

Test Project Session 5

IT SOFTWARE SOLUTIONS FOR BUSINESS

Submitted by:
Independent Test Project Design Team



Contents

This Test Project proposal consists of the following documentation/files:

1. WSC2019_TP09_S5_EN.pdf (Session 5 instructions)
2. Session5-MySQL.sql (SQL Script to create tables with data for MySQL)
3. Session5-MsSQL.sql (SQL Script to create tables with data for Microsoft SQL)

Introduction

Before a well is drilled, a geologic target is identified by a geologist or geophysicist to meet the objectives of the well. For a production well, the target is picked to optimize production from the well and manage reservoir drainage.

The target (the end point of the well) will be matched with a surface location (the starting point of the well), and a trajectory between the two will be designed. In this section of your work you will be tasked to help the relevant department process well data for drilling.

The following objects are considered in designing this part of the package for Kazan Neft:

- Graphical representation of the ground layers and the capacity of each well.
- Storing and updating the test results for each specified well.

Description of Project and Tasks

While developing the test project, please make sure the deliverables conform to the basic guidelines drawn out by different departments at Kazan Neft:

- There should be consistency in using the provided style guide throughout development.
- All required software modules must have applicable and useful validation and error messages as expected by the industry.
- Offer a scrollbar if the number of records on a list or a table that do not fit in the form area comfortably. Hide scrollbars if all content can comfortably be displayed.
- The de-facto standard, ISO compliant date format is YYYY-MM-DD which will be used in this task where applicable.
- Where applicable, use comments in code to have the code more programmer-readable.
- The use of valid and proper naming conventions is expected in all material submitted.
- When a form or a dialogue is in focus, operations on other forms need to be suspended.
- The caption of Delete and Cancel buttons need to be in red to help with accidental mishaps.
- When using colors to differentiate between rows or records, there needs to be visible clarification on the screen as to what they stand for.
- The wireframe diagrams provided as part of this document are only suggestions and the solution produced does not have to be, in any way, mirror what has been pictured.
- Time management is critical to the success of any project and so it is expected of all deliverables to be complete and operational upon delivery.
- The user interface of the current task needs to be implemented on the Android platform and will only be accepted on the mobile devices provided.
- As an industry standard, the company infrastructure is based on a central database and the application should be designed to process all their data requests through a Web API. The company will provide all necessary specifications for you to model and deploy the data interface.



Instructions to the Competitor

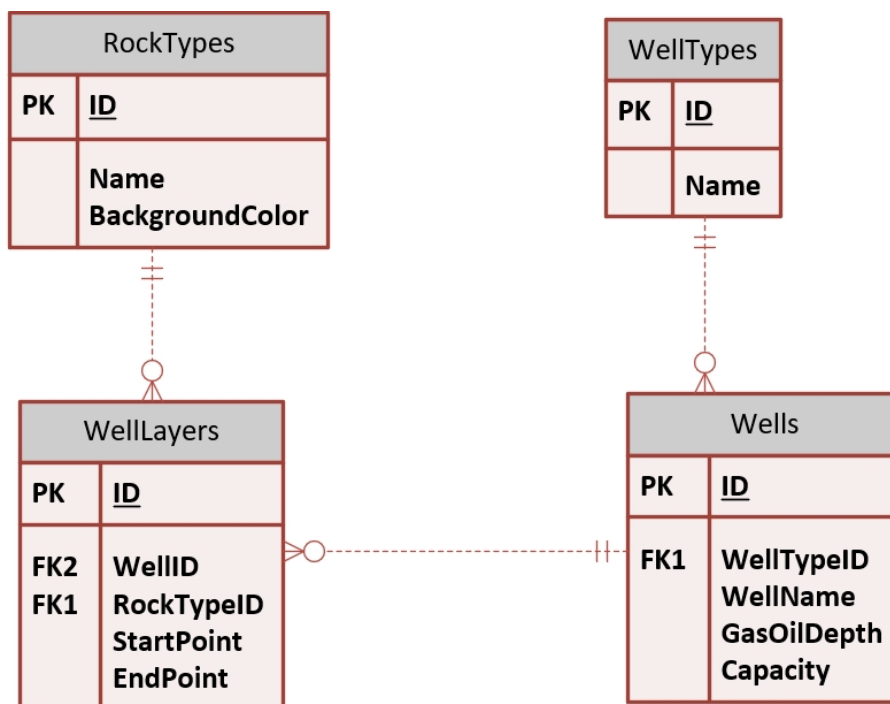
5.1 Connecting to the Database

Use a database by the name of "Session5" in your desired RDBMS Platform (MySQL or Microsoft SQL Server). This will be the main and only database you will use in this session.

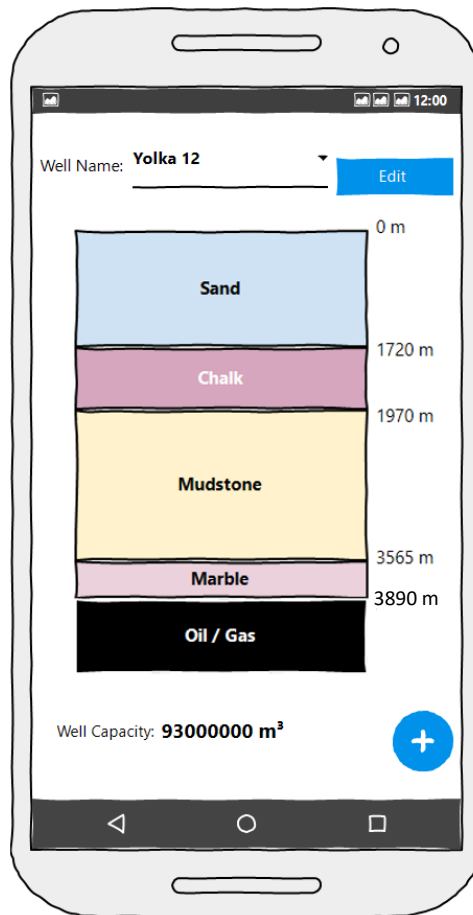
5.2 Importing Database Structure

Depending on your preferred RDBMS platform, a SQL scripts is made available. The said scripts consist of the database structure and data required to complete the tasks. The data needs to be imported to the database created for this session named "Session5".

As instructed by the designers, the database structure provided for the purpose of this section cannot be altered. This applies to removal of tables, adding or deleting any fields on the tables or of change in their data types.



To help further perceive the thinking behind the structure of the database, the database designers provide an Entity-Relationship Diagram (ERD). The aforementioned diagram explains the conceptual and representational model of data used in the database.



5.3 Drawing Identified Layers for each well

The initial form shown to the user after they open the application would be this form. After selecting a well, the available user information is retrieved from the database to graphically represent the shape of the well (layout and depth of the layers) as described below:

- Layers are displayed, in order from the starting point of the well to the end point of the well.
- Select the appropriate color by looking it up in the “BackgroundColor” field of the table “Layers”.
- As shown on the chart above, the depth of each layer should be marked besides them.
- The name of the layer should be placed inside the layer.
- The last layer is always oil/gas and should be displayed on the black background with white text.
- The well capacity is displayed at the bottom of the form.
- The add new well (+) button and edit buttons will get the user to update well information or add new wells to the system. The full description of how they will work is detailed in the next section.



5.4 Registering New Wells

By using the add new well button (+) the user should be able to add the following information to the database:

- Well name, Well Type, Depth of gas or oil extraction, Well capacity, Rock layer, From depth, To Depth.
- In order to submit the form, the following entries are required:
 - Well name, Well Type, Depth of gas or oil extraction, Well capacity
- There needs to be at least layer that has a starting point of zero (surface layer).
- No two layers can overlap and the user should get an appropriate message displayed if a layer is placed inside another layer.
- None of the layers can have a depth that exceeds the value of “Depth of gas or oil extraction” of the well.
- The system will not allow layers of the same name saved on the same well.
- The depth of a layer cannot be less than 100 points.
- The user can remove a layer using a button placed besides them.
- Each well name should be unique.

5.5 Updating Well Data

By using the Edit button on the main form, the user can update the following information to the database:

- Well name, Well Type, Depth of gas or oil extraction, Well capacity, Rock layer, From depth, To Depth.
- In order to submit the form, the following entries are required:
 - Well name, Well Type, Depth of gas or oil extraction, well capacity



- If the value of “depth of gas or oil extraction” is lowered, the system should check to make sure there are no layers associated with the well with a higher value. An appropriate message will indicate the reason why the entered value is not valid.
- If there are new layers to be added to a well, the following constraints should be applied:
 - The starting value for the “FromDepth” which is the first layer is zero.
 - No two layers can overlap and the user should be warned if a layer is placed inside another layer.
 - The depth of every layer should be smaller than to the depth of “Depth of gas or oil extraction”.
- The system will not allow layers of the same name saved on the same well.
- The depth of a layer cannot be less than 100 points.
- The user can remove a layer using a button placed besides them.
- Each well name should be unique.

5.6 Online/Offline Mode Functionality

The application always prefers to work online and to have online access to the database. It is necessary although, for the company geology and production departments to have the application available to them at all times. In some places, they will not have access to the server due to connectivity issues, so the application needs to accommodate to their needs by providing to the following functionality:

- Offline mode of the software:
 - Display an appropriate message to the user when open the application on to indicate that they are currently offline.
 - The date of the last update from the server in offline mode should be displayed at the bottom of the screen at all times.
 - The user may not add new wells to the system.
 - The user may not edit any of the wells on the system.
 - The system will allow the user to browse the list of all the wells:
 - They may also display the ground layers in offline mode.
 - They would also see the capacity and type of well.
 - Network status is monitored every 5 seconds for changes:
 - If the server connectivity is restored, the user is notified with an appropriate message and the software reloads in online mode as described below.
- Reloading into Online mode:
 - As soon as the server connectivity is restored, the application should refresh to display all the latest information.
 - Network status is monitored every 5 seconds for changes:
 - If the application is unable to connect to the server, the user is notified with an appropriate message and the software reloads in offline mode with all the information requested updated to the last access date.
- It goes without saying that after a fresh install of the application, the information retrieval should happen as soon as it is able to make connection to the server.