SQL_DataDetective

Learn Standard Query Language (SQL) With a Webapp

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INTRODUCTION

SQL is a Standard Query Language

A powerful query language that is still used today to access, store and manipulate database

Learning SQL interactively

Create a webapp that will enrich SQL learning experience

Exposure of basic Data Extraction from database

The learning experience include navigation through a relational database

PROBLEM STATEMENT

SQL is easy, but beginners fail when using complex queries

While learning basic SQL is easy, understanding the correlation of each queries and syntax is challenging

Learning SQL is boring

Learning SQL can be intimidating and boring for anyone who want to learn it

Big Database are intimidating

Where to start? What queries should I use? This can be daunting when most company rely on database to store data

OBJECTIVE

1. To develop an interactive learning webapp that introduce SQL queries usage.
2. To add a sequential difficulty step of learning SQL from basic to complex queries structure.
3. To apply learnt SQL queries to improve user ability to identify and extracting data
4. To enforce understanding of quality of data extracted from relational database by data exploration and understand the relevancy between data.

LITERATURE

REVIEW

COMPARISON OF EXISTING SYSTEM

SQL Murder Mystery

Developed by Joon Park and Cathy He, published by Knight Lab

- Narrative driven puzzle
- Soft introduction to SQL

SQLZoo

Developed and maintained by Andrew Cummings

- Beginner's level SQL
- Gives user introduction to SQL and practice Data Science Analysis
- Quizzes for user to solve

SQL Police Department

Published by Wrapped Castle Limited

- Similar narrative puzzle to SQL Murder Mystery
- Varying randomize cases to solve
- Copyrighted usage, and paywall
- Beginner's level SQL

PROPOSED SOLUTION

Add 3 layer of scenario that has varied difficulty

Beginner’s Level
(Tutorials)

Intermediate’s Level (scenario required user to aggregate SQL)

Advanced’s Level
(Narrative driven puzzle)

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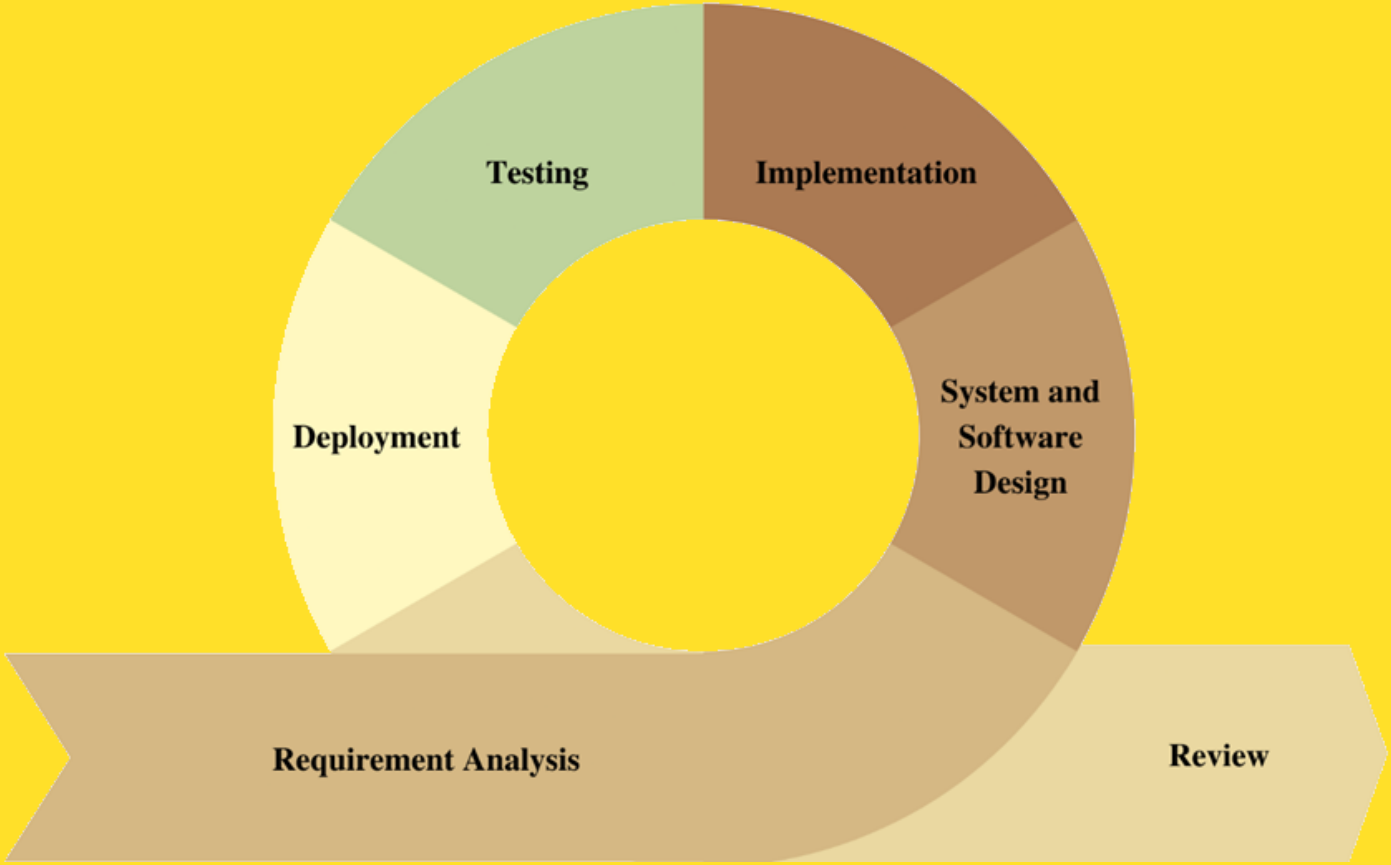
Improve teaching method

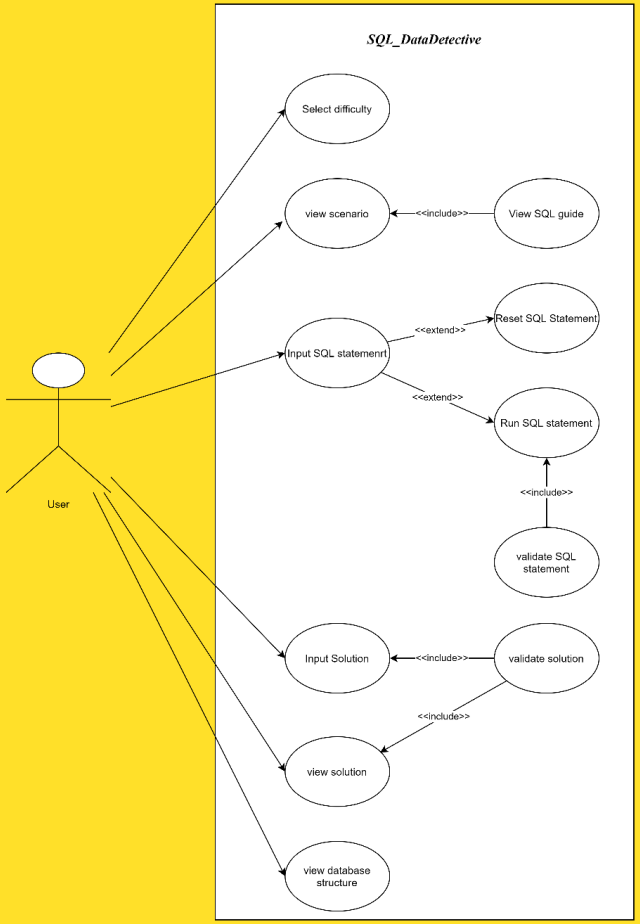
Add more flexibility and depth for narrative

METHODOLOGY

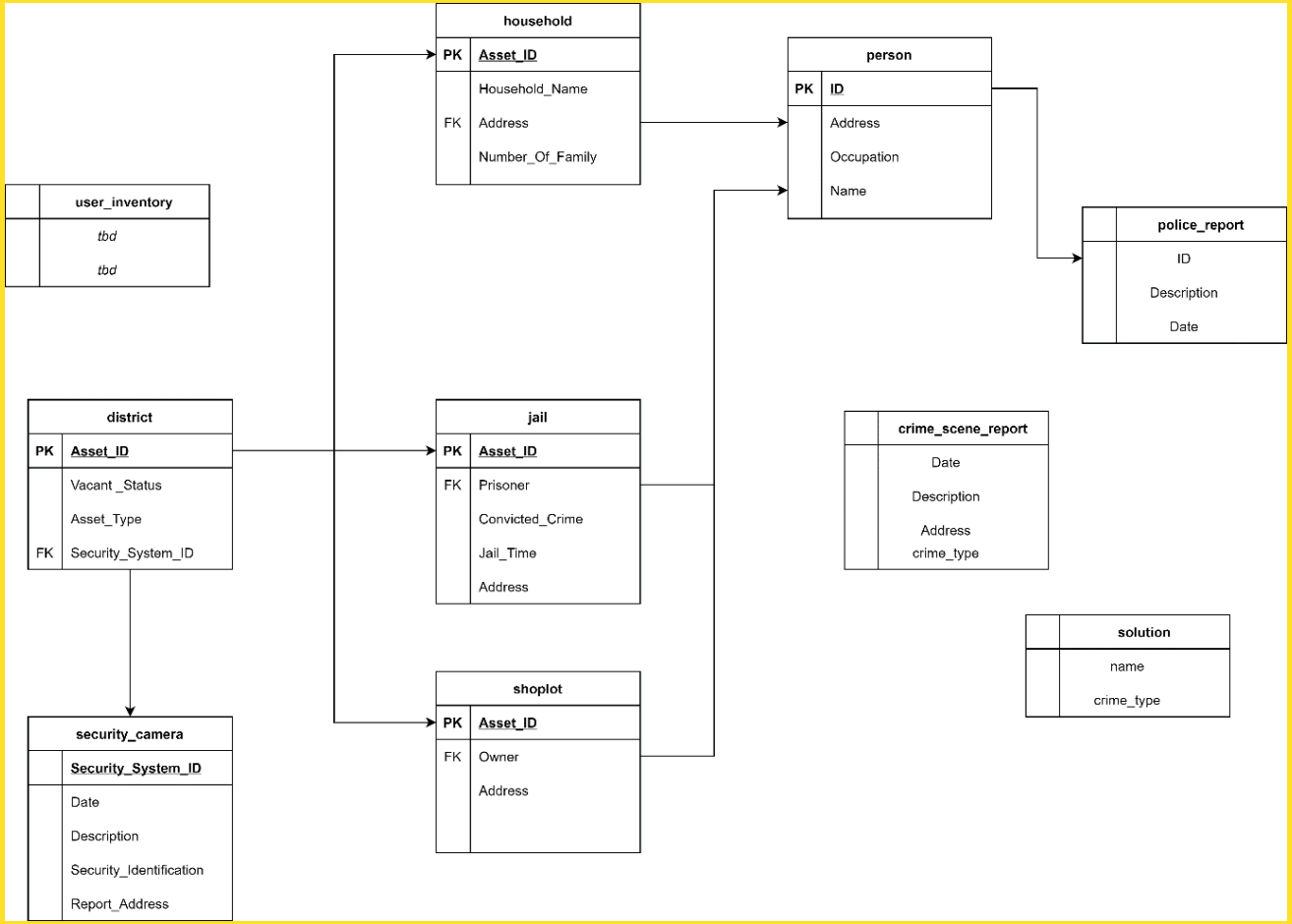
METHODOLOGY



METHODOLOGY: USE CASE DIAGRAM

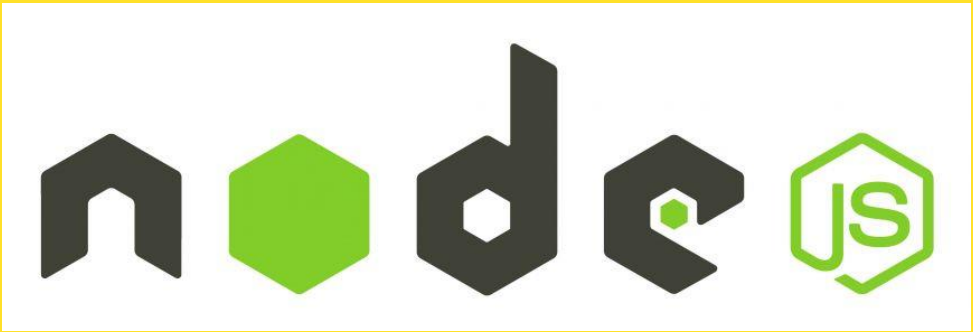


METHODOLOGY : ERD



IMPLEMENTATION

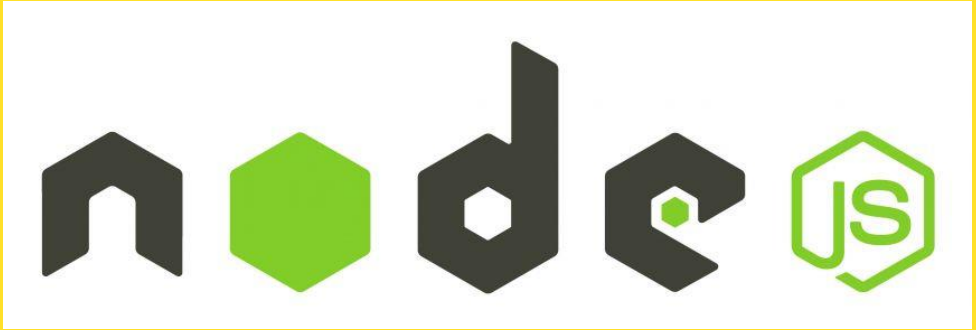
Tool Used:



Sublime text
3 Editor

IMPLEMENTATION

Important Framework Used



open-source JavaScript tool

+

web application framework to support node.js web building

TESTING

Testing Functionalities

No.	Functionalities	Pass Rate	
		Pass/Fail	Total Test Cases
1	Selecting difficulty level	3	/3
2	tutorial	2	/2
3	Test Story selection	2	/2
4	Test SQL execution	1	/1
5	Select SQL statements	1	/1
6	Select Table Name	1	/1
7	Submit Answer	2	/2

TESTING

Additional Tool for Testing

Selenium, open-source testing tool used to test web applications
- used to test certain functionalities

```
C:\FYP>npm install selenium-webdriver

added 14 packages, and audited 179 packages in 3s

12 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
npm notice
npm notice New major version of npm available! 9.8.1 -> 10.2.5
npm notice Changelog: https://github.com/npm/cli/releases/tag/v10.2.5
npm notice Run npm install -g npm@10.2.5 to update!
npm notice
```

Setting up selenium-webdriver into SQL_DataDetective back ups version

CONCLUSION

FUTURE WORKS

ACHIEVEMENT

Objectives	Achievements
To develop a web application with an interactive interface for introducing SQL queries	The objective was achieved by building a web app that focus on introducing SQL to user, as well as mastering it by solving narrative driven puzzle
To design a learning curriculum that starts from basic and gradually increase in complexity of learning SQ	The objective is achieved by designing 3 different difficulty level, beginner, intermediate and advanced SQL challenges that user can choose to face
To evaluate users' ability to identify and extract data by testing their proficiency in applying the SQL learned	User's ability is tested on their ability to write SQL and execute it properly based on their learning on beginner's level SQL
To assess the users' understanding of data quality by measuring their ability to identify relevant data relationships within a relational database through a series of data analysis simulations	The objective is achieved by causing the information they extracted from the database to be important in their problem-solving session, which is prominent feature that drives Advance's level SQL

LIMITATION

I. The database used for SQL_DataDetective is static, hence the replay ability is limited once user understand the full relation of the database.

II. The interface lacks appeal in graphics and animation that can push the potential more for narrative driven puzzle.

III. Throughout the playthrough, user progress is not saved, hence reset or restarting the web app page will reset users progress along the narrative.

IV. Usage of SQL commands is limited for safety reasons, such as DELETE, TRUNCATE and DROP commands are inaccessible on user-end to protect the database.

FUTURE WORKS

I. Adding more narrative to increase replay ability.
II. Adding a save by adding checkpoints for progression in the narrative.
III. With addition of checkpoints, addition of slides for graphics to dictate the narrative is possible.
IV. Take advantage of JavaScript ability to improve the puzzle and narrative experience.
V. Improve user interface to make aesthetically pleasing and have more prominent theme.

CONCLUSION

SQL_DataDetective successfully achieved its learning objectives by building a web app with interactive puzzles and a multi-level curriculum. However, limitations like static database, unappealing visuals, and unsaved progress restrict its replay ability and user experience. Future works aim to address these by adding more narrative, save features, graphical storytelling, and enhanced UI/UX elements. This will improve user engagement and learning through a more immersive and visually appealing experience.

THANK

YOU