



Australian School of Business
School of Information Systems, Technology and Management

INFS5989

ASSIGNMENT-1

Group Project

Assignment Specifications

This is a group assignment to be completed by teams of 3-4 students. Team members **must all** come from the same tutorial class. This assignment represents 30% of the marks for this course.

This project requires the design and implementation of a database using Microsoft Access. The general objective of this assignment is to provide students with an opportunity to apply object-oriented theory and to perform the first steps of a requirements analysis task using the Unified Modelling Language (UML). This assignment examines both the *external* or user view of a system and the *internal* architecture.

1. Assessment for Assignment 1

Your work will be assessed for the following components.

Task	Due Date	Submission Time and location	% Worth
Part 1:	Week 5	Tuesday, lecture time	10%
Part 2:	Week 9	Tuesday, lecture time	20%
TOTAL			30%

2 Submission

For both Part 1 & Part 2, submit a paper copy on the due day, using the cover sheet provided in Blackboard. Any conventional report format is acceptable, as long as it is clear and well organized. The report should be type-written. Page numbering should be included, and should be continuous throughout. The report should be in A4 format. Please do not enclose separate pages in separate plastic pockets. Clarity of language, layout and general presentation is an assessable aspect of each component of this assignment.



It is expected that all work submitted will be of a professional standard. Make sure that the assignment has cover page which can be downloadable from the course website. Any amendments and clarification for this project will be announced during lectures and may be posted on the subject Web pages. You should make sure that you peruse the Web pages at least weekly, and preferably once every day.

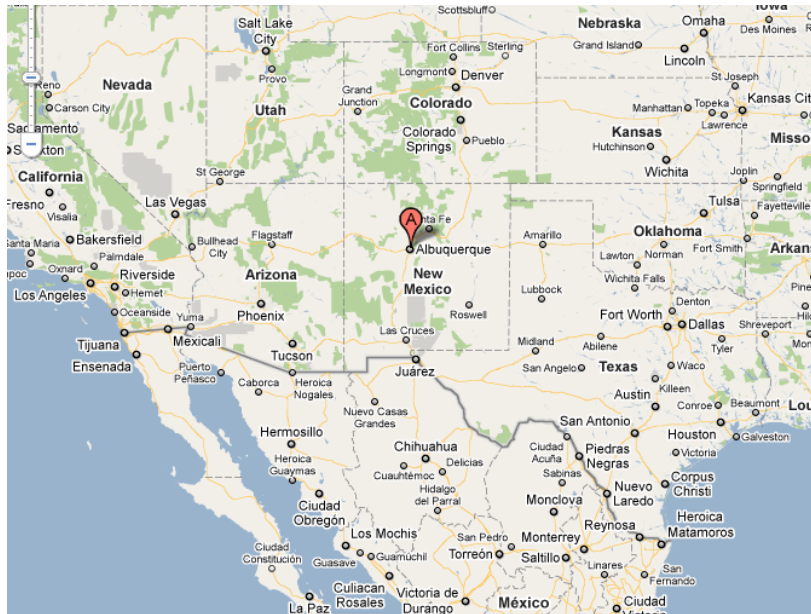
Your lecturer will be available to answer questions on the project. Check their availability by consulting the subject Web pages.

3. Case Study

The Reliable Pharmaceutical Service is a privately held company incorporated in 1975 in Albuquerque, New Mexico. It provides pharmacy services to health-care delivery organisations that are too small to have their own in-house pharmacy. Reliable grew rapidly in its first decade, and by the late 1980s its clients included two dozen nursing homes, three residential rehabilitation facilities, two psychiatric hospitals, and four small speciality medical hospitals. In 1990, Reliable expanded its Albuquerque service area to include Santa Fe and started two new service areas in Las Cruces and Gallup.

Reliable accepts pharmacy orders for patients in client facilities and delivers the orders in locked cases every 12 hours. In the Albuquerque and Santa Fe service area, Reliable employs approximately 12 delivery personnel, 20 pharmacist's assistants (PAs), 6 licensed pharmacists, and 10 office and clerical staff. Another 15 employees work in the Las Cruces and Gallup service areas. The management team includes another six people, mainly company owners.

Personnel at each health-care facility submit patient prescription orders by telephone. Many prescriptions are standing orders, which are filled during every delivery cycle until specifically cancelled. Orders are logged into a computer as they are received. At the start of each 12-hour shift, the computer generates case manifests for each floor or wing of each client facility. A case manifest identifies each patient and the drugs he or she has been prescribed, including when and how often the drugs should be administered. The shift supervisor assigns the case manifests to pharmacists who, in turn, assign tasks to pharmacy assistants (PAs). Pharmacists supervise and coordinate the PAs' work. Pharmacists are highly qualified professionals who can find alternative work easily should they want or need to.



All drugs for a single patient are collected in one plastic drawer of a locking case. Each case is marked with the institution's name, floor number, and wing number (if applicable). Each drawer is marked with the patient's name and room number. Dividers are inserted within a drawer to separate multiple prescriptions for the same patient. When all of the individual components of an order have been assembled, a pharmacist makes a final check of the contents, signs each page of the manifest, and places two copies of the manifest in the bottom of the case, one copy in a filing cabinet in the assembly areas, and the final copy in a mail basket for billing. When all of the cases have been assembled, they are loaded onto a truck and delivered to the health-care facilities.

Order-entry, billing, and inventory-management procedures are a hodgepodge of manual and computer-assisted methods. Reliable uses a combination of Excel spreadsheets, an Access database, and antiquated custom-developed billing software running on personal computers. Pharmacy assistants use the custom-developed billing software to enter orders received by telephone and to produce case manifests. The system has become increasingly unwieldy as facility contracts and Medicare and Medicaid reimbursement procedures have become more complex. Some costs are billed to the health-care facilities, some to insurance companies, some to Medicare and Medicaid, and some directly to patients. The company that developed and maintained the billing software has gone out of business and the office staff has had to work around the software shortcomings and limitations with cumbersome procedures and "workarounds". Inventory management is done manually. The members of the office staff have typically been employed by Reliable for many years and are comfortable with the current systems and processes, despite these inadequacies.

In 1999 Reliable's revenues levelled off at \$40 million, and profit plateaued at \$5.5 million. By 2003, revenue was declining at over 8% per year. Several reasons for the decline included the following:

- Price controls in both Medicare and Medicaid reimbursements and contracts with facilities managed by health maintenance organizations (HMOs) and large national health-care companies
- Increasing competition from national retail pharmacy chains such as Walgreens and in-house pharmacies at large local hospitals
- Inefficient operating procedures, which haven't received a comprehensive review overhaul in almost two decades.

Reliable's management team spent most of the last year developing a strategic plan, the key element of which is a major effort to streamline operations to improve service and reduce costs. Managers see this effort as their only hope of surviving in a future dominated by large health-care companies that can dictate price and outsource pharmaceutical services to whomever they choose. They plan a significant expansion into neighbouring states after the system is up and running, to recoup its costs and increase economies of scale.

4. Information Systems Planning and Development

Reliable's management has placed a high priority on developing a Web-based application to connect client facilities to Reliable. Before the Web component can be implemented Reliable must automate more of the basic information it handles about patients, health-care facilities, and prescriptions. Reliable will begin with an informational Web site that will evolve into an extranet through which Reliable will share information and link processes with clients and suppliers. A significant requirement of the extranet is the compliance with the Health Insurance Portability and Accountability Act (HIPAA), which requires health-care providers and their contractors to protect patient data from unauthorised disclosure. Ensuring HIPAA compliance will require careful attention to extranet security. Once the basic processes are automated and the extranet in place, the system will enable clients to add patient information and place orders through the Web. The system should streamline processes for both Reliable and for its clients. It will also provide useful query and patient management capabilities to distinguish Reliable's services from those of its competitors, possibly including drug interaction and overdose warnings, automated validation of prescriptions with insurance reimbursement policies, and drug and patient cost data and summaries.

Reliable's executives have decided to develop an extranet that enables its client health-care facilities to order drugs and supplies as if they were ordering from an internal pharmacy, as though they were part of Reliable's internal organization.

Tasks for Part 1 (Inception Phase)
1. Create a vision statement for the proposed extranet development 2. Identify three significant business benefits of the proposed project and show how the benefits could be measured. 3. Create a rich picture depicting the context of the proposed extranet development. 4. Using one technique of your choice, conduct a stakeholder analysis of the various parties who affect, or are affected by, the extranet development.
Task allocation: In your report include a list of tasks undertaken by your group, with the names of those who took prime responsibility for each task. Do not state that the whole team did everything, because this will demonstrate poor team management

4.1 Business Requirements

The full system would involve many events and domain classes. We will focus on a subset of events for the system and a subset of domain classes:

When a nursing home needs to fill prescriptions for its patients it provides order details to Reliable. Reliable immediately records information about the order and prescriptions.

Prescription orders come in from all of Reliable's nursing home clients throughout the day. At the start of each 12-hour shift, Reliable prepares a case manifest, detailing all recent orders, which is given to one of the pharmacists. When the pharmacist has assembled the orders for each client, the pharmacist records the order fulfilment. In addition, the system needs to add or update drug inventory information, produce purchase orders to replenish the drug inventory, record inventory adjustments, and generate various management reports. Ignore any billing, payments, or insurance processing.

To process the prescription order Reliable needs to know about the patients, the nursing home, and the nursing home unit where each patient resides. Each nursing home has at least one, but possibly many, units. A patient is assigned to a specific unit. An order consists of one or more prescriptions, each for one specific drug and for one specific patient. An order, therefore, consists of prescriptions for more than one patient. Each patient can have many prescriptions. One pharmacist fills each order.

4.2 Detailed Requirements

There are several points in the order fulfilment process where information must be recorded in the system. New orders must be recorded. Case manifests must be printed at the start of each shift. For long-standing orders, each time a medication is sent out (prescription fulfilment) information must be entered into the system, noting the quantity of medication that was sent and which pharmacist filled the prescription for that shift. Prescriptions are rather complex. They contain basic information, such as ID number, original date of order, drug, unit of dosage (pill, teaspoon, suppository), size of dosage (milligrams, number of teaspoons), frequency or period of dosage (daily, twice a day, every other day, every four hours), and special considerations (take with food, take before meals). In addition, there are several types of prescriptions, each with unique characteristics. Some orders are for a single, one-time-only prescription. Some orders are for a certain number of dosages (pills). Some orders are for a time period (start date, end date). Information about the prescription order must be maintained. An order occurs when the nursing home phones in the needed prescriptions. Since prescriptions may last for an extended period of time, a prescription is a separate entity from the order itself. The system records which employee accepted and entered the original order.

The system also has basic information about drugs. Each drug has generic information, such as name, chemical, and manufacturer. However, more detailed information for each type of dosage, such as the size of the pill, is also kept. A single drug may have many different dosage sizes and types.

In addition, information about the fulfilment of orders must be maintained. For example, on a prescription for a number of pills, each time a pill or a number of pills is dispensed, the system must keep a record of that fact. A record is also maintained of which pharmacist or assistant fulfilled the order. Assume all prescriptions are dispensed only as needed for a 12-hour shift.

Basic data are kept about prescription payers, such as name, address, and contact person. For this exercise, do not worry about billing or payments.

Tasks for Part 2 (Requirements Analysis)
1. Create an event table for the above requirements 2. Create a class diagram with indicative attributes and methods for each class 3. Conduct a CRUD analysis. 4. Develop a use case diagram using the event table. 5. Develop three activity diagrams: one for a use case concerned with entering new orders, one for creating case manifests, and one for fulfilling orders.

6. Write fully developed use case descriptions for each of the three use cases (template available in Blackboard).
7. Develop a system sequence diagram for each of the three use cases.
8. Develop a statechart diagram for an order.

Task allocation: As for Part 1, include a list of tasks undertaken by your group, with the names of those who took prime responsibility for each task.

Attention: Students are reminded of the principles regarding [Academic Misconduct](#), which will be applied for your project work (see Course Outline).