Final Application Specs - Group 5 Hamilton (CSE 498)

Overview

We will implement the suggested application: a CSV manipulation tool inspired by the pandas library. The program can load a CSV file or create a new grid for users to manipulate data. For example, the users can insert or remove rows or columns, merge data grids, sort the data, and write short equations to create new columns. Additionally, they can calculate the mean, median, mode, standard deviation, min, and max of a column or data grid. Users can also retrieve values from a column based on comparisons. Finally, the user can export the data grid to a CSV file.

Interface

The terminal will be used to interface with the program. The following prompts will be available:

- csv
    - i: Import a CSV file
        - Please type the file name you want to import
    - e: Export to a CSV file
        - Please type the name of the file you want to export to
    - b: Go back
- remove
    - rc: Remove a column
        - Please type the column index
    - rr: Remove a row
        - Please type the row index
    - b: Go back
- insert
    - dg: Create a default DataGrid
        - Please type column length
        - Please type row length
    - adc: Insert a default column
        - Please type the column index
        - Please type the default value
    - adr: Insert a default row
        - Please type the row index
        - Please type the default value
    - ac: **Insert a custom column**
        - Please type the column index
        - Please type the custom equation (using column indices)

                - **__**SPEC NOTE****__: Probably need more instructions for this option. It's the most complicated option.
        - ar: **Insert a custom row**
            - Please type the row index
            - Please type the custom equation (using row indices)
                - **__**SPEC NOTE****__: Probably need more instructions for this option. It's the most complicated option.
        - b: Go back
- sort
    - s: Sort the data grid
    - sc: Sort a column
        - Please type the column index
- extra
    - s: Get the shape of the data grid
    - m: Merge data grids
    - b: Go back
- mathematics
    - cmean: Calculate the mean of a column
        - Please type the column index
    - cmed: Calculate the median of a column
        - Please type the column index
    - cmode: Calculate the mode of a column
        - Please type the column index
    - csd: Calculate the standard deviation of a column
        - Please type the column index
    - cmin: Calculate the min of a column
        - Please type the column index
    - cmax: Calculate the max of a column
        - Please type the column index
    - sum: Calculate the mean, median, mode, standard deviation, min, and max of the data grid
    - b: Go back
- comparisons
    - clt: Find values less than a given value for a column
        - Please type the value to compare
        - Please type the column index
    - clte: Find values less than or equal to a given value for a column
        - Please type the value to compare
        - Please type the column index
    - cgt: Find values greater than a given value for a column

        - Please type the value to compare
        - Please type the column index
    - cgte: Find values greater than or equal to a given value for a column
        - Please type the value to compare
        - Please type the column index
    - ce: Find values equal to a value for a column
        - Please type the value to compare
        - Please type the column index
    - cne: Find values not equal to a given value for a column
        - Please type the value to compare
        - Please type the column index
    - b: Go back

- print
    - pv: Print a value from the data grid
        - Please type the column index
        - Please type the row index
    - pc: Print a column from the data grid
        - Please type the column index
    - pr: Print a row from the data grid
        - Please type the row index
    - s: Print a slice of the data grid
        - Please type the starting row index
        - Please type the ending row index
        - Please type the starting column index
        - Please type the ending column index
    - p: To print the data grid
    - b: Go back
- quit
    - q: To quit the program
    - b: Go back

Interface - Example

To clarify how these prompts work, the user will first be given a high-level selection menu:

Please type one of the following:

- csv
- remove

- insert
- sort
- extra
- mathematics
- comparisons
- print
- quit

Once the user selects an option, they will receive a more specific menu. For example, if they choose **csv**.

Please type one of the following:
- i: To import a CSV file
- e: To export to a CSV file
- b: Go back

Finally, after selecting an option, the user will be prompted for final inputs. If they choose **i**:

Answer the following:
- Please type the file name you want to import

Then, go back to the high-level selection menu.

Extra

Our application will use all of our classes. To store the data, we will use our DataGrid class, which stores data in a grid format. The Datum class will handle the data inside the DataGrid class, which stores strings and doubles. The ReferenceVector class is used to easily update the column values in the DataGrid class. Also, to allow users to create short equations for creating new columns, we will use our ExpressionParser class. Finally, we will use our CSVFile class to import and export the CSV files.