COS 221 Practical Assignment 5

UNIVERSITEIT VAN PRETORIA
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- Date Issued: **10th May 2023**
- Date Due: **7th June 2023** before **11:00 (in the morning)**
- Submission Procedure: **Upload to ClickUP**
- Submission Format: **zip or tar + gzip/bzip2 archive**
- This assignment consists of **8 tasks** for a total of **250 marks**.
- There are **10 marks** assigned to group cohesion for this practical assignment.

1 Overview

This last practical assignment in COS221 serves to expose you to projects and activities that will be required of you in the second semester of your second year as well as on the third-year level, especially COS301. This project is a group-based project which will require you to use all of your obtained knowledge in COS221 plus the effort of your group to complete this assignment. This assignment has minimal specifications to allow you to implement all you have learned, but also discover and showcase to the lecturers and yourself what you are capable of achieving as a Computer Science student of the University of Pretoria. For this assignment, you are welcome to do and implement everything that you think is suitable for this project. This means that you are welcome to do more than what is required, but not less. Where specifications might seem vague to yourself or your group, make the required decisions and assumptions, and add them to your uploaded PDF. Simply put, you are required to use your creativity for this assignment, and working in groups will make it easier to find ideas and implement a good project. This process is your first introduction to what will be required of you in your final year and industry as a University of Pretoria graduate.

2 Project Scenario

Tourism has become a significant industry in many countries, generating employment, economic growth, and cultural exchange. The South African Government through the National Department of Tourism wants to make South Africa a destination for tourists interested in wine tasting since the country is a leader in wine production. Furthermore, the department would like to simplify things for tourists within the country and assist them into visit outside destinations. From that perspective, the government contracted the **Global Wine Store** (GWS) for this specific project. **GWS** is a Worldwide organisation that deals with wine production and sale. They are looking for a second-year group of students in CS to help with their project. The company has data that they are already using. You are asked to implement a project for wine tourism, design and implement a user-friendly platform, clean the data where necessary, and extend the data when required (through other APIs/ realistic mock data).

The platform should allow users to view the various wines, along with their region and other pertinent information. This information should be easily filtered to allow users to find what they are looking for. The platform should allow users to view the various wineries/wine farms, with relevant information such as location and available wines. The platform should allow "verified" wineries to add new wines to their catalog. The platform should allow users to review wines. Note that you are allowed to use any realistic data even if it's not given in the specification. Remember to indicate everything in your uploaded PDF file.

For this assignment, you will be making use of the **GWS** data that is provided by the organisation to implement your practical assignment. The information to be able to populate the database and implement the project is provided under the following links:

- `https://sampleapis.com/api-list/wines`
- `https://www.kaggle.com/datasets/sgus1318/winedata`

- https://www.kaggle.com/datasets/zynicide/wine-reviews
- https://archive.ics.uci.edu/ml/datasets/wine+quality
- https://globalwinescore.docs.apiary.io/#introduction/format
- https://wine81.com/
- https://data.world/markpowell/global-wine-points

3 Outcomes

After successful completion of this assignment you should be able to:

- analyse and understand data from multiple sources;
- be able to curate the data
- design a database schema to be implemented in a RDBMS for the curated data;
- design and build a web-based application and:
  - be able to execute a connection to an RDBMS from a programming language;
  - query and manipulate a relational database from a programming language;
  - build a Graphical User Interface (GUI); and
  - utilise the GUI to query and manipulate a relational database.

4 Constraints

1. You must complete this assignment in groups of 5 - 7 students (no less and no more). Make sure you register your teams before the provided registration deadline (this will be announced on Clickup).
2. You may ask the Teaching Assistants for help but they will not be able to give you the solutions.
3. The PDF, database dump, source code, GUI, and git history will be marked.
4. The GUI interfaces:
   (a) which run and perform what they are supposed to do get full marks
   (b) which run but do not perform as required, will receive partial marks
   (c) which do not run will be allocated partial marks based on the functionality they would have exhibited.
5. You need to use a RDBMS (MariaDB) and tools/languages you require to build a web-based application to complete the practical assignment.
6. You may utilise any text editor or IDE, upon an OS of your choice.
7. You **ARE REQUIRED** to use git source code revision to facilitate team collaboration for this practical assignment.

5 Milestones

To be able to success deliver and demonstrate the project to the GWS team on 7 June 2023, you need to adhere to the following milestones:

- Register your teams from Thursday 11 May till Monday 15 May 2023 at midnight.
- Discuss the functional requirements and the (E)ER-diagram, as a group, with your assigned tutor on 17 May 2023.
- Show your database with valid data and some queries to your tutor on 24 May 2023.

- Demonstrate your initial web-based application that integrates with the database on 31 May 2023. A Github check will also be conducted during this session.
- Bookings for the team demonstration will open on Monday 5 June 2023.
- Demonstrate your final project on 7 June 2023.

6 Submission Instructions

You are required to upload a single archive that includes the following files:

- An archive containing your web-based application. If you used a management tool you are required to mention it.
- A pdf containing the answers to the tasks.
- A file or files containing the SQL statements from your database dump to:
  - create your database,
  - create the tables in your database, and
  - populate the tables with the data you populated the tables with.
- Your archive containing your `.git` folder
- A **readme.txt** file informing the marker what they should do to build and execute your application.

Upload your archive to ClickUP. No late submissions will be accepted, so make sure you upload in good time.

7 Online resources

The following resources will help with creating a Java Swing application.

- Git: `https://git-scm.com`
- GitHub: `https://github.com`
- PHP: `https://www.php.net`
- MariaDB: `https://mariadb.com`
- Composer: `https://getcomposer.org`
- Getting Started with MariaDB at: `https://mariadb.com/get-started-with-mariadb/`
- To download MariaDB and access the documentation on your computer. Use the official MariaDB site – `https://www.mariadb.com/`
- There are many other resources online for example Stack overflow – `https://stackoverflow.com/` a platform for developers to learn, share knowledge, and build careers.

8 Rubric for marking

Research	**20**
General overview and explanation	4
Wine types or categories explained	4
Wine points and prices	4
Other useful information for a Wine tourist	4
References	4
(E)ER-diagram	**30**
Entities and Attributes	10
Complex and Derived Attributes	10
Relationships and Cardinality	10
Mapping	**30**
Regular Entity Types	3
Weak Entity Types	3
1:1 Relationships	3
1:N Relationships	3
M:N Relationships	3
Multivalued Attributes	3
N-ary Relationships	3
Specialisation and Generalisation	3
Unions	3
Correctness	3
Relational Schema	**35**
Visual	10
Primary, Secondary, and Foreign keys	5
Constraints	5
Types and constraints (e.g. nullable, length) if applicable	5
Checks on applicable fields	5
Correctness	5
Web-based Application	**50**
Functional requirements	10
Wine Management	10
Verified Winery Management	10
Sort wines by price	10
Queries	10
Data	**20**
Explanation	5
Script/Manual Data Entry	5
Data	10
Development	**25**
Git usage	5
README	5
Overall quality and impression	15
Demo	**40**
Group Cohesion	**10**
Total	**260**

9 Assignment Instructions

Task 1: Research ..... (20 marks)

You are required to conduct research on wine and wineries as a starting point for this project. Note that you have to include references. Your research should not be more than one page long.

Task 2: (E)ER-Diagram ..... (30 marks)

After you have conducted your research in Task 1, you are now required to construct an (E)ER-diagram of your project and provide the final model in your uploaded PDF. You are required to mention all assumptions you have made during your modeling and any other information you deem necessary. If you made multiple iterations to get to your final (E)ER-diagram, be sure to include all iterations, as well as notes on how each iteration improves on the previous.

Task 3: (E)ER-diagram to Relational Mapping ..... (30 marks)

Using the steps for conversion from (E)ER-diagram to the Relational model as was discussed in detail in class, provide a relational mapping of your (E)ER-diagram in your uploaded PDF. Be sure to indicate the conversion for each step, as well as the assumptions you have made and the choice you have made if the conversion could provide multiple solutions.

Task 4: Relational Schema ..... (35 marks)

Provide a designed relational database schema for all your relational mappings obtained in Task 3 in the form of both a visual diagram and SQL statements targeted towards MariaDB. Ensure that you include, where applicable, all of the following:

- Primary, Secondary and Foreign keys
- Constraints
- Types and constraints (e.g. nullable, length) if applicable
- Checks on applicable fields

Task 5: Web-based Application ..... (50 marks)

In COS216 you learned how to create a web application using PHP, HTML5, CSS, and JavaScript. For this task, you are required to implement a web application to manage and perform different queries you find necessary for this project. Your web application must at a minimum be able to:

- Login and manage users
- Manage wines, and wineries.
- Manage sites, addresses, and locations
- Sort wines by quality, price, etc.
- Update the database and/or extend, delete, etc.
- Suggest best destinations based on location.

Task 6: Data ..... (20 marks)

You are required to populate your database with the data for at least 5 wineries in 5 countries with 10 wine categories and types in each. You are welcome to augment the given data and include all your relevant data in your database by hand, a script that creates artificial data, a script that parses an API, or loading the data with XML files from some website/feed/API. You are however required to explain your choice of method and reason in your uploaded PDF file.

Task 7: Development ..... (25 marks)

Your project will be assessed, not only on the functionality it provides but also on your overall development practices such as:

- Usage of git
- Data validation
- Usage of a package manager

- Ease of understanding, spelling and grammar, and structure in your code, git commit messages, uploaded PDF, README etc.
- Quality of the overall delivered solution

Task 8: Demo ..... (40 marks)

Your team will be required to demo your solution to the lecturers of COS221. Booking slots will be opened closer to the time. Note, that all team members are required to be present for the demo to receive marks. In addition, each team member has to explain in the uploaded PDF all their contributions to the project.

IMPORTANT NOTE(S):

- Please refer to the rubric for the detailed allocation of marks.
- Plan your study time and start well in advance with this practical.