**Assignment 1: Web Application Mimicking Google Sheets**

**Objective**

Develop a web application that closely mimics the user interface and core functionalities of Google Sheets, focusing on mathematical and data quality functions, data entry, and key UI interactions.

**Features and Implementation**

**1. Spreadsheet Interface**

• **Mimic Google Sheets UI**: Implement a UI with a toolbar, formula bar, and a grid layout for cells.

• **Drag Functions**: Enable dragging of cell content, formulas, and selections.

• **Cell Dependencies**: Ensure that formulas update dynamically when related cells change.

• **Basic Cell Formatting**: Allow bold, italics, font size, and color adjustments.

• **Row and Column Management**: Implement adding, deleting, and resizing rows and columns.

**2. Mathematical Functions**

The following functions will be implemented:

1. **SUM(range)** - Calculates the sum of a range of cells.

2. **AVERAGE(range)** - Computes the average of values in a range.

3. **MAX(range)** - Returns the maximum value in a range.

4. **MIN(range)** - Returns the minimum value in a range.

5. **COUNT(range)** - Counts numerical values in a range.

**3. Data Quality Functions**

1. **TRIM(cell)** - Removes leading and trailing spaces from a cell.

2. **UPPER(cell)** - Converts text to uppercase.

3. **LOWER(cell)** - Converts text to lowercase.

4. **REMOVE\_DUPLICATES(range)** - Removes duplicate rows from a selected range.

5. **FIND\_AND\_REPLACE(range, findText, replaceText)** - Finds and replaces text within a range.

**4. Data Entry and Validation**

• Support for different data types (numbers, text, dates).

• Basic validation for numeric cells to ensure only numbers are entered.

**5. Testing**

• Provide an interactive UI for users to test functions.

• Display results of function execution clearly.

**Bonus Features**

• Additional mathematical and data quality functions.

• Support for complex formulas and absolute/relative cell referencing.

• Save and load spreadsheet functionality.

• Data visualization with charts and graphs.

**Evaluation Criteria**

• **Fidelity to Google Sheets UI**: Accuracy of interface and user experience.

• **Feature Completeness**: Full implementation of required functionalities.

• **Mathematical and Data Quality Accuracy**: Correctness of functions.

• **Usability**: User-friendly and intuitive interactions.

• **Code Quality**: Readability, maintainability, and modular design.

• **Bonus Features**: Implementation of advanced features.

• **Documentation**: A clear README explaining the tech stack and data structures used.

**Tech Stack**

**Frontend**

• **HTML/CSS**: For UI design and styling.

• **JavaScript (React/Angular/Vue)**: For dynamic UI interactions and state management.

**Conclusion**

This web application aims to closely resemble Google Sheets while implementing core spreadsheet functionalities with an efficient UI. Future improvements could include collaboration features and advanced data visualization tools.