชนิด ขนาด	ปีที่ได้รับ	จำนวนที่มีอยู่	หน่วยนับ
ครุภัณฑ์สำนักงาน			49	
ตู้เก็บแผนที่	ตู้เก็บแผนที่		1	ตู้
		2543	1	
โต๊ะชนิดต่างๆ	โต๊ะทำงานระดับ 1-2		3	ชุด
		2542	1	
		2543	2	
เก้าอี้ชนิดต่างๆ	เก้าอี้ผู้บริหารพนักพิงสูง		45	ตัว
		2542	45	
ครุภัณฑ์ยานพาหนะและขนส่ง			3	
รถจักรยานยนต์	ขนาด 110 ซีซี		3	คัน
		2543	3	
ครุภัณฑ์โฆษณาและเผยแพร่			1	
จอรับภาพ	ขนาด 125*125 ซม		1	จอ
		2542	1	

Summary of hardware quantity in requested budget year and section

APPENDIX C

DESIGNED SCREEN

1.Data manipulation

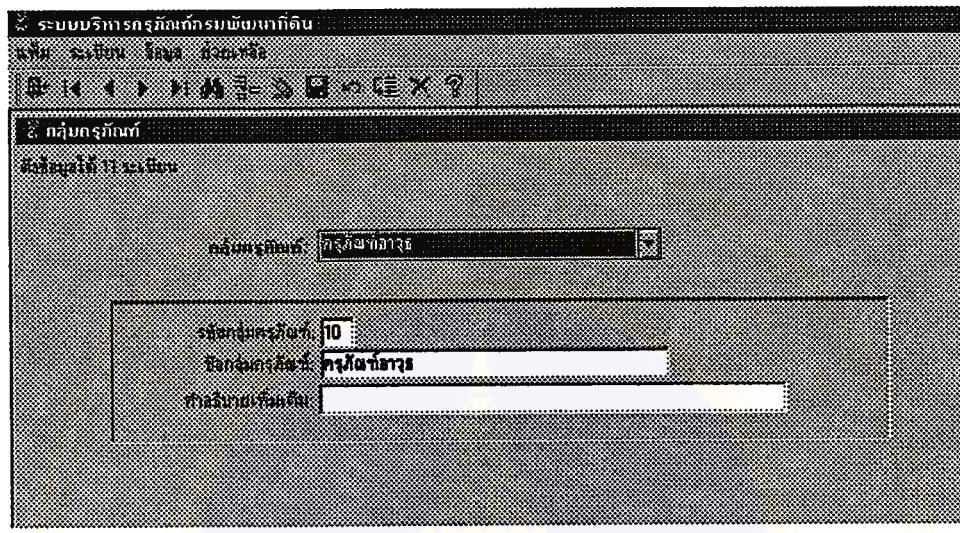


Figure C.1 w_db_hw_group

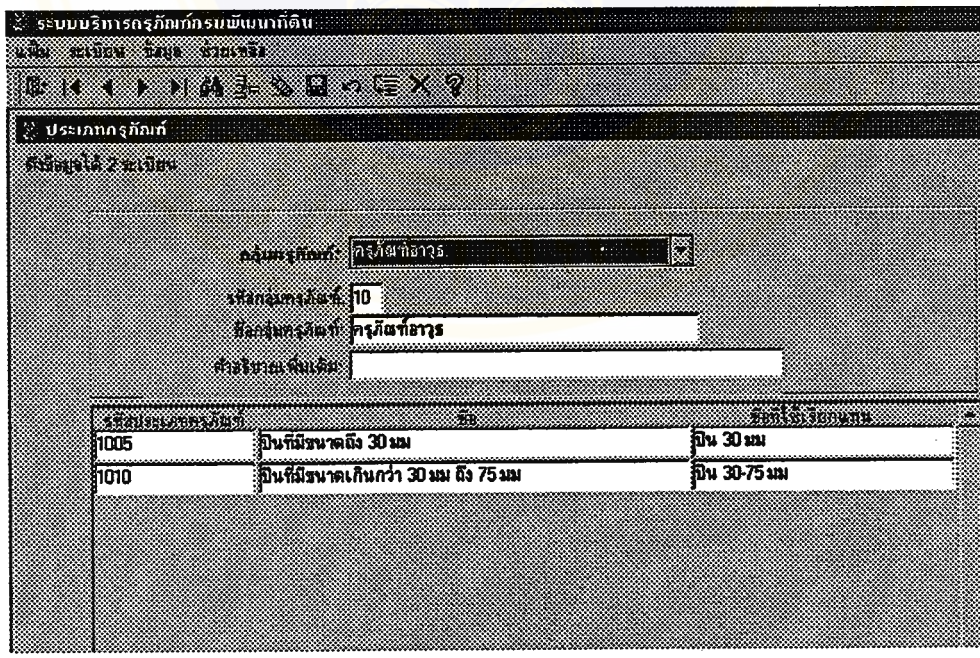


Figure C.2 w_db_hw_class

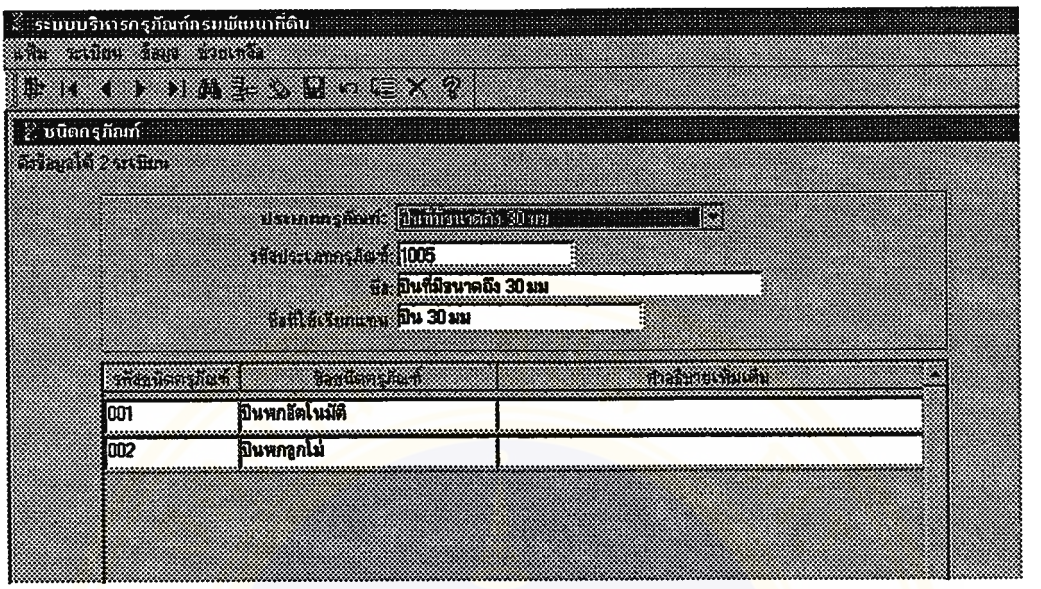


Figure C.3 w_db_hw_type

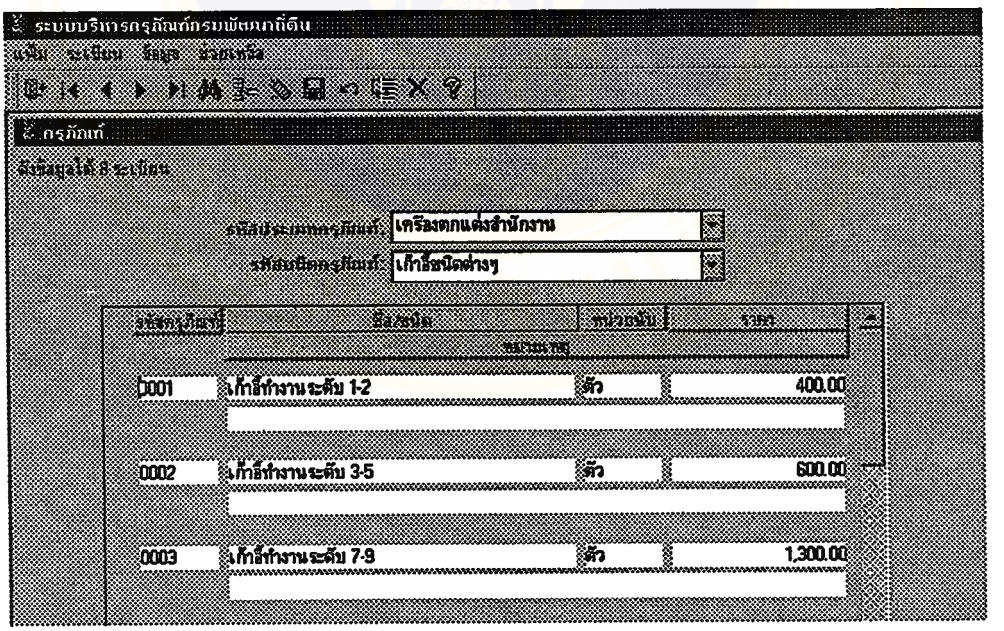


Figure C.4 w_db_hw

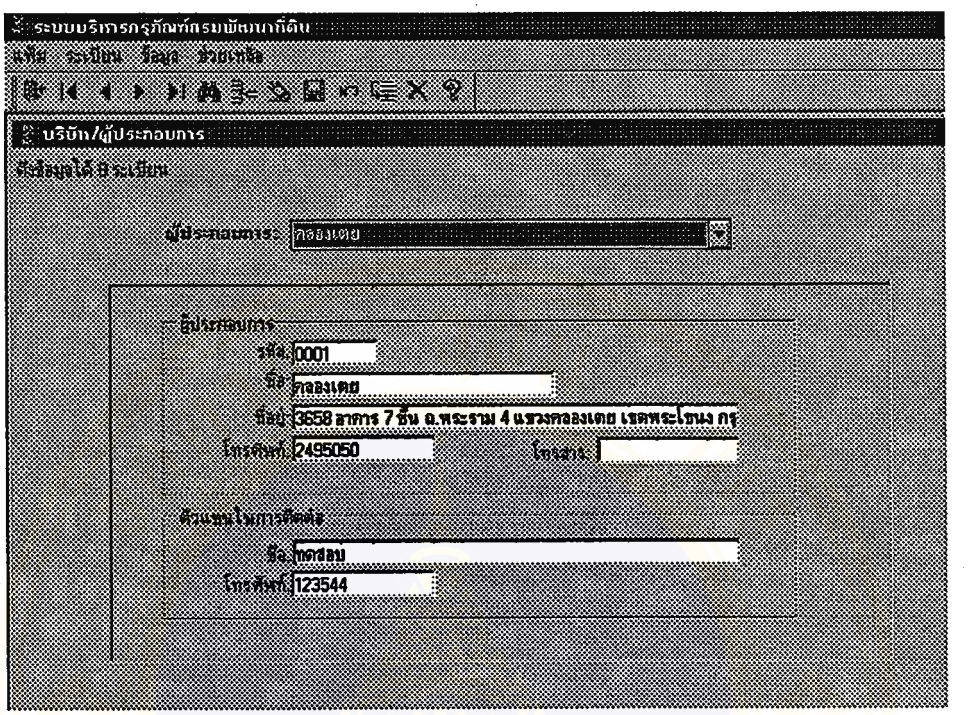


Figure C.5 w_db_supplier

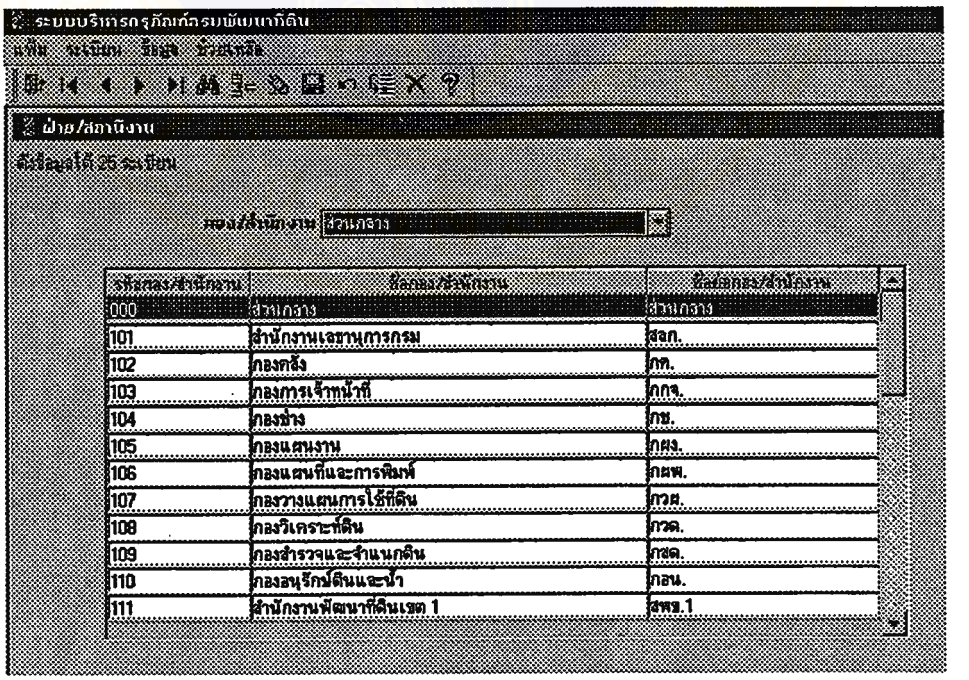


Figure C.6 w_db_division

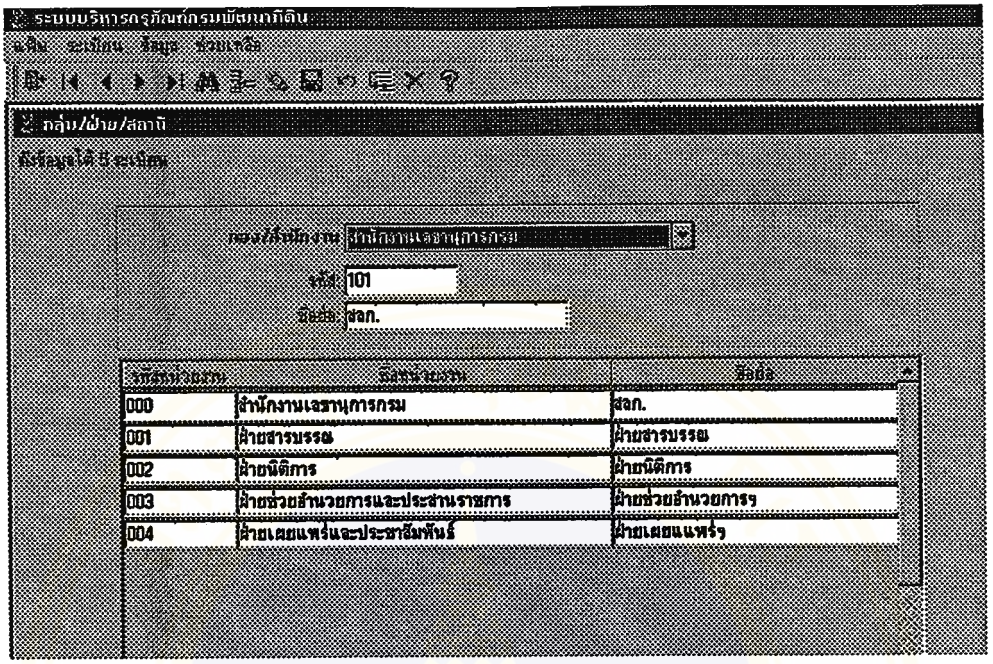


Figure C.7 w_db_section

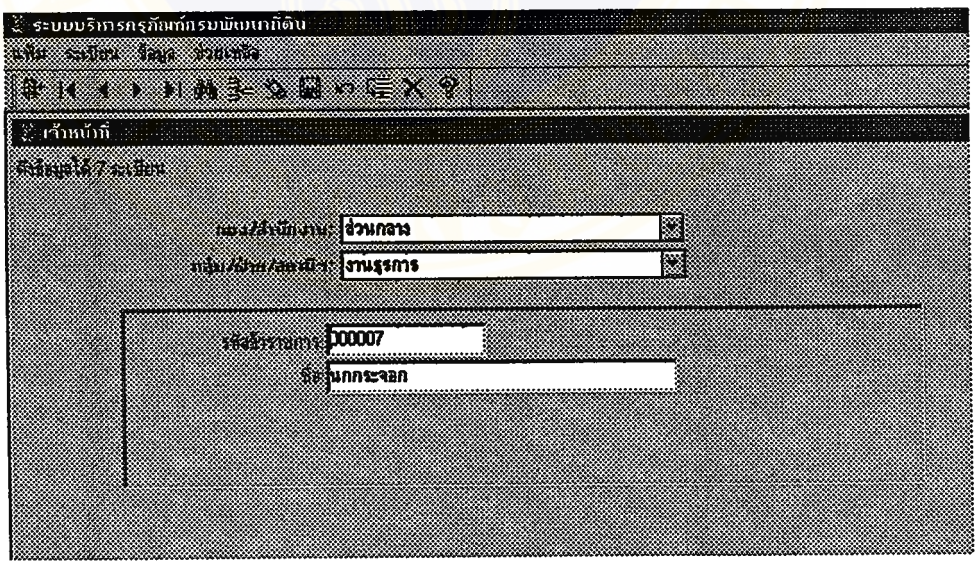


Figure C.8 w_db_staff

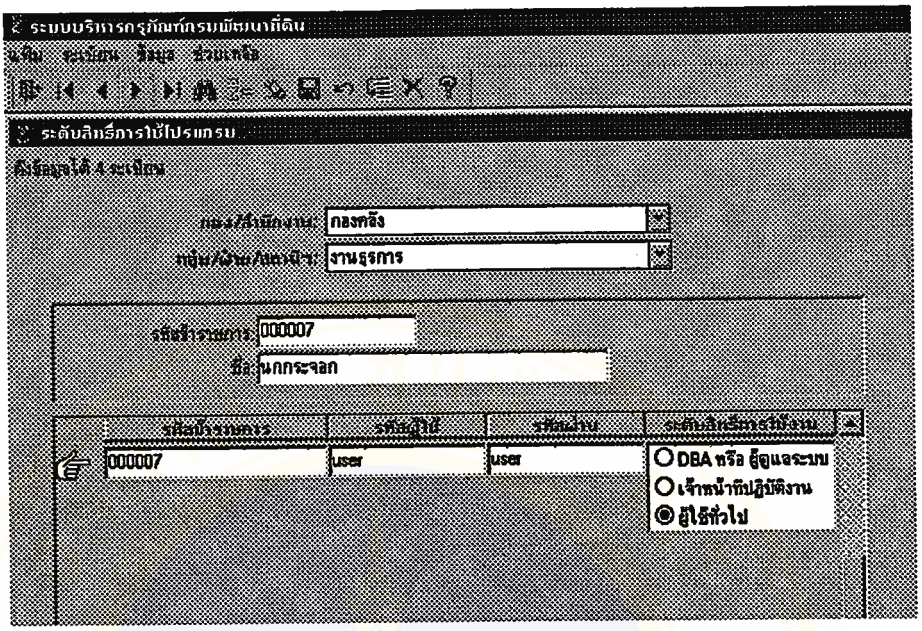


Figure C.9 w_db_security

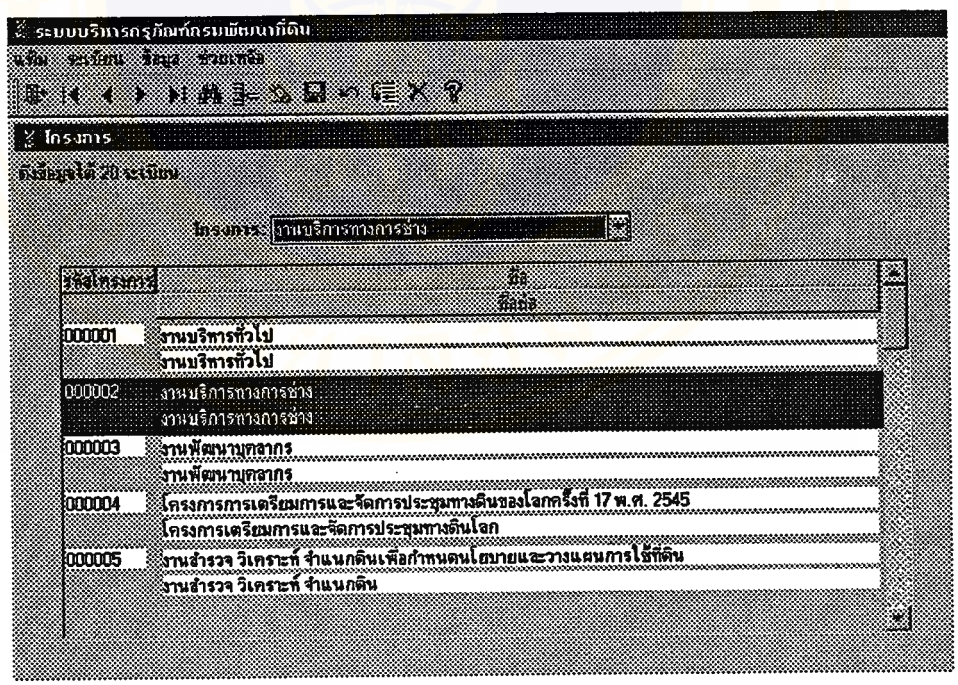


Figure C.10 w_db_project

3. Transaction

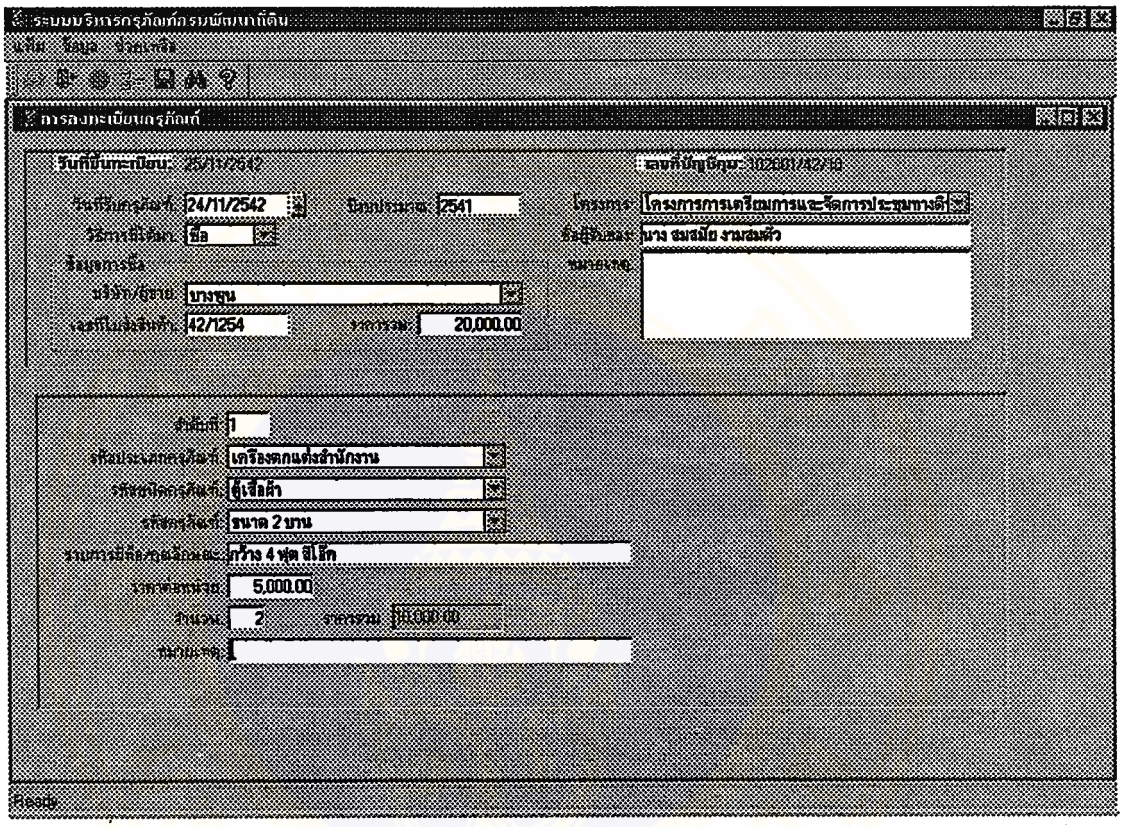


Figure C.11 w_trans_control

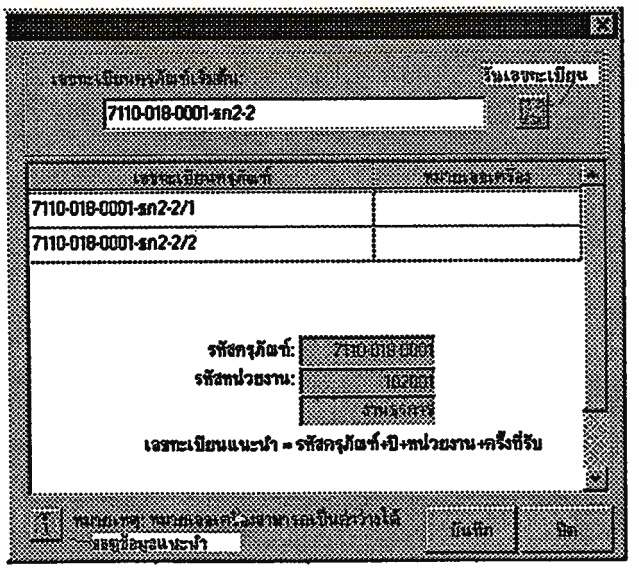


Figure C.12 w_regi_add

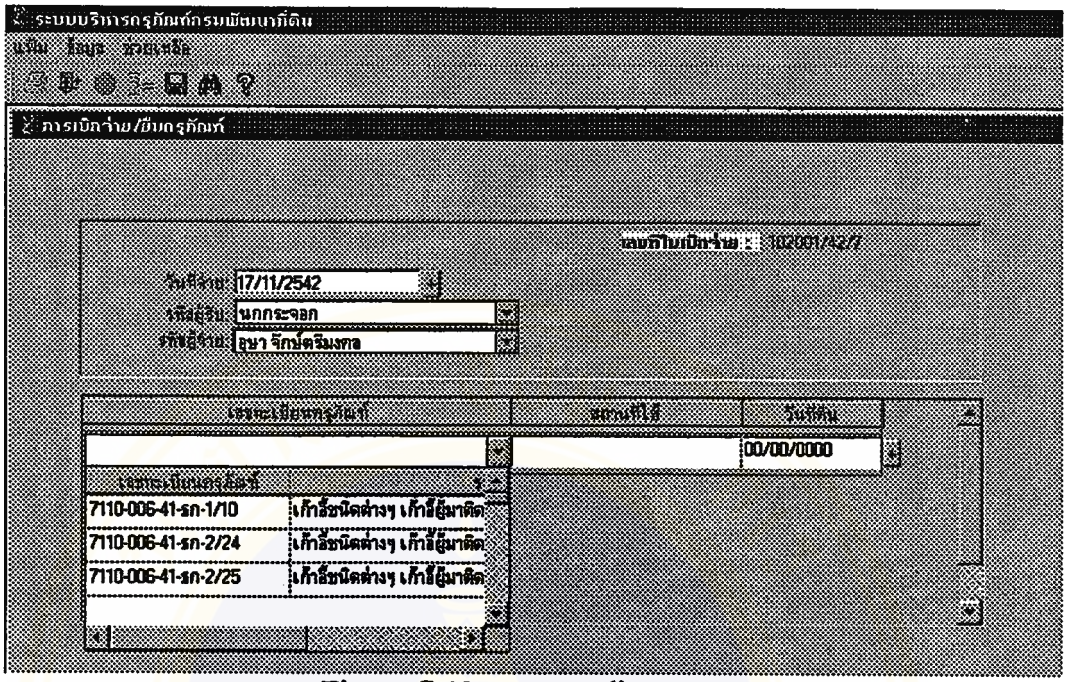


Figure C.13 w_trans_dist

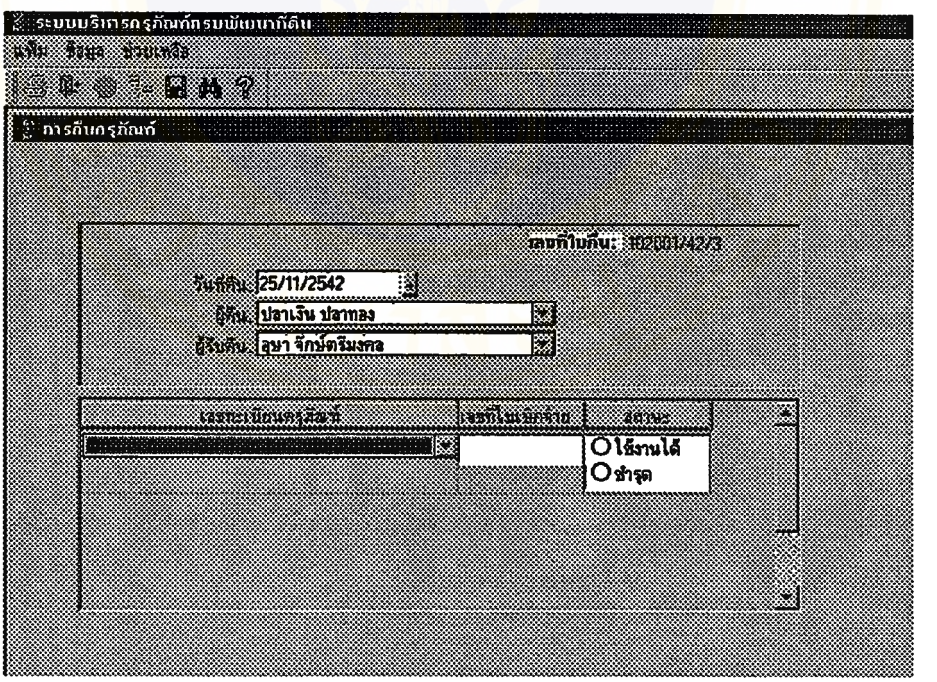


Figure C.14 w_trans_retu

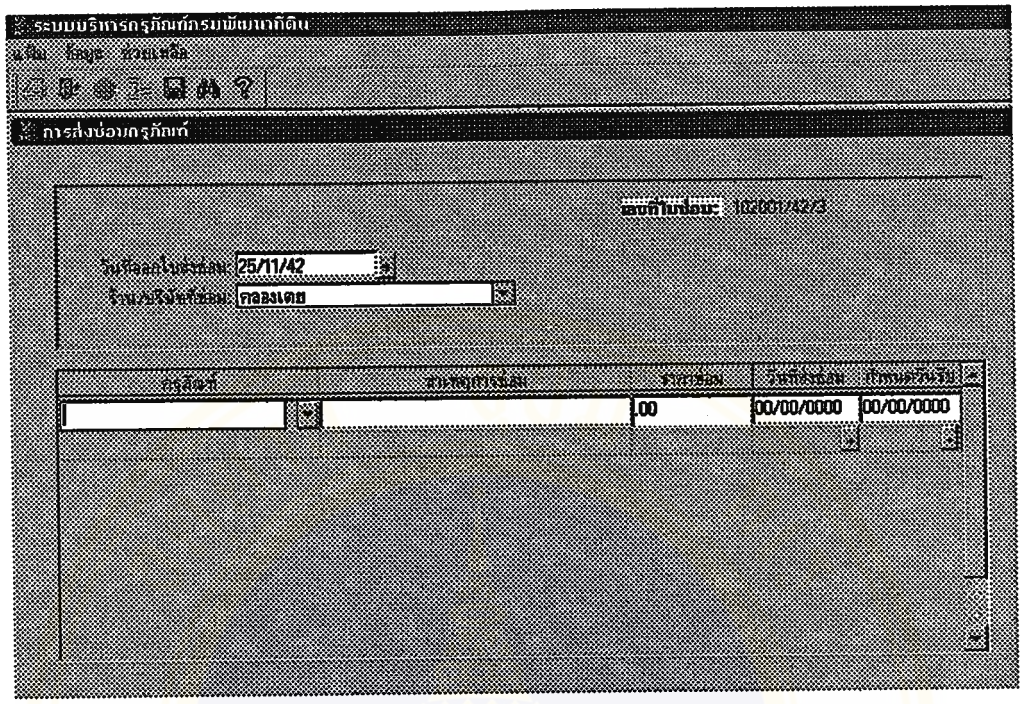


Figure C.15 w_trans_repa

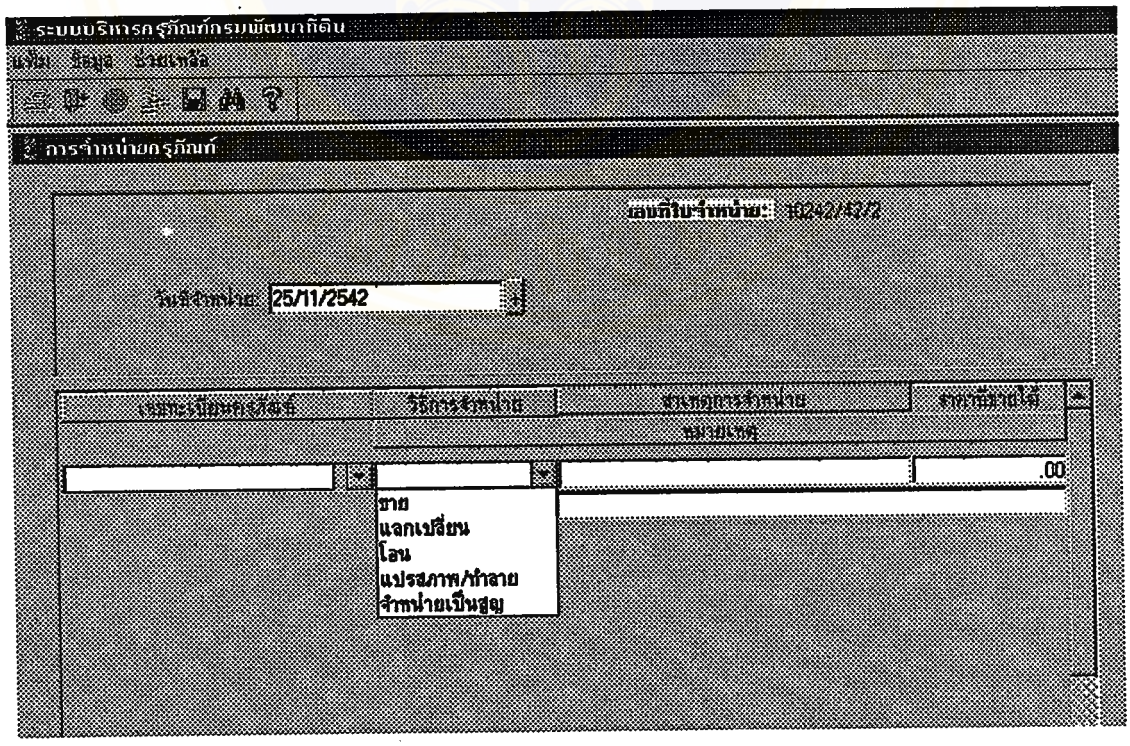


Figure C.16 w_trans_disp

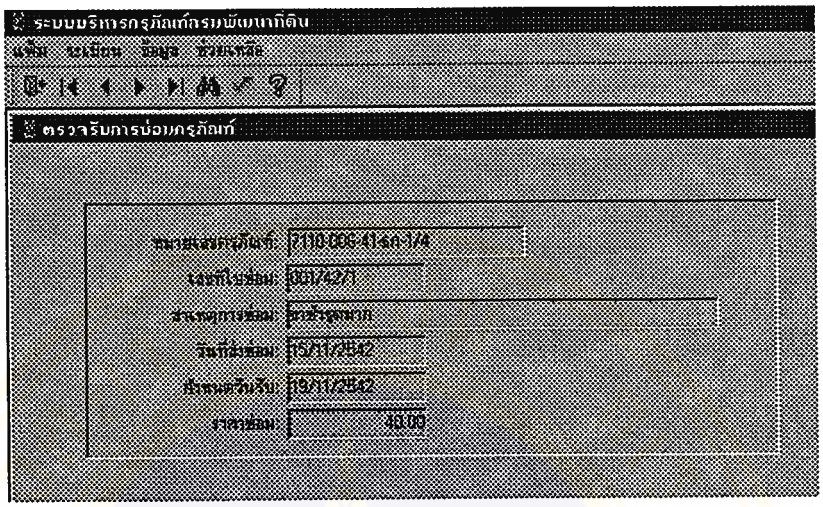


Figure C.17 w_check_repair

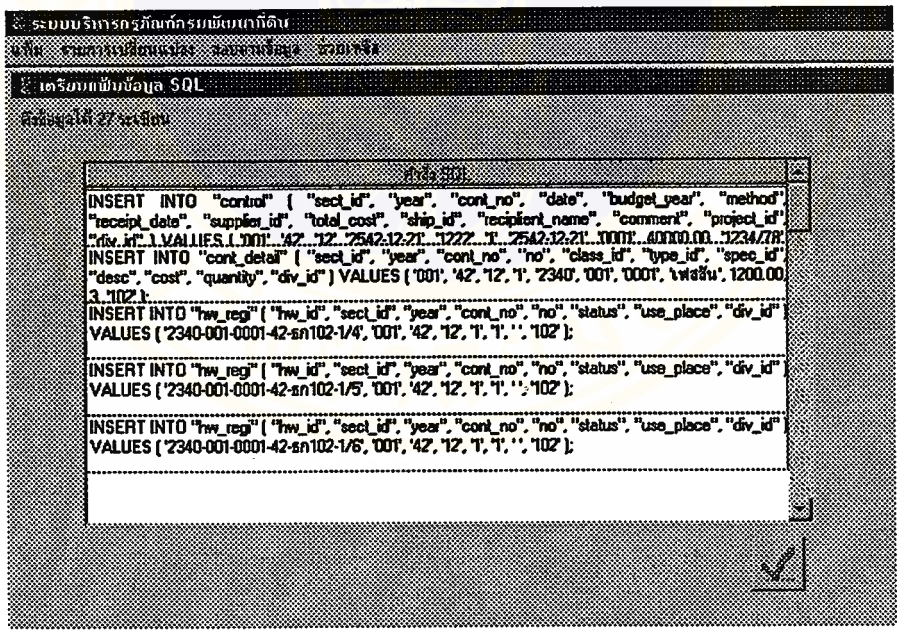


Figure C.18 w_trans_sql

3. Query and Report

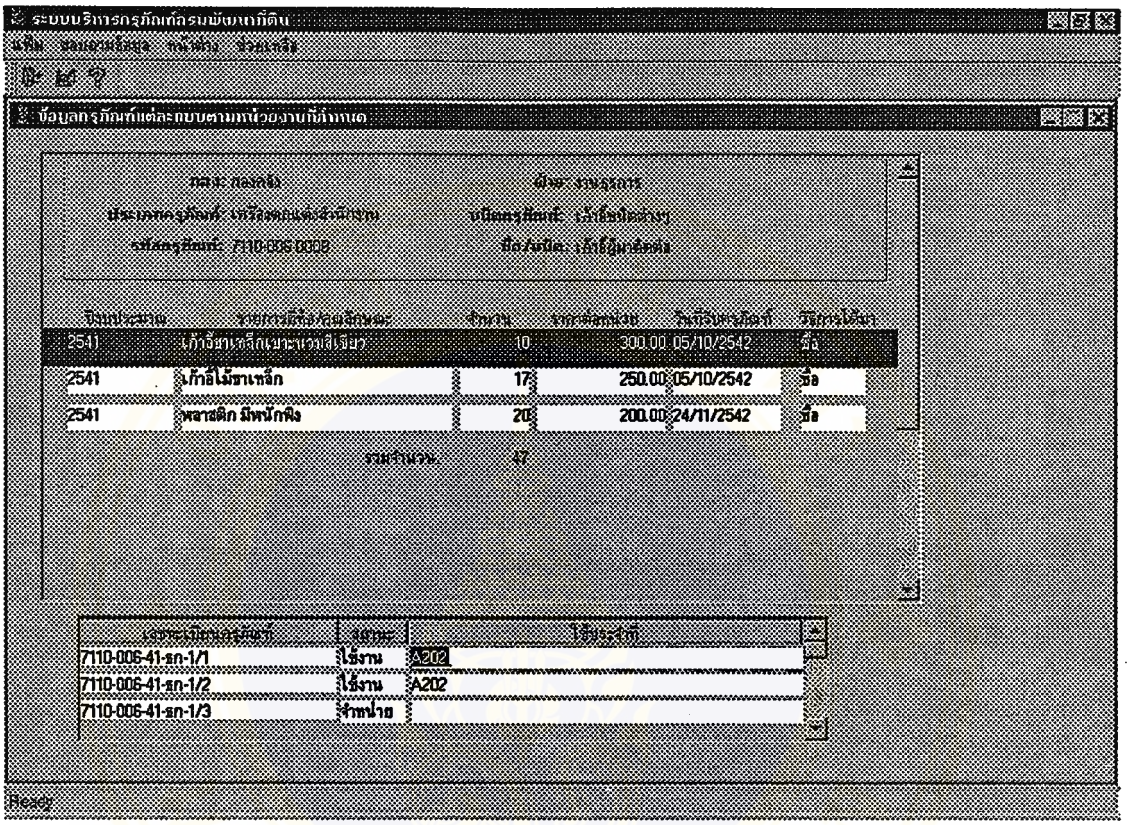


Figure C.19 w_q_hw_spec_show

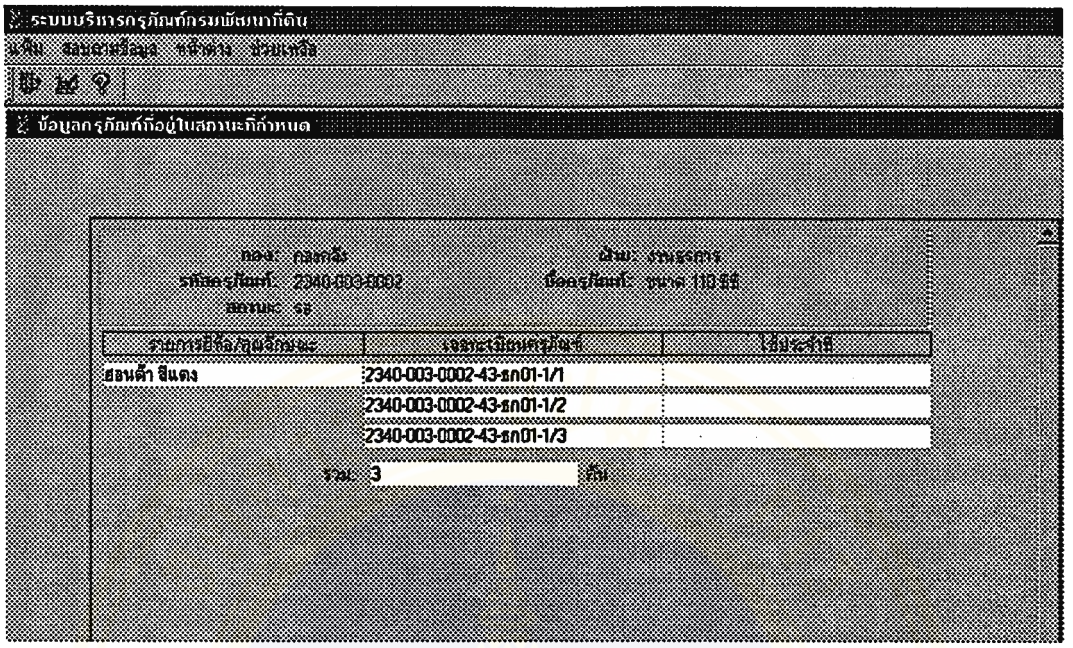


Figure C.20 w_q_hw_status

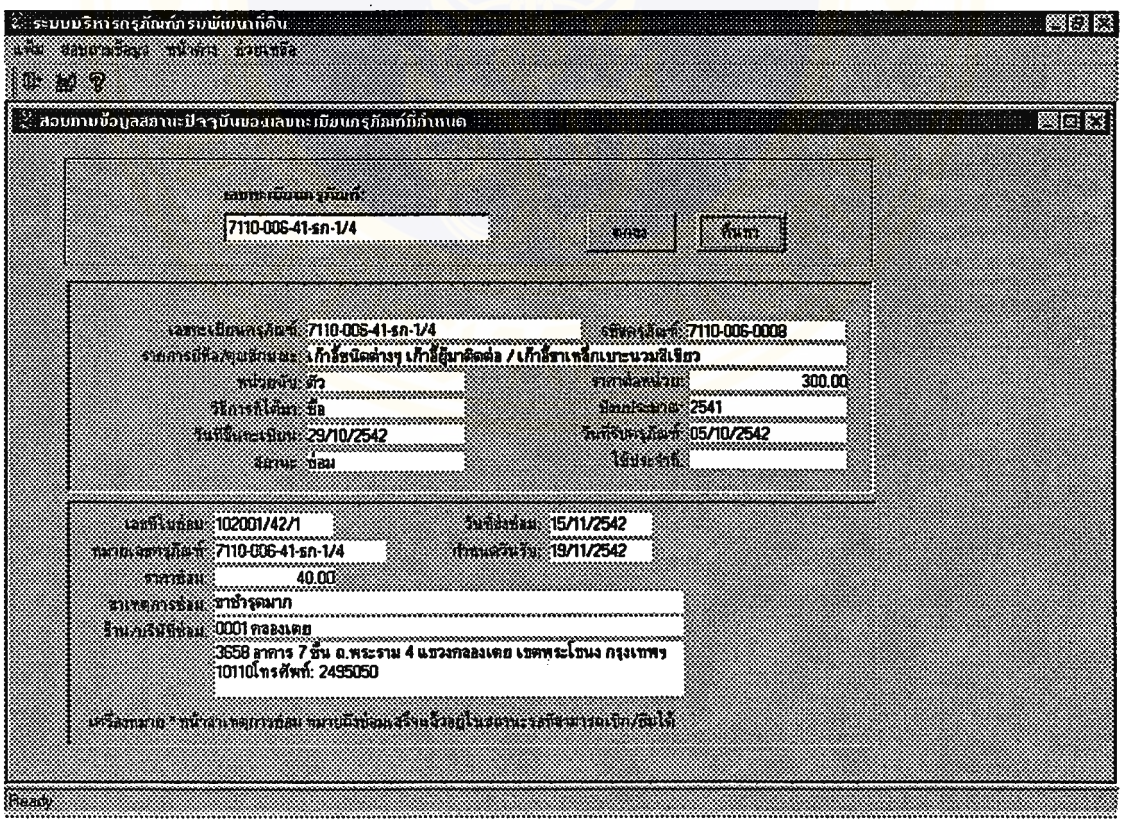


Figure C.21 w_q_regi_desc

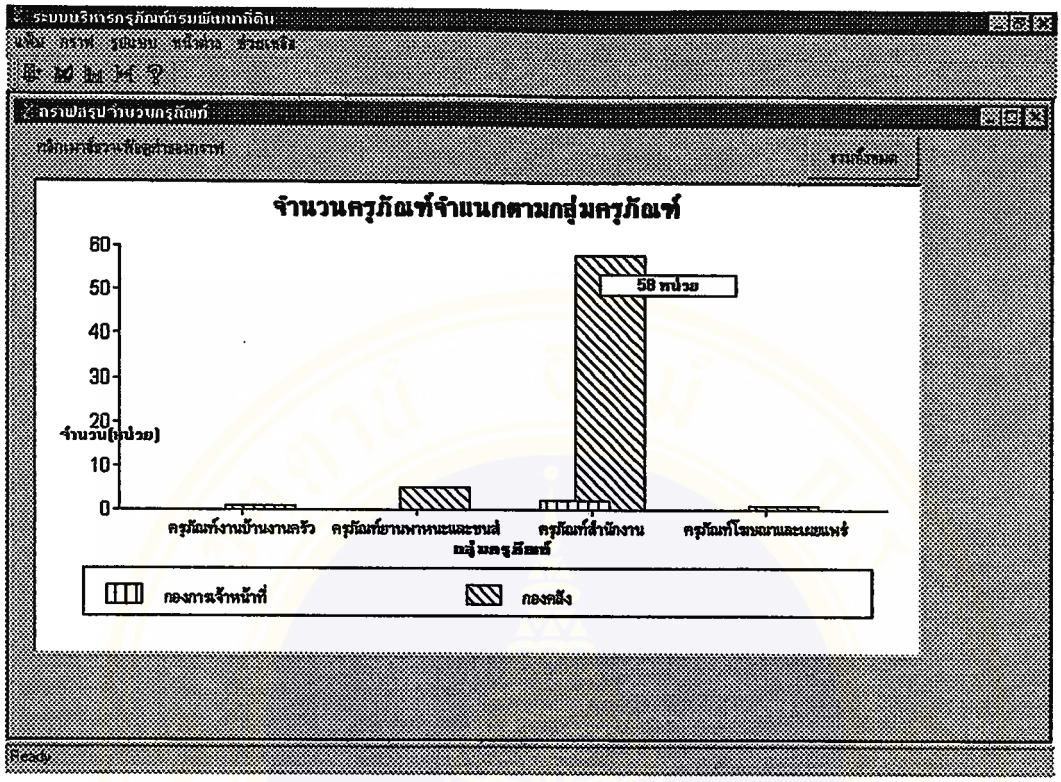


Figure C.22 w_g_sum_quantity

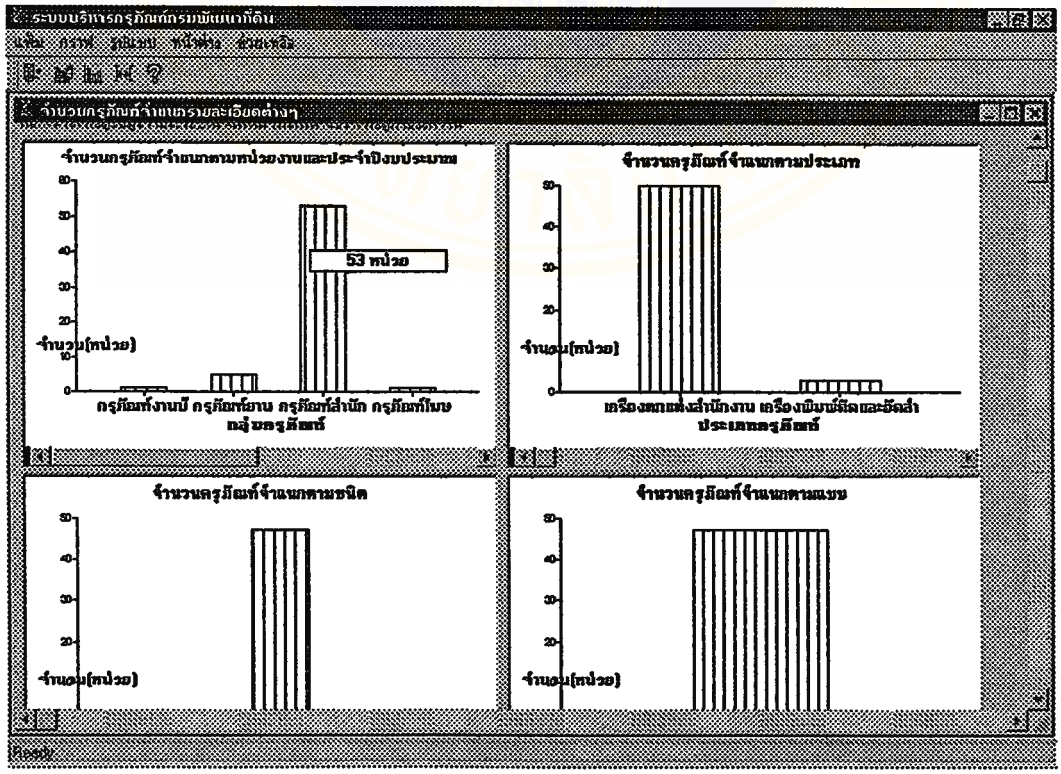


Figure C.23 w_g_drilldown

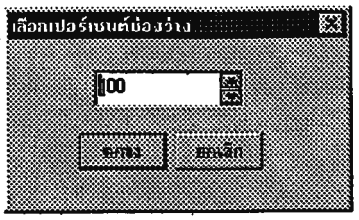


Figure C.24 w_graph_spacing

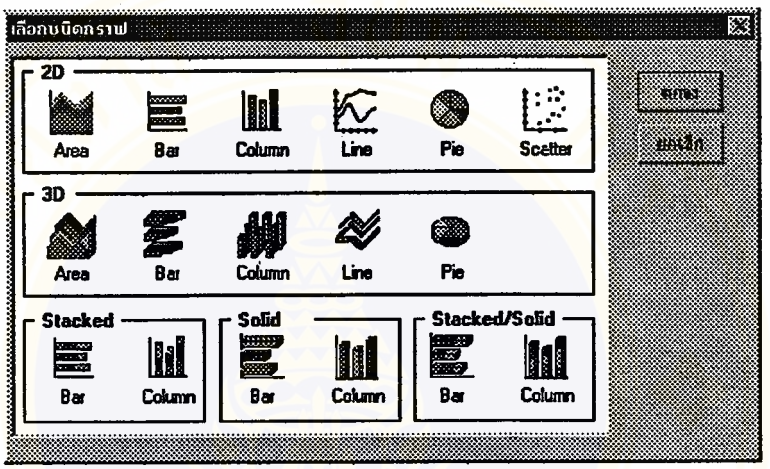


Figure C.25 w_graph_type

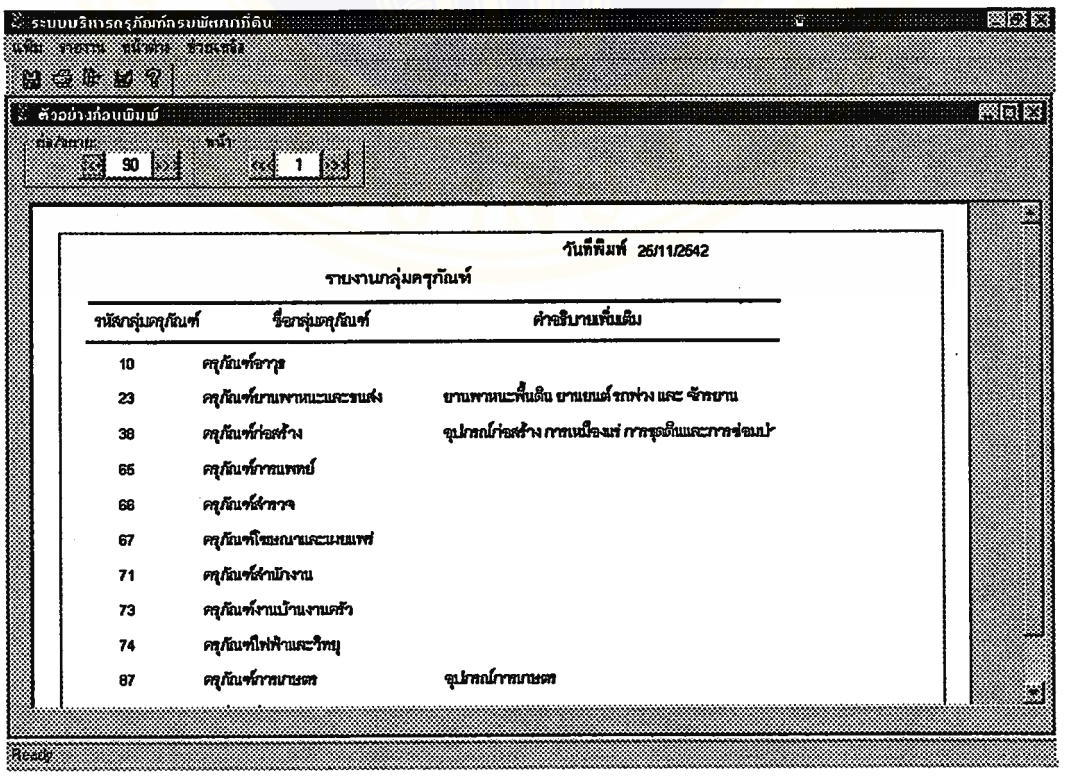


Figure C.26 w_preview

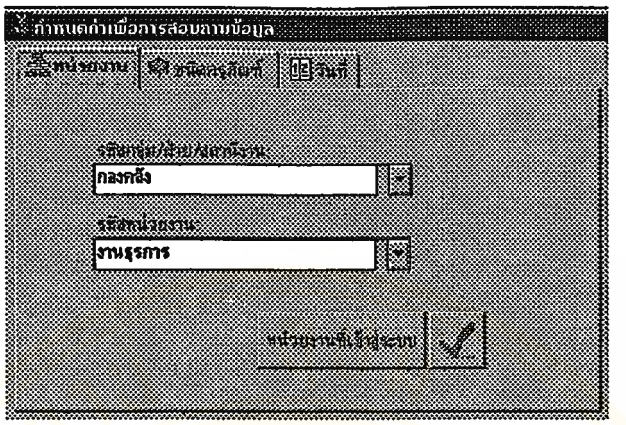


Figure C.27 w_set_arg

4. Shared Window

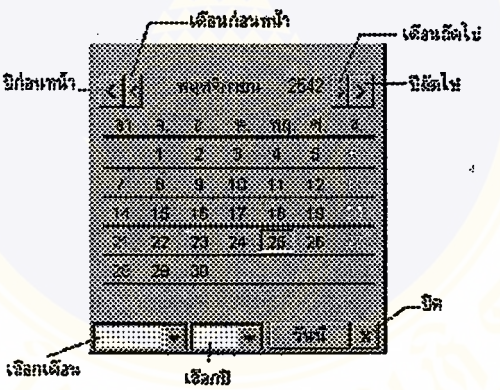


Figure C.28 w_pb_calendar

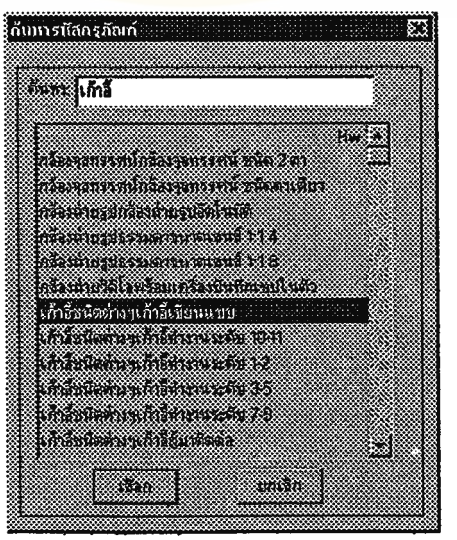


Figure C.29 w_hw_code-search

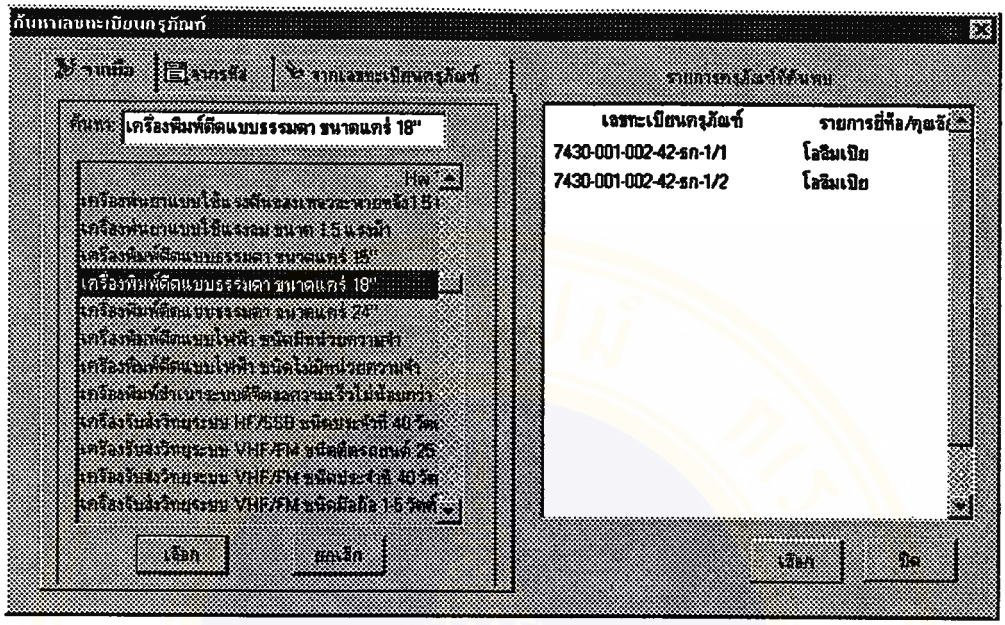


Figure C.30 w_hw_id_search

Figure C.31 w_login

Figure C.32 w_about

APPENDIX D

PROGRAM SPECIFICATION

1. Data manipulation

These windows manipulate data in "BASIC DATA" data store. It has an ancestor window, 10 descendent windows and a shared window.

[Window] w_db_base from Window [Description] ancestor window for data manipulation

Controls	*Control Name*	*Remarks*
Window	<w_db_base>	Menu="m_db_maint";
Datawindow	dw_1	Tab=20; Disable;
Datawindow	dw_2	Tab=20;
Datawindow	dw_list	Tab=10;
Statictext	st_status	

Declaration	
Instance variable	boolean ib_needSave = false long il_row, il_row_deleted datawindow idw_x

Script	*Type*	*Name*
w_db_base	Event	Close Closequery Open ue_add ( ) ue_cancel ( ) ue_delete ( ) ue_first ( ) ue_init ( ) ue_last ( ) ue_next ( ) ue_prev ( ) ue_show_status (string as_str) ue_undelete ( ) ue_undo ( ) ue_update ( )
dw_2	ControlEvent	Dberror Itemchanged Retrieveend

Event: w_db_base.Close
Close(This)
Event: w_db_base. Open
This.Post Event ue_init()
Event: w_db_base.ue_init ( )
Disable undelete button

Event: w_db_base. Closequery

IF dw_2.DeletedCount()+dw_2.ModifiedCount() > 0 OR ib_needSave THEN
Messagebox (Ask for save ,Question!, YesNoCancel!,1)
IF update THEN PostEvent("ue_update") and Close Window
ELSEIF Cancel THEN Don't allow to close window
Else Don't save and Close window
END IF
ELSE Close Window
END IF

Event: w_db_base.ue_add ()

il_row = dw_2.insertrow(dw_2.getrow())
IF Error then
dw_2.setrow(il_row) and disable dw_list
ib_needsave = TRUE
ELSE MessageBox(Cannot insert row)
END IF

Event: w_db_base.ue_cancel ()

IF MessageBox(Confirm to cancel) = Yes THEN
This.Post Event ue_init() and enable dw_list
ib_needsave = False
END IF

Event: w_db_base.ue_delete ()

IF MessageBox(Confirm to delete)=Yes THEN
il_row_deleted = dw_2.GetRow()
dw_2.deleterow(il_row_deleted)
ib_needSave =True and enable undelete button
END IF

Event: w_db_base.ue_first ()

if not ib_needSave then
idw_x.ScrollToRow(1) and get focus
end if

Event: w_db_base. ue_last ()

if not ib_needSave then
idw_x.ScrollToRow(idw_x.rowCount()) and get focus
end if

Event: w_db_base. ue_next ()

if not ib_needSave then
idw_x.ScrollNextRow() and get focus
end if

Event: w_db_base. ue_prev ()

if not ib_needSave then
idw_x.ScrollPriorRow() and get focus
end if

Event: w_db_base. ue_show_status (string as_str)
st_status.text = as_str
Event: w_db_base. Ue_undelete ()
Get the last row in the deleted buffer Move the last row in the deleted buffer to the primary buffer set focus to the row that was "restored"
Event: w_db_base. Ue_undo ()
Get the original value of this row/column Reset it to the original value Reset the modified flag for this row

Event: w_db_base. Ue_update ()

if dw_2.Update() > 0 then
commit; and enable dw_list
ib_needsave = False
else RollBack;
end if

ControlEvent: dw_2. Dberror
set sqldbcode, sqlerrtext, sqlsyntax, row, dw_name to error_data OpenWithParm(w_db_error,error_data) Return 1
ControlEvent: dw_2. Itemchanged
ib_needsave = True
ControlEvent: dw_2. Retrieveend
Parent.Post Event ue_show_status("retrieved data "+string(This.RowCount())+" rows ")

[Window] w_db_division from w_db_base	Normal
[Description] manipulate data in division data store	

Controls	*Control Name*	*Remarks*
w_db_base	<w_db_division>	Title="Division";
w_db_base`dw_1	dw_1	Tab=30; Invisible;
w_db_base`dw_2	dw_2	DataObject="d_division";
w_db_base`dw_list	dw_list	DataObject="d_ddw_division";

Script	*Type*	*Name*
w_db_division	Event	ue_init ue_search
dw_2	ControlEvent	Rowfocuschanged
dw_list	ControlEvent	Itemchanged

Event: w_db_division. ue_init
Call super::ue_init dw_list.Getchild("div_id",dwc_1) Retrive dwc_1, dw_list and dw_2
Event: w_db_division. ue_search

string ls_sql, ls_search_name long ll_found
ls_sql = 'select name1 from division'
ls_search_name = OpenWithParm(w_search,ls_sql)
If ls_search_name <> "" then
ll_found = dw_2.Find("name1 = '"+ls_search_name+"'", 1, dw_2.RowCount())
IF ll_found > 0 THEN
dw_2.ScrollToRow(ll_found)
ELSE
MessageBox(Not found message)
End if
END IF

ControlEvent: dw_list.itemchanged
il_row = dw_2.Find("div_id = '"+ This.Gettext() +"'", 1, dw_2.RowCount()) dw_2.ScrollToRow(il_row)

ControlEvent: dw_2.Rowfocuschanged

long ll_found string ls_search
IF ib_needSave then
This.ScrollToRow(il_row) // move to edit row
Else
ls_search = This.GetItemString(this.getRow(),"div_id")
dw_2.ScrollToRow(currentRow)
ll_found = dw_list.Find("div_id = '"+ls_search+"'", 1, dw_list.RowCount())
IF ll_found > 0 THEN dw_List.ScrollToRow(ll_found) end if
end if

[Window] w_db_hw from w_db_base Master-detail [Description] Manipulate data in HW data store

Controls	*Control Name*	*Remarks*
w_db_base	<w_db_hw>	Title="hardware";
w_db_base`dw_1	Dw_1	Tab=30; Invisible;
w_db_base`dw_2	Dw_2	DataObject="d_tb_hw";
w_db_base`dw_list	Dw_list	DataObject="d_ddw_hw_type";

Declaration	
Instance Variable	String is_class_id, is_type_id, is_id Datawindowchild dwc_1,dwc_2 Integer ii_id // integer of primary key

Script	*Type*	*Name*
w_db_hw	Event	ue_add ue_cal_id ue_init ue_retrieve ue_search
dw_2	ControlEvent	Rowfocuschanged
Dw_list	ControlEvent	Itemchanged Itemfocuschanged Rowfocuschanged

Event: w_db_hw. ue_add
Call super::ue_add if il_row > 0 then // no error dw_2.SetItem of class_id and type_id on il_row convert ii_id++ to string[4] and set item to spec_id on il_row end if
Event: w_db_hw. Ue_cal_id

Select max(convert(numeric,spec_id)) Into :is_id from hw
where class_id = :is_class_id and type_id = :is_type_id;
IF IsNull(is_id) then
ii_id = 0
Else ii_id =integer(is_id)
End if

Event: w_db_hw. Ue_retrieve
Dw_2.Retrieve(is_class_id,is_type_id) This. Post Event ue_cal_id()

Event: w_db_hw. ue_init
Call super::ue_init Set DatawindowChild of class_id and type_id Retrive datawindowChild and dw_list Dw_2.Modify("spec_id.EditMask.ReadOnly = yes") and Idw_x = dw_2
Event: w_db_hw. ue_search

String ls_sql, ls_search_name
ls_sql = 'select name from hw_type'
ls_search_name = OpenWithParm(w_search,ls_sql)
if ls_search_name <> "" then
Select class_id,type_id into :is_class_id, :is_type_id From hw_type Where name = :ls_search_name;
dw_list.Find("class_id = '"+is_class_id+"' and type_id = '"+is_type_id+"'", 1, dw_list.RowCount())
dw_list.ScrollToRow(found row)
END IF

ControlEvent: dw_2.RowFocusChange

IF ib_needSave then
This.ScrollToRow(il_row)
Else dw_2.SetRowFocusIndicator(Hand!, 0)
end if

ControlEvent: dw_list. Itemchanged

IF dwo.name = 'type_id' THEN
This.Post Event rowFocuschanged(This.getrow())
END IF

ControlEvent: dw_list. Itemfocuschanged

IF dwo.name = 'type_id' THEN
is_class_id = This.GetItemString(This.GetRow(),'class_id')
IF isNull (is_class_id) then
MessageBox(Warn to choose data in class_id ') and Set Column 'class_id'
Return
end if
dwc_2.SetFilter("class_id = '"+is_class_id+"'") and Filter
END IF

ControlEvent: dw_list. Rowfocuschanged
is_type_id = This.GetItemString(This.GetRow(),'type_id') Parent.Post event ue_retrieve()

[Window] w_db_hw_class from w_db_base Master-detail
[Description] manipulate data in hw_class data store

Controls	*Control Name*	*Remarks*
w_db_base	<w_db_hw_class>	Title="HW CLASS";
w_db_base`dw_1	dw_1	Tab=30; DataObject="d_hw_group";
w_db_base`dw_2	dw_2	DataObject="d_hw_class";
w_db_base`dw_list	dw_list	DataObject="d_ddw_hw_group";

Declaration	
Instance Variable	string is_group_id

Script	*Type*	*Name*
w_db_hw_class	Event	ue_init ue_retrieve ue_search

Script	*Type*	*Name*
dw_1	ControlEvent	Rowfocuschanged
dw_list	ControlEvent	Itemchanged

Event w_db_hw_class.ue_init
Call super::ue_init dw_list.Getchild("group_id",dwc_1) retrieve dwc_1, dw_list and dw_2 idw_x = dw_1 // set for record navigator
Event w_db_hw_class.ue_retrieve
dw_2.retrieve(is_group_id)
Event w_db_hw_class.ue_search

string ls_sql, ls_search_name long ll_found
ls_sql = 'select name from hw_group'
ls_search_name = OpenWithParm(w_search,ls_sql)
if ls_search_name <> "" then
ll_found = dw_1.Find("name = '"+ls_search_name+"'", 1, dw_1.RowCount())
dw_1.ScrollToRow(ll_found)
END IF

ControlEvent.dw_1.rowfocuschanged

long ll_row
if not ib_needSave then
is_group_id = this.GetItemString(This.GetRow(),"group_id")
ll_row = dw_list.Find("group_id = '"+is_group_id+"'",1,dw_list.RowCount())
dw_list.ScrollToRow(ll_row)
Parent.Post EVENT ue_retrieve()
end if

ControlEvent.dw_list.itemchanged
ll_row = dw_1.Find("group_id = '"+ This.Gettext()+"'", 1, dw_1.RowCount()) dw_1.ScrollToRow(ll_row)

[Window] w_db_hw_group from w_db_base Normal
[Description] manipulate data in HW_GROUP data store

Controls	*Control Name*	*Remarks*
w_db_base	<w_db_hw_group>	Title="HW_GROUP";
w_db_base`dw_1	Dw_1	Tab=30; Invisible;
w_db_base`dw_2	Dw_2	DataObject="d_hw_group";
w_db_base`dw_list	Dw_list	DataObject="d_ddw_hw_group";

Script	*Type*	*Name*
w_db_hw_group	Event	ue_init ue_search
dw_2	ControlEvent	Rowfocuschanged
dw_list	ControlEvent	Itemchanged

Event: w_dw_hw_group. ue_init
Call super::ue_init dw_list.Getchild("group_id",dwc_1) retrieve dwc_1,dw_list and dw_2 idw_x = dw_2 and dw_2.Modify("group_id.EditMask.ReadOnly = yes")

Event: w_dw_hw_group. ue_search

string ls_sql, ls_search_name long ll_found
ls_sql = 'select name from hw_group'
ls_search_name = OpenWithParm(w_search,ls_sql)
if ls_search_name <> "" then
ll_found = dw_2.Find("name = '"+ls_search_name+"'", 1, dw_2.RowCount())
dw_2.ScrollToRow(ll_found)
END IF

ControlEvent:dw_2.rowfocuschanged

long ll_found string ls_search
IF ib_needSave then
This.ScrollToRow(il_row)
Else
ls_search = This.GetItemString(this.getRow(),"group_id")
ll_found = dw_list.Find("group_id = '"+ls_search+"'", 1, dw_list.RowCount())
dw_List.ScrollToRow(ll_found)
end if

ControlEvent:dw_list.itemchanged
il_row = dw_2.Find("group_id = '"+ This.Gettext()+"'", 1, dw_2.RowCount()) dw_2.ScrollToRow(il_row)

[Window] w_db_hw_type from w_db_base Master-detail [Description] manipulate data in HW_TYPE data store

Controls	*Control Name*	*Remarks*
w_db_base	<w_db_hw_type>	Title="hardware type";
w_db_base`dw_1	Dw_1	Tab=30; DataObject="d_hw_class_ff";
w_db_base`dw_2	Dw_2	DataObject="d_hw_type_grid";
w_db_base`dw_list	Dw_list	DataObject="d_ddw_hw_class";

Declaration	
Instance Variable	String is_class_id

Script	*Type*	*Name*
w_db_hw_type	Event	ue_add ue_init ue_retrieve ue_search
dw_1	ControlEvent	Rowfocuschanged
dw_list	ControlEvent	Itemchanged

Event: w_db_hw_type.ue_add

Call super::ue_add
if no error then
dw_2.setItem(il_row,"class_id",is_class_id)
dw_2.setrow(il_row) and set column 'type_id'
dw_2.Modify("type_id.EditMask.ReadOnly = no")
end if

Event: w_db_hw_type.ue_retrieve
dw_2.retrieve(is_class_id)

Event: w_db_hw_type.ue_init
Call super::ue_init dw_list.Getchild("class_id",dwc_1) retrieve dwc_1,dw_list and dw_2 idw_x = dw_1 dw_2.Modify("type_id.EditMask.ReadOnly = yes")
Event: w_db_hw_type.ue_search

string ls_sql, ls_search_name long ll_found
ls_sql = 'select name1 from hw_class'
ls_search_name = OpenWithParm(w_search,ls_sql)
IF ls_search_name <> "" then
ll_found = dw_1.Find("name1 = '"+ls_search_name+"'", 1, dw_1.RowCount())
dw_1.ScrollToRow(ll_found)
END IF

ControlEvent: dw_1.Rowfocuschanged

Long ll_row
If not ib_needSave then
is_class_id = this.GetItemString(This.GetRow(),"class_id")
ll_row = dw_list.Find("class_id = '"+is_class_id+"'",1,dw_list.RowCount())
dw_list.ScrollToRow(ll_row)
Parent.Post EVENT ue_retrieve()
End if

ControlEvent: dw_list.itemchange
Ll_row = dw_1.Find("class_id = '"+ This.gettext() +"'", 1, dw_1.RowCount()) dw_1.ScrollToRow(ll_row)

[Window] w_db_project from w_db_base	Normal
[Description] manipulate data in PROJECT data store	

Controls	*Control Name*	*Remarks*
w_db_base	<w_db_project>	Title="Project";
w_db_base`dw_1	dw_1	Tab=30; Invisible;
w_db_base`dw_2	dw_2	DataObject="d_tb_project";
w_db_base`dw_list	dw_list	DataObject="d_ddw_project";

Script	*Type*	*Name*
w_db_project	Event	ue_init ue_search
dw_2	ControlEvent	Rowfocuschanged
dw_list	ControlEvent	Itemchanged

Event: w_db_project.ue_init
Call super::ue_init dw_list.Getchild("project_id",dwc_1) and retrieve dwc_1, dw_list
Event: w_db_project.ue_search

string ls_sql, ls_search_name long ll_found
ls_sql = 'select name1 from project'
ls_search_name = OpenWithParm(w_search,ls_sql)
if ls_search_name <> "" then
ll_found = dw_2.Find("name1 = '"+ls_search_name+"'", 1, dw_2.RowCount())
dw_2.ScrollToRow(ll_found)
END IF

ControlEvent: dw_2.Rowfocuschanged

long ll_found string ls_search
IF ib_needSave then This.ScrollToRow(il_row)
Else
ls_search = This.GetItemString(this.getRow(),"project_id")
ll_found = dw_list.Find("project_id = '"+ls_search+"'", 1, dw_list.RowCount())
dw_List.ScrollToRow(ll_found)
end if

ControlEvent: dw_list.Itemchanged
il_row = dw_2.Find("project_id = '"+ This.gettext() +"'", 1, dw_2.RowCount()) dw_2.ScrollToRow(il_row)

[Window] w_db_section from w_db_base	Normal
[Description] manipulate data in SECTION data store	

Controls	*Control Name*	*Remarks*
w_db_base	<w_db_section>	Title="Section";
w_db_base`dw_1	dw_1	Tab=30; DataObject="d_division_ct";
w_db_base`dw_2	dw_2	DataObject="d_section";
w_db_base`dw_list	dw_list	DataObject="d_ddw_division";

Declaration	
Instance Variable	String is_div_id, is_id Int ii_id

Script	*Type*	*Name*
w_db_section	Event	ue_add ue_cal_id ue_init ue_retrieve ue_search
dw_1	ControlEvent	rowfocuschanged
dw_list	ControlEvent	itemchanged

Event: w_db_section.ue_add

Call super::ue_add
if il_row > 0 then
ii_id++
convert ii_id to string[3]
Set item "sect_id" and div_div to dw_2 on il_row
dw_2.setrow(il_row) and set column 'name1'
end if

Event: w_db_section.ue_cal_id
select MAX(sect_id) Into :is_id from section where div_id = :is_div_id; ii_id = Integer(is_id) li_id = ii_id+1
Event: w_db_section.ue_init
Call super::ue_init dw_list.Getchild("div_id",dwc_1) Retrieve dwc_1, dw_list, dw_1 idw_x = dw_1 dw_2.Modify("sect_id.EditMask.ReadOnly = yes")

Event: w_db_section.ue_retrieve
dw_2.retrieve(is_div_id) This.Post Event ue_cal_id()
Event: w_db_section.search

string ls_sql, ls_search_name long ll_found
ls_sql = 'select name1 from division'
ls_search_name = OpenWithParm(w_search,ls_sql)
if ls_search_name <> "" then
ll_found = dw_1.Find("name1 = '"+ls_search_name+"'", 1, dw_1.RowCount())
dw_1.ScrollToRow(ll_found)
END IF

ControlEvent: dw_1.rowfocuschanged

long ll_row
if not ib_needSave then
is_div_id = this.GetItemString(This.GetRow(),"div_id")
ll_row = dw_list.Find("div_id = '"+is_div_id+"'",1,dw_list.RowCount())
dw_list.ScrollToRow(ll_row)
Parent.Post EVENT ue_retrieve()
end if

ControlEvent: dw_list.itemchanged
ll_row = dw_1.Find("div_id = '"+This.gettext() +"'", 1, dw_1.RowCount()) dw_1.ScrollToRow(ll_row)

[Window] w_db_security from w_db_base One to one relationship
[Description] manipulate data in SECURITY data store

Controls	*Control Name*	*Remarks*
w_db_base	<w_db_security>	Title="Privilege of users ";
w_db_base`dw_1	Dw_1	Tab=30; DataObject="d_staff_ff";
w_db_base`dw_2	Dw_2	DataObject="d_tb_security";
w_db_base`dw_list	Dw_list	DataObject="d_ddw_section";

Declaration	
Instance Variable	String is_div_id, is_sect_id Datawindowchild dwc_1,dwc_2 Boolean ib_found = false

Script	*Type*	*Name*
w_db_security	Event	ue_add ue_init ue_search
dw_1	Event	ue_retrieve ( )
	ControlEvent	Rowfocuschanged
dw_2	ControlEvent	Rowfocuschanged
dw_list	ControlEvent	Itemchanged Itemfocuschanged Rowfocuschanged

Event: dw_1.ue_retrieve
This.Retrieve(is_div_id,is_sect_id) if This.RowCount() > 0 then dw_2.visible = TRUE end if

Event: w_db_secrity.ue_add

```
Call super::ue_add
string ls_id
if il_row > 0 and (not ib_found) then
        ls_id = dw_1.GetItemString(dw_1.GetRow(),"gov_id")
        dw_2.SetItem (il_row, "gov_id", ls_id )
        dw_2.scrollTorow(il_row) and set column 'user_id'
end if
```

Event: w_db_secrity.ue_init

```
Call super::ue_init
dw_list.getChild('div_id',dwc_1)
dw_list.getChild('sect_id',dwc_2)
retrieve dwc_1, dwc_2, dw_list, dw_1, dw_2
idw_x = dw_1 and disable insert button
```

Event: w_db_secrity.search

```
String ls_sql, ls_search_name  long ll_found
ls_sql = 'select name from staff'
ls_search_name = OpenWithParm(w_search,ls_sql)
if ls_search_name <> "" then
        Select div_id,sect_id into :is_div_id, :is_sect_id From staff Where name = :ls_search_name;
        ll_found = dw_list.Find("div_id = '"+is_div_id+"' and sect_id = '"+is_sect_id+"'", 1,
dw_list.RowCount())
        dw_list.ScrollToRow(ll_found)
        dw_1.Post Event ue_retrieve()
        ll_found = dw_1.Find("gov_id = '"+ls_search_name+"'",1,dw_1.RowCount())
        dw_1.ScrollToRow(ll_found)
END IF
```

ControlEvent: dw_1.Rowfocuschanged

```
String ls_gov_id  long ll_found
ll_found = This.GetRow()
IF ll_found > 0 then
        ls_gov_id = This.GetItemstring(ll_found,"gov_id")
        ll_found = dw_2.Find("gov_id = '"+ ls_gov_id +"'", 1, dw_2.Rowcount())
        If ll_found > 0 then
                ib_found = True
                dw_2.scrollToRow(ll_found) and disable insert button
        else
                 ib_found = false and enable insert button
        end if
end if
```

ControlEvent: dw_2. Rowfocuschanged

```
IF ib_needSave then
        This.ScrollToRow(il_row)
Else    dw_2.SetRowFocusIndicator(Hand!, 0)
End if
```

ControlEvent: dw_list .Itemchanged

```
IF dwo.name = 'sect_id' THEN
        This.Post Event rowFocuschanged(This.getrow())
END IF
```

ControlEvent: dw_list. Rowfocuschanged

```
is_sect_id = This.GetItemString(This.GetRow(),'sect_id')
dw_1.Post Event ue_retrieve()
```

ControlEvent: dw_list. Itemfocuschanged

IF dwo.name = 'sect_id' THEN
is_div_id = This.GetItemString(This.GetRow(),'div_id')
IF isNull(is_div_id) then
MessageBox(Warn to choose division id) and Set Column 'div_id'
Return
End if
dwc_2.SetFilter("div_id = '"+is_div_id+"'") and filter
END IF

[Window] w_db_staff from w_db_base	Normal
[Description] manipulate data in STAFF	

Controls	*Control Name*	*Remarks*
w_db_base	<w_db_staff>	Title="Staff";
w_db_base`dw_1	dw_1	Tab=30; Invisible;
w_db_base`dw_2	dw_2	DataObject="d_staff_ff";
w_db_base`dw_list	dw_list	DataObject="d_ddw_section";

Declaration	
Instance Variable	string is_div_id, is_sect_id datawindowchild dwc_1,dwc_2

Script	*Type*	*Name*
w_db_staff	Event	ue_add ue_init ue_retrieve ue_search
dw_2	Event	ue_dropdown pbm_dwndropdown
dw_list	ControlEvent	Itemchanged Itemfocuschanged Rowfocuschanged

Event: w_db_staff. ue_add

Call super::ue_add
If no error then
Dw_2.setItem div_id and sect_id
Dw_2.setrow(il_row) and set column 'gov_id'
end if

Event: w_db_staff. ue_init
Call super::ue_init dw_list.getChild('div_id',dwc_1) dw_list.getChild('sect_id',dwc_2) retrieve dwc_1, dwc_2, dw_list and idw_x = dw_2
Event: w_db_staff. ue_retrieve
dw_2.retrieve(is_div_id,is_sect_id)
*Event: dw_2.*ue_dropdown pbm_dwndropdown

if IsNull(is_div_id) then
MessageBox('Warn to choose division id)
else dwc_2.setFilter("div_id = '"+is_div_id+"'") and filter
end if

Event: w_db_staff. ue_search

String ls_sql, ls_search_name long ll_found
ls_sql = 'select name1 from division'
ls_search_name = OpenWithParm(w_search,ls_sql)
if ls_search_name <> "" then
ll_found = dw_1.Find("name1 = '"+ls_search_name+"'", 1, dw_1.RowCount())
dw_1.ScrollToRow(ll_found)
END IF

ControlEvent: dw_list. Itemchanged

IF dwo.name = 'sect_id' THEN
This.Post Event rowFocuschanged(This.getrow())
END IF

ControlEvent: dw_list. Itemfocuschanged

IF dwo.name = 'div_id' THEN
is_div_id = This.GetItemString(This.GetRow(),'div_id')
IF isNull(is_div_id) then
MessageBox(Warn to choose division id) and Return
end if
dwc_2.SetFilter("div_id = '"+is_div_id+"'") and filter
END IF

ControlEvent: dw_list. Rowfocuschanged
is_sect_id = This.GetItemString(This.GetRow(),'sect_id') Parent.Post event ue_retrieve()

[Window] w_db_supplier from w_db_base	Normal
[Description] manipulate data in SUPPLIER data store	

Controls	*Control Name*	*Remarks*
w_db_base	<w_db_supplier>	Title="Supplier/company";
w_db_base`dw_1	dw_1	Tab=30; Invisible;
w_db_base`dw_2	dw_2	DataObject="d_supplier";
w_db_base`dw_list	dw_list	DataObject="d_ddw_supplier";

Declaration	
Instance Variable	integer ii_supplier_id string is_id

Script	*Type*	*Name*
w_db_supplier	Event	ue_add ue_cal_id ue_init ue_search
dw_2	ControlEvent	Rowfocuschanged
dw_list	ControlEvent	Itemchanged

Event: w_db_supplier.ue_add
Call super:: ue_add Convert ii_supplier_id++ to string[4] dw_2.setItem(il_row,"supplier_id",ls_supplier_id) and set column 'name'
Event: w_db_supplier.ue_cal_id
Select max(convert(numeric,supplier_id)) Into :is_id from supplier; ii_supplier_id = Integer(is_id)

Event: w_db_supplier.ue_init
Call super::ue_init dw_list.Getchild("supplier_id",dwc_1) retrieve dwc_1, dw_list, dw_2 This.Post Event ue_cal_id() idw_x = dw_2 and dw_2.Modify("supplier_id.EditMask.ReadOnly = yes")
Event: w_db_supplier.ue_search

string ls_sql, ls_search_name long ll_found
ls_sql = 'select name from supplier'
ls_search_name = OpenWithParm(w_search,ls_sql)
if ls_search_name <> "" then
ll_found = dw_2.Find("name = '"+ls_search_name+"'", 1, dw_2.RowCount())
dw_2.ScrollToRow(ll_found)
END IF

ControlEvent: dw_2.rowfocuschanged

long ll_found string ls_search
IF ib_needSave then
This.ScrollToRow(il_row)
Else
ls_search = This.GetItemString(this.getRow(),"supplier_id")
ll_found = dw_list.Find("supplier_id = '"+ls_search+"'", 1, dw_list.RowCount())
dw_List.ScrollToRow(ll_found)
end if

ControlEvent: dw_list.itemchanged
il_row = dw_2.Find("supplier_id = '"+ This.Gettext()+"'", 1, dw_2.RowCount()) dw_2.ScrollToRow(il_row)

[Window] w_search from Window Shared window
[Description] receive SQL statement to create datawindow and return selected name

Controls	*Control Name*	*Remarks*
Window	<w_search>	Type=response!; Title="Search data";
u_selection_list	uo_1	

Declaration	
Instance Variable	string is_name

Script	*Type*	*Name*
w_search	Event	Close Open
uo_1	ControlEvent	ue_entry_chosen

Event: w_search.close
CloseWithReturn(This, is_name)
Event: w_search.open
string ls_sql ls_sql = Message.StringParm uo_1.create_datawindow(sqlca, ls_sql)
ControlEvent: uo_1.ue_entry_chosen
is_name = return_selected () Close(Parent)

2. Transaction process

These windows manipulate data in "TRANS DATA" data store. It divides into 2 major processes: adding and editing. Adding process has an ancestor window, 5 descendent windows, a shared window and 2 additional windows. Editing process has an ancestor window, 5 descendent windows and a shared window.

Adding process

[Window] w_trans_base from Window **[Description] window ancestor for transaction adding process**

Controls	*Control Name*	*Remarks*
Window	<w_trans_base>	Menu="m_trans_add"; Title="Transaction";
Datawindow	dw_1	Tab=20;
Datawindow	dw_2	Tab=10;

Declaration	
Shared Variable	string ss_list
Instance Variable	boolean ib_needSave = false, ib_pass = false long il_row_1, il_row_2, il_row, il_main_no datawindowchild dwc_hw_id string is_hw_id, is_dataobject datastore ids_sql_trans

Script	*Type*	*Name*
w_trans_base	Event	Close Closequery Open ue_add_dw_1 ( ) ue_add_dw_2 ( ) ue_hw_search ( ) ue_init ( ) ue_print ( ) ue_update_dw_1 ( ) ue_update_dw_2 ( )
dw_1	ControlEvent	Rowfocuschanged Sqlpreview Dberror
dw_2	Event	ue_filter (string as_hw_id)
	ControlEvent	Dberror Sqlpreview

Event: w_trans_base. Close

IF ib_pass Then
This.Trigger event ue_check_error() andCommit;
Else Rollback;
end if
Destroy ids_sql_trans

Event: w_trans_base. Closequery

```
IF (dw_1.ModifiedCount() > 0 OR dw_2.ModifiedCount() > 0 ) and (ib_needsave) THEN
        Messagebox (Ask for save ,Question!, YesNoCancel!,1)
        IF update THEN
                This.Trigger Event ue_update_dw_2()
                IF ib_pass then  close window
                Else don't allow to close window
                End if
        ELSEIF Cancel THEN Don't allow to close the window
        Else ib_pass = false and Don't save and Close window
        END IF
ELSE    Close Window
END IF
```

Event: w_trans_base. Open

```
This.Post Event ue_init()
```

Event: w_trans_base. ue_add_dw_1 ( )

```
il_row_1 = dw_1.insertrow(0)
if il_row_1 <= 0 then
        MessageBox("Cannot insert row)and disable update_dw_1 button
        Return
elseif il_row_1 > 0 then
        dw_1.ScrollToRow(il_row_1)
         set item gs_div_id, gs_sect_id, gs_year to dw_1
end if
```

Event: w_trans_base. ue_add_dw_2 ( )

```
il_row_2 = dw_2.insertrow(0)
if il_row_2 <= 0 then
        MessageBox(Cannot insert row)
        Return
elseif il_row_2 > 0 then
        dw_2.scrollToRow(il_row_2)
        ib_needsave = TRUE
        Enable search, update_dw_2 button and disable insert_dw_2 button.
end if
```

Event: w_trans_base. ue_hw_search ( )

```
IF gs_proc<>gs_cont then
        is_hw_id = OpenWithParm(w_hw_id_search,1)
        if is_hw_id = " " then
                return
        end if
end if
```

Event: w_trans_base ue_init ( )

```
Disable insert_dw_2, update_dw_2,  search, m_print button and set invisible dw_2
dw_1.Retrieve(gs_div_id,gs_sect_id,gs_year)
ids_sql_trans = Create DataStore  "d_ds_sql_trans"
```

Event: w_trans_base. ue_print ( )

```
str_trans_print lstr_data
w_trans_print l_w_instance
lstr_data.s_dataobject = is_dataobject
lstr_data.s_no = string(il_main_no)
OpenSheetWithParm(l_w_instance,lstr_data,g_w_mdi,0,Layered!)
```

Event: w_trans_base. ue_update_dw_1 ()

dw_1.TriggerEvent ("ue_check_error")
If ib_pass then
IF dw_1.Update() = 1 Then
This.Post event ue_retrieve_dw_2()
This.Post Event ue_add_dw_2()
Disable update_dw_1, dw_1 button and visible dw_2
Else
Ib_pass =false and set focus dw_1
end if
End IF

Event: w_trans_base. ue_update_dw_2 ().
dw_2.TriggerEvent ("ue_check_error") enable print button ib_needSave = False
ControlEvent: dw_1. Rowfocuschanged
this.ScrollToRow(il_row_1)
ControlEvent: dw_1. Sqlpreview

string ls_sql long ll_row
IF (sqltype = PreviewInsert!) or (sqltype = PreviewUpdate!) then
ls_sql = sqlsyntax + ';'
ll_row = ids_sql_trans.InsertRow(0)
ids_sql_trans.object.sql_text[ll_row] = ls_sql
ids_sql_trans.object.done[ll_row] = 'N'
IF ids_sql_trans.Update() <> 1 then
MessageBox(Cannot update please close window without save)
ib_pass = false
END IF
END IF

ControlEvent: dw_1. Dberror
See in w_db_base.dberror
Event: dw_2. ue_filter (string as_hw_id)
dwc_hw_id.SetFilter("hw_regi_hw_id <> '"+as_hw_id+"'") and Filter
ControlEvent: dw_2. Dberror
See in w_db_base.dberror
ControlEvent: dw_2. Sqlpreview
See in dw_1.sqlpreview

[Window] w_trans_control from w_trans_base [Description] hardware control and registration

Controls	*Control Name*	*Remarks*
w_trans_base	<w_trans_control>	Title="Register";
w_trans_base`dw_1	dw_1	DataObject="d_control_add";
w_trans_base`dw_2	dw_2	DataObject="d_cont_detail_ff";

Declaration	
Instance Variable	datawindowchild dwc_1, dwc_2 il_detail_no ir_total=0

Script	*Type*	*Name*
w_trans_control	Event	ue_add_dw_1 ue_add_dw_2 ue_cal_id ue_check_error ue_hw_search ue_init ue_retrieve_dw_2 ue_update_dw_2
Dw_1	Event	type integer ue_change_total ( )
	ControlEvent	Buttonclicked ue_check_error
Dw_2	ControlEvent	ue_check_error ue_dropdown

Event: w_trans_control. ue_add_dw_1

```
Call super::ue_add_dw_1
Set string(il_main_no), gd_today to dw_1
```

Event: w_trans_control. ue_add_dw_2

```
Call super:: ue_add_dw_2
Set gs_div_id, gs_sect_id, gs_year, string(il_main_no), string(il_detail_no) to dw_2
```

Event: w_trans_control. ue_cal_id

```
select max(convert(numeric,cont_no)) Into :ls_main_no from control
where div_id = :gs_div_id and sect_id = :gs_sect_id and year = :gs_year;
il_main_no = Integer(ls_main_no)+1
```

Event: w_trans_control. ue_check_error

```
IF real(dw_1.Object.total_cost[il_row_2]) <> ir_total then
        Messagebox (Total cost is incorrect, Ask to change)
        IF Change THEN
                Dw_1.Event ue_change_total()
        END IF
end if
```

Event: w_trans_control. ue_hw_search

```
Call super:: ue_hw_search
str_hw_code lstr_hw_code
lstr_hw_code = Open(w_hw_code_search,This)
if lstr_hw_code.s_class_id <> " " then
        ll_row = dw_2.getrow()
        set class_id, type_id, spec_id to dw_2
end if
```

Event: w_trans_control. ue_init

```
Call super:: ue_init
is_dataobject = 'd_r_control'
This.Post Event ue_add_dw_1()
```

Event: dw_1.ue_change_total

```
This.object.total_cost[il_row_1] = ir_total
if This.Update() = 1 then //success
        return 1
end if
```

Event: w_trans_control. ue_retrieve_dw_2

```
Call super:: ue_retrieve_dw_2
dw_2.getChild('type_id',dwc_1)
dw_2.getChild('spec_id',dwc_2)
retrieve dwc_1, dwc_2 and dw_2.Retrieve(gs_div_id,gs_sect_id,gs_year,string (il_main_no))
if dw_2.RowCount() > 0 then
        il_detail_no = dw_2.Rowcount() + 1
else    il_detail_no = 1
end if
```

Event: w_trans_control. ue_update_dw_2

```
Call super::ue_update_dw_2
if ib_pass = false then
      return
end if
      str_cont_d_pk str_parms     int li_pass, i_rc
      IF dw_2.update()<=0 THEN
        Ib_pass = False
      Else
         Set gs_div_id, gs_sect_id, gs_year, String(il_main_no),  String(il_detail_no),
         dw_2.object.class_id[il_row_2],dw_2.object.type_id[il_row_2],
         dw_2.object.spec_id[il_row_2], dw_2.object.quantity[il_row_2] to str_parms
          li_pass = OpenWithParm(w_regi_add,str_parms)
        IF li_pass = 0 Then // not pass, there're error while system had updated regi data
                 Messagebox (Ask to register again)
                IF register THEN
                        This.TriggerEvent("ue_update_dw_2")
                ELSEIF cancel THEN
                        Ib_pass = false
                        Disable insert_dw_2 button and set focus dw_2
                END IF
        ELSE
                Enable insert_dw_2 button and disable update_dw_2 button
                ir_total= ir_total+ dw_2.Object.cal_cost[il_row_2]
                ib_pass= true and  il_detail_no++
        END IF
END IF
```

ControlEvent: dw_2.ue_dropdown

```
ll_row = This.GetRow()
ls_column = This.GetColumnName()
IF ls_column = 'type_id' THEN
        ls_class_id = dw_2.object.class_id[ll_row]
        IF isNull (ls_class_id) then
                MessageBox(Want to choose class_id) and Set Column 'class_id'
                Return
        End if
        dwc_1.SetFilter("class_id = '"+ls_class_id+"'") and filter
elseif ls_column = 'spec_id' THEN
        ls_class_id = dw_2.object.class_id[ll_row] , ls_type_id = dw_2.object.type_id[ll_row]
        dwc_2.setFilter("class_id = '"+ls_class_id+"'and type_id = '"+ls_type_id+"'") and filter
END IF
```

ControlEvent: dw_1. Buttonclicked

```
ls_date =  Open(w_pb_calendar)
if ls_date <> '00/00/0000' then
        This.SetItem(il_row_1,'receipt_date',date(ls_date))
end if
```

ControlEvent: dw_1.ue_check_error

Check Today >= receipt_date <> null
Check budget_year, project_id <> null
If method = 1 (buy) then
  Supplier_id, ship_id <> null
end if

ControlEvent: dw_2.ue_check_error
Check class_id,type_id,spec_id and desc <> null

[Window] w_trans_dist from w_trans_base [Description] Distribution or borrowing

Controls	*Control Name*	*Remarks*
w_trans_base	<w_trans_dist>	Title="Distribute or borrow ";
w_trans_base`dw_1	dw_1	DataObject="d_distribute_add";
w_trans_base`dw_2	dw_2	DataObject="d_dist_detail_grid";

Declaration	
Instance Variable	datastore ids_dist_detail, ids_hw_regi

Script	*Type*	*Name*
w_trans_dist	Even	Close ue_add_dw_1 ue_add_dw_2 ue_cal_id ue_hw_search ue_init ue_retrieve_dw_2 ue_update_dw_2
dw_1	ControlEvent	Buttonclicked ue_check_error
dw_2	ControlEvent	Buttonclicked ue_check_error

Event: w_trans_dist.Close
Call super::Close Destroy ids_hw_regi Destroy ids_dist_detail
Event: w_trans_dist. ue_add_dw_1
Call super:ue_add_dw_1 Set string(il_main_no), gd_today to dw_1
Event: w_trans_dist. ue_add_dw_2
Call super:: ue_add_dw_2 Set gs_sect_id, gs_sect_id, gs_year, string(il_main_no) to dw_2 set column "dist_detail_hw_id"
Event: w_trans_dist. ue_cal_id
string ls_main_no select max(convert(numeric,dist_no)) Into :ls_main_no from distribute where div_id = :gs_div_id and sect_id = :gs_sect_id and year = :gs_year; il_main_no = Integer(ls_main_no)+1

Event: w_trans_dist.ue_hw_search
Call super::ue_hw_search dw_2.object.dist_detail_hw_id[il_row_2] =is_hw_id Set column "hw_regi_use_place"
Event: w_trans_dist.ue_init
Call super::ue_init is_dataobject = 'd_r_dist' This.Post Event ue_add_dw_1()
Event: w_trans_dist.ue_retrieve_dw_2

dw_2.getChild("dist_detail_hw_id",dwc_hw_id)
ids_dist_detail = Create DataStore "d_ds_dist_detail"
ids_hw_regi = Create DataStore "d_ds_hw_regi"
retrieve dwc_hw_id, dw_2, ids_dist_detail, ids_hw_regi
IF gs_proc = gs_distribute then
dw_2.modify("dist_detail_return_date.visible = '0'")
invisible dw_2.object.btn_date
END IF

Event: w_trans_dist.ue_update_dw_2

Call super:: ue_update_dw_2
string ls_use_place,ls_status, ls_hw_id ,ls_dist_no date ld_return_date
if ib_pass = false then
return
end if
if gs_proc = gs_distribute then
ls_status = "2" and ld_return_date = Date("01/01/0001")
elseif gs_proc = gs_borrow then
ls_status = "3" and ld_return_date = dw_2.object.dist_detail_return_date[il_row_2]
end if
Get ls_use_place, ls_hw_id from dw_2
Set all items to ids_dist_detail
 	
Update ls_status and ls_use_place to ids_hw_regi
Insert SQL statement of ids_dist_detail and ids_hw_regi to ids_sql_trans
Invisible update_dw_2 and enable insert_dw_2
dw_2.Post Event ue_Filter(ls_hw_id)

ControlEvent: dw_1.ButtonClicked

ls_date = Open(w_pb_calendar)
if ls_date <> '00/00/0000' then
This.SetItem(il_row_1,'date',date(ls_date))
end if

ControlEvent: dw_1.ue_check_error
Check Today >= date <> null Check recipient_id,distributor_id <>null
ControlEvent: dw_2.ButtonClicked

ls_date = Open(w_pb_calendar)
if ls_date <> '00/00/0000' then
This.SetItem(il_row_2,'dist_detail_return_date',date(ls_date))
end if

ControlEvent: dw_2.ue_check_error

Check hw_id<.>null
If gs_proc = borrow then
Check today <=return_date<>null
End if

[Window] w_trans_disp from w_trans_base [Description] Dispose hardware

Controls	*Control Name*	*Remarks*
w_trans_base	<w_trans_disp>	Title="Dispose";
w_trans_base`dw_1	dw_1	DataObject="d_dispose_add";
w_trans_base`dw_2	dw_2	DataObject="d_disp_detail_tb";

Declaration	
Instance Variable	datastore ids_hw_regi

Script	*Type*	*Name*
w_trans_disp	Event	Close ue_add_dw_1 ue_add_dw_2 ue_cal_id ue_hw_search ue_init ue_retrieve_dw_2 ue_update_dw_2
dw_1	ControlEvent	Buttonclicked ue_check_error
dw_2	ControlEvent	ue_check_error

Event: w_trans_disp.Close
Call super:: Close Destroy ids_hw_regi
Event: w_trans_disp. ue_add_dw_1
Call super:: ue_add_dw_1 Set string(il_main_no), gd_today to dw_1
Event: w_trans_disp. ue_add_dw_2
Call super:: ue_add_dw_2 Set gs_div_id, gs_sect_id, gs_year, string(il_main_no) to dw_2 Set column "hw_id"
Event: w_trans_disp. ue_cal_id
Select max(convert(numeric,disp_no)) Into :ls_main_no from dispose Where div_id = :gs_div_id and sect_id = :gs_sect_id and year = :gs_year; il_main_no = Integer(ls_main_no)+1
Event: w_trans_disp. ue_hw_search
Call super:: ue_hw_search dw_2.object.hw_id[il_row_2] =is_hw_id Set column "method"
Event: w_trans_disp. ue_init
Call super:: ue_init is_dataobject = 'd_r_disp' This.Post Event ue_add_dw_1()
Event: w_trans_disp. ue_retrieve_dw_2
dw_2.getChild("hw_id",dwc_hw_id) ids_hw_regi = Create DataStore "d_ds_hw_regi" Retrieve dwc_hw_id, dw_2, ids_hw_regi
ControlEvent: dw_1.ue_check_error
Check Today>=date <>null

Event: w_trans_disp. ue_update_dw_2

Call super:: ue_update_dw_2
if ib_pass = false then
return
end if
IF dw_2.update()<=0 THEN
ib_pass = False
ELSE
Update ids_hw_regi.status = "6" // dispose
Insert SQL statement of ids_hw_regi to ids_sql_trans
dw_2.Post Event ue_Filter(ls_hw_id)
END IF

ControlEvent: dw_1.ButtonClicked

ls_date = Open(w_pb_calendar)
if ls_date <> '00/00/0000' then
This.SetItem(il_row_1,'date',date(ls_date))
end if

ControlEvent: dw_2.ue_check_error

Check hw_id,cause,method <.>null
If gs_proc = borrow then
Check today <=return_date<>null
End if

[Window] w_trans_repa from w_trans_base
[Description] Repair

Controls	*Control Name*	*Remarks*
w_trans_base	<w_trans_repa>	Title="Repair";
w_trans_base`dw_1	dw_1	DataObject="d_repair_add";
w_trans_base`dw_2	dw_2	DataObject="d_repa_detail_grid";

Declaration	
Instance Variable	Datastore ids_hw_regi

Script	*Type*	*Name*
w_trans_repa	Event	Close ue_add_dw_1 ue_add_dw_2 ue_cal_id ue_hw_search ue_init ue_retrieve_dw_2 ue_update_dw_2
dw_1	ControlEvent	Buttonclicked ue_check_error
dw_2	ControlEvent	Buttonclicked ue_check_error

Event: w_trans_repa.Close
Call super::Close Destroy ids_hw_regi

Event: w_trans_repa. ue_add_dw_1
Call super::ue_add_dw_1 Set string(il_main_no), gd_today to dw_1 Set column "supplier_id"
Event: w_trans_repa. Ue_add_dw_2
Call super::ue_add_dw_2 Set gs_div_id, gs_sect_id, gs_year, string(il_main_no) to dw_2 set column "hw_id"
Event: w_trans_repa. Ue_cal_id
select max(convert(numeric,repa_no)) Into :ls_main_no from repair where div_id = :gs_div_id and sect_id = :gs_sect_id and year = :gs_year; il_main_no = Integer(ls_main_no)+1
Event: w_trans_repa. ue_hw_search
Call super::ue_hw_search dw_2.object.hw_id[il_row_2] =is_hw_id Set column "cause"
Event: w_trans_dist. ue_init
Call super::ue_init is_dataobject = 'd_r_repa' This.Post Event ue_add_dw_1()
Event: w_trans_repa. Ue_retrieve_dw_2
dw_2.getChild("hw_id",dwc_hw_id) ids_hw_regi = Create DataStore "d_ds_hw_regi" Retrieve dww_hw_id, ids_hw_regi, and dw_2
Event: w_trans_repa. ue_update_dw_2

Call super:: ue_update_dw_2
If ib_pass = false then Return end if
IF dw_2.update()<=0 THEN
ib_pass = False
ELSE Update ids_hw_regi.status = "5" // repair
Insert SQL statement of ids_hw_regi to ids_sql_trans
dw_2.Post Event ue_Filter(ls_hw_id)
END IF

ControlEvent: dw_1.ButtonClicked

ls_date = Open(w_pb_calendar)
If ls_date <> '00/00/0000' then
This.SetItem(il_row_1,'date',date(ls_date))
End if

ControlEvent: dw_1.ue_check_error
Check Today >= date <> null Check supplier_id <> null
ControlEvent: dw_2.ButtonClicked

ls_date = Open(w_pb_calendar)
if ls_date <> '00/00/0000' then
IF dwo.name = "cb_repair" then
This.SetItem(il_row_2,'repair_date',date(ls_date))
elseif dwo.name = "cb_return" then
This.SetItem(il_row_2,'return_date',date(ls_date))
end if
end if

ControlEvent: dw_2.ue_check_error
Check hw_id,cause <> null

[Window] w_trans_retu from w_trans_base [Description] Return hardware from borrower

Controls	*Control Name*	*Remarks*
w_trans_base	<w_trans_retu>	Title="Return";
w_trans_base`dw_1	dw_1	DataObject="d_return_add";
w_trans_base`dw_2	dw_2	DataObject="d_retu_detail_grid";

Declaration	
Instance Variable	Datastore ids_dist_detail, ids_hw_regi long il_dist

Script	*Type*	*Name*
w_trans_retu	Event	Close ue_add_dw_1 ue_add_dw_2 ue_cal_id ue_hw_search ue_init ue_retrieve_dw_2 ue_update_dw_2
dw_1	ControlEvent	Buttonclicked ue_check_error
dw_2	Event	type integer ue_search_dist_no (string as_hw_id)
	ControlEvent	Itemfocuschanged ue_check_error

Event: w_trans_retu.Close
Call super::ue_close Destroy ids_hw_regi and ids_dist_detail
Event: w_trans_retu. ue_add_dw_1
Call super::ue_add_dw_1 Set string(il_main_no), gd_today to dw_1
Event: w_trans_retu. ue_add_dw_2
Call super:: ue_add_dw_2 Set gs_div_id, gs_sect_id, gs_year, string(il_main_no) to dw_2 Set column "hw_id"
Event: w_trans_retu. ue_cal_id
select max(convert(numeric,retu_no)) Into :ls_main_no from "return" where div_id = :gs_div_id and sect_id = :gs_sect_id and year = :gs_year; il_main_no = Integer(ls_main_no)+1
Event: w_trans_retu. ue_hw_search
Call super::ue_hw_search dw_2.object.hw_id[il_row_2] =is_hw_id Set column "status"
Event: w_trans_retu. ue_init
Call super::ue_init is_dataobject = 'd_r_retu' This.Post Event ue_add_dw_1()
Event: w_trans_retu. ue_retrieve_dw_2
dw_2.getChild("hw_id",dwc_hw_id) ids_hw_regi = Create DataStore "d_ds_hw_regi" ids_dist_detail = Create DataStore "d_ds_dist_detail_search" Retrieve dwc_hw_id, ids_hw_regi, ids_dist_detail and dw_2

Event: w_trans_retu.ue_update_dw_2

Call super::ue_update_dw_2
if ib_pass = false then return end if
IF dw_2.update()<=0 THEN
ib_pass = False
ELSE
If dw_2.status = 1 then
Update ids_hw_regi.status = '1'
Else Update ids_hw_regi.status = '4'
End if
Update status of ids_dist_detail = "0"
Insert SQL statement of ids_hw_regi and ids_dist_detail to ids_sql_trans
dw_2.Post Event ue_Filter(ls_hw_id)
END IF

ControlEvent: dw_1.ButtonClicked

ls_date =Open(w_pb_calendar)
if ls_date <> '00/00/0000' then
This.SetItem(il_row_1,'date',date(ls_date))
end if

ControlEvent: dw_1.ue_check_error
Check Today>=date <>null Check return_id, recipient_id <> null
Event: dw_2.ue_search_dist_no.
il_dist = ids_dist_detail.Find("hw_id = '"+as_hw_id+"'",1,ids_dist_detail.RowCount()) This.object.Dist_no[il_row_2] = ids_dist_detail.object.dist_no[il_dist] This.object.Dist_year[il_row_2] = ids_dist_detail.object.year[il_dist] Return 1
ControlEvent: dw_2.itemfocuschanged

if dwo.name = "status" then
ls_findString = " hw_id = '"+ This.object.hw_id[il_row_2]+"'"
ll_Found = dwc_hw_id.Find(ls_FindString,1,dwc_hw_id.RowCount())
i_rc = This.Event ue_search_dist_no(ls_search)
if i_rc = 0 then //fail
This.SetColumn("hw_id")
end if
end if

ControlEvent: dw_2.ue_check_error
Check hw_id, status <> null

[Window] w_check_repair from Window
[Description] Update repaired hardware by changing status to wait and adding '*' to cause

Controls	*Control Name*	*Remarks*
Window	<w_check_repair>	Menu="m_check_repair"; Title="receive repaired hardware";
Datawindow	dw_1	Tab=40; Disable; DataObject="d_ff_repa_detail";

Declaration	
Shared Variable	string ss_list
Instance Variable	boolean ib_pass = false datastore ids_hw_regi, ids_sql_trans

Script	*Type*	*Name*
w_check_repair	Event	Close Closequery Open ue_first ( ) ue_init ( ) ue_last ( ) ue_next ( ) ue_prev ( ) ue_search_hw_id ( ) ue_update_repair ( )
dw_1	Event	ue_find (string as_hw_id)
	ControlEvent	Dberror Sqlpreview

Event: w_check_repair.Close

```
IF ib_pass = True Then
        Commit;
Else    rollback;
end if
Destroy ids_hw_regi and ids_sql_trans
```

Event: w_check_repair. Closequery

See in w_db_base but using dw_1 instead of dw_2

Event: w_check_repair. Open

```
This.Post Event ue_init()
```

Event: w_check_repair. ue_first ( )

```
dw_1.ScrollToRow(1)
```

Event: w_check_repair. ue_init ( )

```
ids_sql_trans = Create DataStore "d_ds_sql_trans"
ids_hw_regi = Create DataStore "d_ds_hw_regi"
Retrieve dw_1, ids_sql_trans and ids_hw_regi
dw_1.SetFilter("cause not like '*%'") and Filter()
```

Event: w_check_repair. ue_last ( )

```
dw_1.ScrollToRow(dw_1.RowCount())
```

Event: w_check_repair. ue_next ( )

```
dw_1.ScrollNextRow()
```

Event: w_check_repair. ue_prev ( )

```
dw_1.ScrollPriorRow()
```

Event: w_check_repair. ue_search_hw_id ( )

```
ls_hw_id = OpenWithParm(w_hw_id_search,1)
dw_1.Post Event ue_find(ls_hw_id)
```

Event: dw_1. ue_find (string as_hw_id)

```
if as_hw_id <> " " then
        dw_1.Find("hw_id = '"+as_hw_id+"'", 1, dw_1.RowCount())
        dw_1.ScrollToRow(ll_found)
end if
```

Event: w_check_repair. ue_update_repair ()

dw_1.getrow()
Insert '*' in dw_1.cause(currow)
IF dw_1.update()<=0 THEN
ib_pass = False
else
ids_hw_regi.Find("hw_id = '"+ls_hw_id+"'",1, ids_hw_regi.RowCount())
Update ids_hw_regi.Object.status[ll_row] = "1" //wait
END IF

ControlEvent: dw_1.dberror
See in w_db_base.dw_2.dberror
ControlEvent: dw_1.sqlpreview
See in w_trans_base.dw_1.Sqlpreview

[Window] w_trans_sql from Window [Description] Prepare SQL statement data

Controls	*Control Name*	*Remarks*
Window	<w_trans_sql>	Title="Prepare SQL data";
datawindow	dw_2	Tab=10; DataObject="d_sql_trans";
picturebutton	pb_ok	Tab=20;
statictext	st_status	

Declaration	
Shared Variable	string ss_list
Instance Variable	datastore ids_sql_trans

Script	*Type*	*Name*
w_trans_sql	Event	Open ue_init ( ) ue_update ( )
dw_2	ControlEvent	dberror
pb_ok	ControlEvent	clicked

Event: w_trans_sql.open
This.Post Event ue_init()
Event: w_trans_sql.ue_init()
ids_sql_trans = Create DataStore "d_ds_edit_sql" Retrieve ids_sql_trans and dw_2
Event: w_trans_sql.ue_update()

ll_row = ids_sql_trans.RowCount()
FOR ll_count=1 TO ll_row
ids_sql_trans.object.done[ll_count] = 'Y'
NEXT
if ids_sql_trans.Update() > 0 then
commit;
else RollBack;
end if

ControlEvent: dw_2.dberror
See in w_db_base.dw_2.dberror
ControlEvent: pb_ok.clicked

i_rc = dw_2.saveas("",text!,False)
if i_rc = 1 then
Parent.Trigger event ue_update()
end if

[Window] w_trans_print from w_print_base [Description] Print transaction report

Controls	*Control Name*	*Remarks*
W_print_base	<w_trans_print>	Menu="m_trans_print";

Script	*Type*	*Name*
w_trans_print	Event	ue_init

Event w_trans_print.ue_init()
str_trans_print str_x string ls_rc str_x = Message.PowerObjectParm dw_1.dataobject = str_x.s_dataobject dw_1.SetTransObject(SQLCA) dw_1.Retrieve(gs_div_id,gs_sect_id,gs_year,str_x.s_no) This.Post event Ue_set_page() dw_1.modify("DataWindow.Print.Preview = yes")

Editing process

[Window] w_trans_edit_base from Window [Description] ancestor window of transaction editing process

Controls	*Control Name*	*Remarks*
Window	<w_trans_edit_base>	Menu="m_trans_edit";
datawindow	dw_1	Tab=20; Disable;
datawindow	dw_2	Tab=10;

Declaration	
Instance Variable	boolean ib_needsave = false, ib_pass = false long il_row_1, il_row_2, il_row string is_hw_id, is_no datastore ids_sql_trans

Script	*Type*	*Name*
w_trans_edit_base	Event	Close Closequery Open ue_cancel ( ) ue_init ( ) ue_retrieve ( )

Script	*Type*	*Name*
		ue_search ( ) ue_undo ( ) ue_update ( ) ue_update_dw_2 ( )
	PrivateFunc	wf_undo (datawindow adw_x) return integer
Dw_1	ControlEvent	Dberror Itemchanged Sqlpreview
Dw_2	Event	ue_check_error ( )
	ControlEvent	dberror itemchanged sqlpreview

Event: w_trans_edit_base.Close

IF ib_pass Then
Commit;
Else rollback;
end if
Destroy ids_sql_trans and close(This)

Event: w_trans_edit_base.Closequery
See in w_db_base.Closequery but they check dw_1 and dw_2
Event: w_trans_edit_base.Open
This.Post Event ue_init()
Event: w_trans_edit_base.ue_cancel()
See in w_db_base.ue_cancel
Event: w_trans_edit_base.ue_init()
ids_sql_trans = Create DataStore "d_ds_sql_trans" and invisible dw_1 and dw_2 This.Trigger Event ue_search()
Event: w_trans_edit_base.ue_retrieve()

if is_no <> 'n' then
dw_1.Retrieve(gs_div_id,gs_sect_id,gs_year,is_no) and visible dw_1
il_row_1 = dw_1.GetRow()
This.Trigger event ue_retrieve_dw_2()
end if

Event:w_trans_edit_base.ue_search
is_no = open(w_trans_q_no,This) This.Trigger Event ue_retrieve()
Event:w_trans_edit_base.ue_undo

if wf_undo(dw_1)= 0 then
wf_undo(dw_2)
end if

Event: w_trans_edit_base.ue_update()

dw_1.TriggerEvent ("ue_check_error")
If ib_pass then
IF dw_1.Update() = 1 Then This.Trigger Event ue_update_dw_2()
Else ib_pass =false and set focus dw_1
end if
End IF

Event: w_trans_edit_base.ue_update_dw_2
dw_2.TriggerEvent ("ue_check_error")

PrivateFunction:w_trans_edit_base. wf_undo (datawindow adw_x) return integer
Get the original value of adw_x row/column Reset it to the original value Reset the modified flag for adw_x row
ControlEvent: dw_1.dberror
See in w_db_base.dw_2.dberror
ControlEvent: dw_1.Itemchanged
ib_needsave = True
ControlEvent: dw_1.sqlpreview
See in w_trans_base.dw_1.sqlpreview
Event: dw_2.ue_check_error()
long ll_row ll_row = This.RowCount() FOR il_row_2 = 1 TO ll_row This.Trigger Event ue_check_fn() if not(ib_pass) then return end if NEXT
ControlEvent: dw_2.dberror
See in w_db_base.dw_2.dberror
ControlEvent: dw_2.itemchanged
ib_needsave = True
ControlEvent: dw_2.sqlpreview
See in w_trans_base.dw_2.sqlpreview

[Window] w_trans_edit_cont from w_trans_edit_base [Description] Edit registraton data

Controls	*Control Name*	*Remarks*
w_trans_edit_base	<w_trans_edit_cont>	Title="Edit registration";
w_trans_edit_base`dw_1	dw_1	DataObject="d_control_edit";
w_trans_edit_base`dw_2	dw_2	DataObject="d_cont_detail_edit";
datawindow	dw_3	Tab=20; DataObject="d_hw_regi_edit";

Declaration	
Instance Variable	datawindowchild dwc_1, dwc_2

Script	*Type*	*Name*
w_trans_edit_cont	Event	ue_retrieve_dw_2 ue_update_dw_2
dw_1	ControlEvent	Buttonclicked ue_check_error
dw_2	Event	ue_dropdown pbm_dwndropdown
	ControlEvent	Rowfocuschanged ue_check_fn
dw_3	Event	ue_filter (string as_no)
	ControlEvent	sqlpreview

Event: w_trans_edit_cont.ue_retrieve_dw_2
dw_2.getChild('type_id',dwc_1) dw_2.getChild('spec_id',dwc_2) retrieve dwc_1, dwc_2, dw_2 ,dw_3 and visible dw_2 and dw_3 ls_no = dw_2.Object.no[1] dw_3.Post Event ue_filter(ls_no)
Event: w_trans_edit_cont.ue_update_dw_2

Call super:: ue_update_dw_2
If ib_pass then
IF dw_2.Update() <>1 and dw_3. Update<> 1Then
ib_pass =false
end if
End IF

ControlEvent: dw_2.Rowfocuschanged
ls_no = This.GetItemString(this.getRow(),"no") dw_3.Post Event ue_filter(ls_no)
Event: dw_2.ue_filter(string as_no)
clear old filter This.SetFilter("no = '"+ as_no +" '") and Filter
ControlEvent: dw_3.sqlpreview
See in w_trans_control dw_1.sqlpreview
** *dw_1.ButtonClicked , dw_1.ue_check_error and dw_2.ue_dropdown see in w_trans_control* *dw_2. ue_check_fn see in w_trans_control.dw_2.ue_check_error*

[Window] w_trans_edit_disp from w_trans_edit_base [Description] Edit disposal data

Controls	*Control Name*	*Remarks*
w_trans_edit_base	<w_trans_edit_disp>	Title="Edit disposal";
w_trans_edit_base`dw_1	dw_1	DataObject="d_dispose_edit";
w_trans_edit_base`dw_2	dw_2	DataObject="d_disp_detail_edit";

Script	*Type*	*Name*
w_trans_edit_disp	Event	ue_retrieve_dw_2 ue_update_dw_2
dw_1	ControlEvent	Buttonclicked ue_check_error
dw_2	ControlEvent	ue_check_fn

Event: w_trans_edit_disp.ue_retrieve_dw_2

If retrieve dw_2 is no error then
visible dw_2
end if

Event: w_trans_edit_disp.ue_update_dw2

Call super:: ue_update_dw_2
if ib_pass = false then
return
end if
IF dw_2.update()<=0 THEN
ib_pass = False and dw_2.SetFocus()
end if

** *dw_1.ButtonClicked and dw_1. ue_check_error see in w_trans_disp* *dw_2.ue_check_fn see in w_trans_disp.dw_2.ue_check_error*

[Window] w_trans_edit_dist from w_trans_edit_base [Description] Edit distribution data

Controls	*Control Name*	*Remarks*
w_trans_edit_base	<w_trans_edit_dist>	Title="Edit distribution";
w_trans_edit_base`dw_1	Dw_1	DataObject="d_distribute_edit";
w_trans_edit_base`dw_2	Dw_2	DataObject="d_dist_detail_edit";

Declaration	
Instance Variable	Datastore ids_dist_detail, ids_hw_regi

Script	*Type*	*Name*
w_trans_edit_dist	Event	ue_retrieve_dw_2 ue_update_dw_2 ue_update_fn ( )
dw_1	ControlEvent	ue_check_error

Event: w_trans_edit_dist.ue_retrieve_dw_2
ids_dist_detail = Create DataStore "d_ds_dist_detail" ids_hw_regi = Create DataStore "d_ds_hw_regi" retrieve dw_2, ids_dist_detail, ids_hw_regi and visible dw_2
Event: w_trans_edit_dist.ue_update_dw_2

Call super:: ue_update_dw_2
if ib_pass = false then
return
end if
ll_row = dw_2.RowCount()
For il_row_2 = 1 to ll_row
This.Trigger event ue_update_fn()
Next

Event: w_trans_edit_dist.ue_update_fn
Get ld_return_date, ls_use_place , ls_hw_id from dw_2 Find hw_id in ids_dist_detail Update ld_return_date to ids_dist_detail update use place in hw_regi table insert sql statement of ids_dist_detail and hw_regi in ids_sql_trans
ControlEvent:dw_1.ue_check_error
See in w_trans_dist.dw_1.ue_check_error

[Window] w_trans_edit_repa from w_trans_edit_base [Description] Edit repair data

Controls	*Control Name*	*Remarks*
w_trans_edit_base	<w_trans_edit_repa>	Title="Edit repair";
w_trans_edit_base`dw_1	dw_1	DataObject="d_repair_edit";
w_trans_edit_base`dw_2	dw_2	DataObject="d_repa_detail_edit";

Script	*Type*	*Name*
w_trans_edit_repa	Event	ue_retrieve_dw_2 ue_update_dw_2
dw_1	ControlEvent	ue_check_error
dw_2	ControlEvent	Buttonclicked ue_check_fn

Event: w_trans_edit_repa.ue_retrieve_dw_2
ids_dist_detail = Create DataStore "d_ds_dist_detail" ids_hw_regi = Create DataStore "d_ds_hw_regi" retrieve dw_2, ids_dist_detail, ids_hw_regi and visible dw_2
Event: w_trans_edit_repa.ue_update_dw_2

Call super:: ue_update_dw_2
if ib_pass = false then
return
end if
IF dw_2.update()<=0 THEN
ib_pass = False and dw_2.SetFocus()
end if

*** dw_1.ue_check_error and dw_2.buttonclicked see in w_trans_repa* *dw_2.ue_check_fn see in w_trans_repa.ue_check_error*

[Window] w_trans_edit_retu from w_trans_edit_base [Description] Edit return data

Controls	*Control Name*	*Remarks*
w_trans_edit_base	<w_trans_edit_retu>	Title="Edit return";
w_trans_edit_base`dw_1	dw_1	DataObject="d_return_edit";
w_trans_edit_base`dw_2	dw_2	DataObject="d_retu_detail_edit";

Declaration	
Instance Variable	Datastore ids_hw_regi

Script	*Type*	*Name*
w_trans_edit_retu	Event	ue_retrieve_dw_2 ue_update_dw_2 ue_update_fn ( )
dw_1	ControlEvent	Buttonclicked ue_check_error

Event: w_trans_edit_retu.ue_retrieve_dw_2
ids_hw_regi = Create DataStore "d_ds_hw_regi" Retrieve dw_2 , ids_hw_regi and visible dw_2
Event: w_trans_edit_retu.ue_update_dw_2

Call super:: ue_update_dw_2
if ib_pass = false then
return
end if
For il_row_2 = 1 to dw_2.RowCount()
This.Trigger event ue_update_fn()
Next

Event: w_trans_edit_retu.ue_update_fn

long ll_row string ls_hw_id, ls_status
IF dw_2.update()<=0 THEN
ib_pass = False
else
get ls_hw_id from dw_2
if dw_2.object.status[il_row_2] = "1" then //good
ls_status = "1"
elseif dw_2.object.status[il_row_2] = "2" then //bad
ls_status = "4"
end if
Find ls_hw_if in ids_hw_regi and update status = ls_status
Insert sql statement of ids_hw_regi to ids_sql_trans
End if

*** dw_1.ue_check_error and dw_2.buttonclicked see in w_trans_retu*

[Window] w_trans_q_no from Window
[Description] Get editing number of transaction and display the data to edit

Controls	*Control Name*	*Remarks*
Window	<w_trans_q_no>	Type=response!; Title="Get number";
Commandbutton	cb_cancel	Tab=40; Text="Cancel";
commandbutton	cb_ok	Tab=30; Text="OK";
editmask	em_no	Tab=10;
groupbox	gb_1	Tab=50; Text="Enter requested number";

Declaration	
Instance Variable	string is_no = 'n'

Script	*Type*	*Name*
w_trans_q_no	Event	Close
cb_cancel	ControlEvent	Clicked
cb_ok	ControlEvent	Clicked

Event: w_trans_q_no.Close
CloseWithReturn(This,is_no)
ControlEvent:cb_ok.clicked

IF isNull(em_no.text) then
MessageBox(Warn to enter number)
Else
is_no = em_no.text
CloseWithReturn(Parent,is_no)
end if

ControlEvent: cb_cancel.clicked
is_no = 'n' CloseWithReturn(Parent,is_no)

3. Query and Report

These windows create pre-define results and reports. These outputs devide into 3 style: tabular, graph and report. Tabular has 3 windows, which display overall or deep in detail data. Graph has an ancestor window, 2 descendent windows and 2 shared window. Report has a window to preview and print. All 3 styles have to call w_set_agr window that is described in section 4. Shared window.

Tabular result

[Window] w_q_hw_regi_desc from Window [Description] Hardware data and status of requested HW_ID

Controls	*Control Name*	*Remarks*
Window	<w_q_hw_regi_desc>	Menu="m_queries_main"; Title="Current status of hardware";
Commandbutton	cb_ok	Tab=20; Text="OK";
Commandbutton	cb_search	Tab=30; Text="SEARCH";
Datawindow	dw_1	Tab=50;Disable; DataObject="d_ff_hw_detail_desc";
datawindow	dw_2	Tab=40;
groupbox	gb_hw_id	
singlelineedit	sle_hw_id	Tab=10;
statictext	st_1	Text="HW_ID:";

Declaration	
Instance Variable	boolean ib_retu = false datastore ids_dist, ids_retu, ids_repa, ids_disp string is_status='0', is_expression, is_hw_id

Script	*Type*	*Name*
w_q_hw_regi_desc	Event	Close open ue_init ( )
cb_ok	ControlEvent	clicked
cb_search	ControlEvent	clicked
dw_1	Event	ue_find ( ) ue_search (string as_hw_id)
dw_2	Event	ue_find ( )

Event: w_q_hw_regi_desc.close
Destroy ids_dist, ids_disp, ids_repa and ids_retu
Event: w_q_hw_regi_desc.open
Post Event ue_init()
ControlEvent:cb_ok.clicked

if sle_hw_id.text <> " " then
dw_1.Post Event ue_search(sle_hw_id.text)
end if

Event: w_q_hw_regi_desc.ue_init()

```
invisible dw_1 and dw_2
ids_dist = Create DataStore "d_ff_dist_desc"
ids_disp = Create DataStore "d_ff_disp_desc"
ids_retu = Create DataStore "d_ff_retu_desc"
ids_repa = Create DataStore "d_ff_repa_desc"
retrieve dw_1 and all datastore
```

ControlEvent:cb_search.Clicked

```
ls_hw_id  = OpenWithParm(w_hw_id_search,2)
if ls_hw_id <> " " then
        sle_hw_id.text = ls_hw_id
        dw_1.Post Event ue_search(ls_hw_id)
end if
```

Event:dw_1.ue_find()

```
ll_row = This.GetRow()
is_hw_id = This.object.hw_regi_hw_id[ll_row]
is_status = This.Object.hw_regi_status[ll_row]
dw_2.Post Event ue_find()
```

Event:dw_1.ue_search(string as_hw_id)

```
ll_found = dw_1.Find("hw_regi_hw_id = '"+as_hw_id+"'", 1, dw_1.RowCount())
IF ll_found > 0 THEN
        dw_1.ScrollToRow(ll_found)
        visible dw_1 and invisible dw_2
        dw_1.Post Event ue_find()
ELSE
        Invisible dw_1 and dw_2
        MessageBox(Not found message)
END IF
```

Event: dw_2.ue_find()

```
this.SetFilter("") and Filter // clear old filter
CHOOSE CASE is_status
        CASE "1" // wait
                if not ib_retu then
                        ids_retu.SetFilter("retu_detail_status = '1' ") andFilter
                        is_expression = "retu_detail_hw_id = '"+is_hw_id+"'"
                        This.DataObject = ids_retu.DataObject
                        ids_retu.ShareData(dw_2) and ib_retu = True
                end if
        CASE "2" // use
                ids_dist.SetFilter("dist_detail_status = '1' ") and Filter
                is_expression = "dist_detail_hw_id = '"+is_hw_id+"'"
                This.DataObject = ids_dist.DataObject and  ids_dist.ShareData(dw_2)
        CASE "3" //borrow
                ids_dist.SetFilter("dist_detail_status = '2' ") and Filter
                is_expression = "dist_detail_hw_id = '"+is_hw_id+"'"
                This.DataObject = ids_dist.DataObject and  ids_dist.ShareData(dw_2)
        CASE "4" //bad
                ids_retu.SetFilter("retu_detail_status = '2' ") and Filter()
                is_expression = "retu_detail_hw_id = '"+is_hw_id+"'"
                This.DataObject = ids_retu.DataObject and  ids_retu.ShareData(dw_2)
        CASE "5" //repair
                ids_repa.SetFilter("repa_detail_cause not like '*%'") and Filter()
                is_expression = "repa_detail_hw_id = '"+is_hw_id+"'"
                This.DataObject = ids_repa.DataObject and ids_repa.ShareData(dw_2)
```

```
        CASE "6" // dispose
                is_expression = "disp_detail_hw_id = '"+is_hw_id+"'"
                This.DataObject = ids_disp.DataObject  and ids_disp.ShareData(dw_2)
END CHOOSE

ll_found = This.Find(is_expression,1,This.RowCount())
if ll_found > 0 then
        this.ScrollToRow(ll_found) and visible dw_2
elseif is_status = "1" then // wait may be in "wait" status coz  it repaired
        This.SetFilter("") and Filter // clear old filter
        ids_repa.SetFilter("repa_detail_cause like '*%'") and Filter
        is_expression = "repa_detail_hw_id = '"+is_hw_id+"'"
        This.DataObject = ids_repa.DataObject and ids_repa.ShareData(dw_2)
        ib_retu = false
        ll_found = This.Find(is_expression,1,This.RowCount())
        if ll_found > 0 then
                This.ScrollToRow(ll_found) and visible dw_2
        end if
end if
```

[Window] w_q_hw_spec_show from Window
[Description] Display hardware data of requested specification and section

Controls	*Control Name*	*Remarks*
Window	<w_q_hw_spec_show>	Menu="m_queries_main"; Title="Hardware data in identified specifiycaiton and section";
datawindow	dw_1	Tab=10; DataObject="d_tb_hw_spec_list";
datawindow	dw_2	Tab=20; DataObject="d_tb_hw_id_spec_list";

Script	*Type*	*Name*
w_q_hw_spec_show	Event	Open ue_init ( )
dw_1	ControlEvent	Doubleclicked Rowfocuschanged

Event:w_q_hw_spec_show.Open
Post Event ue_init()
Event:w_q_hw_spec_show.ue_init()
str_q_hw str_x str_x = Message.PowerObjectParm dw_1.Retrieve(str_x.s_div_id,str_x.s_sect_id,str_x.s_class_id,str_x.s_type_id,str_x.s_spec_id)
ControlEvent:dw_1.Doubleclicked
str_cont_d_pk str_data ll_row = dw_1.getRow() get div_id, sect_id, year, cont_no, no from dw_1 set these items to str_data dw_2.Retrieve(str_data.s_div_id,str_data.s_sect_id,str_data.s_year,str_data.s_cont_no,str_data.s_no)
ControlEvent:dw_1.rowfocuschanged
SelectRow(0,false) SelectRow(currentrow,True) ScrollToRow(currentRow)

[Window] w_q_hw_status_show from Window [Description] Display hardware list in requested status , section and specification

Controls	*Control Name*	*Remarks*
Window	<w_q_hw_status_show>	Menu="m_queries_main"; Title="Hardware list of identified status";
datawindow	dw_1	Tab=10;

Declaration	
Instance Variable	str_q_hw istr_x

Script	*Type*	*Name*
w_q_hw_status_show	Event	Open ue_init ( )

Event: w_q_hw_status_show.open

```
Post Event ue_init()
```

Event: w_q_hw_status_show.ue_init()

```
istr_x = Message.PowerObjectParm
CHOOSE CASE istr_x.s_status
        CASE '10'
                dw_1.dataobject = 'd_tb_retu_borr_date'
                dw_1.Retrieve(istr_x.s_div_id,istr_x.s_sect_id,istr_x.d_startdate,istr_x.d_stopdate)
        CASE '11'
                dw_1.dataobject = 'd_tb_retu_borr_date_spec'
                  dw_1.Retrieve(istr_x.s_div_id,istr_x.s_sect_id,istr_x.d_startdate,istr_x.d_stopdate,
                                istr_x.s_class_id,istr_x.s_type_id,istr_x.s_spec_id)
        CASE '20'
                dw_1.dataobject = 'd_tb_retu_repa_date'
                dw_1.Retrieve(istr_x.s_div_id,istr_x.s_sect_id,istr_x.d_startdate,istr_x.d_stopdate)
        CASE '21'
                dw_1.dataobject = 'd_tb_retu_repa_date_spec'
                 dw_1.Retrieve(istr_x.s_div_id,istr_x.s_sect_id,istr_x.d_startdate,istr_x.d_stopdate,
                                istr_x.s_class_id,istr_x.s_type_id,istr_x.s_spec_id)
        CASE ELSE
                dw_1.dataobject =  'd_tb_hw_status_list'
                dw_1.Retrieve(istr_x.s_div_id,istr_x.s_sect_id,istr_x.s_class_id,istr_x.s_type_id,
                                istr_x.s_spec_id,istr_x.s_status)
END CHOOSE
```

Graph result

[Window] w_graph_base from Window [Description] ancestor window for graph result in query process

Controls	*Control Name*	*Remarks*
Window	<w_graph_base>	Menu="m_graph_main";
datawindow	dw_1	Tab=10;
statictext	st_1	Text="click right button to display graph value";
statictext	st_popup	Invisible; Text="Popup";

Script	*Type*	*Name*
w_graph_base	Event	Close Open ue_graph_type ue_spacing
dw_1	Event	ue_rbuttonup pbm_rbuttonup
	ControlEvent	Rbuttondown

Event: w_graph_base.Close
Close(This)
Event: w_graph_base.Open
Post event ue_init()
Event: w_graph_base.ue_graph_type
OpenWithParm (w_graph_type, dw_1)
Event: w_graph_base.ue_spacing
OpenWithParm (w_graph_spacing, dw_1)
Event: dw_1.ue_rbuttonup pbm_rbuttonup
st_popup.visible = false
ControlEvent: dw_1.Rbuttondown

grObjectType ClickedObject
string ls_grgraphname="gr_1"
int li_series, li_category
ClickedObject = this.ObjectAtPointer (ls_grgraphname, li_series, li_category)
If ClickedObject = TypeData! Then
st_popup.text = string(this.GetData(ls_grgraphname, li_series, li_category)) + " units"
st_popup.x = parent.PointerX()
st_popup.y = parent.PointerY() - 65
st_popup.visible = true
End If

[Window] w_g_sum_quantity from w_graph_base
[Description] Display summary quantity graph that have series property

Controls	*Control Name*	*Remarks*
w_graph_base	<w_g_sum_quantity>	Title="Summary hardware quantity graph";
commandbutton	cb_ok	Tab=20; Text="Total";
w_graph_base`dw_1	dw_1	DataObject="d_gh_sum_quan_series";

Declaration	
Instance Variable	string is_series, is_text

Script	*Type*	*Name*
w_g_sum_quantity	Event	ue_init
cb_ok	ControlEvent	clicked

Event: w_g_sum_quantity.ue_init

```
str_report str_x  string ls_rc
str_x = Message.PowerObjectParm
dw_1.dataobject = str_x.s_dataobject
CHOOSE CASE str_x.i_style
        CASE 1 dw_1.Retrieve()
        CASE 2 dw_1.Retrieve(gstr_data.s_div_id,gstr_data.s_sect_id, gstr_data.s_year)
        CASE 3 dw_1.Retrieve(gstr_data.s_div_id,gstr_data.s_sect_id, gstr_data.s_budget_year)
        CASE 4 dw_1.Retrieve(gstr_data.s_div_id)
        CASE 5 dw_1.Retrieve(gstr_data.s_budget_year)
END CHOOSE

is_series = dw_1.Object.gr_1.series
CHOOSE CASE is_series
        CASE 'division_name1'
                is_text = 'Division Series'
        CASE 'hw_regi_status'
                is_text = 'Status Series'
END CHOOSE
```

ControlEvent.cb_ok.Clicked

```
IF This.Text = "Over All" then
        dw_1.Modify("gr_1.series = '~"noseries ~" ' ") and This.Text = is_text
Else
        dw_1.Modify("gr_1.series = '"+is_series+"' ") and This.Text = "Over all"
End If
```

[Window] w_g_drilldown from w_graph_base
[Description] Drilldown of hardware quantity in group, class, type or specification

Controls	*Control Name*	*Remarks*
w_graph_base	<w_g_drilldown>	Title="Drill down graph of hardware quantity";
w_graph_base`dw_1	dw_1	DataObject="d_gh_hw_group_div_year";
datawindow	dw_2	Tab=20; DataObject="d_gh_hw_class_div_year";
datawindow	dw_3	Tab=30; DataObject="d_gh_hw_type_div_year";
datawindow	dw_4	Tab=40; DataObject="d_gh_hw_spec_div_year";

Declaration	
Instance Variable	string is_series, is_text

Script	*Type*	*Name*
w_g_drilldown	Event	ue_graph_type ue_init ue_spacing
dw_1	ControlEvent	Clicked
dw_2	Event	ue_rbuttonup pbm_rbuttonup
	ControlEvent	Clicked Rbuttondown
dw_3	Event	ue_rbuttonup pbm_rbuttonup
	ControlEvent	Clicked Rbuttondown
dw_4	Event	ue_rbuttonup pbm_rbuttonup
	ControlEvent	Rbuttondown

Event: w_g_drilldown.ue_graph_type
Call super:: ue_graph_type ls_style = dw_1.object.gr_1.graphtype dw_2.object.gr_1.graphtype = ls_style dw_3.object.gr_1.graphtype = ls_style dw_4.object.gr_1.graphtype = ls_style
Event: w_g_drilldown.ue_init
dw_1.Retrieve(gstr_data.s_div_id,gstr_data.s_sect_id, gstr_data.s_budget_year)
Event: w_g_drilldown.ue_spacing
Call super::ue_spacing ls_space = dw_1.object.gr_1.spacing dw_2.object.gr_1.spacing = ls_space dw_3.object.gr_1.spacing = ls_space dw_4.object.gr_1.spacing = ls_space
ControlEvent: dw_1.clicked

GrObjectType ClickedObject
string ls_group, ls_grgraphname="gr_1"
int li_series, li_category
ClickedObject = this.ObjectAtPointer (ls_grgraphname, li_series,li_category)
If ClickedObject = TypeData! or ClickedObject = TypeCategory! then
ls_group = this.CategoryName (ls_grgraphname, li_category)
dw_2.Modify (ls_grgraphname + ".title=" + "' hardware class in " + ls_group + "' ")
dw_2.Retrieve(gstr_data.s_div_id,gstr_data.s_sect_id,gstr_data.s_budget_year, ls_group)
Else
MessageBox (Parent.Title, "Click on requested hardware group")
End If

** *dw_2.Clicked see in dw_1.Click but change class to type and dw_2 to dw_3* *dw_3.Clicked see in dw_1.Click but change class to spec and dw_2 to dw_4* *Other Event and ControlEvent of dw_2, dw_3 and dw_2 see in w_graph_base. They are the same algorithms but have some different detail.*

[Window] w_graph_type from Window [Description] General response window to modify a graph type

Controls	*Control Name*	*Remarks*
Window	<w_graph_type>	Type=response!; Title="Graph Type";
u_graph_gallery	uo_1	

Declaration	
Instance Variable	graph igr_parm datawindow idw_parm object io_passed

Script	*Type*	*Name*
w_graph_type	Event	open
uo_1	ControlEvent	gallery_cancel gallery_ok

Event: w_graph_type.open

// Receive and remember in the igr_parm or idw_parm instance variable
Graphicobject lgro_hold
Lgro_hold = message.powerobjectparm
If lgro_hold.TypeOf() = Graph! Then
io_passed = Graph! And igr_parm = message.powerobjectparm
Elseif lgro_hold.TypeOf() = Datawindow! Then
io_passed = Datawindow and idw_parm = message.powerobjectparm
End If

ControlEvent:uo_1.gallery_cancel gallery_ok
Get the graph type from the graph gallery user object. Set the type in the passed graph object. Close (parent)

[Window] w_graph_spacing from Window
[Description] General response window to set graph spacing

Controls	*Control Name*	*Remarks*
Window	<w_graph_spacing>	Type=response!; Title=" graph spacing";
commandbutton	cb_cancel	Tab=20; Text= "Cancel";
commandbutton	cb_ok	Tab=30; Text="OK";
editmask	em_spacing	Tab=10;

Declaration	
Instance Variable	object io_passed graph igr_parm datawindow idw_parm int ii_original_spacing

Script	*Type*	*Name*
w_graph_spacing	Event	open
cb_cancel	ControlEvent	Clicked
cb_ok	ControlEvent	Clicked
em_spacing	Event	ue_enchange pbm_enchange

Event: w_graph_spacing.open

Graphicobject lgro_hold
lgro_hold = Message.PowerObjectParm
If lgro_hold.TypeOf() = Graph! Then
io_passed = Graph! And igr_parm = Message.PowerObjectParm
em_spacing.text = string(igr_parm.spacing) and ii_original_spacing = igr_parm.spacing
Elseif lgro_hold.TypeOf() = Datawindow! Then
io_passed = Datawindow! And idw_parm = Message.PowerObjectParm
em_spacing.text = idw_parm.Object.gr_1.spacing
ii_original_spacing = Integer(em_spacing.text)
End If

Event: em_spacing.ue_enchange pbm_enchange

If io_passed = Graph! Then
igr_parm.spacing = integer (em_spacing.text)
Elseif io_passed = Datawindow! Then
idw_parm.Object.gr_1.spacing = em_spacing.text
End If

ControlEvent: cb_cancel.Clicked

If io_passed = Graph! Then
igr_parm.spacing = ii_original_spacing
Elseif io_passed = Datawindow! Then
idw_parm.Object.gr_1.spacing= string(ii_original_spacing)
End If
Close (parent)

ControlEvent: cb_ok.Clicked
Close (parent)

4. Shared windows

These windows derive from shared functions in above-mentioned section. Shared windows are w_db_error, w_login, w_pb_calendar, w_print_base, w_hw_code_search, w_hw_id_search, w_set_arg and w_about.

[Window] w_db_error from Window [Description] Display error of data window

Controls	*Control Name*	*Remarks*
Window	<w_db_error>	Type=response!; Title="Error";
commandbutton	cb_1	Tab=30; Text="Close";
multilineedit	mle_error_detail	Tab=10;
multilineedit	mle_fix_detail	Tab=20;
statictext	st_1	Text="Table";
statictext	st_2	Text="Row";
statictext	st_3	Text="Error detail";
Statictext	st_5	Text="Fix detail";
Statictext	st_row	
Statictext	st_table	

Script	*Type*	*Name*
w_db_error	Event	Open
cb_1	ControlEvent	Clicked

Event: w_db_error.open
str_db_error error_FromDW error_FromDW = Message.PowerObjectParm Convert error_FromDW to thai string Display thai string
ControlEvent: cb_1.Clicked
Close(Parent)

[Window] w_login from Window
[Description] Validate access level

Controls	*Control Name*	*Remarks*
Window	<w_login>	Type=response!; Title="Login to inventory management system";
commandbutton	cb_close	Tab=40; Text="Cancel";
commandbutton	cb_ok	Tab=30; Text="OK";
singlelineedit	sle_passwd	Tab=20;
singlelineedit	sle_user_id	Tab=10;
statictext	st_1	Text="User name:";
statictext	st_2	Text="Password:";

Declaration	
Instance Variable	string is_login_state = "NO"

Script	*Type*	*Name*
w_login	Event	close
cb_close	ControlEvent	Clicked
cb_ok	ControlEvent	clicked

Event: w_login.Close

```
CloseWithReturn(This, is_login_state)
```

ControlEvent.cb_close.Clicked

```
Close(Parent)
```

ControlEvent.cb_ok.clicked

```
string ls_passwd, ls_gov_id, ls_level
 Select passwd,gov_id,level into :ls_passwd, :ls_gov_id, :ls_level From security
        Where user_id = :sle_user_id.text;
if ls_passwd = sle_passwd.text then
        is_login_state = "YES"
        select div_id, sect_id into :gs_div_id, :gs_sect_id From staff where gov_id = :ls_gov_id;
        if isNumber(gs_div_id) and Len(gs_div_id) = 3 and &
                isNumber(gs_sect_id) and Len(gs_sect_id) = 3 then
                        gs_level = ls_level
                        parent.triggerevent("Close")
                        OPEN ( g_w_mdi, g_s_mdi )
        END IF
 Else    MessageBox(Invalid access)
 END if
```

[Window] w_pb_calendar from Window
[Description] pop-up calendar window; all powerbuilder (not OLE)

Controls	*Control Name*	*Remarks*
Window	<w_pb_calendar>	Type=response!;
line	Ln_1	Disable;
u_pb_calendar	uo_1	Tab=1;

Structure	*Variable type*	*Variable name*
mousepos	long	Xpos
mousepos	long	ypos

Declaration	
External Function	FUNCTION boolean GetCursorPos(ref structure mousepos) LIBRARY "user32.dll"
Instance Variable	Private mousepos i_mousepos

Script	*Type*	*Name*
w_pb_calendar	Event	open

Event: w_pb_calendar.Open
Get the pointer position using the LOCAL External Function... Set pop-up window in x, y position The UO will CloseWithReturn(i_window,dateparm).

[Window] w_set_arg from Window
[Description] Setting section, hardware specification, date, year argument for query and report

Controls	*Control Name*	*Remarks*
Window	<w_set_arg>	Title=" Set argument value";
commandbutton	cb_log_sect	Tab=70; Text=" login section";
commandbutton	cb_startdate	Tab=60; Disable; Text="+";
commandbutton	cb_stopdate	Tab=50; Disable; Text="+";
datawindow	dw_hw	Tab=40; DataObject="d_hw_code";
datawindow	dw_sect	Tab=20; DataObject="d_ff_sect_select";
editmask	em_startdate	Tab=70; Disable;
editmask	em_stopdate	Tab=60; Disable
editmask	em_year	Tab=60;
Picturebutton	pb_date_ok	Tab=60;
Picturebutton	pb_hw_ok	Tab=50;
Picturebutton	pb_sect_ok	Tab=50;
Picturebutton	pb_year_ok	Tab=70;
radiobutton	rb_range	Text="Date";
radiobutton	rb_today	Text="Today";
statictext	st_date	Text="to";
tab	tab_query	Tab=10;
userobject	tabpage_date	Text="Date";
userobject	tabpage_hw	Text="Hardware specification";
userobject	tabpage_sect	Text="section";
userobject	tabpage_year	Text="year/Budget year";

Declaration	
Instance Variable	datawindowchild dwc, dwc_1,dwc_2 boolean ib_today

Script	*Type*	*Name*
w_set_arg	Event	Open ue_init ( )

Script	*Type*	*Name*
cb_log_sect	ControlEvent	Clicked
cb_startdate	ControlEvent	Clicked
cb_stopdate	ControlEvent	Clicked
dw_hw	Event	ue_get_hw_code ( )
	ControlEvent	Itemfocuschange
ddw_sect	Event	ue_find (string as_div_id, string as_sect_id) ue_get_sect_id ( )
	ControlEvent	Itemfocuschanged
em_stopdate	ControlEvent	Losefocus
pb_date_ok	ControlEvent	clicked
pb_hw_ok	ControlEvent	Clicked
pb_sect_ok	ControlEvent	Clicked
pb_year_ok	ControlEvent	Clicked
rb_range	ControlEvent	Clicked
rb_today	ControlEvent	Clicked
tab_query	Event	ue_date_enable (boolean ab_flag)

Event:w_set_arg.open

```
This.Post Event ue_init()
```

Event:w_set_arg.ue_init()

```
ls_parm = message.stringParm
if ls_parm = 'query' then
        This.ChangeMenu(m_queries_main)
        Invisible tabpage_year
        tab_query.tabpage_hw.dw_hw.getChild('type_id',dwc_1)
         tab_query.tabpage_hw.dw_hw.getChild('spec_id',dwc_2)
        retrieve dwc_1, dwc_2 and tab_query.tabpage_hw
elseif ls_parm = 'report' then
        This.ChangeMenu(m_reports_main)
        Invisible tabpage_date and tabpage_hw
        tab_query.tabpage_year.em_year.text = gstr_data.s_year
elseif ls_parm = 'graph' then
        This.ChangeMenu(m_graph_main)
        Invisible tabpage_date and tabpage_hw
        tab_query.tabpage_year.em_year.text = gstr_data.s_year
end if
gstr_data.s_status = '0'
tab_query.tabpage_sect.dw_sect.getChild('sect_id',dwc)
Retrieve dwc and  tab_query.tabpage_sect.dw_sect
tab_query.tabpage_sect.dw_sect.Post event ue_find(gstr_data.s_div_id,gstr_data.s_sect_id)
```

ControlEvent: cb_log_sect.clicked

```
gstr_data.s_div_id = gs_div_id
gstr_data.s_sect_id = gs_sect_id
dw_sect.Trigger Event ue_find(gs_div_id, gs_sect_id)
```

ControlEvent: cb_startdate.clicked

```
ls_date = Open(w_pb_calendar)
if ls_date <> '00/00/0000' then
        em_startdate.Text = ls_date
end if
```

ControlEvent: cb_stopdate.clicked

```
ls_date = Open(w_pb_calendar)
If ls_date <> '00/00/0000' then
        em_Stopdate.Text = ls_date
        em_stopDate.TriggerEvent(loseFocus!)
end if
```

Event: dw_hw.ue_get_hw_code()

```
ll_row = This.getRow()
gstr_data.s_class_id = This.GetItemString(ll_row, "class_id")
gstr_data.s_type_id =This.GetItemString(ll_row, "type_id")
gstr_data.s_spec_id =This.GetItemString(ll_row, "spec_id")
```

ControlEvent: dw_hw.Itemfocuschanged

```
ll_row = This.GetRow()
ls_colunm = This.getColumnName()
IF ls_colunm = 'type_id' THEN
        ls_class_id = This.object.class_id[ll_row]
        dwc_1.SetFilter("class_id = '"+ls_class_id+"'") and filter
elseif ls_colunm = 'spec_id' THEN
        ls_class_id = This.object.class_id[ll_row]
        ls_type_id = This.object.type_id[ll_row]
        ls_expression =
        dwc_2.setFilter("class_id = '"+ls_class_id+"'and type_id = '"+ls_type_id+"'") and filter
END IF
```

Event: ddw_sect.ue_find (string as_div, string as_sect_id)

```
ll_row = This.Find("div_id = '"+as_div_id+"'and sect_id = '"+as_sect_id+"'",1,This.RowCount())
if ll_row > 0 then
        set as_div_id , as_sect_id to ddw_sect
        This.ScrollToRow(ll_row)
end if
```

Event: ddw_sect.ue_get_sect_id()

```
ll_row = This.getRow()
gstr_data.s_div_id = This.GetItemString(ll_row, "div_id")
gstr_data.s_sect_id = This.GetItemString(ll_row, "sect_id")
```

ControlEvent: ddw_sect.Itemfocuschanged

```
ll_row = This.GetRow()
IF dwo.name = 'sect_id' THEN
        ls_div_id = This.object.div_id[ll_row]
        dwc.SetFilter("div_id = '"+ls_div_id+"'") and filter
end if
```

ControlEvent: em_stopdate. Losefocus

```
if Date(em_stopdate.text) < date(em_startdate.text) then
        ls_temp = em_stopdate.text
        em_stopdate.text = em_startDate.text
        em_startDate.text = ls_temp
end if
```

ControlEvent: pb_date_ok. Clicked

```
if ib_today then
        gstr_data.d_startdate = gd_today
        gstr_data.d_stopdate = gd_today
else
        gstr_data.d_startdate = Date(em_startdate.text)
        gstr_data.d_stopdate = Date(em_stopdate.text)
end if
```

ControlEvent: pb_hw_ok. Clicked
dw_hw.Post Event ue_get_hw_code()
ControlEvent: pb_sect_ok. Clicked
dw_sect.Post Event ue_get_sect_id()
ControlEvent: pb_year_ok.clicked

ls_this_year = string(year(today())+543)
ls_year = trim(em_year.text)
if Integer(ls_year) <= Integer(ls_this_year) then
gstr_data.s_budget_year = ls_year
gstr_data.s_year = Right(ls_year,2)
end if

ControlEvent: rb_range .Clicked
ib_today = false tab_query.Post event ue_date_enable(True) em_startdate.SetFocus()
ControlEvent: rb_today.Clicked
ib_today = true tab_query.Post event ue_date_enable(false)
Event: tab_query.ue_date_enable(boolean ab_flag)
tab_query.tabpage_date.em_startdate.enabled =ab_flag tab_query.tabpage_date.em_stopdate.enabled =ab_flag tab_query.tabpage_date.cb_startdate.enabled = ab_flag tab_query.tabpage_date.cb_stopdate.enabled = ab_flag

[Window] w_print_base from Window [Description] ancestor window for print output from dw_1

Controls	*Control Name*	*Remarks*
Window	<w_print_base>	Menu="m_reports_main"; Title="Preview;
commandbutton	cb_1	Tab=60; Text="<<<";
commandbutton	cb_2	Tab=50; Text=">>>";
commandbutton	cb_last	Tab=40; Text="<<<";
commandbutton	cb_next	Tab=70; Text=">>>";
datawindow	dw_1	Tab=90;
editmask	em_1	Tab=80; Text="100";
editmask	em_page	Tab=30;
groupbox	gb_1	Tab=20; Text="Zoom:";
groupbox	gb_rows	Tab=10; Text="Page:";

Declaration	
Instance Variable	int ii_pagecount

Script	*Type*	*Name*
w_print_base	Event	Open Resize ue_print ( ) ue_save_as ( ) ue_set_page ( ) ue_zoom (integer ai_size)
cb_1	ControlEvent	Clicked

Script	*Type*	*Name*
cb_2	ControlEvent	Clicked
cb_last	Event	clicked pbm_bnclicked
cb_next	Event	clicked pbm_bnclicked
em_1	ControlEvent	Modified

Event: w_print_base.open
This.Post Event ue_init()
Event: w_print_base.resize
dw_1.width = this.width - 100 dw_1.height = this.height - 400
Event: w_print_base.ue_print()
dw_1.print()
Event: w_print_base.ue_save_as().
dw_1.saveas()
Event: w_print_base.ue_set_page()
em_page.text = string(1) ii_pagecount = integer(dw_1.describe("evaluate('pagecount()',1)")) em_page.minmax = "1-"+string(ii_pagecount)
Event: w_print_base.ue_zoom(integer as_size)
dw_1.modify('datawindow.print.preview.zoom = ' + String(ai_size))
ControlEvent:cb_1.Clicked

if integer(em_1.text) > 10 THEN
li_size = integer(em_1.text) -10
parent.event trigger ue_zoom(li_size)
em_1.text = string(li_size)
end if

ControlEvent:cb_2.Clicked
li_size = integer(em_1.text) +10 parent.event trigger ue_zoom(li_size) em_1.text = string(li_size)
Event:cb_last.Cliked pbm_bnclicked

if integer(em_page.text) >1 THEN
em_page.text = string(integer(em_page.text) - 1)
dw_1.scrollpriorpage()
end if

Event:cb_next.Clicked pbm_bnclicked

if integer(em_page.text) < ii_pagecount THEN
em_page.text = string(integer(em_page.text) + 1)
dw_1.scrollnextpage()
end if

ControlEvent: em_1.Modified
parent.event trigger ue_zoom(integer(this.text))

[Window] w_hw_code_search from Window [Description] hardware code search by name

Controls	*Control Name*	*Remarks*
Window	<w_hw_code_search>	Type=response!; Title="hardware code search";
u_selection_list	uo_1	

Declaration	
Instance Variable	string is_name str_hw_code istr_hw_code

Script	*Type*	*Name*
w_hw_code_search	Event	Close open
uo_1	ControlEvent	ue_entry_chosen

Event:w_hw_code_search.Close

if is_name <> ' ' then
SELECT "hw"."class_id", "hw"."type_id","hw"."spec_id" INTO :istr_hw_code.s_class_id,
:istr_hw_code.s_type_id, :istr_hw_code.s_spec_id FROM "hw","hw_type" WHERE
("hw_type"."class_id" = "hw"."class_id") and ("hw_type"."type_id" = "hw"."type_id")
and ("hw_type"."name"+"hw"."name" = :is_name);
end if
CloseWithReturn(This,istr_hw_code)

Event:w_hw_code_search.open
istr_hw_code.s_class_id = " " ls_sql = 'select "hw_type"."name" ' + '+' + '"hw"."name" FROM "hw","hw_type" WHERE' ls_sql +='("hw_type"."class_id" = "hw"."class_id")'and ("hw_type"."type_id" = "hw"."type_id") ' uo_1.create_datawindow(sqlca, ls_sql)
ControlEvent: uo_1.ue_entry.chosen
is_name = return_selected () Close(Parent)

[Window] w_hw_id_search from Window [Description] search hw_id from name or class, type, specification

Controls	*Control Name*	*Remarks*
Window	<w_hw_id_search>	Type=response!; Title="Hardware ID search";
commandbutton	cb_1	Tab=70; Text="OK";
commandbutton	cb_close	Tab=20; Text="Close";
commandbutton	cb_ok	Tab=30; Text="OK";
datawindow	dw_2	Tab=40; DataObject="d_hw_code";
datawindow	dw_3	Tab=40; DataObject="d_hw_id_search";
statictext	st_1	Text="Found Hardware List";
tab	tab_search	Tab=10;
userobject	tabpage_hw_id	Text="ID";
userobject	tabpage_id	Text="Code";
userobject	tabpage_name	Text="Name";
u_selection_list	uo_1	Tab=50;
u_selection_list	uo_2	Tab=50;

Declaration	
Instance Variable	string is_hw_id, is_status long il_style datawindowChild dwc_1, dwc_2

Script	*Type*	*Name*
w_hw_id_search	Event	Close Open ue_init ( )
cb_1	ControlEvent	Clicked
cb_close	ControlEvent	clicked
cb_ok	ControlEvent	clicked
dw_2	Event	ue_get_hw_id ( )
	ControlEvent	itemfocuschanged
dw_3	Event	type integer ue_retrieve (string as_class_id, string as_type_id, string as_spec_id)
	ControlEvent	Doubleclicked
uo_1	ControlEvent	ue_entry_chosen
uo_2	ControlEvent	ue_entry_chosen

Event:w_hw_id_search.Close

```
CloseWithReturn(This,is_hw_id)
```

Event:w_hw_id_search.Open

```
il_style = Message.DoubleParm
This.Post Event ue_init()
```

Event:w_hw_id_search.ue_init().

```
ls_sql = 'select "hw_type"."name" ' + '+' + '"hw"."name" FROM "hw","hw_type" WHERE'
ls_sql +='( "hw_type"."class_id" = "hw"."class_id" ) and ( "hw_type"."type_id" = "hw"."type_id" )'
tab_search.tabpage_name.uo_1.create_datawindow(sqlca, ls_sql)
ls_sql = "select hw_id from hw_regi"
tab_search.tabpage_hw_id.uo_2.create_datawindow(sqlca, ls_sql)

tab_search.tabpage_id.dw_2.getChild('type_id',dwc_1)
tab_search.tabpage_id.dw_2.getChild('spec_id',dwc_2) // successful = 1
retrieve dwc_1, dwc_2, dw_2, dw_3 and invisible dw_3
if il_style = 1 then //  transaction process, it must use status
        if (gs_proc = gs_distribute) or (gs_proc = gs_borrow) then
                is_status = "1" // wait
        elseif gs_proc = gs_return  then
                is_status = "3" //borrow
        elseif gs_proc = gs_repair then
                is_status = "4" //bad
        elseif gs_proc =gs_dispose then
                is_status = "4" //bad
        elseif gs_proc = gs_check_repa then
                is_status = "5" //repair
        end if
end if
```

ControlEvent: cb_1.clicked

```
dw_2.PostEvent ("ue_get_hw_id")
```

ControlEvent: cb_close.clicked

```
CloseWithReturn(Parent,is_hw_id)
```

ControlEvent: cb_ok.clicked

```
ll_row = dw_3.getrow()
if ll_row > 0 then
        is_hw_id = dw_3.GetItemString(ll_row,"hw_regi_hw_id")
        CloseWithReturn(Parent,is_hw_id)
end if
```

Event: dw_2.ue_get_hw_id()

```
ll_row = This.getRow()
ls_class_id = This.GetItemString(ll_row, "class_id")
ls_type_id =This.GetItemString(ll_row, "type_id")
ls_spec_id =This.GetItemString(ll_row, "spec_id")
dw_3.Event ue_retrieve(ls_class_id,ls_type_id,ls_spec_id)
```

ControlEvent: dw_2.itemfocuschanged

```
ll_row = This.GetRow()
ls_colunm = This.getColumnName()
IF ls_colunm = 'type_id' THEN
        ls_class_id = dw_2.object.class_id[ll_row]
        dwc_1.SetFilter("class_id = '"+ls_class_id+"'") and filter
elseif ls_colunm = 'spec_id' THEN
        ls_class_id = dw_2.object.class_id[ll_row]
        ls_type_id = dw_2.object.type_id[ll_row]
        dwc_2.setFilter("class_id = '"+ls_class_id+"'and type_id = '"+ls_type_id+"'") and Filter
END IF
```

Event: dw_3.ue_retrieve

```
if il_style = 1 then
      ls_expression = "cont_detail_class_id = '"+as_class_id+"'and  &
      cont_detail_type_id =  '"+as_type_id+"'  and cont_detail_spec_id = '"+as_spec_id+"' and  &
      hw_regi_status = '"+is_status+"'"
else
     ls_expression = "cont_detail_class_id = '"+as_class_id+"'
     and cont_detail_type_id = '"+as_type_id+"'  and cont_detail_spec_id = '"+as_spec_id+"'"
end if
dw_3.SetFilter(ls_expression) and  filter
```

ControlEvent: dw_3.Doubleclicked

```
cb_ok.TriggerEvent(Clicked!)
```

ControlEvent: uo_1.ue_entry_chosen

```
str_hw_code lstr_hw_code
ls_name = return_selected ()
if ls_name <> ' ' then
        SELECT "hw"."class_id", "hw"."type_id","hw"."spec_id"
        INTO :lstr_hw_code.s_class_id, :lstr_hw_code.s_type_id, :lstr_hw_code.s_spec_id
  FROM "hw","hw_type"    WHERE ( "hw_type"."class_id" = "hw"."class_id" ) and
     ( "hw_type"."type_id" = "hw"."type_id" )  and  ( "hw_type"."name"+"hw"."name" = :ls_name);
 dw_3.Event ue_retrieve(lstr_hw_code.s_class_id,lstr_hw_code.s_type_id,lstr_hw_code.s_spec_id)
end if
```

ControlEvent: ue_2.ue_entry_chose

```
is_hw_id = return_selected ()
cb_close.TriggerEvent(Clicked!)
```

BIOGRAPHY

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