Advanced Database Course Project based on the Mountain View Community Hospital from Modern Database Management Hoffer, Ramesh, Topi(10e)

General project guidelines, rules and regulations

1. Please come up with teams of two to three people only. If we have one person left over, then that person can join one of the existing teams.

2. The complete project must be turned in at the start of the last class before the final. It needs to be in a 3-ring binder, typed and must look professional. All source code is to be included in the submitted hardcopy , and all work is to be uploaded to Blackboard a week before the final exam.

3. I will personally inspect the whole project for each team.

4. No extensions will be given. I urge you to start working on it right away.

5. Each team will have a team leader, who will be reporting the progress of the project To me on a weekly basis. This can be a short paragraph giving specifics, and not making general statements.

6.Each team will decide upfront 1-2 weekly meetings (at least), and email me the meetings schedule within the first week.

7.If a TA is assigned to the class you may ask him/her questions on the project.

8. You do not need to turn in each phase separately. You turn in the completed project only. Each team will turn in one hardcopy and one electronic version of the project.

Detailed Project Description

[200 pts] Phase 1: Enhanced ER Model and Business Rules

[i] Develop a detailed Enhanced Entity-Relationship (EER) diagram and business rules for the Mountain View Community Hospital case study described after chapters 1-4. That means tha you need to study the MVCH Case at the end of chapters 1,2,3,4.

The developed model should constitute the answer to project assignments P1, P2, and P3 described on page nnn of the textbook after chapter 3. Your design should include the EER model specifications should follow the level of details explained in chapter 3. It is recommended that you use a data model design tool like Microsoft Visio to design and document your EER model.

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Chapter 3:

[Pi] Means Project Assignment # i at the end of Ch. 3.

[P1] Revise the list of business rules you developed in Ch 2 in light of the information provided in this case segment and your insights from case exercises 1,2,5,7. [see below]

Ch 3 Case Exercises:

[Ci] Means Case Exercise #i.

[C1] ***Draw an EER diagram to represent th***e requirements described in this case segment carefully following the notation from this chapter.

[C2] Suppose each care center had two nurses-in-charge, one for the day shift, and one for the evening shift. How would that change the diagram you developed in C1-Case Exercise #1?

[C5] ***Derive and clearly state the business rules*** that are implicit in the Volunteer Application Form in MVCH Figure 3-1, at the end of the chapter.

[C7] Compare the EER diagram that you have developed in this chapter with the E-R diagram you developed in Ch. 2. What are the differences between these two diagrams? Why are there differences?

[P2] Following the notation from this chapter, merge you ch 2 E-R diagram with the EER diagram you developed for Case Exercises C1,C2

to represent the data requirements for MVCH's new system.

[P3] Document and explain the decisions you made during merging.

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Chapter 2:

[Pi] Means Project Assignment # i at the end of Ch. 2.

[P1] ***Develop an E-R diagram for MVCH based on the enterprise data model*** you developed in Ch. 1, and the case description , questions and exercises presented in this chapter. Using the notation described in this chapter , clearly indicate the different types of entities , attributes(identifiers, multivalued attributes, composite attributes, derived attributes) and relationships that apply in this case.

[P2] ***Develop a list of well-stated business rules for your E-R diagram.***

[P3] Prepare a list of questions that have arisen as a result of your E-R modeling efforts, and that need to be answered to clarify your understanding of MVCH's business rules and data requirements.

Note: Use the Hoffer book, 10-th edition for phase 1. You basically need to study everything you need to about the MVCH (Mountain View Community Hospital)by reading about the MVCH case study at the end of each of the first four chapters in the book. These are the pages in blue.

Phase I deliverables

1. Develop an E-R diagram for MVCH
2. Draw an EER diagram of MVCH
3. Develop a list of well-stated business rules for your E-R diagram.

[200 pts**] Phase 2: Logical Database Design and Relational Model**

[i] ***Develop a detailed relational schema for the Mountain View Community Hospital case study as described after chapter 4. All relations in your design should at least be in 3rd normal form (3NF).***

The developed relational schema should constitute the answer to project assignments P1, P2,and P4 described on page mmm of the textbook after chapter 4. It is recommended that you use a data model design tool like Microsoft Visio to design and document your relational schema.

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Ch 4

[P1] ***Map the EER diagram you develop in Ch 3 to a relational schema,*** using techniques described in this chapter. Be sure to underline all primary keys, include all necessary Foreign Keys, and clearly indicate referential integrity constraints.

[P2] Analyze and diagram the functional dependencies in each relation. If any relation is not in 3NF, decompose that relation into 3NF relations using the steps described in this chapter. Revise the relational schema accordingly.

[P3] If necessary, revisit and modify the EER model you developed in Ch 3, and explain the changes you made.

Phase II Deliverables

1. **Develop a detailed relational schema for the Mountain View Community Hospital case**
2. **Analyze and diagram the functional dependencies in each relation.**

[200 pts] Phase 3: SQL Programming

[i] ***Develop SQL code that would create the database files corresponding to your relational schema for the Mountain View Community Hospital case study created in phase 2 of the class project.***

The developed SQL code should constitute the answer to project assignments P1 and P2 described on page ??? of the textbook after chapter 6.

Your SQL code should include enough comments and documentation to describe its design and functionality. It is recommended that you execute your SQL code on a DBMS to test its correctness and gain the hands on experience, which is the main objective of this project.

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Chapter 6:

[P1] Use the Physical data model you created in Ch 5 to guide you in writing the SQL statements for creating the MVCH database for the relational schema in Ch 4.

(a) Write the SQL statements for creating the tables, specifying data types and field lengths, establishing Primary Keys and Foreign Keys, and implementing other constraints identified.

(b) Following the examples in CH 5, write the SQL statements that create the indexes.

[P2] ***Populate all the tables it with sample data using SQL*Loader .***
Be prepared to defend the sample test data you insert into the database.

Deadline: Last class before the final exam

Phase III deliverables

1. Develop SQL code scripts that would create the database files corresponding to your relational schema for the Mountain View Community Hospital case study created in phase 2 of the class project.

Organize the scripts so that you can execute them from one central command file(.bat)

2. Populate all the tables it with sample data using SQL*Loader .

[400 pts] Phase 4: Web-enabled DB Interface

[i] Develop a web-enabled interface for the Mountain View Community Hospital case study database created in prior phases of the class project. The developed web- interface should constitute the answer to project assignments P1 described on page ??? of the textbook after chapter 8.

Your interface code should include enough comments and documentation to describe its design and functionality.

You don't need to implement the full database model developed in previous phases . It is sufficient to implement a subset of the relations, but it has to be large enough to provide useful functionality.

[ii You should also implement a couple of queries on the DB, to be initiated from the web interface. Query results should be displayed on the web interface as well.

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Chapter 8:

Web-enable the MVCH database you developed earlier and develop one or more functionalities such as:

(a) Online patient registration (e.g for ambulatory surgery, for Dr. "Z"MS Center, etc)

(b) Online volunteer application

(c) Login for employees or physicians with a username and password.

Phase IV deliverables

1. Develop a web-enabled interface for the Mountain View Community Hospital case study database

2. Write a front-end interface using one table in Oracle 10g/11i. Your front-end could be using Java or some other language. Your front-end must be username/password protected.

The following operations need to be demonstrated. Insert ,Update, Delete, Query of records from the Web-enable front-end.

3. You must very clearly list all software tools used, their version, the websites that you downloaded the software from, and the sequence in which you downloaded all the software.
4. Describe the overall development environment including lessons learned.

Dealing with the realities of a project

1. After reading the case requirements, begin to work with the selected version of the electronic files. To the extent that tables have been defined, students should try to match them to the case requirements and work toward a completed data model. As part of that process, students are to look for tables that may be poorly designed, multi-valued attributes, and so forth. Missing tables should be identified, defined, and added to the data model also. Foreign keys may not have been included yet in the table design, making it impossible for students to establish the relationships they need. Develop the students' understanding that working with sample data can be quite helpful in identifying design inadequacies.

2. A project that requires the students to spend some time with the case, regardless of which database they are using, would be to create a treatment record for each patient's visit. The treatment record report should include all treatments received and the items involved in those treatments, along with the physician and staff involved in the treatment. This treatment record can also be used as a basis for an invoice by adding the costs charged for each line item. Students should easily identify incomplete or flawed modeling when they work on this report.

3. Another project could be recording employee work schedules for a period of time. This is a part of the project where the data model is still incomplete. Student solutions will require further analysis and completion of a better data model.

4. Consider patient tracking while they are resident patients. What if a patient changes beds in the middle of their stay? The model provided assumes that patients remain in one bed during their stay, but the primary key would allow them to move to more than one bed. The difference between an admission date and a treatment or change-of-room date could be much cleaner and clearer. Can you construct a report that will indicate which beds are currently available?

5. How would you handle the discharge of a patient?

6. Will the use of a Person supertype with Patient, Volunteer, Physician, and Employee subtypes work? You should look closely at this model and work with it until you are satisfied that you understand how it is working, or you have improved it so that it works better. Create reports, such as listing employees assigned to Care Centers.