**Team project on database development**

**Objectives**

1. Divide into groups of 2-4 students and register your team
2. Choose subject area and describe the domain in detail. Discuss your subject area with teaching assistants.
3. Conceptual model development (in ERDPlus)
4. Relational schema design
5. Create a database in PostrgeSQL
6. Fill the database with test data
7. Write several relevant queries. Create two functions.
8. Create views and prepare a report

**·**  **Subject area analysis: structural and functional analysis**. Who will work with data? How? Find and look through the sites, mobile applications, other software, and documents related to your topic. You are creating an operational database that supports some business process, not just describing the parts of real world. Start writing your text report by formulating the business requirements of potential users that are involved in a business-process (or content consumption). Describe these requirements in video presentation. Write the requirements (1-2 pages) in your report. They should include general information about the subject area, possible database users and business functions to be automated with help of the database.

* **Conceptual model development (in ERDPlus).** What information objects are important for your subject area? Identify entities, their attributes and set logical relationships. Add a screenshot of ERD. Describe the model in your video. Model must match the requirements from the previous point. Minimal number of entities is 8.
* **Relational schema design** (in ERDPlus). How data should be structured in context of relational database? Convert the ERD to a relational schema. Choose correct data types, check foreign keys. Your model should conform to at least 3NF. Briefly review the model in video. Add a screenshot of your relational schema
* **Deployment of a database in an RDBMS** (PostrgeSQL). Organize a dedicated place for your data. Generate DDL script and create tables. Database should be implemented on a training server.
* **Filling the database with test data**. Test data will help you in development and debugging. All tables should be populated with records. Fill at least one table with many rows (not less than 1000. Consider transactional tables first, i.e. orders, bookings, attendance, etc.). You can use Excel to prepare INSERT statements.

**· Writing queries.** All queries must help answering questions relevant for your business processes. Trivial queries (simple queries like “select \* from t”) will be rejected. First write a description for a query – what it finds and in what circumstances it will be used. Development results should be closely related to the characteristics of the subject area. No need to write queries that do not add value to your IT-solution from the potential user’s point of view.

* Q1. Query with filter, projection, aggregate function, and grouping. Number of tables involved – at least 2. Please, specify the purpose of this query. Who will use it and when? How data from the query will help the user?
* Q2. Query with subquery in any part of it. Please, specify the purpose of this query. Who will use it and when? How data from the query will help the user?
* Q3. Query with window function (running total, ranking or lag) and regular aggregation (with group by) in one statement. Please, specify the purpose of this query. Who will use it and when? How data from the query will help the user?

Functions should be developed to automate tracking of business processes. E.g., assign delivery order to available employee.

· **Create functions, views and a report.** Create two views. The first view will be an editable view that shows business data (like project’s attribute, employee’s contacts, etc.) and allows users or programs to change it. The second view should be used as a data source for your report in Excel or another visualization tool. Pay attention to details like formatting of your report.

Individual contribution of each participant will be evaluated. All team members should understand all business-related and technical details of the project. Students may be randomly asked questions about the project. Inability or refuse to explain how the database works will result in grade decrease down to 0 / 10.

**Submit your work:**

1. Report in docx or pdf format
2. 15 min video presentation
3. DDL and other queries in txt file with comments

**Docx report requirements**

It is necessary to describe the results of each task. The following mandatory requirements are listed below:

* Title page;
* List of students in the team;
* Database name;
* Page numbers;
* Careful formatting of text;
* Screenshots with captions;
* Automatically generated table of contents;
* Headers with nested structure. Each heading should have meaningful title corresponding to its contents;
* One of the sections should be devoted to roles of each team member.

**Video Requirements**

To get a grade, you need to prepare a video (no more than 15 minutes) with a presentation of your work, and then upload it to online hosting service. Add a link to the report and attach it to submission in form of comment. Mandatory parts of the video are written below:

* Short introduction and overview of your subject area. How can potential users benefit from working with the database?
* Tell about data modelling. Which tools did you use? Present the conceptual and logical models created;
* Describe one of the most interesting queries.
* Show how functions work;
* Show adding data through a view;
* Show the report and describe its value for users.

Win extra points for simulating a fragment of a business process in your database. Show how data will be changed while the business process is being executed.

Creativity is welcomed and rewarded! Max time for presentation is limited to 15 minutes.

Downgrade: every day from the deadline the mark drops by 15 percent.

**Deadline:** in the first presentation