Cairo University
Faculty of Engineering
Computer Engineering Department
CMPN202/ CMP2020

Database Management Systems

Project

Project Description

Objectives

This project should make the student able to:
- ❑ Go through the phases of creating a relational-database-based system
    a. Analysis phase
    b. Design phase
    c. Implementation phase
- ❑ Use database design tools (e.g. SQL server, Oracle, MySQL…….)
- ❑ Create database application
- ❑ Work in a team and learn how to communicate and organize work with others

Project Phases

Project Phase	Deliverables	Percentage	Due Date
Analysis Phase	Project Proposal	5%	Week4
Design Phase	ER Diagram	15%	Week7
	Database Schema	5%	Week13 (with final project delivery)
Implementation Phase	Project Delivery	75%	Week13

Notes:

Feedback for each delivered report is **maximum 1 week after** delivery.
Project assigned total grade is **20** marks.

Project Requirements

It is required to create a relational database system. Your system should be based on a *real-world* model. You will go through the following phases:

1- Team Formation Phase

Number of students per team is 3 to 4 students.

2- Analysis Phase

- ❑ Your team should select a *real-world* application that uses database for its operation.
- ❑ Identify the requirements for your database. You may:
  - o Meet people who use the real-world model of your system,
  - o Get a list of requirements from a documented system, or
  - o Identify reasonable and acceptable requirements by yourself.
- ❑ Applications are not supposed to be neither *too complex nor trivial*.
- ❑ Innovative ideas are rewarded. Think of non-conventional applications.
- ❑ **Prepare and deliver a *project proposal* report.**

3- Design Phase

In this phase, you will identify the structure of the database that will be used in your system.

- ❑ Identify the database entities and the relationships between these entities. This is done by thinking about the real-world model of your system.
- ❑ Draw the "Entity-Relationship" (ER) diagram for your database.
- ❑ A good, clear and a well-defined ER diagram will make it easier for you when creating your tables and relationships.
- ❑ **Prepare and deliver the *ER diagram* report.**

Your ER report will be evaluated by TAs to correct any design errors

Then:

- ❑ Starting from the corrected ER report
  - o Follow the algorithm described in the Lecture to map the diagram into database relations.
  - o Show primary and foreign keys.
- ❑ **Prepare the *database schema* report.**

4- Implementation Phase

In this phase you will convert your design into a working system. This phase implies both the **creation of the database** itself and the development of the **user interface** for the system (windows application/web application/mobile application).

- ❑ Identify the tools you are going to use for implementation.
- ❑ Create the database using a database engine (e.g. SQL Server, Oracle, MySQL etc.)
- ❑ Develop friendly GUI using tools like VC#.net, VB.net, Java, etc.

❑ Don't assume that the system users know anything about the database systems or database queries. Your interface should hide such technical details from the user.

❑ **Prepare a *demo* to show your work.**

Project Deliverables

Cover Page

All project deliverables should have the following cover page

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Cairo University   <Write here SEM or CHS
Faculty of Engineering   followed by team number>
Computer Engineering Department   example1: **CHS - team 7**
CMPN202 (or CMP2020 for semester)   example2: **SEM - team 9**

Introduction to Database Systems
\<Project Name\>
\<Report Title\>
Team Number:

Team Members:
\<Name\>   \<Sec\>   \<B.N\>   (or Name and ID for CHS)

Contact info:
Write ***all*** emails of team members to be able to contact your team.

\<Date\>

Note: ***SEM****: for semester,* ***CHS****: for credit hours system.*

Analysis Phase Deliverables

Project Proposal Report
Report should contain
1- Cover page. (described above)
2- Proposed project description: one or two paragraphs to describe the project (the system) you intend to implement.
3- List of system users: who can use your system? (2-4 types of users)*
4- For each user, write functionalities that your system provides (5-10 functionalities per user type)*
5- List of real-world entities that should be present in your system. (10-15 entities)*
Notes:
❑ Storing data is NOT functionality; rather functionality is what users will do with stored data.
❑ Reports should be submitted to the TA responsible for your project. (Each team will be informed of the TA responsible for their project).

* *The above numbers are for guidance and may be somehow tolerated.*

Design Phase Deliverables

1-ER Diagram Report
Report should contain
1- Cover page. (described above)
2- Problem definition.
3- List of system users and privileges of each user.
4- List of entities and a brief description for each entity. This doesn't mean to list the attributes of the entity. It means to describe what this entity represents in the database.
5- List of relationships and a brief description for each relationship.
6- ER Diagram.
     a. The first page should show the entities and the relationships between all the entities (with no attributes on entities. Relationships attributes should be shown here).
     b. The rest pages should show the attributes of each entity.
Note: *State **explicitly** any reasonable **assumptions or restrictions** you have.*

2-Database Schema Report
Report should contain
1- Cover page. (described above)
2- The new ER diagram after correcting any errors in ER report according the ER feedback.
3- Database schema diagram showing
      a. Database relations (tables) showing primary keys.
      b. Foreign keys showing the referenced relations. (Can be shown as arrows from referencing relation to referenced relation)
4- Any database constraints.

Implementation Phase Deliverables

Deliverables
1- A Soft copy of the Project uploaded online on the delivery date.
Delivery contains
      (1) ID.txt file. (Information about the team and its members)
      (2) The schema report.
      (3) The project files.

Your tables should contain ready sample data - At least 20 tuples in major tables.

Delivery Schedule: To be announced.

Evaluation Criteria
Note: The percentages below are for the Implementation phase, therefore, their total is 75%.
   ❑ **User support (5%)**
      ▪ Different types of users supported by your application.
      ▪ No hardcoded passwords. Users' data should be stored in a DB table.
      ▪ Each individual user should have a username and a password.
      ▪ Application should enable users to sign up, login, logout and change password.
      ▪ Only first admin user can be created manually then he should be able to change his password.
      ▪ Admin should be able to create other admins through the application.
      ▪ Encrypted password is recommended.
   ❑ **System Functionality (50%)**
      ▪ How comprehensive the functionality is supported by your application for different types of end users.

- All access to the database must be done through the application. Direct access to database table is not allowed.

❑ **Reporting Facility (10%)**
- Statistical reports depending on your application
  - Detailed statistical reports for specific parts of the database.
  - Managerial level reports to see some overall statistics of the whole application.

❑ **GUI (10%)**
- Do not expect users to be database programmers.
- Do not expect users to memorize IDs. Use names instead of IDs.
- Interface should be operation-oriented not table oriented. i.e. categorize your end user interface items with respect to functionalities to be supported rather than tables to be accessed.

❑ **Individual's role**: Grade for each individual according to his/her role.

Important Note
- Each team member should identify EXACTLY his/her role in the project; as he/she will be evaluated accordingly, not necessarily that all team members got the same mark.