

Cairo University  
Faculty of Engineering  
Computer Engineering Department  
CMPN202/ CMP2020

# Database 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

<i><b>Project Phase</b></i>	<i><b>Deliverables</b></i>	<i><b>Percentage</b></i>	<i><b>Due Date</b></i>
<b>Analysis Phase</b>	<b>Project Proposal</b>	<b>5%</b>	<b>Week4 (Nov. 12,2020)</b>
<b>Design Phase</b>	<b>ER Diagram</b>	<b>15%</b>	<b>Week7 (Dec. 1, 2020)</b>
	<b>Database Schema</b>	<b>5%</b>	<b>Week13 (with final project delivery)</b>
<b>Implementation Phase</b>	<b>Project Delivery</b>	<b>75%</b>	<b>Week13 (Jan. 10,2021)</b>

#### Notes:

Feedback for each delivered report is **maximum 1 week after** delivery.  
 Project assigned total grade is **15** 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:
  - Meet people who use the real-world model of your system,
  - Get a list of requirements from a documented system, or
  - 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
  - Follow the algorithm described in the Lecture to map the diagram into database relations.
  - 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

<p>Cairo University Faculty of Engineering Computer Engineering Department CMPN202 (or CMP2020 for semester)</p>	<p>&lt;Write here SEM or CHS followed by team number&gt; example1: <b>CHS - team 7</b> example2: <b>SEM - team 9</b></p>
<h1>Introduction to Database Systems</h1> <h2>&lt;Project Name&gt;</h2> <h2>&lt;Report Title&gt;</h2> <h2>Team Number: #</h2>	
<p><b>Team Members:</b> &lt;Name&gt;                      &lt;Sec&gt;                      &lt;B.N&gt; (or Name and ID for CHS)</p>	
<p><b>Contact info:</b> Write <i>all</i> emails of team members to be able to contact your team.</p>	
<p>&lt;Date&gt;</p>	

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

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## 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.*

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## 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.
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## 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.