2. Requirements, Constraints, And Standards

As part of a completed project that meets client needs, it's crucial that we fulfill requirements while sticking to our constraints and meeting engineering standards.

2.1 Requirements & Constraints

We must meet various requirements for our project to be successful. These requirements follow the categories of functional, resource, physical, aesthetic, user experiential, economic, and UI requirements.

2.1.1 Functional Requirements

- The tool must correctly convert CSV files into a PostgreSQL database
- OpenAI integration for correctly converting natural language into SQL queries
- Previous Requests will be easily retrievable during that user session

2.1.2 Resource Requirements

- Node.js
  - OpenAI Node library
- React
- PostgreSQL
- Sufficiently powerful computer to run the tool; specifics depend on the desired response time.

2.1.3 Physical Requirements

- Developer computers capable of housing a portion of the dataset and running the user interface
- User computers capable of maintaining a large database and running the user interface

2.1.4 Aesthetic Requirements

- User interface that is easy to navigate

2.1.5 User Experiential Requirements

- Ability to query a database without technical knowledge of querying language

2.1.6 Economic Requirements

- OpenAI API input tokens[1]

[1]The use of OpenAI API input tokens is optional and requires a subscription for access.

2.1.7 UI Requirements

- Visual panel for viewing query resolutions
- Button to download query resolutions as CSV files
- Menu for switching between natural language queries, predefined SQL queries, and user-defined SQL query
- Box for entering queries

2.1.8 Privacy and Security Requirements

- These are not the main functions of the program. However, the program will meet a minimum requirement of ensuring data integrity so that there is no malformation of the database

2.2 Engineering Standards

Our project aims to adhere to several engineering standards to ensure a quality product.

2.2.1 ISO/IEC/IEEE 12207:2017 Systems and software engineering - Software life cycle management

- This standard specifically outlines the definitions and requirements dictated by the software lifecycle. The definition of the individual aspects of our software and how they are handled throughout the development and maintenance cycle.
- Our project must specifically adhere to this standard as we develop our software. A taut structure when developing the software will help ensure that the final deliverable is a product that is fully functional and exceeds the expectations of its user base.

2.2.2 ISO/IEC/IEEE 24748-3:2020 Systems and software engineering - Life cycle management

- This standard specifically outlines a framework and establishes a guideline for implementing standard 12207:2017 for the software life cycle process. This standard provides methods to ensure consistency throughout the development process and acts as a technical guidance tool for implementing standard 12207:2017
- Our project will implement this standard because it goes hand in hand and provides guidance and assistance in implementing 12207:2017.

2.2.3 ISO/IEC/IEEE 29148:2018 Systems and software engineering - Life cycle processes - Requirements engineering

- This standard outlines the required engineering provisions for the process and products throughout the software development life cycle, Defining how to create good requirements and pinpointing the tools required for proper iterative and recursive development. This standard is, in part, a guideline for 12207:2017.
- Our project will implement this standard because it goes hand in hand and provides guidance and assistance in implementing 12207:2017.

2.2.4 ISO/IEC 9075-1:2023 Information technology - Database languages SQL

- This standard outlines the minimum requirements for what a database engine should fulfill to ensure proper SQL syntax for interpreting SQL queries.
- Our project implements this standard as the main function of our project is creating an application that will query an SQL database.

2.2.5 IEEE Code of Ethics (2020)

- This code outlines the professional responsibilities of engineers and technology professionals. It defines the ethical obligations of individuals in ensuring safety, integrity, and fairness in their work, as well as fostering trust and transparency within the broader community.
- Our project will adhere to the IEEE Code of Ethics to ensure that we operate with the highest ethical standards, safeguarding public welfare and maintaining honesty in all claims and technical practices. This adherence will guide our team in managing conflicts of interest, making responsible decisions, and ensuring that the technology we develop prioritizes the health, safety, and welfare of the public.