# CS312 Business Data Processing (Level 5)

# Spring1 2024 – Final Project

## Description

This project has the same specifications as the CS205 final project. There are four major additions to the skill set of CS205:

* Subqueries
* Hierarchical queries.
* PL/SQL procedures and functions
* Denormalised design choices and PL/SQL triggers.

Accordingly, your project will have to employ these new aspects of SQL.

You will monitor the activities of a company or a personal hobby or an event or series of events in a set of tables. Subsequently you will apply all data processing techniques you have learned in CS205 and during the first semester of the present course.

The application will be chosen in consultation with me and I will give you feedback on your application scope and design. The tables should include all information that should be monitored, and which would allow you to produce useful and meaningful queries.

### Project Specifications

The project involves the creation of a multiuser database application capable of a large number of transactions and views. It is expected that the application will be reached, via the network, by people and/or stations in many locations. Users are expected to have different access rights to different subsets of the data.

It is expected that you will use at least 5-6 tables (preferably 6-8 or more) and you will be implementing at least:

* one M-N relationship
* one self 1-N relationship (hierarchy)

Given the level of expertise that should have been acquired at this level the database must be optimally designed at the conceptual and physical level. This implies the following:

* Full research of the application's requirements; careful identification of the data to be stored and the queries to be asked. Crystallization of domain's properties and needs in mind.
* Table design and table level constraints; ERD. Principles of Relational Modeling and Normalization are expected to be correctly adhered to.
* Population of tables with decent set of values.
* Business logic support through triggers.
* Employment of structured programming principle through views and functions.
* Conscious denormalised choices in DB design, which require appropriate triggers to ensure data consistency.

## Tasks

### Design your database

Carefully outline what information and operations your application supports. Which queries would provide useful information to the customers. Then think which tables should host this information, obeying the principles of sound Relationsal Data Model design.

Produce an ERD diagram and CREATE TABLE statements.

### Populate your tables

This is a very important stage. It is important that the values you supply are realistic so that you fully understand data interrelationship.

You can use my tool for generating random values so that you can provide more data more easily.

### Enhance your database

Provide extra fields for denormalised design and associated triggers.

Provide views, functions and procedures and improved development practices.

Provide user access specifications and support them in any way possible.

### Query the data

Provide a variety of SQL statements SELECT, UPDATE as well as DELETE and INSERT statements. Be sure to explore applications and synthetic combinations of all major skill sets:

* Subqueries
* Hierarchical queries
* User-defined or Oracle functions
* Report producing procedures
* Batch procedures (Synchronizations and trigger correctness checks).

### Word report

#### Presentation

Introductory text presenting the application: motivation and what it attempts to do and which problems to solve.

Expand on motivation. Be more specific on the needs and the kinds of reports various users would like to have.

#### Table description

Explain the fields you decided to have in the table: what information does each field contain? How is this information important for your bookkeeping?

#### Enhancements

Explain the reasoning of all that you provided in the corresponding task. Present the solution.

#### Queries

Explain the reasoning of all that you provided in the corresponding task. Present the solution.

#### Suggestions for further development

How could this application be further expanded? Would expansion mean change in its logic or addition of new features?

## Submit

You will submit:

1. The Data Generation file (Excel and possibly Access)
2. Your ERD file
3. The SQL dump of your database (includes all constraints)
4. An SQL file with all your queries and PL/SQL triggers, procedures etc.
5. A Word file with the report

## Marking Criteria

The following criteria will form the final grade of this project, by their corresponding weights:

|  |  |
| --- | --- |
| **Criterion** | **Weight** |
| Clear application requirements description | 8 |
| Correct design supports all requirements | 8 |
| Correct DDL for design implementation | 8 |
| Quality of data | 8 |
| PL/SQL and queries | 60 |
| Clear vision of application's limitations and potential for expansion | 8 |
| **Total** | **100** |

## Suggested topics

The following list is not exhaustive but I believe it shows the subjects you can tackle and be substantial even at a simple level.

* Which database would host user info, access control and messages in a simple online forum?
* The back end of a banking application for Savings accounts only.
* The back end of a banking application for Customer Loans only.
* The back end of a banking application for Customer Portfolio Management only. Backend only, no decision making. Can take several directions.
* A small hotel in Zagorochoria, newly built with a blend of innovation and traditional.
* An application for a Doctor with his own practice.
* A project management application. Assignments of resources (human, material, machine, money, time) to tasks. Linear tasks. Especially for this project be sure to contact me a lot.
* A supermarket offers home delivery via phone. The database support for orders and delivery assignments.
* Statistics for the NBA, the SuperLeague or any sport or league that you want.
* Statistics for a **single** basketball game. Interesting for a two-people group: one does the statistics of the league, the other of the game. Each can work independently and submit and then they can see how they can join the two designs and re-submit a joint. project.
* The Public Relations department of a company or institution.
* A Travel Company which organizes excursions at various times to various locations.