

INFT 2101 – Fall 2023 - Case Requirements – Read Carefully

You are required to engage in requirements determination actions.

Groups are automatically generated and consist of 3 - 4 students.

There is much to be discovered by you and your group to enable the writing of a requirements document for this business case. The narrative you have been provided only gives an overview of the business problem at hand, but you must question the stakeholders further to reveal essential details and define the problem fully and clearly.

Yes, this is a kind of simulation.

You can achieve this through interviewing the Professor as a simulation of conversing with the client / stakeholder. There will be two ways to do this:

1. Post specific questions in the MS Team channel designated by the Professor.
2. Attend the scheduled “collaborative working sessions” in class where you will be given the opportunity to interview the Professor live to try to reveal more details about the case that you need to know.

Keep in mind that Googling things like “Community Hospital database assignment” might turn up some results, but they aren’t likely to be very helpful for this highly customized version of the case. Nope. You’ll have to put in the time for this.

You are expected to make good use of the MS Teams conversation channels for this case to meet the requirement of “openness and transparency” as outlined in the case details. All questions for Nathan or other members of his team should be posted to the “LRCH” channel made available for this case.

There will also be individual MS Team channels for each group to use for brainstorming, open communications, planning and the sharing of ideas among the group. A component of your group mark is based on your ability to collaborate with others through the provided MS Team and the LVCH channel. Rather than use an external platform, using the provided channel is your chance to demonstrate the collaboration you will be graded on.

Case Overview

Maintaining an Open Dialog

Nathan and his team are keenly interested in openness and transparency between competing groups so that any final solutions come as close as possible to an accurate representation of the efficient and effective data structure that the hospital hopes to benefit from.

Lake Ridge Community Hospital is a not-for-profit, short-term stay general hospital. It is the only hospital in the city of Oshawa, a rapidly growing city with a population of about 400,000 people on the shores of Lake Ontario just East of Toronto. LRCH serves the surrounding rural areas in Durham Region as well as the city of Oshawa. At the present time the hospital has 100 beds. However, plans call for expansion to 200 beds soon.

Hospital Organization

As with most hospitals, LRCH is divided into two organizational groups. The physicians, headed by Dr. Browne (Chief of staff) are responsible for providing quality medical care to their patients. The group headed by Ms. Baker (hospital administrator) provides the nursing, clinical, and administrative support required by the physicians to service their patients.

Existing Information Systems

LRCH leases its server and storage equipment from a major hardware vendor. Plans call for adding a faster processor, additional memory and/or possibly moving to virtual disk storage in the next budget cycle year; however, the extent of these additions has yet to be determined.

Present information systems are batch-oriented and include standalone software applications for Patient Accounting, Billing, Accounts Receivable and Financial Accounting. These application packages were obtained from a software vendor specializing in hospital applications, but they do not all connect to one another resulting in issues with data not being updated correctly across all systems.

Nathan Heller, who was recently appointed head of Information Systems, identified the following deficiencies with the present system:

1. The system does not support the medical staff in recording or reporting the results of laboratory tests and procedures.
2. The handling of treatment prescriptions is entirely paper-based and not represented in the current IS system.
3. Since the entire system is batch-oriented, it does not support immediate system-wide access for processes like patient registration or inquiries regarding billing which can delay all sorts of things until the batches are executed overnight.

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4. The system does not accumulate costs by department or cost centre, making it quite hard to get an idea about the state of costs by department.
5. The system is inflexible and does not respond well to changing management needs or to the frequent changes in reporting requirements of external health systems agencies.

Management at LRCH had for some time recognized that the present information systems were not responsive to their needs. Mr. Lopez, the Hospital's assistant administrator, who had previous experience with database systems in a large city hospital, had advocated that LRCH investigate the database approach. Mr. Heller was hired as manager of Information Systems partly because of his experience with database systems.

The following are the major documents, reports and displays that are required by the LRCH Hospital.

Patient Display

A display of the basic data maintained for each patient is shown in figure 3-1. A clerk in the Admissions Office would enter this data when a patient is first admitted to the hospital. A patient record should be able to be retrieved by supplying either the patient number or patient name and phone number. When a patient is later readmitted, their data is up-dated as necessary.

Figure 3-1.

PATIENT-NO:	12345
PATIENT-NAME:	Baker, Mary A.
PATIENT-ADDRESS:	300 Oak St.
CITY-PROV-PC:	Oshawa, ON L1Y 1V1
TELEPHONE:	905 555-5555
SEX:	F
HCN:	444 333 222
LOCATION:	328B
EXTENSION:	623
DATE-ADMITTED:	10/02/2021
FINANCIAL-STATUS:	ESI
DISCHARGE-DATE:	

Most of the fields are self-explanatory with a few exceptions. LOCATION is the room and bed location the patient is currently assigned to. The first three digits indicate the room, and the last character indicates the bed in the room (A, B, C or D). The displayed location is updated along with any other information when and if the patient is re-admitted, but we must also keep track of where they once were in previous visits to manage contact-tracing. FINANCIAL-STATUS is the patients second financial source (insurance provider) of health coverage after provincially covered health care. If the patient doesn't have a second source of health coverage, the financial status is listed as

“Self”. DISCHARGE-DATE is the most recent date the patient was discharged. When the patient is re-admitted this field currently resets to null which leaves us unable to track lengths of stays.

Physician Display

Figure 3-2.

PHYSICIAN-NO: 4321
PHYSICIAN-NAME: M. D. Thayer
TELEPHONE: 250 555-4444
SPECIALTY: Paediatrics

Each referring physician requires a daily report showing the patients who are currently admitted to the hospital and who were referred by that physician. The format of the existing report is shown in figure 3-3. At any given time, each physician has an average of two patients under their care at the hospital.

Figure 3-3.

DATE: 10/04/2014

PHYSICIAN-NAME: DUNN, A. J.

PATIENT-NO	PATIENT-NAME	LOCATION	DATE-ADMITTED
12870	Gonzalez, P. T.	103A	09/28/2014
23819	Thomas, Marie	214C	10/04/2014
61431	Cuadra, L. R.	281B	10/02/2014

The Daily Revenue Report is a listing of all revenue-generating transactions that have been reported on a particular day. The format of this report is shown in figure 3-4.

Figure 3-4.

Daily Revenue Report 10/04/2012

PATIENT -NO	PATIENT- NAME	LOC	FIN. SOURCE	COST- CENTRE	ITEM- CODE	DESC	CHARGE	TOTAL
12345	Baker, Mary	101A	Assure	100	2000	Semi-Private Room	200.00	

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56789	Killy, J. C.	210C	Self-Pay	100	2005	Television	5.00	230.00
			Assure	110	1580	Glucose	25.00	
			ESI	100	2001	Private Room	250.00	
			ESI	125	3010	Chest X-Ray	30.00	
							280.00	

The transactions on this report are sorted by patient, as shown in the figure. The only field that requires additional explanation is the COST-CENTRE. This is an organizational subdivision used for accounting purposes. ie. A department category.

For each item that is charged to a patient, a clerk would enter the transaction into the system.

Following are guidelines to be used in this process.

1. As a clerk enters a transaction, he or she determines the financial source for that item and patient combination from patient record.
2. Each item (identified by an ITEM-CODE) can be associated with one and only one cost centre.
3. The charge for a particular item is the same for all patients.

Patients at LRCH incur an average of about five charge transactions per day per stay at the hospital.

Room Utilization Report

The Room Utilization Report (figure 3-5) is also a daily report that shows the occupancy of the hospital rooms. It is used for scheduling and control purposes.

Figure 3-5. Room Utilization Report 10/04/2014

LOCATION	TYPE	PATIENT-NO	PATIENT-NAME	DATE-ADMITTED
100A	SP	30854	Kuhn, Gregory	10/03/2014
100B	SP			
101A	SP	12345	Baker, Mary	10/02/2014
101B	SP	41932	Darnell, Joann	09/30/2014

The field TYPE indicates the type of accommodations for each room location. Possible values would include PR: Private, SP: Semiprivate, IC: Intensive Care, W3: Ward, 3 beds and W4: Ward, 4 beds.

Revenue Analysis

The Revenue Analysis report is a weekly report that shows the total revenues, by cost centre, and the distribution of revenues by method of payment. The format of this report is shown in figure 3-7.

Figure 3-7.

Revenue Analysis

Date: 10/06/2014

COST-CENTRE	NAME	NO-OF-TRANS	TOTAL CHARGES	ASSURE	ESI	SELF PAY	OTHER
100	Room & Board	682	124,210.58	69,225.18	12,842.30	5,947.05	36,196.06
110	Laboratory	536	11,941.29	8,620.00	2,315.19	906.10	100.00
125	Radiology	215	4,862.75	2,914.25	1,020.25		928.25

Patient Bill

A statement is printed and mailed to the patient three days after being discharged from the hospital. The format of this statement is shown in figure 3-6. The various charges are grouped by cost centre as shown.

Figure 3-6.

Patient Bill

PATIENT NO: 12345
 PATIENT NAME: Mary Baker
 PATIENT ADDRESS: 300 Oak St.
 Oshawa, ONT
 V1V 1V1

DATE: 10/07/2014
 DATE ADMITTED: 10/04/2014
 DISCHARGE DATE: 10/06/2014

COST-CENTRE	NAME	DATE CHARGED	ITEM-CODE	DESCRIPTION	CHARGE	BALANCE DUE
100	Room & Board	10/04/2014	2000	Semiprivate Room	200.00	
		10/04/2014	2005	Television	5.00	
		10/05/2014	2000	Semiprivate Room	200.00	
		10/06/2014	2000	Semiprivate Room	200.00	
				Subtotal		605.00
110	Laboratory	10/04/2014	1580	Glucose	25.00	
		10/05/2014	1585	Culture	20.00	
				Subtotal		45.00
125	Radiology	10/05/2014	3010	Chest X-ray	30.00	
		10/05/2014	3010	Chest X-ray	30.00	
				Subtotal		60.00
				Balance Due		\$710.00

The balance due is the balance before the patient's insurance coverage pays its share or they pay it themselves. The average length of stay for a patient is three days.

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Case Requirements – Checklist

In your assigned groups prepare a formal report containing your group's recommendations for the database design for Lake Ridge Community Hospital.

This report must contain at a minimum:

Your report should be prepared with the utmost care and close attention paid to report structure, sentence structure, spelling and grammar. This report will be presented to Nathan, Dr. Browne and Ms. Baker as one item to be considered in their decision of which group to go with for the database design.

In addition to the report, you will have to create a development database to help illustrate the system functionality to the hospital team using SQL Server.

- Create the database, all tables and all required relationships to allow for the development of supporting applications.
- All tables should contain a reasonable amount of development data. At a minimum include data for 30 patients along with appointments and treatments. 5 physicians and 4 or 5 Cost Centres each with at least two items per centre. All tables related to tables containing data on those objects listed should also have an appropriate amount of data to test your database properly against these requirements. There should be a link in your DC Connect course shell to a website that is very helpful in generating example data. Use it!

Create a series of SQL queries to retrieve and display the following information from your SQL database:

- **Room Utilization**
 - Overall Occupancy by Rooms
 - Overall Occupancy by Beds
 - Occupancy by Room Type
 - # of Beds Discharging Patients Today
 - # of Empty Rooms by Room Type
- **Physician-Patient Details**
 - A physician should be able to see the following data:
 - all the patients of theirs *currently* in the hospital
 - view individual patient details including:
 - total number of appointments
 - personal data
 - previous and upcoming treatments
 - the ability to assign treatments to a patient
 - have the option to save individual notes about a patient

Think about how views (stored procedures) could help you with this program. Also, be sure to consider the program Style Guide when writing this application. Full marks are

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only achievable on this component for solutions that include all necessary aspects of the Style Guide including full, descriptive documentation.

Timelines & Due Dates

1. Formative project consultations are scheduled to take place in class or at an alternative time scheduled in the Professors office hours. Appointments begin the beginning of the designated hour and should be planned for 8 minutes in length. If you miss this deadline you will be assigned a date and time for your group's meetings. Your WHOLE group must be in attendance for each formative consultation.
 - a. **Week 5** - Deliverable #1
 - i. Draft Introduction
 - ii. Draft Mission Statement
 - iii. Draft As-Is Contextual and Level 1 Data-Flow Diagrams
 - b. **Week 7** – Deliverable #2
 - i. Draft Functional & Non-functional Requirements
 - ii. **GROUPS FINALIZED AFTER THIS DELIVERABLE –**
 1. If you wish to make any changes to your team roster, this is the last week to bring it to my attention and work it out. As of Week 8 groups are locked in.
 - c. **Week 9** – Deliverable #3
 - i. Finalized Contextual and Level 1 Data-Flow Diagram(s)
 - ii. Draft 3NF Normalized Relational Schema in “shorthand”
 - iii. Draft Entity Relationship Diagram
 - d. **Week 11** - Deliverable #4
 - i. Data Dictionary
 - ii. SQL CREATE Scripts
 - iii. SQL INSERT Scripts with Example Data
 - iv. SQL SELECT – Examples of Data Usage

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e. **Week 12** - Deliverable #5

- i. Draft presentation agenda & slides for client presentation.

2. **Week 13** – Final Presentation to LRCH

- i. 10-Minute Presentation to the class, and potentially invited guests role-playing as LRCH representatives, presenting your understanding of the business problem, and demonstrating your solution to the problem. All group members must be involved in the presentation; you can demo your database and present your solution with the assistance of a PowerPoint, Prezi, YouTube or even interpretive dance; you should all be prepared to field questions.

This is not a technical presentation as much as an informative presentation to convince LRCH that your team has a great solution and should be chosen for this job over the other teams. Focus on convincing us you understand the problem(s).

- ii. Final Report - Final formal report/proposal handed in; SQL Server database and all SQL scriptsDue immediately following your group presentation.

Late submissions will not be accepted

Evaluation Notes

- The overall mark assigned to your solution will be adjusted for each individual team member according to an assessment by your peers of your contributions to the project. This adjustment can be equal to up to 60% of your total final mark for the case. Everyone is expected to contribute to discussion, question generation, problem solving, normalization, dashboard creation and contributing to the database and application development and your final presentation. How your group splits up some of the tasks is up to you and your group.
- Each group must submit their own unique proposal for this case based solely on the requirements gathering process that took place. Plagiarism of any degree will not be tolerated.