



Examination Room and Seating Arrangement System of AU

by

Mr. Sri Krishna .T.M.

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

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer Information Systems
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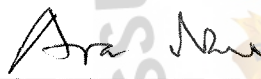
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Academic Year July 20, 2003


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

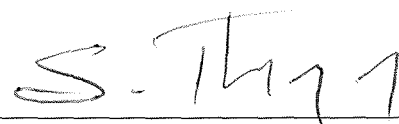
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ABSTRACT

This system development project presents the analysis and design of Examination Room and Seating System. The project is developed to solve the problems of assigning rooms and seat allocation, which is being done manually. The objectives of this project are to analyze and design a computerized system for exam room allocation, to improve the efficiency and reduce the time, of the work related to room allocations, to automate the task of assigning seat numbers and develop a prototype of the system.

The study of this project begins with the required definition and analysis of the existing system. Information system analysis and design tools such as context diagrams, data flow diagrams, data dictionaries, entity relationship diagram and structure charts are used to analyze both the existing and proposed systems. Candidate solution matrix is also used to compare various alternatives in order to come with the most effective solution. Capital budgeting models such as the payback method, the cost-benefit ratio, and the net present value are used to evaluate the purposed system.

It was found out that the new computerized system is implemented using 10Base-T LAN with 1 server, 3 clients, and 1 Laser printer. Software for the proposed system are Windows 98, MS Office 2000, and Microsoft Visual Basic 5.0 and Informix RDBMS. Based upon payback method, it shows that the initial investment will pay for itself after 3 years. In term of degree of achievement, the proposed system can process data about 6 times faster than the existing system.

To further improve the purposed system, it is recommended that a Web-based solution should be developed and implemented. This will allow users and students accessing the system more easily and faster

ACKNOWLEDGEMENTS

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I. INTRODUCTION

1.1 Background of the Project

Nowadays, computers are widely used in business for various reasons such as to increase their market share, to respond to their customers needs in a fast and efficient manner, to respond to changes quickly etc. This is also true for educational institutions where the staffs at the institutions such as universities, colleges and schools, have to provide instant service to students, as students are the main “customers” of those institutions.

The Admin office at AU, Bangkok, is in charge for assigning the exam rooms for courses and its corresponding sections. The basic problem here is that they are doing this process manually, i.e. they do it by collecting information about the courses and its sections and student lists and use MS Excel by providing some sort of formula to calculate the number of students per room and number of sections per room etc. This task will take a long time as there are lots of courses and sections and also students as well.

So, a computerized Exam Seat System is being proposed and developed to help the Admin staffs task easier and to make them work in an efficient manner.

1.2 Objectives of the Project

The objectives of developing this project are as follows:

- (1) To analyze and design a computerized system for the exam room allocation for courses, sections and students.
- (2) To improve the efficiency as well as to reduce the time, of the work related to assigning rooms.

- (3) To automate the task of assigned seat numbers to students for, who are assigned to exam rooms.
- (4) To develop a fully functioning prototype of the above-mentioned system.

1.3 Scope of the Project

Analysis and design in the process of allocating rooms to courses and its sections and development of its reports. Develop a database that will store the assigned rooms and its corresponding data, which will be helpful for the administration staff to print out the reports for them and students as well.

The major aspects of Examination Seating Arrangement system consists of the following:

- (1) Manage Room information.
 - (a) Add new Room
 - (b) Update existing Room Information
 - (c) Search Room information
 - (d) Delete existing Room Information
- (2) Manage Building information.
 - (a) Add new Building
 - (b) Update existing Building Information
 - (c) Search Building information
 - (d) Delete existing Building Information
- (3) Retrieve Study Course Details
 - (a) Check valid course
 - (b) Retrieve Student List
- (4) Assign Room to Course
 - (a) Calculate Seat available

- (b) Assign Room & Retrieve Updated Student List
- (5) Report (s)
 - (a) Check Criteria for Report
 - (b) Retrieve Data and Calculate Seat Number
 - (c) Prepare & Show Report to Admin Officer
- (6) Exam Room checking by students
 - (a) Check Exam Room

1.4 Deliverables

The deliverables of this project are

- (1) System design document
- (2) A prototype of the proposed system
- (3) Candidate and Feasibility Matrices Documents etc.

1.5 The Project Plan

The project plan is shown in Figure 1.1.

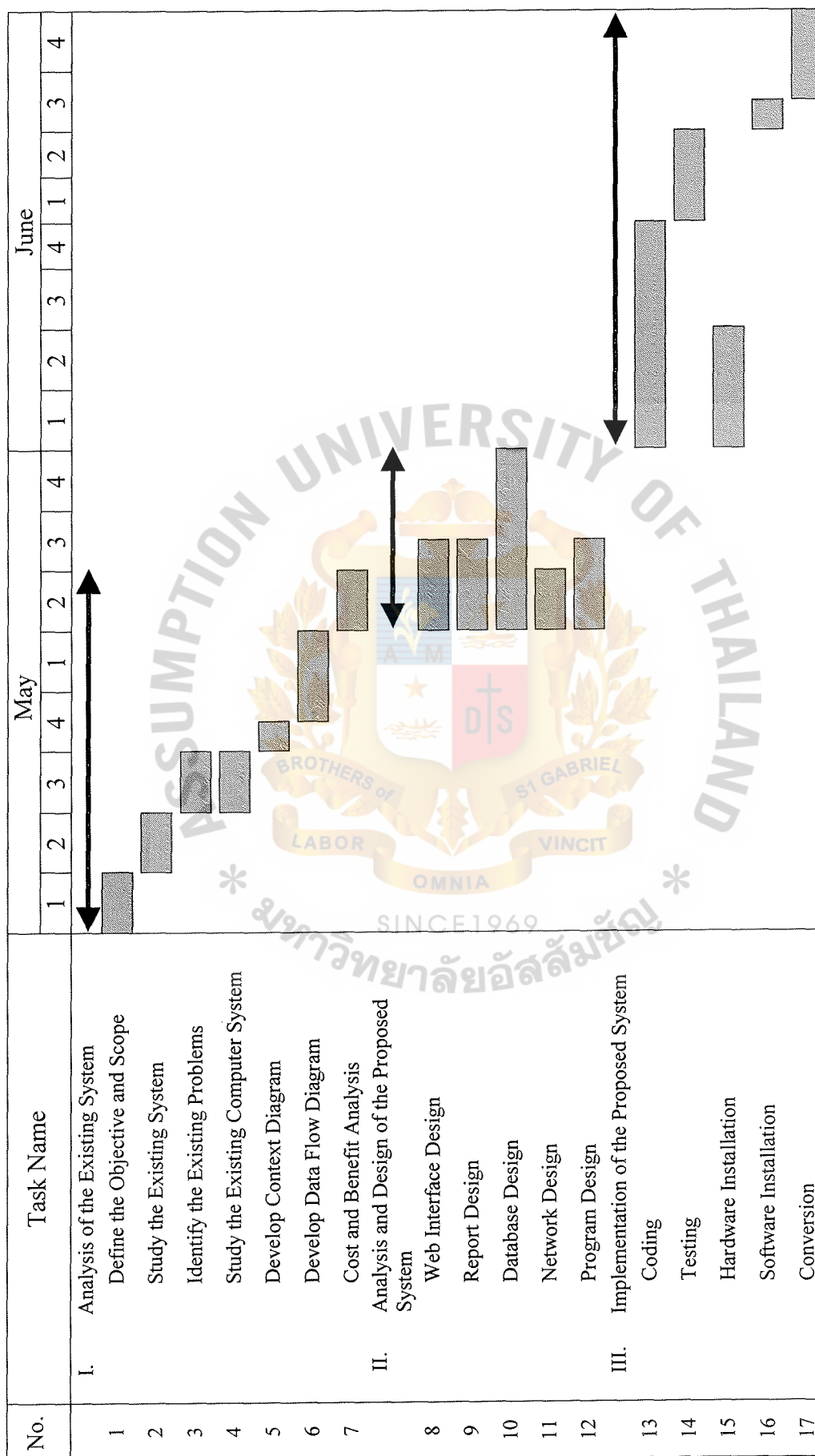


Figure 1.1. Project Plan of Exam Seating and Arrangement System.

II. THE EXISTING SYSTEM

2.1 Background of Organization

Assumption University was initially originated from Assumption Commercial College in 1969 as an autonomous higher education institution under the name of Assumption School of Business. In 1972, with the approval of the Ministry of Education, it was officially established as Assumption Business Administration College or ABAC. In May 1975, the Ministry of University Affairs accredited it. In 1990, it was granted new status as "Assumption University" by the Ministry of University Affairs.

Assumption University exists for the main purpose of serving the nation by providing scientific and humanistic knowledge, particularly in the business education and management science through research and interdisciplinary approaches.

To this end it aims at forming intellectually competent graduates who:

- (1) Are morally sound, committed to acting justly, and open to further growth.
- (2) Appreciate freedom of expression; imbibe right attitudes and ideologies through a carefully integrated curriculum of Ethics, Science, Languages and Business Management.
- (3) Achieve academic excellence through hard work, critical thinking, and effective decision-making.

Currently, AU is offering a number of Bachelor programs, Master programs and Doctorate programs as well. All these programs are being conducted in English. Thai language is used only for 5 courses, which are being taken only by Thai native speakers. Figure 2.1 on the next page shows the organization chart for Assumption University. This project is concerned with the Administration department.

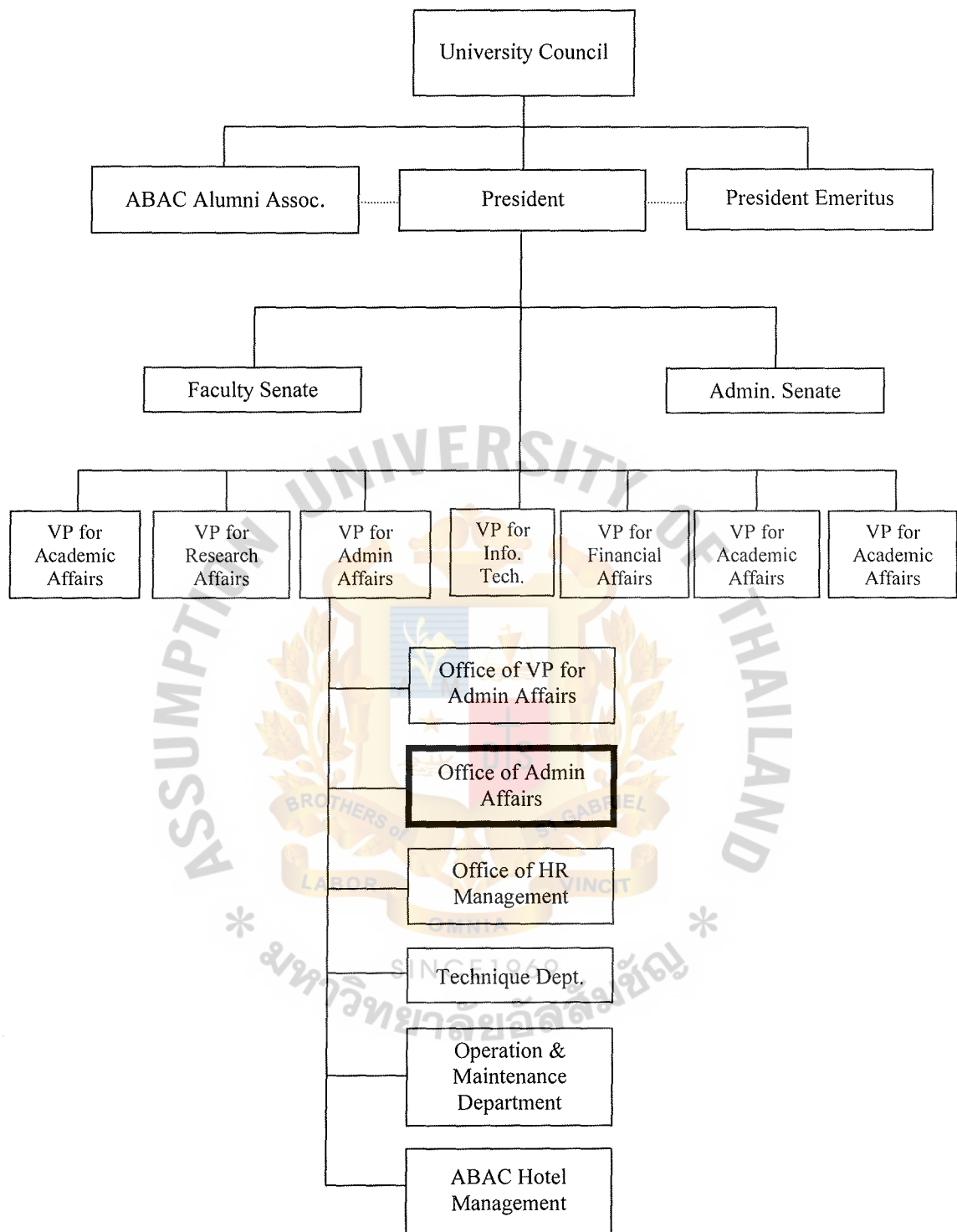


Figure 2.1. A Partially Filled Organization Chart of Assumption University.

As we can see in Figure 2.1, AU's organization structure has been divided into 2 main divisions:

- (1) Faculty Senate
- (2) Administrative Senate

Each division has distributed its responsibilities to many departments. The **Admin office** comes under **Vice President for Administrative Affairs**. This project will focus on the Admin office, which deals with examination room assignments, running seat numbers, posting seat reports for students etc respectively.

2.2 Area under Study

Assigning exam rooms are being done manually in AU, by Admin office staff and Registration office staff as well, in all these years. It takes lot of staff to collate the data such as courses, its sections and students taking each course in each semester etc.

The area under study of this project will focus on the aspect of examination seating arrangement specifically. This system will concern about:

- (1) Maintaining of Room and Building Records information.
- (2) Assignment of Rooms to course/section and students.
- (3) Assignment of seat numbers for students.
- (4) Report(s) for Admin office.
- (5) Exam room checking for Students.

2.3 Current Problems

The major problem is that the data in Registration department is computerized i.e. they have stored all student records who have taken what courses and sections this year/semester. But they can't send it over to Admin office that is in charge of assigning rooms based on the student strength and room size as well.

So, the registration office will print out the data and send it to Admin where the admin staff manually key in the data and assign rooms using MS Excel application. Then, they have to print out the seating report and assign seat numbers for individual students. This takes lot of time and lot of staff time and paper waste as well.

2.4 How Existing System Works

The existing system (manual) could well be divided into 2 major functions. First one is register or store the student record along with the course he/she has taken this semester in to the database before sending this data to the Admin office.

This activity has 2 groups of students:

- (a) New Students: The data concerning students such as id, name, courseId, section etc has to be registered in the database.
- (b) Existing Students: Some students may opt for late exam so the Registrar staff may have to change the exam date, time and room number for this particular student.

The above activities are already implemented using the **RMIS system** currently. So, we do not have to worry about data entry and error correction methods in the input data. When the Registrar staff finished with input data, they print the data and send it over to Admin office. Since Admin office does not have any computerized system and also they can't access the Registrar's database, Admin staffs have to manually type in all the data into MS Excel and try to assign the room number to the course and section including the student list, based on the total number of students in a section and the room strength.

Once the above process is over, the Admin staff again prints the completed list i.e. list report which contains studentid, courseId, section, room number, year, semester and assign seat numbers for each student. Once the seat numbers have been assigned, these

entries are saved in the database again and printed out in the report format for the students, which will be posted in front of rooms or notice boards.

The main problem in the above scenario is that there is no database, which could be received from the Registrar office (i.e. **RMIS system**) and stored for seat arrangement. Moreover, while assigning the room number, the Admin staff has to manually check the room strength, its row size, how many could sit in each row etc and then also check upon the section strength etc, which is a tedious process and also it takes up a long time and staff resources as well.



III. THE PROPOSED SYSTEM

3.1 System Specification

There are many methods to elicit information from users, but for this system, **interview technique** is selected. The users of this system were asked how they want to store, process, and query or print the data in each of their department. As an analyst, I wanted to know how the data flows from one department to another and also the report type, like, how it should be represented, what are the things to be shown in the report etc. I've summarized the user requirements for each department, which are given below:

Admin Office

- (1) The Admin office would like to have screens for Building and Room so as to edit existing information or add new buildings or rooms to the database.
- (2) A screen to show the courseId, section, exam date, start time, end time for the selected courseId and its exam type.
- (3) A screen for assigning the room number for the selected courseId and its section. This screen must show the course information such as Id, section each student taking the course this year/semester along with the room information, if it is already been assigned a room, otherwise show nothing.
- (4) Show room information such as room number, its total strength, seats used, seats remaining etc.
- (5) A confirmation screen when the room is about to be assigned.

Student

- (1) Students would like a screen wherein they can type in their id to retrieve the room information and seat information for the exam on that day.

3.2 System Design

2481 e.1

After careful analysis of the user requirements and system specification, the system design process was started with designing database requirements, followed by data flow diagrams for input and output and finally system implementation.

3.2.1 Data Model for Proposed System

The database for the proposed system consists of 7 tables. They are as follows:

- (1) Building -- > to store building information such as building code, campus code and description.
- (2) Room -- > to store room information such as room code, building code, campus code, seat amount, number of rows, size, phone number, remark and status.
- (3) Course -- > to store course information such as course id, course name etc.
- (4) Section -- > to store section information such as courseId, section number, exam date, room code etc.
- (5) Room Used -- > to store used room's data i.e. once the room is assigned to a course and section, simultaneously that data will be stored in this table for future reference.
- (6) Student -- > to store student information such as student id, first name, last name etc.
- (7) Studycourses -- > to store information of courses, sections taken by students in the current year/semester, exam type, room code, grade, time etc.
- (8) User -- > to store user names and passwords for admin staff and students.

3.2.2 Data Flow Diagrams

The context system for the proposed system is shown below. As mentioned earlier, the actors are RMIS System, Admin office and Students.

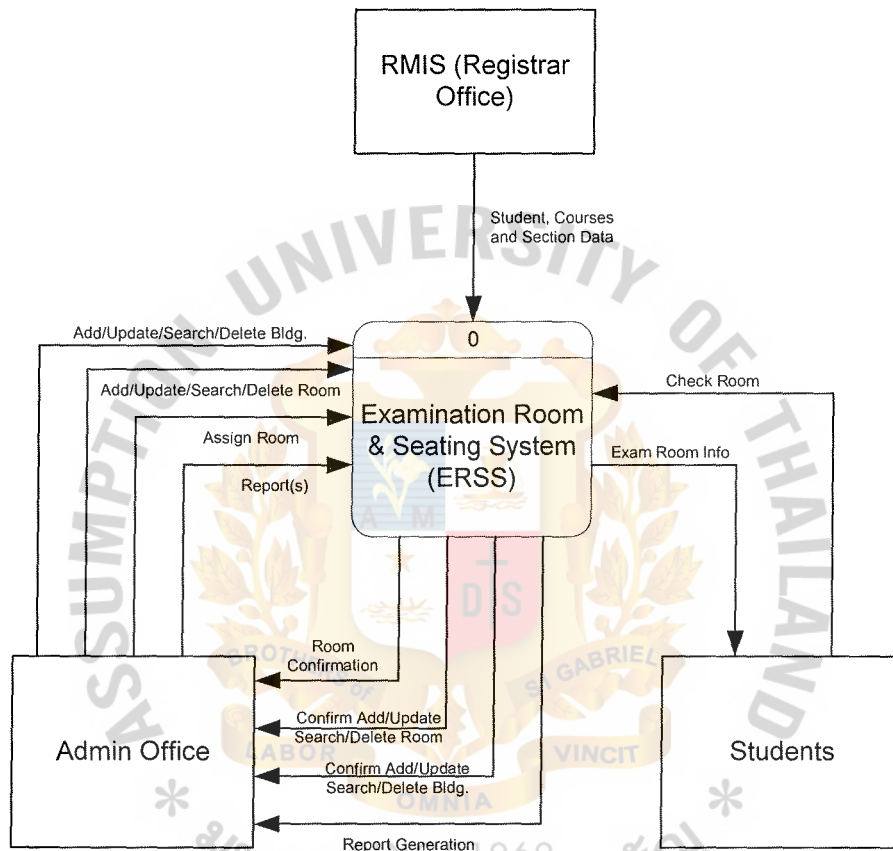


Figure 3.1. Context Diagram for the Proposed System.

Note: In this context diagram, the RMIS system is used only to receive the data that was fed into it by the Office of Registrar. The Examination seating arrangement system uses those data and assigns the room and seating number and prints out the reports for Admin office and students as well.

3.3 Feasibility Analysis of Candidate Systems

During the systems selection, the system analyst identifies the candidate system solutions and analyzes those solutions for feasibility. The feasibility analysis uses the Candidate Systems Matrix and Feasibility Analysis Matrix for presenting candidates and recommendations to management.

3.3.1 Candidate Systems Matrix

To find out the solution that can support business requirement, I found 3 candidates to support the solution as shown below in the Table 3.1. This table shows the characteristics of each candidate so that the system designer and users can compare and select the best one.

Table 3.1. Candidate System Matrix.

Characteristics	Candidate I	Candidate II	Candidate III
Proposed system computerized.	The solution would be developed by in-house programmers in order to satisfy the users requirements.	Same as candidate I	The solution will be developed by outside companies.
Benefits	Fully supports business processes required by users and easy to maintain.	Fully supports only the important business process given by users, created on the fly. i.e. a solution for time-being.	Fully supports business processes required by users to develop a professional system.
Servers and Workstations	Windows 2000 Professional Server, 3 Windows 2000 PC.	1 Windows 98 PC.	Same as I.
Software Tools	MS Visual Basic 5.0	MS Excel	Same as I
Application software	Custom solution	Same as I	Same as I
Method of data processing	Client - Server	Stand – alone	Same as I
Output Devices	Laser Printer	Same as I	Same as I
Input Devices	Keyboard and Mouse	Same as I	Same as I
Storage	RDBMS Informix	MS Access	Same as I.

The summary of 3 candidates are as follows:

(1) Candidate I

This solution is to be developed by in-house developers and programmers. It is a custom made solution, developed using MS Visual Basic 5.0 language. It can support all the business processes needed by users. This solution uses Windows 2000 Professional server and Windows 2000 clients in a client-server methodology. The input devices are keyboard and mouse and output device is a Laser Jet printer via the network.

This candidate solution is highly recommended as the in-house programmers have good coding experience and completely in touch with the Informix RDBMS software. Moreover, the Registrar's Office has already purchased the Informix RDBMS software, there is no special cost for buying the database management systems. So, once the developers get the requirements from the users, they can start developing the software immediately.

(2) Candidate 2

This solution is like a on the fly software. The in-house developers form some sort of formula and create a macro and put in MS Excel software. But this could not be construed as a solution.

(3) Candidate 3

This solution is similar like candidate I but the basic difference is developing the application by outsourcing. It will take less construction time but budget will have to be stretched as the developing fee will be much higher than developing in-house.

3.3.2 Feasibility Analysis Matrix

The feasibility analysis for the above candidate solutions are shown below, in Table 3.2. After analyzing the matrix, the first candidate is selected for the implementation.

Table 3.2. Feasibility Analysis Matrix of 3 Candidate Systems.

Feasibility	Weight	Candidate I	Candidate II	Candidate III
Operational Feasibility	30%	Fully supports functionalities required by users. Score: 100	Supports only the main functionality required by users. Score: 70	Fully supports to function required by the users. Score: 100
Technical Feasibility	30%	The in-house programmers are efficient in Database design using Informix as well as MS Visual Basic 5.0. It has many features and support large amount of data. Modification could be made in no time, as the in-house programmers will be available all the time. Score: 95	Some of the staff in Admin office can't use MS Excel and also this solution could not support huge amount of data as well as the input data has to be typed in by staffs, which will waste time. Score: 70	Same as candidate I. Score: 95
Economic Feasibility <ul style="list-style-type: none"> Cost to develop Pay back period 	20%	Approx: 432,544 Baht Approx: 2.7 yrs	Approx: 301,200 Baht Approx: 4 yrs	Approx: 528,370 Baht Approx: 4.3 yrs
<ul style="list-style-type: none"> NPV Detail Cal. 	20%	Approx: 386,297 Baht See Table 3.3. Score: 75	Approx: 64,407 Baht See Table 3.4. Score: 60	Approx: 43,642 Baht See Table 3.5. Score: 90
Schedule Feasibility	20%	2 months Score: 97	1 month Score: 100	3 – 5 months Score: 60
Ranking	100%	93	74	88.5

Table 3.3. Payback Analysis of Candidate Solution 1, Baht.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Dev. Cost:	-432544					
Operation & Maintenance Cost		-15600	-17660	-19926	-22419	-25160
Discount Factor 5%	1	0.952	0.907	0.864	0.823	0.784
Time adjusted cost	-432544	-14851	-16017	-17216	-18450	-19725
Cumulative Time adjusted Cost	-432544	-447395	-463412	-480628	-499078	-518803
Benefit derived from operations of new system	0	190000	200000	210000	220000	230000
Discount factor 5%	1	0.952	0.907	0.864	0.823	0.784
Time adjusted benefits	0	180880	181400	181440	181060	180320
Cumulative benefits	0	180880	362280	543720	724780	905100
Cumulative Life-time time adjusted costs + benefits	-432544	-266515	-101132	63092	225702	386297

Table 3.4. Payback Analysis of Candidate Solution 2, Baht.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Dev. Cost:	-301200					
Operation & Maintenance Cost		-28600	-31460	-34606	38066.6	-46061
Discount Factor 5%	1	0.952	0.907	0.864	0.823	0.784
Time adjusted cost	-301200	-27238	-28535	-29894	-31317	-32809
Cumulative Time adjusted Cost	-301200	-328438	-356973	-386867	-418184	-450993
Benefit derived from operations of new system	0	100000	110000	120000	130000	140000
Discount factor 5%	1	0.952	0.907	0.864	0.823	0.784
Time adjusted benefits	0	95200	99770	103680	106990	109760
Cumulative benefits	0	95200	194970	298650	405640	515400
Cumulative Life-time time adjusted costs + benefits	-301200	-233238	-162003	-88037	2544	64407

Table 3.5. Payback Analysis of Candidate Solution 3, Baht.

Cost Items	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Dev. Cost:	-528370					
Operation & Maintenance Cost		-22260	-24486	-26935	-29628	-32591
Discount Factor 5%	1	0.952	0.907	0.864	0.823	0.784
Time adjusted cost	-528370	-21200	-22210	-23267	-24383	-25536
Cumulative Time adjusted Cost	-528370	-549570	-571780	-595047	-619422	-644958
Benefit derived from operations of new system	0	140000	150000	160000	170000	180000
Discount factor 5%	1	0.952	0.907	0.864	0.823	0.784
Time adjusted benefits	0	133280	136050	138240	139910	141120
Cumulative benefits	0	133280	269330	407570	547480	688600
Cumulative Life-time time adjusted costs + benefits	-528370	-416290	-302450	-187477	-71942	43,642

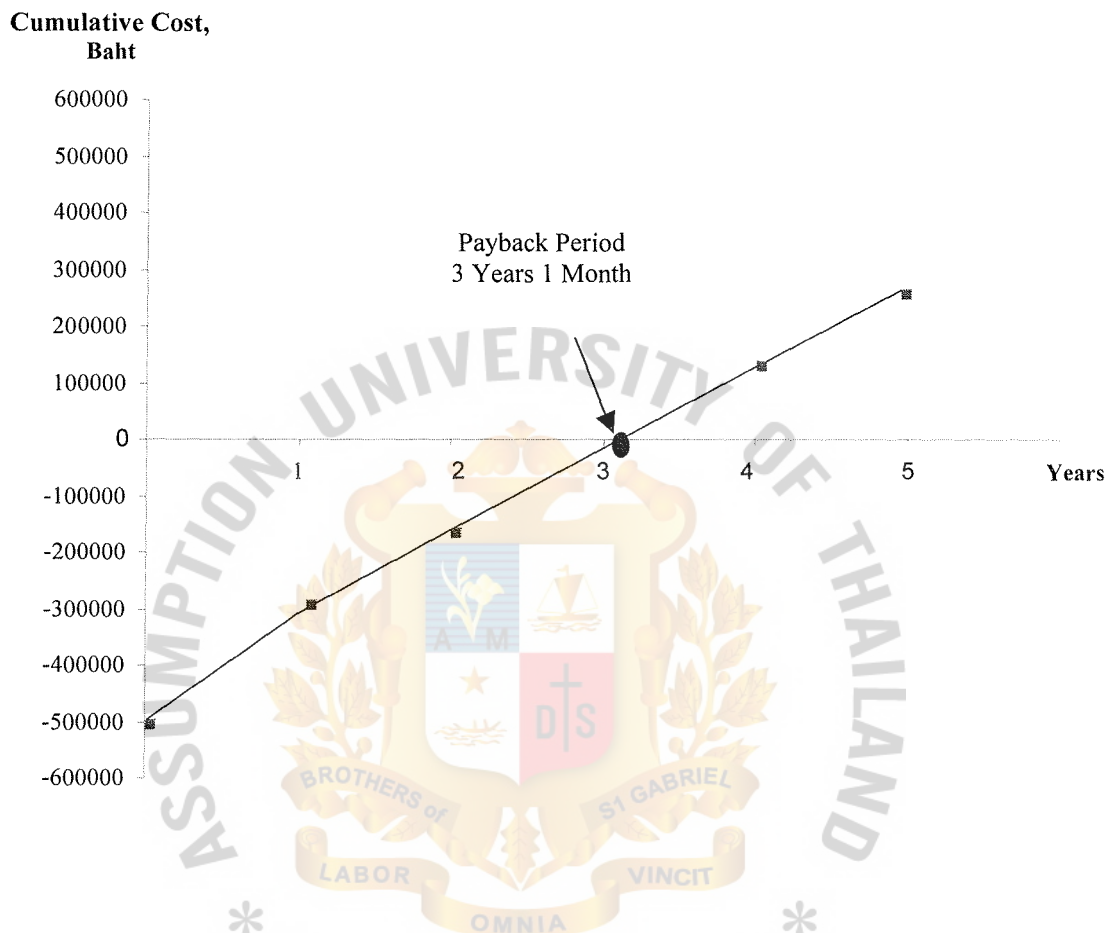


Figure 3.2. Payback Analysis Chart of Candidate Solution 1.

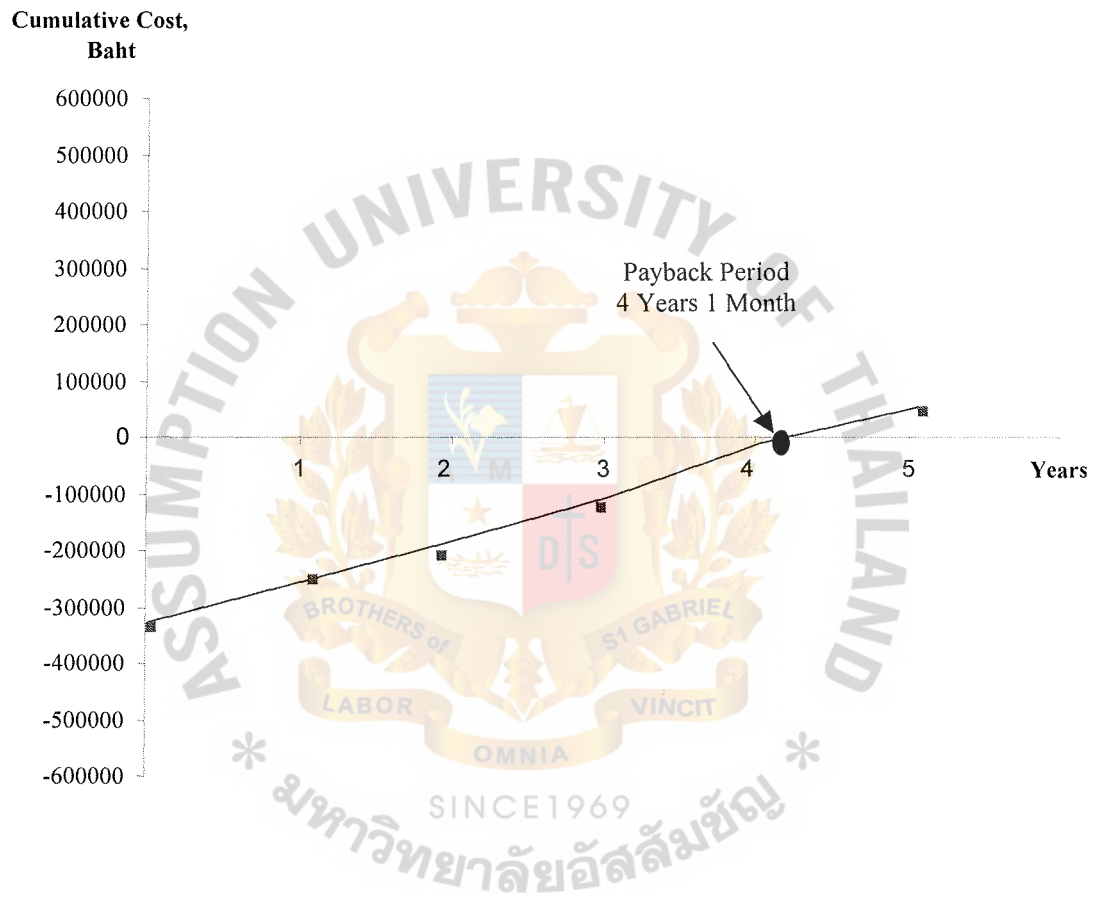


Figure 3.3. Payback Analysis Chart for Candidate Solution 2.

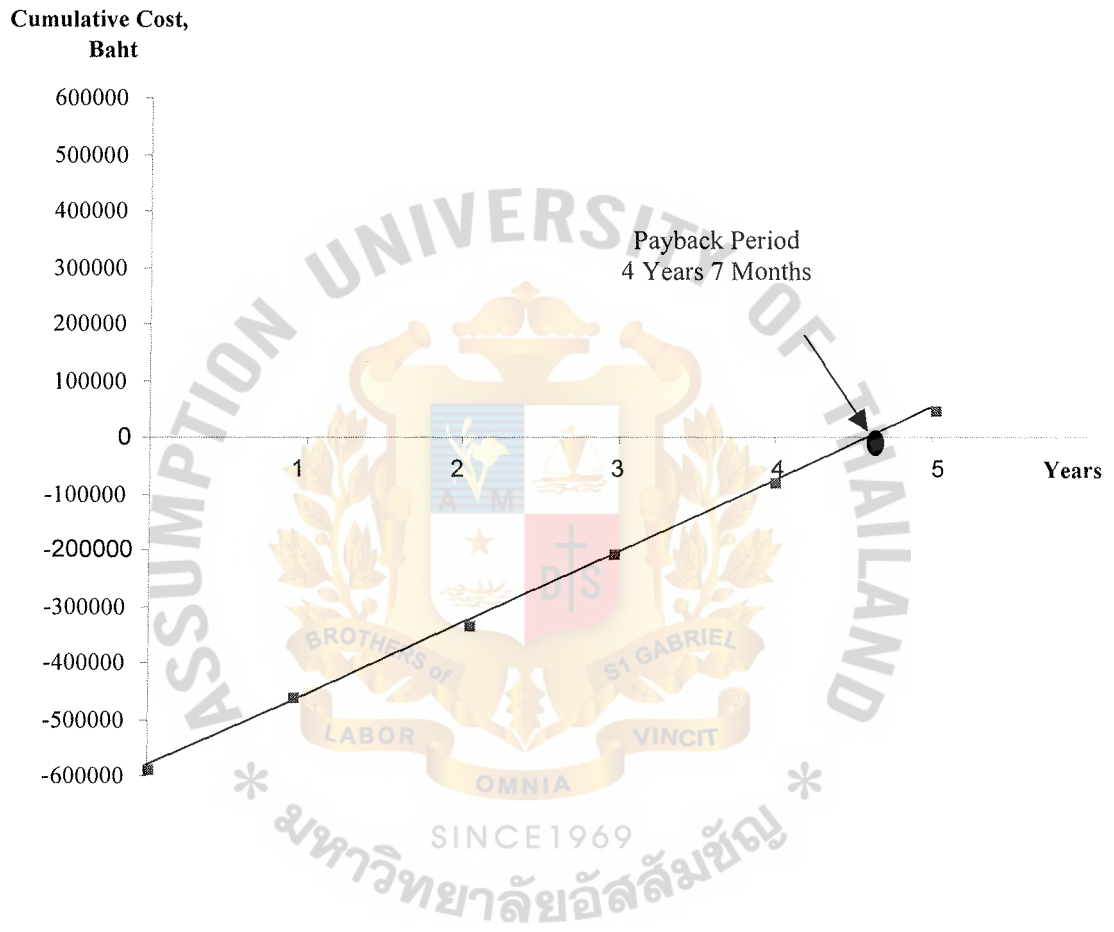


Figure 3.4. Payback Analysis Chart of Candidate Solution 3.

3.4 Hardware and Software Requirements

3.4.1 Hardware Requirements

- (1) File Server 1 Unit
 - (a) Pentium III 800
 - (b) 2 – 18 GB SCSI Hard Disk Drive
 - (c) SCSI controller
 - (d) 52 X CD – ROM
 - (e) Keyboard
 - (f) Mouse
 - (g) 15' LG Digital Monitor
 - (h) Tape Backup
- (2) PC Workstation 3 Units
 - (a) Pentium III 667
 - (b) 128 MB RAM
 - (c) 10 GB Hard Disk Drive
 - (d) 52 X CD – ROM
 - (e) Keyboard
 - (f) Mouse
 - (g) 15' LG Digital Monitor
- (3) Printer 1 Unit
 - (a) HP Laser Jet 1200
- (4) Network adapter
 - (a) Ethernet 10 – Base T
- (5) Network Peripherals
 - (a) HUB 10/100, 8 port

- (6) UPT Cable

3.4.2 Software Requirements

- (1) Database Server: Informix Online Server Version 7.2.3
- (2) Microsoft Windows 2000 Professional Edition.
- (3) Microsoft Office 2000 Thai Edition.
- (4) Microsoft Visual Basic 5.0



3.4.3 Network Configuration of the Proposed System

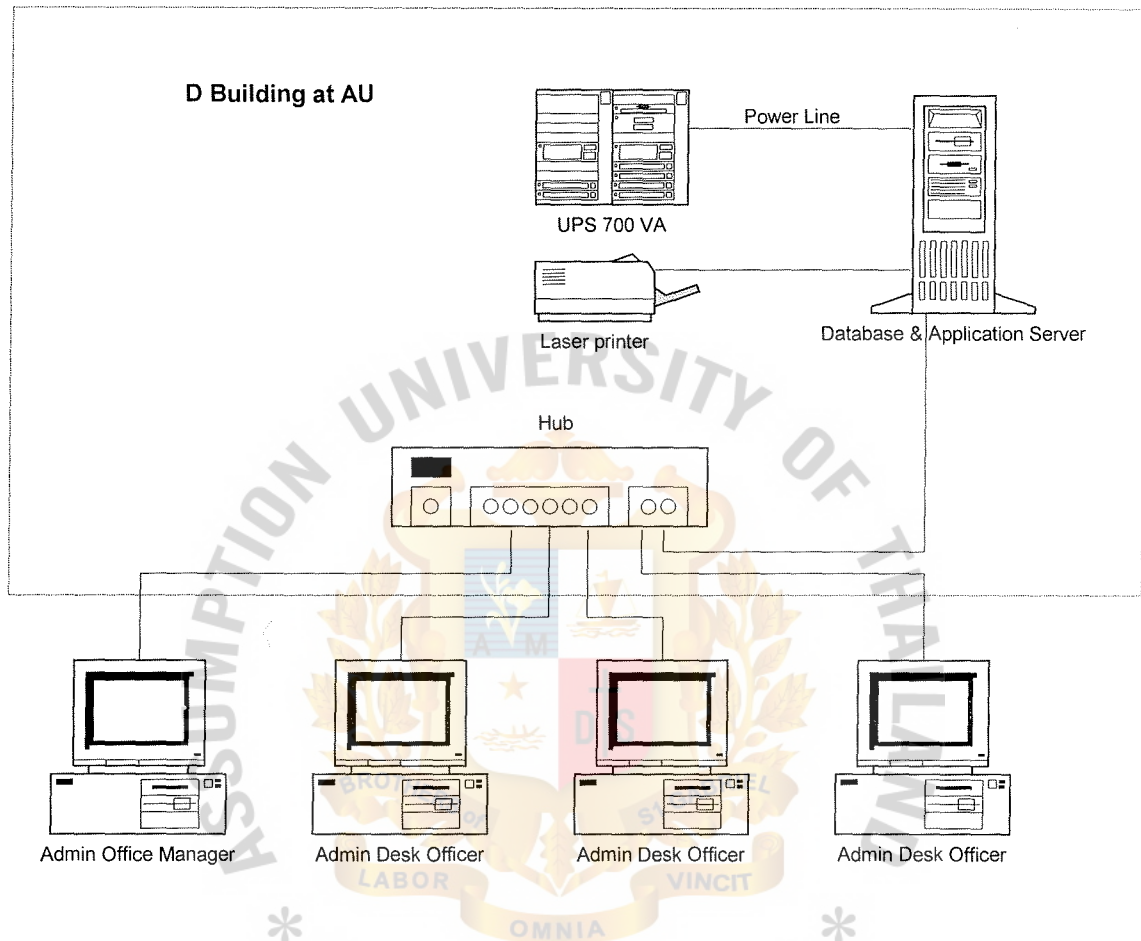


Figure 3.5. Network Configuration of the Proposed System.

3.7 Cost Analysis of Manual System

Table 3.6. Cost Analysis of Manual System, Baht.

Cost Items	Years				
	1	2	3	4	5
Fixed Cost					
PC 2 units@ 22, 000 Baht	44, 000	-	-	-	-
MS Office 1 unit@ 25, 000 Baht	25, 000	-	-	-	-
Printer 1 unit @ 10, 000 Baht	10, 000	-	-	-	-
Total Fixed cost	79, 000	-	-	-	-
<u>Operating Cost</u>					
<u>Salary Cost:</u>					
Manager 1 Person@42,000 Baht	42, 000	44,700	46, 670	49, 937	53, 530
<u>Staff:</u>					
Clerks: 3 Persons@12,000 Baht	36, 000	39, 600	43, 560	47, 916	52, 707
Operator: 3 Persons@11,000 Baht	33, 000	36,300	39,930	43,923	48,315
Service Staff: 2 Persons @ 8,000 Baht	16, 000	17,600	19,360	21,296	23,425
Total Operating Cost	128, 000	138,200	149,520	163,072	177,977
Total Cost	1,536,000	1,658,400	1,794,240	1,956,864	2,135,274
Total Manual Cost	1,657,500	1,784,300	1,925,630	2,094,393	2,276,654

Five Years Accumulated Manual System Cost

Table 3.7. Accumulated Manual System Cost, Baht.

Year	Total Manual Cost	Accumulated Cost
1	1,657,500	1,657,500
2	1,784,300	3,441,800
3	1,925,630	5,367,430
4	2,094,393	7,461,823
5	2,276,654	9,738,477
Total	9,738,477	-

3.6 Cost Analysis of Computerized System

Table 3.8. Cost Analysis of Computerized System, Baht.

Cost Items	Years				
	1	2	3	4	5
Fixed Cost					
<u>Hardware cost:</u>					
Workstations 3 units @36,000	108,000	-	-	-	-
Laser Printer 1 Unit @5, 100	5, 100	-	-	-	-
Network Accessories	9, 000	-	-	-	-
Total Fixed cost	14,208	14,208	14,208	14,208	14,208
Software Cost					
MS Win 2k	8,000	8,000	8,000	8,000	8,000
MS Office 2000	5,000	5,000	5,000	5,000	5,000
Network software	8,000	8,000	8,000	8,000	8,000
Total Software Cost	21,000	21,000	21,000	21,000	21,000
Implementation Cost:					
User Training	2,500	2,500	2,500	2,500	2,500
Installation	1,500	1,500	1,500	1,500	1,500
Software Development	20,000	20,000	20,000	20,000	20,000
Total Implementation Cost	24,000	24,000	24,000	24,000	24,000
Total Fixed costs	38,208	38,208	38,208	38,208	38,208
Office Supplies Cost:					
A4 Paper	9,500	10,400	12,040	13,944	14,128
HW Maintenance	5,000	5,500	6,050	6,655	7,320
SW Maintenance	5,000	5,500	6,050	6,655	7,320
Miscellaneous	2,000	2,200	2,420	2,662	2,928
Total Annual Office supplies cost	19,700	23,600	26,560	29,916	31,696
Total Annual Operational Costs	1,459,700	1,571,600	1,679,600	1,780,600	1,877,696
Total Annual Salary Cost	1,440,000	1,548,000	1,653,000	1,749,144	1,845,000

Five Years Accumulated Computerized System Cost

Table 3.9. Five Years Accumulated Computerized System Cost, Baht.

Year	Total Computerized Cost	Accumulated Cost
1	1,497,908	1,497,908
2	1,609,818	3,107,726
3	1,717,808	4,825,534
4	1,818,808	6,644,342
5	1,915,904	8,560,246
Total	8,560,246	-

3.7 Comparison between Manual and Computerized System Costs

Table 3.10. Comparison between Manual and Computerized System Costs, Baht.

Year	Computerized Cost	Manual Cost
1	1,497,908	1,657,500
2	3,107,726	3,441,800
3	4,825,534	5,367,430
4	6,644,342	7,461,823
5	8,560,246	9,738,477

3.8 Break-Even Analysis Graph

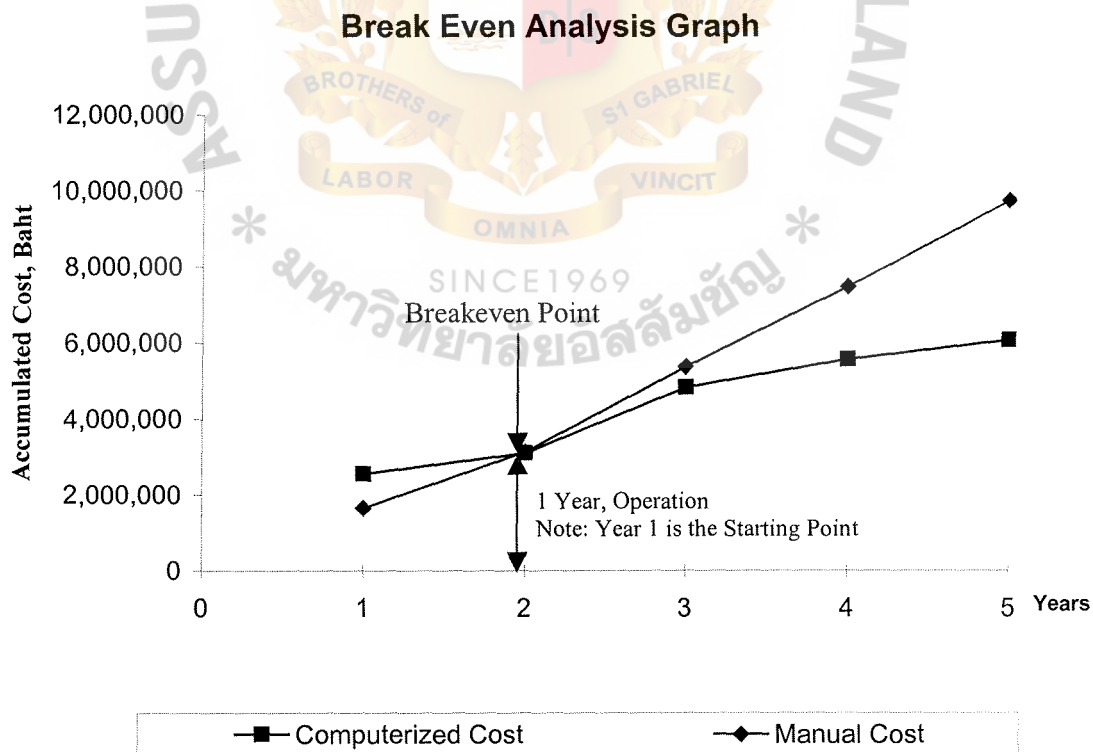


Figure 3.6. Break-Even Analysis Graph for ESS.

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

After the detailed analysis and design of the proposed system's inputs and outputs as well as database, the implementation phase starts by writing the code by following the DFD diagrams, designed in the system design phase.

Prototyping technique was used to develop the GUI (Graphical User Interface) because it gives better communication between the developer and users. The developer builds the prototype and demonstrates it to the user until they are satisfied with their requirements. While the prototype is being developed, users may be involved in refining the requirements further but it should be a reasonable change, of course.

After the development of prototype is over, the developing team and users will sit together to test the overall system. The test plan and results are described in the next section.

4.2 Test Plan

After programming, we need to test the whole system. System test ensures that all modules in the program are error free. The steps of the test are as follows:

(1) Stub Testing:

This test is performed in individual modules, whether they are mini programs, subroutine or a block.

(2) Unit Testing:

This is a test whereby all the modules that have been coded and stub tested are tested as an integrated unit.

(3) System Testing:

This is a test that ensures that application programs written in isolation work properly when they are integrated in to the whole system.

(4) Special System Testing:

This can be called as peak load testing. This is to determine whether the system can handle the volume of activities that occur when the system is at the peak of its processing demand.

4.3 Training

Systems can succeed or fail because of the way they are operated and used. Meaning, the quality of training received by the personnel involved with the system in various capacities helps or hinders and may even prevent the successful implementation of an information system. The users must be trained to use equipments and to follow the procedures required by the system.

The objectives of training depend on requirements of user's task. For the Admin staff, they need to know how to enter the data using the software, how to search the database using the software etc. They must also know about how to respond to error messages and call up routines that will print report(s).

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The proposed system replaces the manual system in the Admin office of AU, to gain more benefits to Admin Office. The new system can greatly improve the overall performance of the admin staff as it greatly reduces the time spent on collating the data received from Registrar office, manually. The task has been made simple by computerized system and without human intervention means that time is reduced as well as number of human errors are reduced.

In terms of management, the new system can completely improve the workflow of Admin office by improving their data processing process, input process, output process and reporting processes. The system also ensures data is kept safely in the database with password protection and access given only to senior staffs.

The proposed system also provides a good report for the Admin office such as seating report, which will help students as well. Moreover, this system has used the MS Visual Basic 5.0 and MS Access 2000 as the database, which maintains the standard windows look and feel the users are accustomed to.

5.2 Degree of Comparison between Manual System and Proposed System

The table below shows the degree of achievement for each process in manual system and the proposed system. It shows that each process in proposed system fares very much faster than each process in the manual system.

Table 5.1. Comparison of Degree of Achievement between Manual System and Proposed System.

Process	Manual System	Proposed System
Maintaining Room/Bldg. Information	20 minutes	3 minutes
Response to Study Courses Details	20 minutes	1 minute
Assign Room	15 minutes	2 minutes
Produce Report	50 minutes	10 minutes

5.3 Recommendations

Some of the improvements that could be done with this system are:

- (1) A centralized database for both the Office of Registrar and Admin office so that there is no need for RMIS system to transfer data every semester. Moreover, when students drop the courses, it will be reflected in the RMIS database but not in Admin database. This problem could be overcome by implementing a centralized database for both the offices.
- (2) In the current version of examination seating system, students can check their seats either in front of the notice board or in some computers where this application is installed, that too, only on the exam day. This could be improved by making this information available on the web i.e. students can just log into the AU website and type in their id and password and go to this system, where they can check their room number, campus name, exam time and seat number on the web.
- (3) A small sub system could be added to this system such as Room management sub-system, which manages the rooms and allocates the rooms

for meetings, student gatherings, etc. Of course, the first preference goes to Registrar's office, which reserves the room for classes as well as examinations. After that, the remaining rooms could be managed to be allocated for the above said programs, through this added sub-system. The whole system could be converted to a web – based solution i.e. a system where the rooms could be allocated online and rooms could also be managed over the internet.





APPENDIX A

ENTITY RELATIONSHIP DIAGRAM

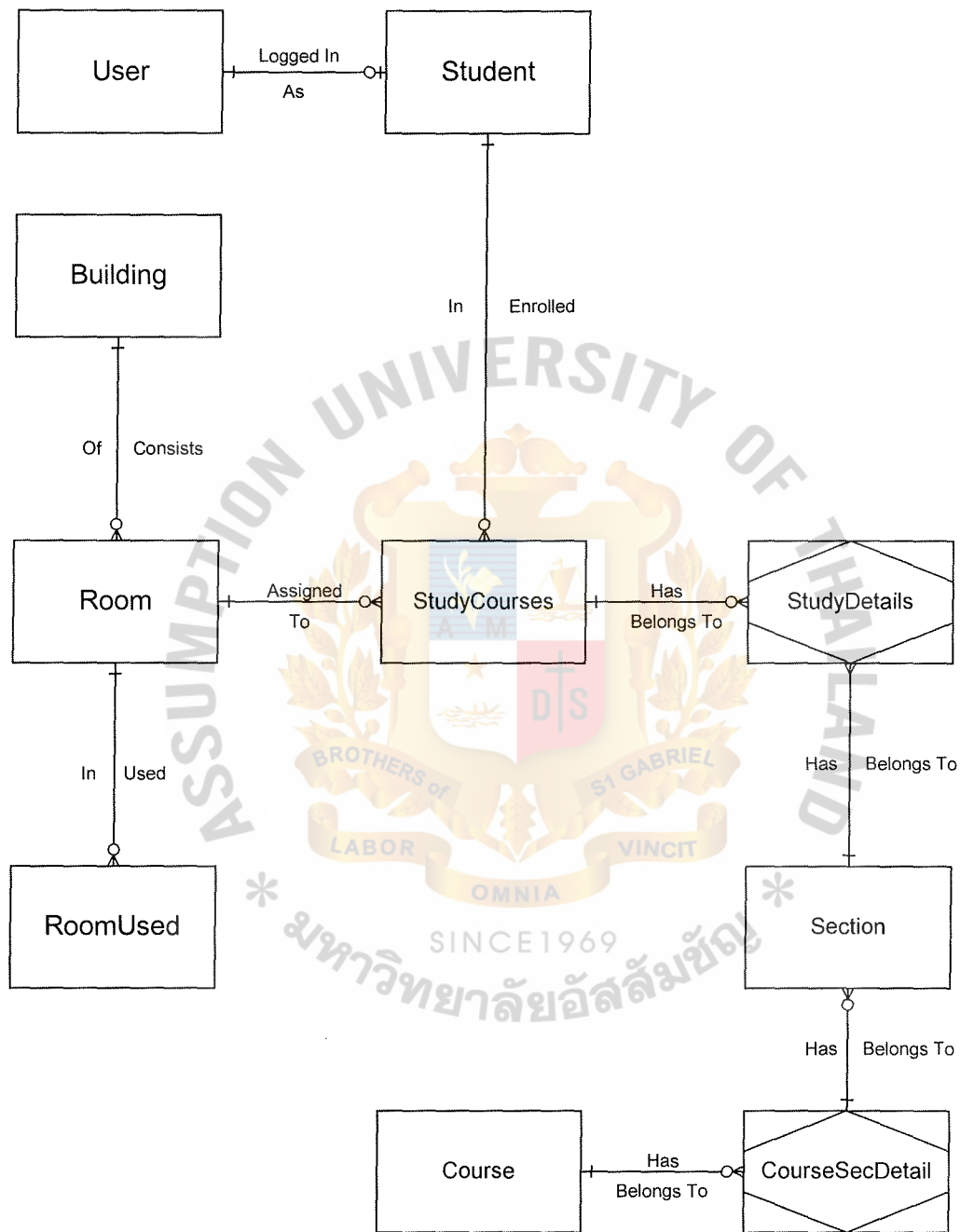


Figure A.1. E – R Model of the Proposed System.



APPENDIX B
DATA DICTIONARY

Table B.1. Building Table Dictionary.

Field Name	Data Type	Description
BldgCode	Text (6)	Building Code
Desc	Text (40)	Description about the building
CampCode	Char (1)	Campus code (B for Bangna, H for Huamark).

Table B.2. Course Table Dictionary.

Field Name	Data Type	Description
CourseId	Text (7)	Course id
EngName	Text (50)	Course Name in English
ThName	Text (50)	Course Name in Thai
ShEngName	Text (50)	Short Name in English
ShThname	Text (50)	Short Name in Thai

Table B.3. Room Table Dictionary.

Field	Data Type	Description
RoomCode	Char (6)	Room code
BldgCode	Char (6)	Building code – link to Building table.
CampCode	Char (1)	Campus code
SeatNo	Number	Total seat amount in room.
NumRow	Number	Number of rows in a room.
NumSize	Number	Number of columns in each row
Remark	Char (50)	Any remarks
Phone No	Number	Phone number, if any
Status	Char (1)	Status of room – A or I

Table B.4. Room Used Table Dictionary.

Field	Data Type	Description
Year	Char (4)	Current year.
Sem	Char (1)	Current semester – valid values (1,2,3)
RoomCode	Char (6)	Room id
Seq	Auto Number	Auto number
UseType	Char (1)	Exam type – Q - quiz, M – mid-term or F - final.
UseDate	Date	Date this room is being used.
FromTime	Char (5)	Starting time of exam
ToTime	Char (5)	Ending time of exam
CourseId	Char (7)	Course id
Section	Number	Section number
SeatAmt	Number	Total Seat Amount.
SeatUsed	Number	Total number of seats used till now.
UserId	Char (10)	User of the system.
Ludate	Date	Date records were inserted.
Status	Char (1)	Status of room used – A, I

Table B.5. Student Table Dictionary.

Field	Data Type	Description
Studentid	Char (7)	Student id number.
Engfname	Char (50)	First name → English
Englname	Char (50)	Last name → English
Thfname	Char (50)	First name → Thai
Thlname	Char (50)	Last name → Thai



Table B.6. Study Courses Table Dictionary.

Field	Data Type	Description
Year	Char (4)	Current year
Semester	Char (1)	Current semester
Seq	Number	Auto number
Studentid	Char (7)	Student id
Courseid	Char (6)	Course id
Section	Number	Section number
Grade	Char (2)	Grade(s) for this course
Status	Char (1)	Status of the course – A or I
Ludate	Date	Date last system was accessed
Luuser	Char (8)	User who accessed system recently.
Paidflag	Char (1)	Whether student has paid fees or not
Refundflag	Char (1)	Whether student has been refunded
Refundamt	Number	Amount given to student
Deleteflag	Char (1)	Used in RMIS
Course type	Char (1)	Used in RMIS
Tranflag	Char (1)	Used in RMIS
RoomCode	Char (6)	Room code
Exam date	Date	Exam date
FromTime	Char (5)	Starting time of exam
ToTime	Char (5)	Ending time of exam
Exam Type	Char (1)	Type of exam – Q- quiz, M – Mid, F – Final.

Table B.7. Section Table Dictionary.

Field	Data Type	Description
CourseId	Char (6)	Course id
Section	Number	Section number
Registyr	Char (4)	Current year
Registsem	Char (1)	Current Semester
SeatLimit	Number	Seat Limit for this course and section.
SeatAvai	Number	No. Of seats available now
SeatUsed	Number	No. of seats used.
Instcode	Char (10)	Instructor's id
Findate	Date	Final exam date
Finperiod	Number	Time Period
Finstarttm	Char (20)	Starting time of final exam
Finhramt	Number	Number of hours exam
Finroom	Char (6)	Mid-term exam room.
Middat	Date	Mid-term exam date
Midperiod	Number	Time Period
Midstarttm	Char (20)	Starting time of Mid-term exam
Midhramt	Number	Number of hours exam
Midroom	Char (6)	Mid-term exam room.
Miscdate1	Date	Miscellaneous dates
Miscdate2	Date	Miscellaneous dates
Latedate	Date	Late exam date
Lateperiod	Number	Time Period
Latestarttm	Char (20)	Starting time of Late exam
Latehramt	Number	Number of hours exam
Lateroom	Char (6)	Late exam room.
Postdate	Date	Posting date
Postuntil	Date	Post notice until this date
Boardno	Char (5)	Board number
Remark	Char (50)	Any remark

Table B.8. User Table Dictionary.

Field	Data Type	Description
User name	Char (9)	User names for employees and students.
Password	Char (10)	Passwords
Status	Char (1)	A – Admin, S - Student





APPENDIX C

DATA FLOW DIAGRAM

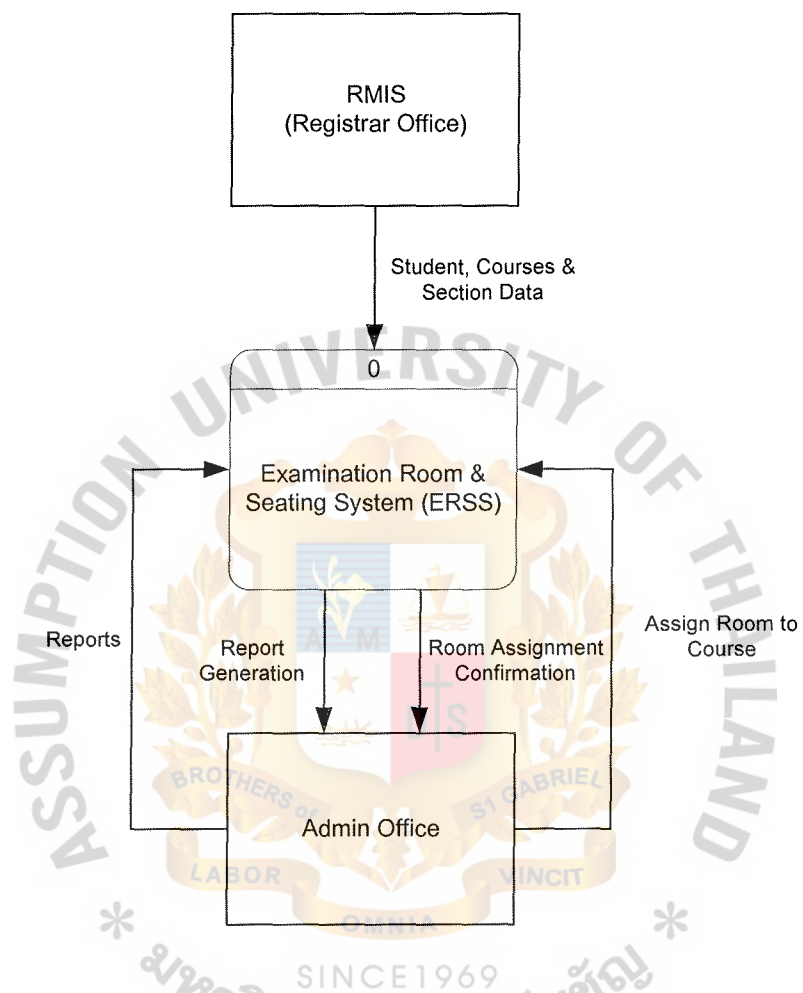


Figure C.1. Context Diagram of Existing System.

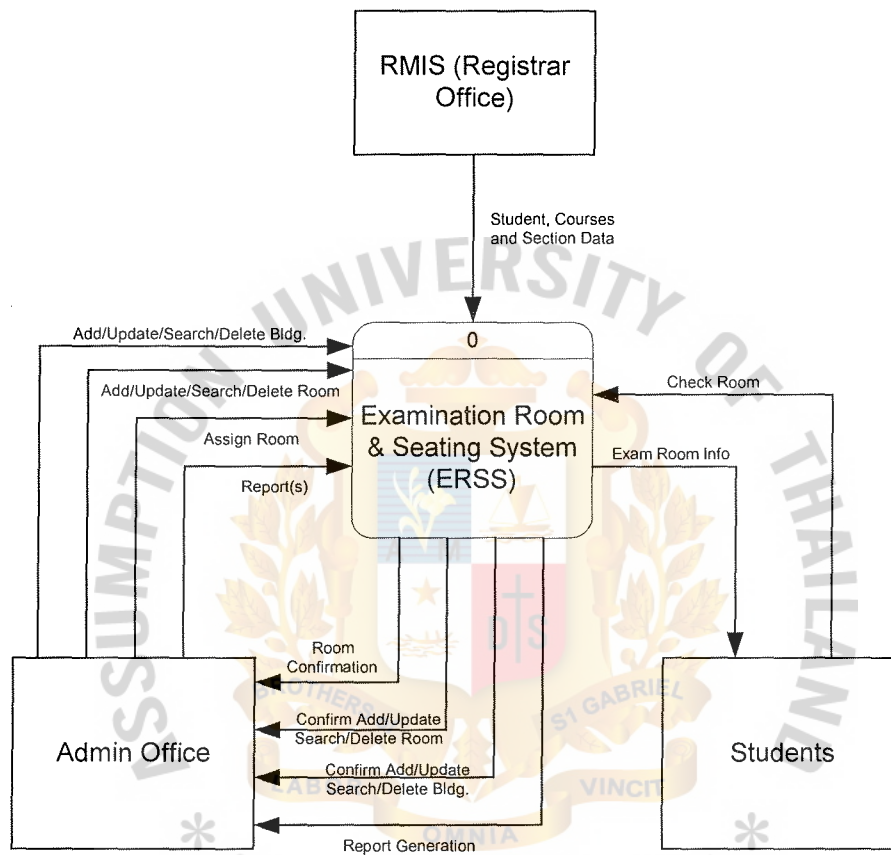


Figure C.2. Context Diagram of Proposed System.

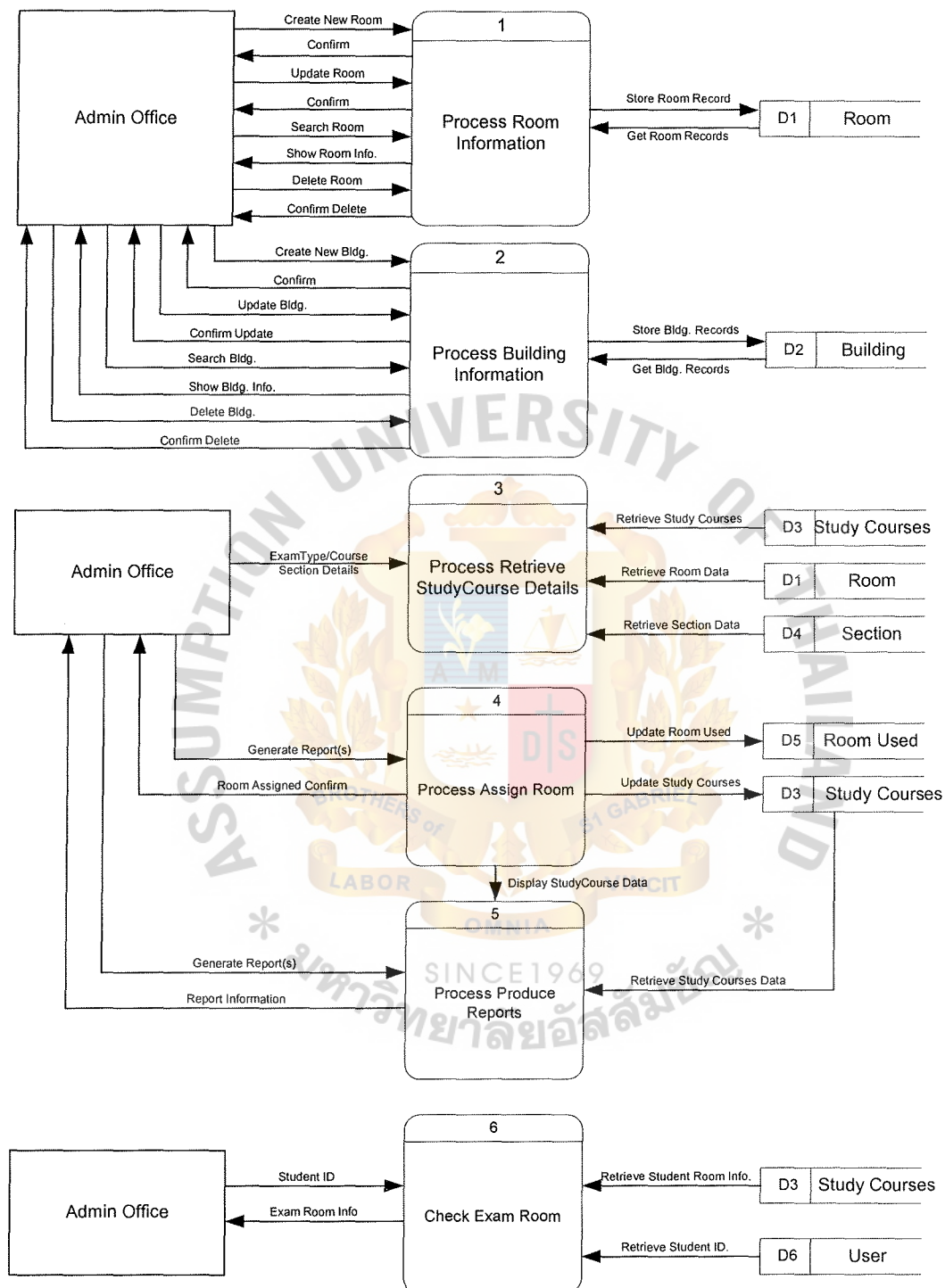


Figure C.3. Level 0 DFD of Proposed System.

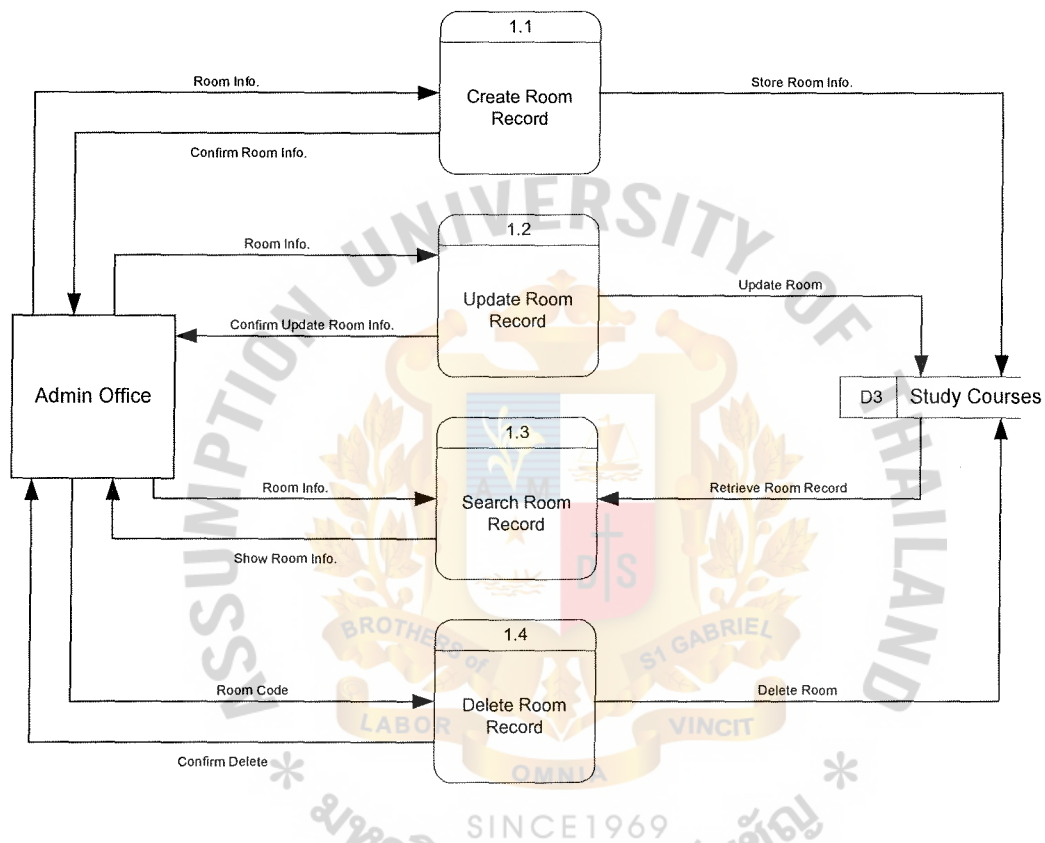


Figure C.4. Level 1 DFD of Process Room Information.

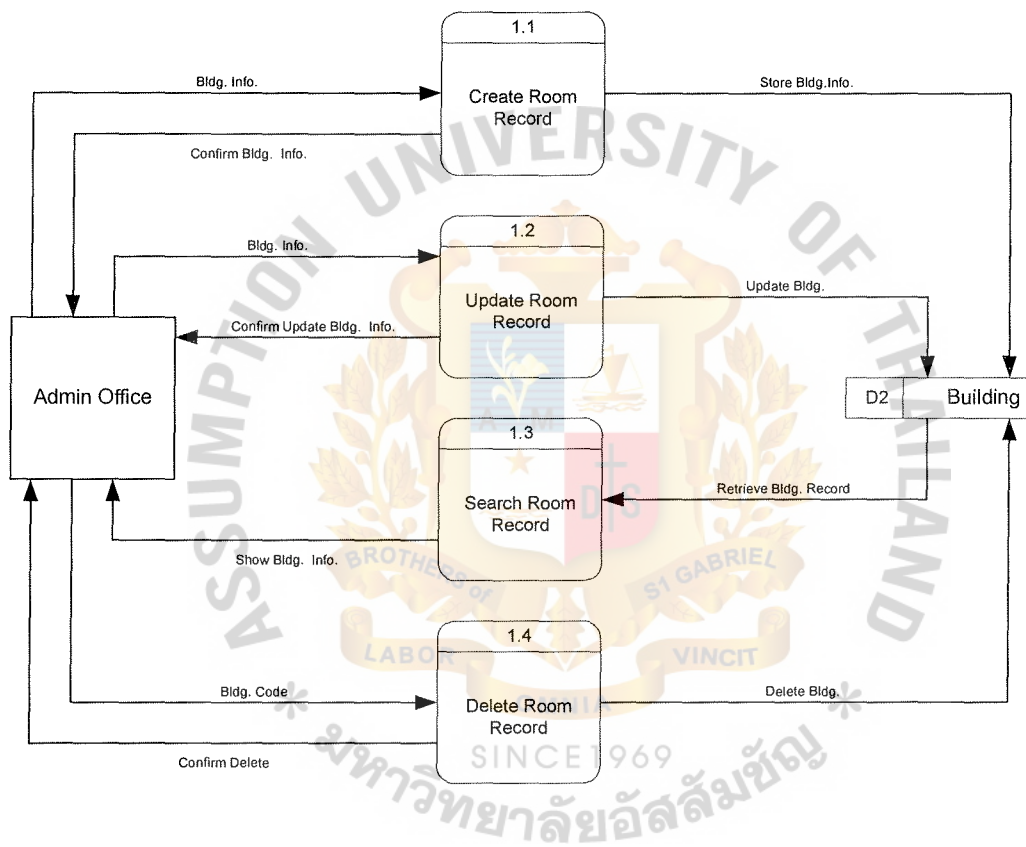


Figure C.5. Level 1 DFD of Process Building Information.

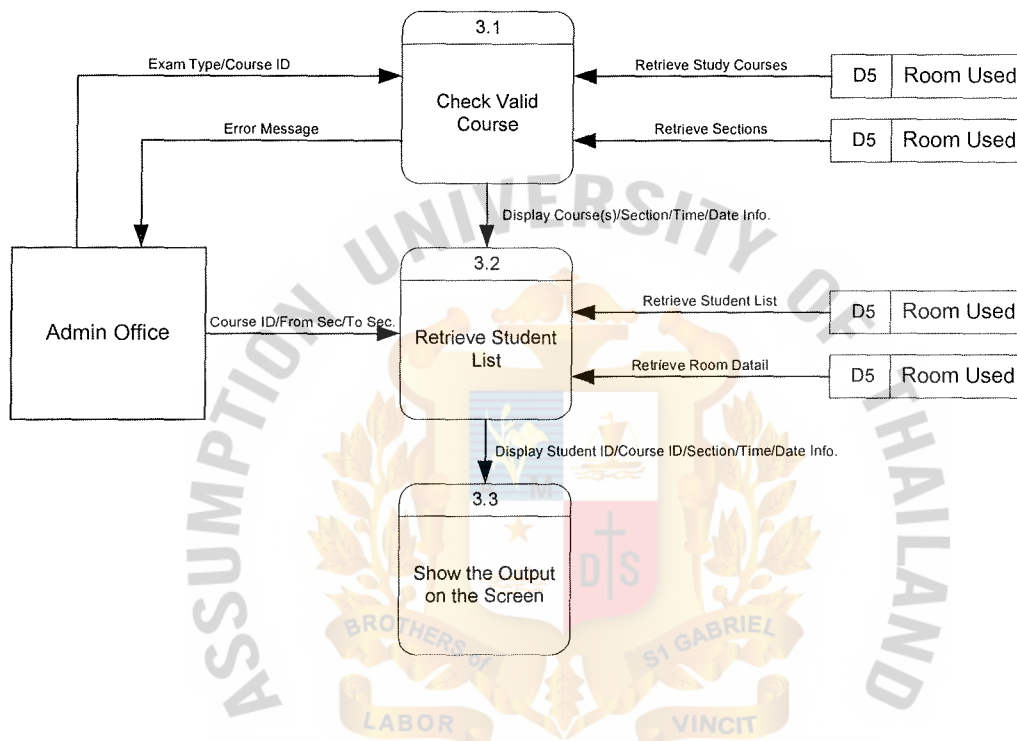


Figure C.6. Level 1 DFD of Process Retrieve Study Course Details.

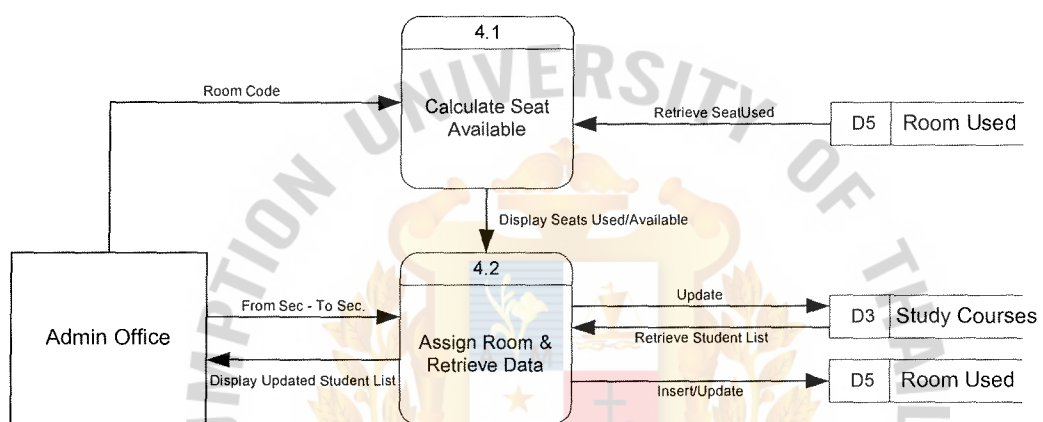


Figure C.7. Level 1 DFD of Process Assign Room.

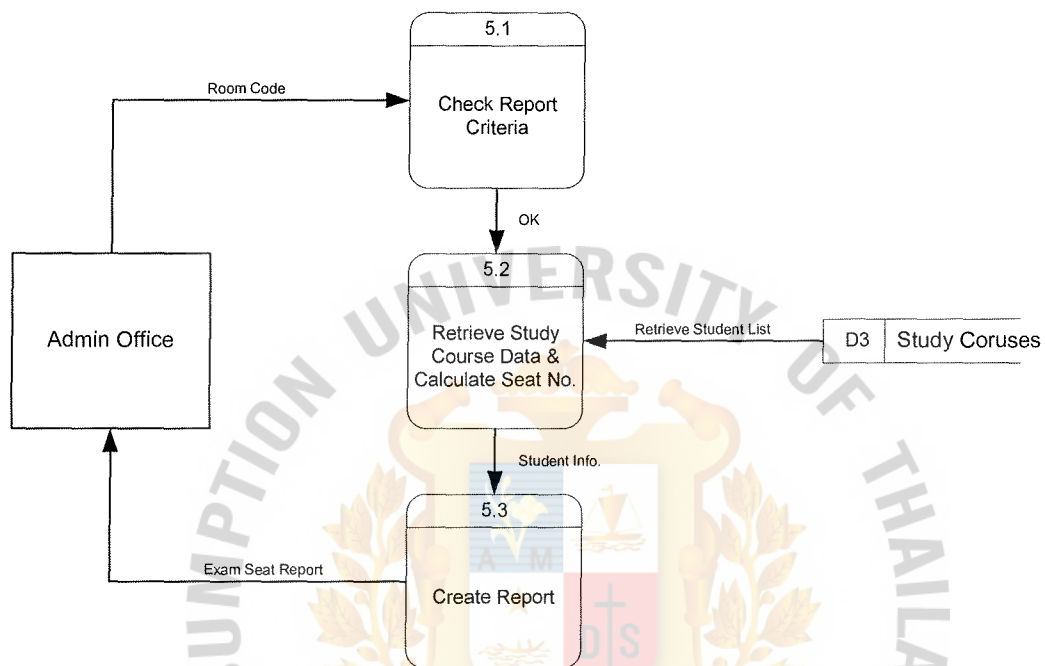


Figure C.8. Level 1 DFD of Process Produce Report.

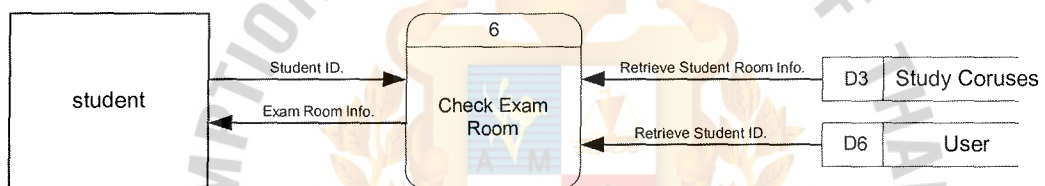


Figure C.9. Level 1 DFD of Process Exam Room Checking by Students.



APPENDIX D
STRUCTURE CHART

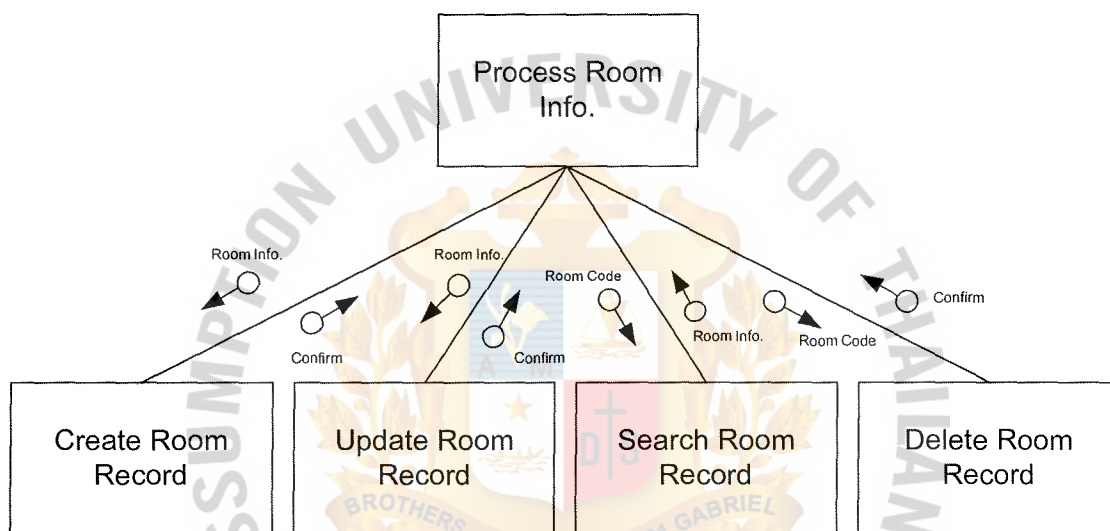


Figure D.1. Structure Chart of Process Room Information.

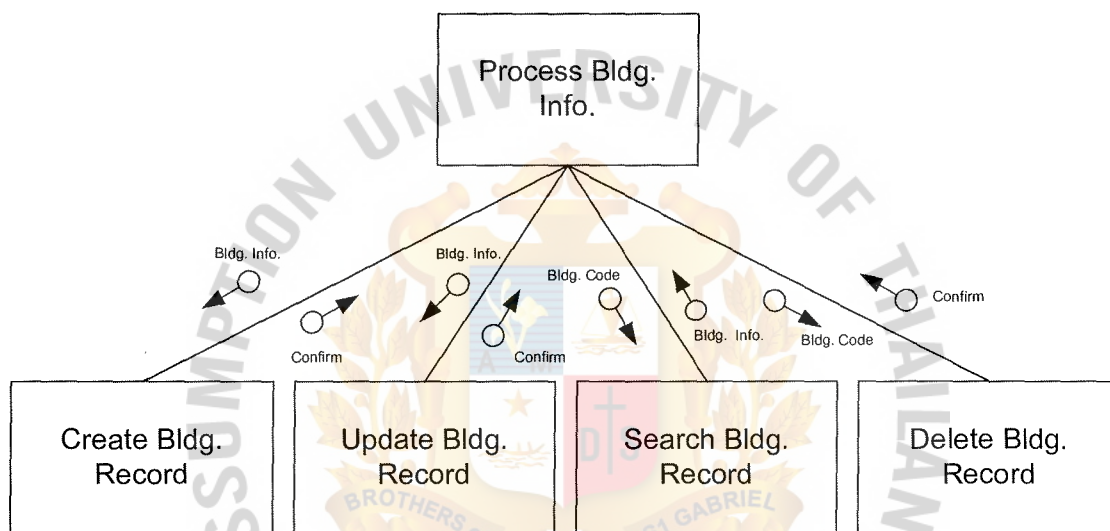


Figure D.2. Structure Chart of Process Building Information.

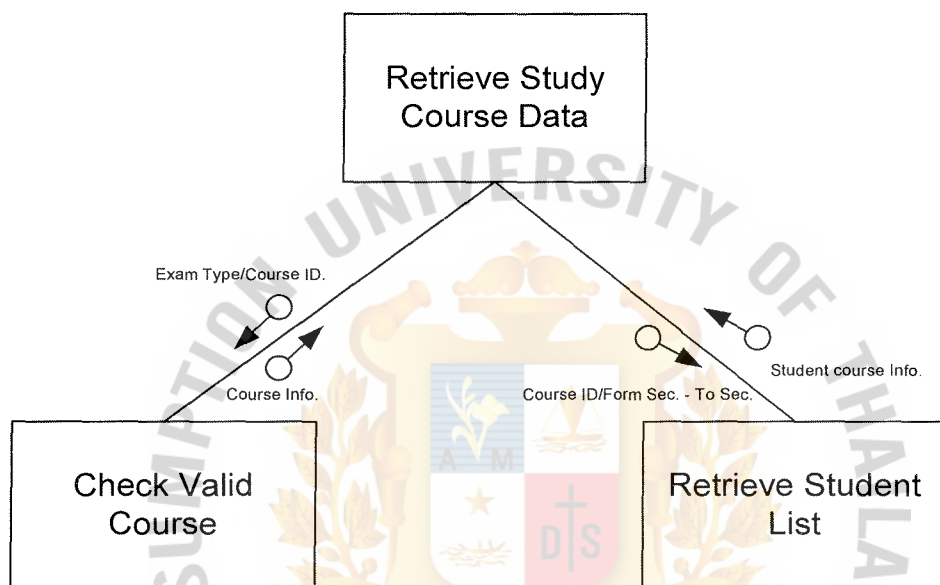


Figure D.3. Structure Chart of Retrieve Study Course Data.

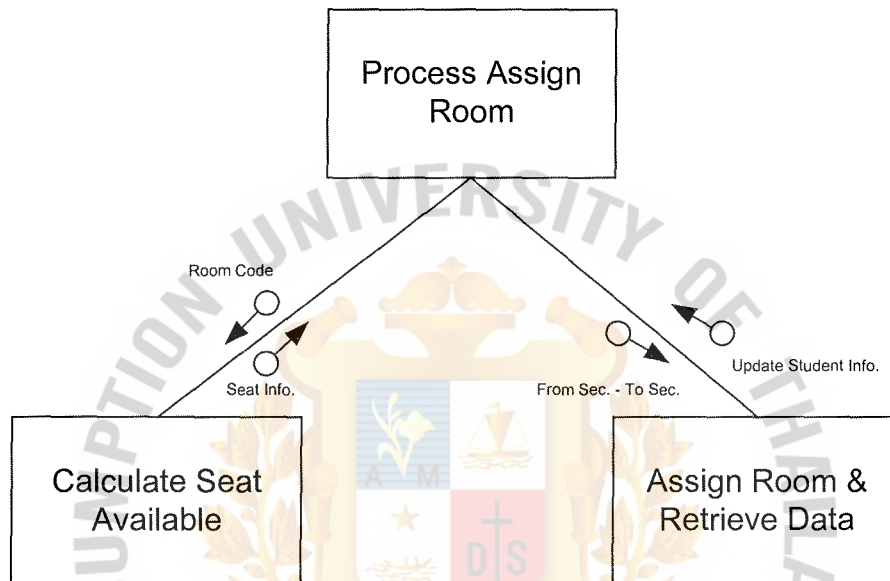


Figure D.4. Structure Chart of Process Assign Room.

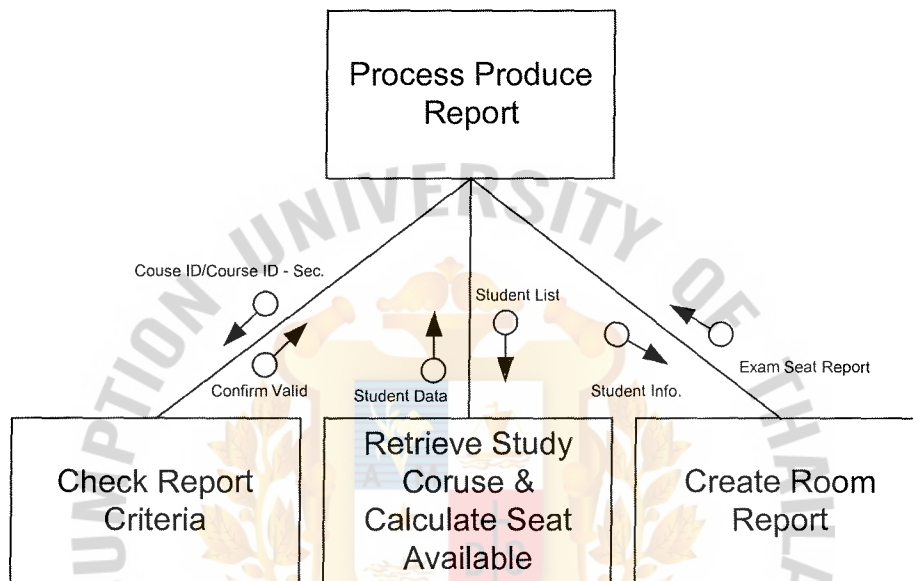


Figure D.5. Structure Chart of Produce Report Process.





Figure E.1. Main Menu for the System (Entry Point for Both Admin Officer & Student).

Exam Seating Arrangement System

Exam Seating Arrangement System

Main Menu

Year

Semester

Maintenance Program

Room	Arrange Exam Seat
Building	
Section	
Student Seating Information	Report Menu

Exit

Figure E.2. Admin Officer's Main Menu.

Room Maintenance Form

Room Code:	A34	Building Code:	A
Camp Code:	I	Seat Amount:	30
Number of Rows:	5	Size:	6
Remark:	Pilot	Phone No:	6987
Status:	Y		

[K] [<] [>] [>|] [Find] [New] [Edit] [Delete] [Update] [Cancel] [Close]

Ready.

Figure E.3. Room Maintenance Screen.

Building Maintenance Form

Building Code : A

Description: A building

CampCode: N

< < > >| Find New Edit Delete Update Cancel Close

Ready.

Figure E.4. Building Maintenance Screen.

Exam Seat Arrangement

Exam Seat Arrangement

Exam Type: Final

Course ID: BA1600

Retreive Data

CourseID	Section	Exam Date	From Time	To Time	No.Student	Used
BA1600	1	3/11/98 F	09.30 FS	9 FSHr	64	0
BA1600	2	3/11/98 F	09.30 FS	9 FSHr	60	0
BA1600	3	3/11/98 F	09.30 FS	9 FSHr	62	0
BA1600	4	3/11/98 F	09.30 FS	9 FSHr	61	0
BA1600	5	3/11/98 F	09.30 FS	9 FSHr	59	0
BA1600	6	3/11/98 F	09.30 FS	9 FSHr	59	0
BA1600	7	3/11/98 F	09.30 FS	9 FSHr	59	0
BA1600	8	3/11/98 F	09.30 FS	9 FSHr	60	0
BA1600	9	3/11/98 F	09.30 FS	9 FSHr	59	0
BA1600	10	3/11/98 F	09.30 FS	9 FSHr	56	0

CourseID	From Section	To Section
BA1600	1	2

Arrange Seat

Close

Figure E.5. Display Course Information Screen.

Exam Seat Arrangement

CourseID

BA1600

Section

1

To Section

2

No. Student

124

Exam Date

3/11/98

From Time

09.30

To Time

12.30

Seq	CourseID	Section	StudentID	Room	Date	Time
1	BA1600	1	3511721	A34	1/11/98	09.30
2	BA1600	1	3914754	A34	1/11/98	09.30
3	BA1600	1	4010016	A34	1/11/98	09.30
4	BA1600	1	4010248	A34	1/11/98	09.30
5	BA1600	1	4011001	A34	1/11/98	09.30
6	BA1600	1	4012601	A34	1/11/98	09.30
7	BA1600	1	4020062	A34	1/11/98	09.30
8	BA1600	1	4020102	A34	1/11/98	09.30
9	BA1600	1	4020156	A34	1/11/98	09.30
10	BA1600	1	4020322	A34	1/11/98	09.30

Room

A34(30)

Seat Limit

30

Row

5

Seat Avail

30

Size

6

Start Seq

To Seq

Seat Used

Date

3/11/98

From Time

09.30

Confirm

Close

Figure E.6. Display Student Information and Room Details.

Assigning Room Process will take place in this Screen.

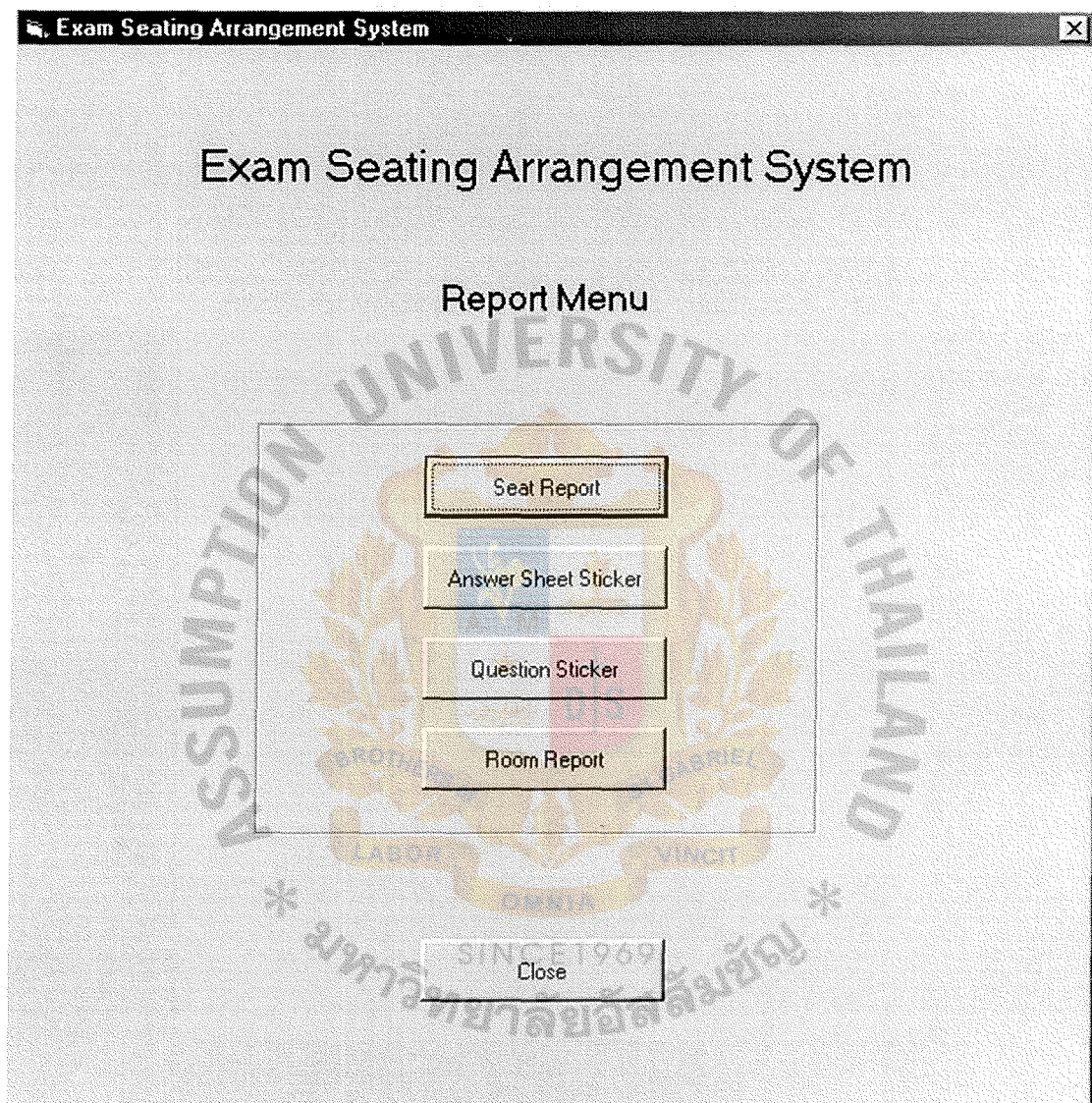


Figure E.7. Report Menu Screen (Except Seat Report, Other Operations Shown Above Will Be Included Only in the Next Version).

Exam Seating Arrangement System

Exam Seating Arrangement System

Seat Report

Exam Type

Mid-Term

☐ CourseID

To CourseID

☒ CourseID

BA1600

To Section

3

Section

3

To Section

3

Student Per Page

20

Preview

Close

Figure E.8. Seat Report Menu Screen.

tmpreport.imp - Notepad

File Edit Search Help

AS OF : 02/06/2003 ASSUMPTION UNIVERSITY R. 1
 SEMESTER: 1998/2 EXAMINATION SEATING REPORT

BA1600

ROW	SUBJECT DATE-TIME ROOM	ADM.NO.	NAME	SECTION	SEAT	NO. OF BOOK-ANS SHEETS	SIGNATURE
		3813219		B.	001	11	
		3820817		B.	D32	11	
		3920521		B.	D32	12	
		3920754		B.	D32	13	
		3920856		B.	D32	14	
		3923040		B.	D32	15	
		4011623		B.	D32	21	
		4012424		B.	D32	22	
		4012710		B.	D32	23	
		4020196		B.	D32	24	
		4020286		B.	D32	25	
		4110018		B.	D32	31	

Figure E.9. Seat Report Output for Admin Officer.

Student ID	Room Number	Exam Seat Number
U4215789	P45	1/5

Figure E.10. Exam Room Information Output for Student.

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