

# Database Systems - Research Project

## Objectives

The purpose of this project is to analyze, specify, design, implement, document, and demonstrate a database management information system in specific domain. It is required to design and develop a database for a real application based on your choice

The project will involve identifying an end-user need for a relational database, determining the requirements for the database, developing the database, designing the logical specifications, building and populating the database, and developing queries/views that will showcase the capabilities of the database for fulfilling the identified user needs

## Purpose and Method

The purpose of the course project is to provide the students with the knowledge of database design and implementation and the skills to apply it.

## Teamwork and Project Management

Each team consists of 3 to 5 students working on the same project. *Teamwork is **required** since team work is an integral part of Database design and development*

All team members must take part in all project activities and **none** of the activities should be done exclusively by one student. Each team member or a pair must be *responsible* for all aspects of development required for the features they own.

## Report Format

A report is submitted by the whole team and will be graded as a whole, and points will be split among the team members according to the declared contributions

A report must have a *cover page* containing:

- . the course title,
- . group number,
- . project title,
- . submission date, and
- . all team-member names.

Negative points will be assigned to reports missing- or having an incomplete cover page.

The **second page** of each report must detail the **breakdown of individual contributions** to the project (use more pages if necessary). **Each student** should provide an **itemized list** of his or her contributions to components of the report.

## Report Sections

### 1. The main purpose of the project

This section should describe the main project goals for the database you will create. A narrative description of the business used for the project or application being created. This should also include a description of the problem or opportunity being addressed. Identification of the information needs - what information would help solve the problem or allow one to take advantage of the opportunity.

What kind of data will be stored? Here, describe the data that will be in the system and where it will come from. Be as detailed as possible, including names and descriptions of various types of data.

### 2. Data (Conceptual) Model

- a) **Domain.** A detailed table containing *all* attribute names, descriptions, and constraints (technical constraints such as data type and length, and business constraints) as well as a similar table that describes relationships.
- b) **Conceptual Data Model Diagram.** Create an ER diagram that includes all entities, attributes, and relationships. Ensure that you display proper cardinality and participant constraints for every entity-relationship connection. Ensure that all entities, relationships, and attributes have globally unique names.

### 3. Logical and Physical Modeling

Given the E-R diagram and sets of attributes for each entity, the next step is to convert the E-R model into a relational. It includes: tables with information on primary keys, foreign keys, field types, etc. The tables and relationships between them should be essentially the same as will be used in the final application.

### 4 Database Implementation

Groups should then implement the database tables created in the previous step. For each relation, write a SQL CREATE TABLE statement. Write separate ALTER TABLE statements to add PRIMARY KEY and FOREIGN KEY constraints to the tables. Data should be supplied for each table by writing SQL INSERT statements. The amount of data should be such that the need for a database is clear. In other words, provide enough examples to demonstrate why a database was required in the first place.

### 5 Application Implementation

The application (forms, reports, queries, menus or navigation form) can then be created on top of the tables. In general, a simple data entry form should be created for each table. At least two reports that reflect the core of the business should also be created.

For Queries, provide the associated SQL statements and a description of what the queries are used for.