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Course and Section: CMSC 150 (WX-2L)

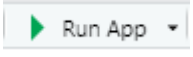
# Exercise 10: Integration

## (User Guide on how to run the program)

## Quick Background:

- The window application is created using R Shiny.
- It consists of several R files, namely:
  - ui.R
  - server.R
  - LatigayEx08.R (Program for QSI)
  - LatigayEx09.R (Program for QSI)
    - All of the aforementioned R files are linked with one another via *source("server.R")*
- The program utilizes the R packages:
  - shiny
  - shinyMatrix
  - shinyThemes
    - If these packages are not yet installed in your RStudio, a prompt will appear inquiring if you would like to install these packages. Please do so.
    - If the prompt did not appear in your RStudio when you open the aforementioned files, just utilize ***install.packages("<name of the package>").***
      - e.g. install.packages("shinyMatrix")
- The theme of the program is "darkly". It is a built-in theme from the package "shinythemes".

## Before running the program:

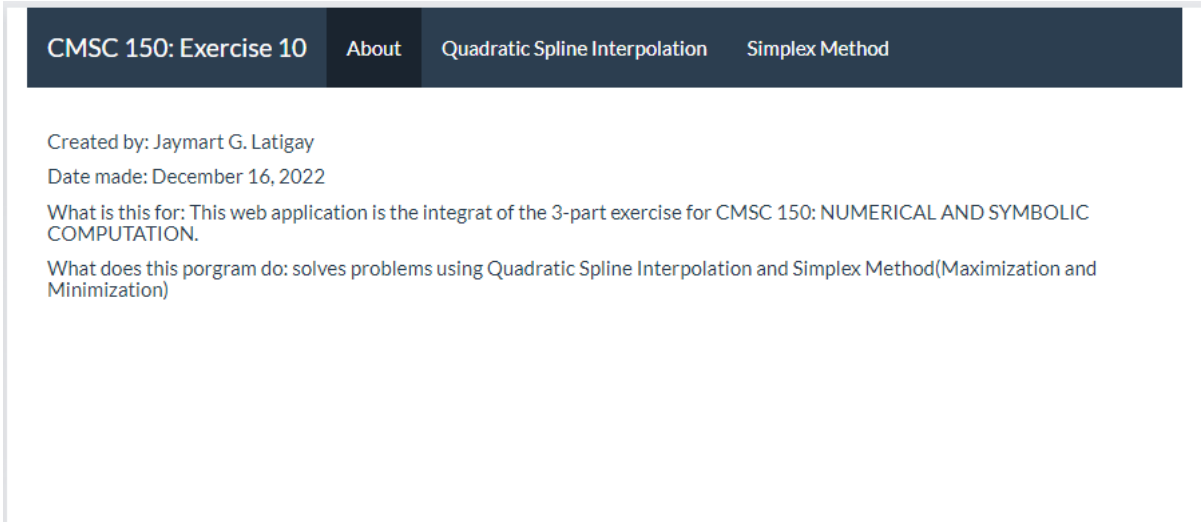
- Make sure that all of the files or at least ui.R are opened in your Rstudio as they are necessary for the application to run.
- When ***ui.R*** is opened and you are on its tab, you will see this icon: 

on the rightmost corner of the text editor. Click on it.
- Upon doing so, you will now be introduced to the User Interface of the window application!

## Parts of Window Application:

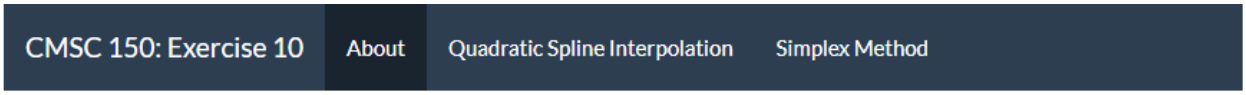
### a. About page and the navigation bar

- Initially, when you run the program, you will see the contents of the "About" tab panel :



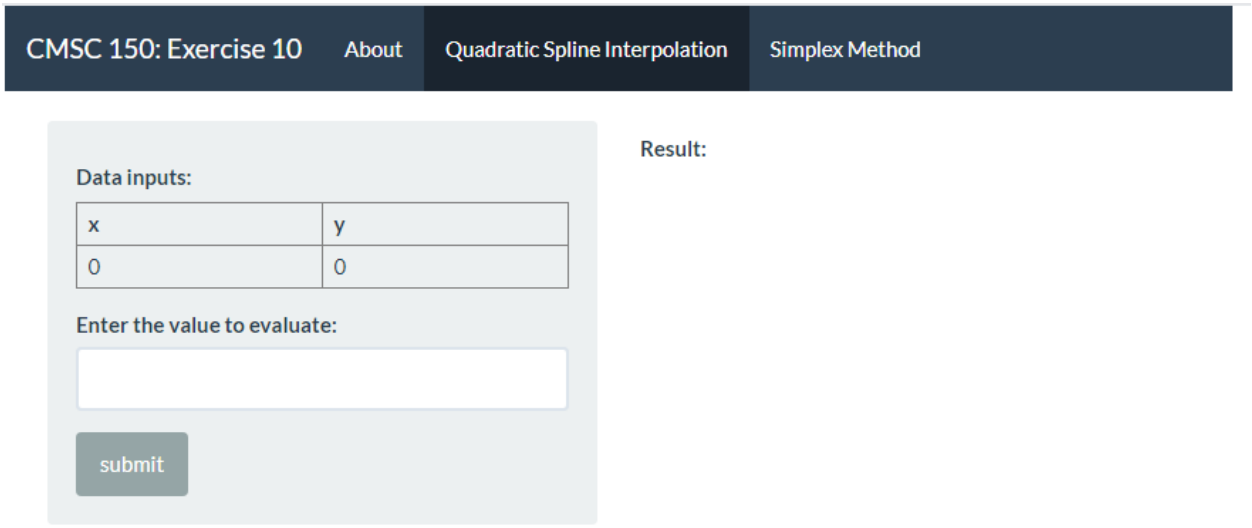

  - The "About" tab panel contains the name of the person who made the web application, the date it was made, what it is for, and the gist of what the program does.

- Above the tab panel, you'll see a navigation bar. This will serve as your portal to other tab panels specified by their respective names.
- "CMSC 150: Exercise 10" is the name of the navigation bar, and the equally separated words represent the tab panels.
  - If a tab in the navigation bar is highlighted, it means that you are currently on that tab's tab panel.
    - In the image, the tab "About" is highlighted, which means that you are on its tab panel.
- To navigate the window application, just click on the tab you want to use or access.

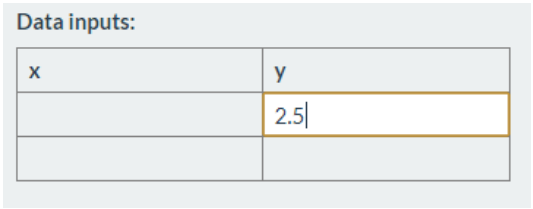


## b. Quadratic Spline Interpolation

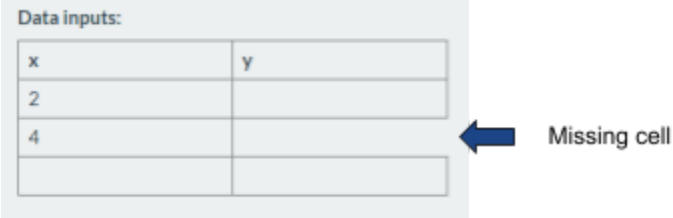
- This is what you'll see when you first click the tab "Quadratic Spline Interpolation"




- **Parts of the page:**
  - Sidebar panel:
    - **<u>Matrix</u>**
      - The matrix shown is an editable matrix that accepts numeric values.
      - Once you input values within the last row cells of the current matrix, the <u>matrix will extend by one row, allowing you to be able to input more values.</u>



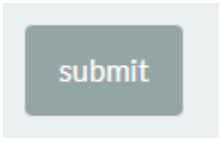

      - However, <u>due to a bug with the package library("shinyMatrix"), when you input values first to column x for two consecutive times or the x column has more values than the y column, the next cell for x value will "vanish" and will be uneditable.</u>
        - To know more: *https://stackoverflow.com/questions/67599203/how-to-save-updated-shiny-matrix-input-values-into-a-data-frame-or-working-memo*



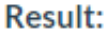

- To avoid this bug, **I suggest filling up the y column first with all its values before inputting to the cells of the x column**.

- **<u>Value to evaluate on dataPoints</u>**
  - Basically, <u>you just have to enter the numeral or number</u> you want to be evaluated via QSI using the x and y data points.
  - 

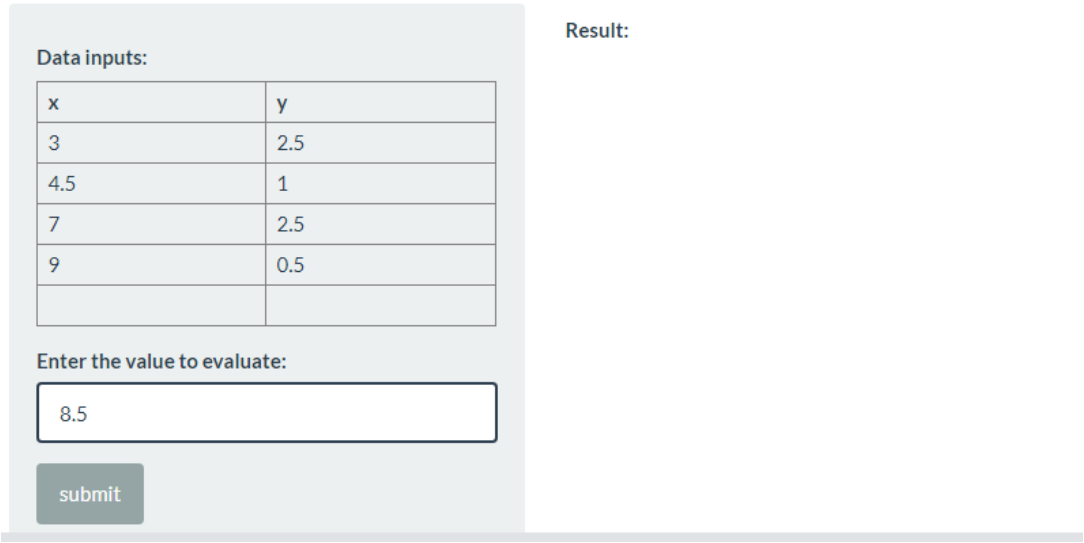

- **<u>Submit button</u>**
  - When you have entered all the values you need to be in the data inputs and value to be evaluated, click submit.



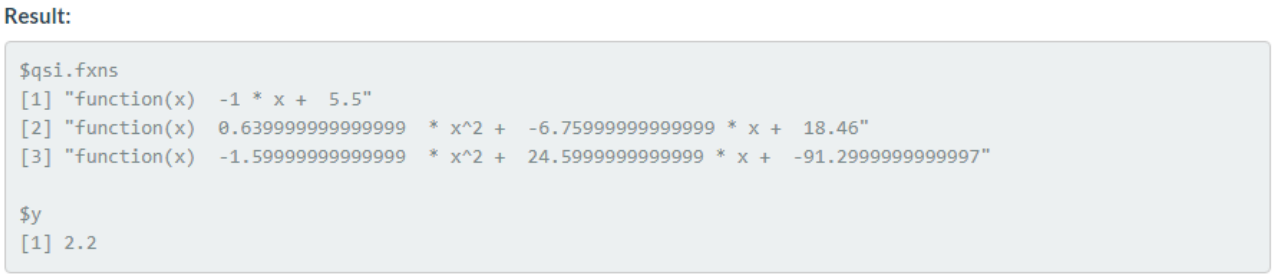

- **Main Panel: Result**
  - When you are done inputting the necessary values, after clicking submit, the results will be displayed in the main panel, next to the sidebar panel.
  - Initially, it is blank.



**Example Run (QSI) :**



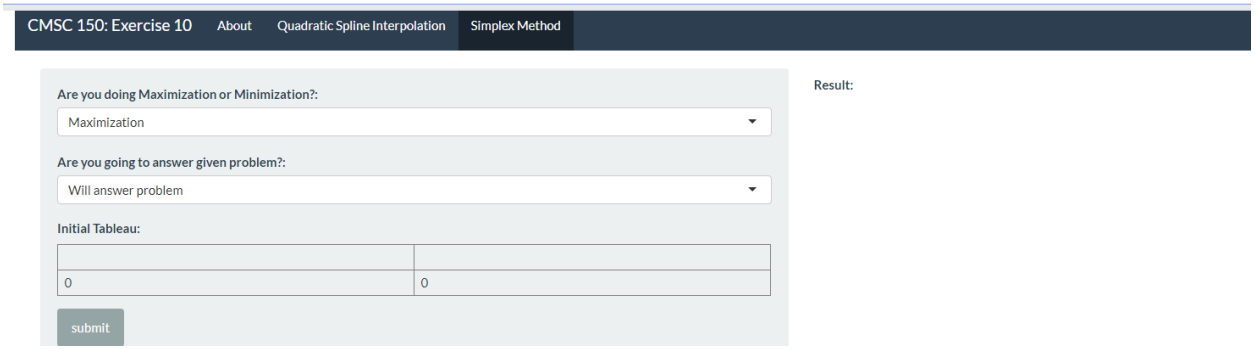

*(Image 1: Inputting values QSI)*



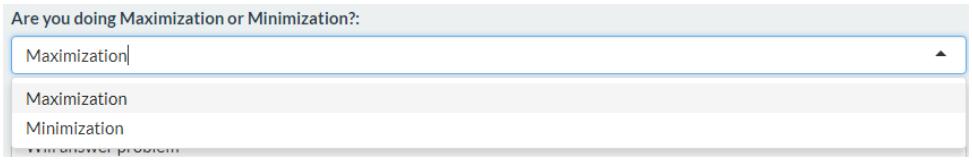

*(Image 2: Output of the inputted values after clicking the submit button in QSI)*

## c. Simplex Method

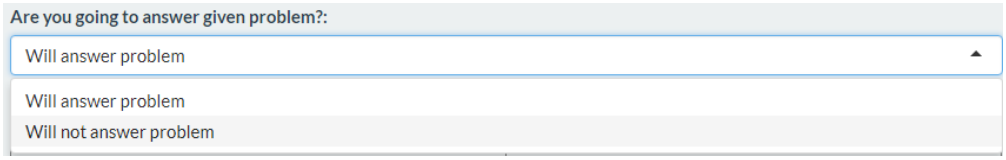
- This is what you'll initially see when you click the tab:



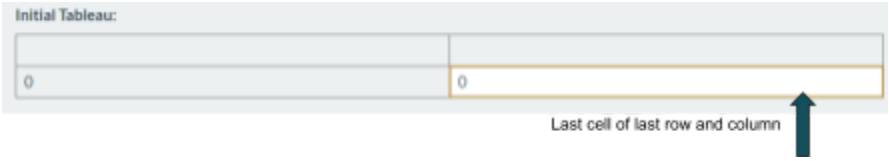

- **Parts of the page:**
  - Sidebar panel:
    - **Drop down button for choosing between "Maximization" and "Minimization".**
      - When clicked, it will show you an option between maximization and minimization.




    - **Drop down button for indicating whether you will be answering the given problem on exercise 9.**
      - When clicked, it will show you an option between doing or not doing the given problem in exercise 9.




    - **Initial Tableau**
      - Initially, it only has two rows and columns.
      - In order to extend the matrix by row, column or both, you must do this:
        - **By column**: input values to any cells in the current last column
        - **By row**: input values to any cells in the current last row
        - **Both**: input value to the rightmost cell of the last row, at the same time, is also the last cell of the last column of the current matrix.

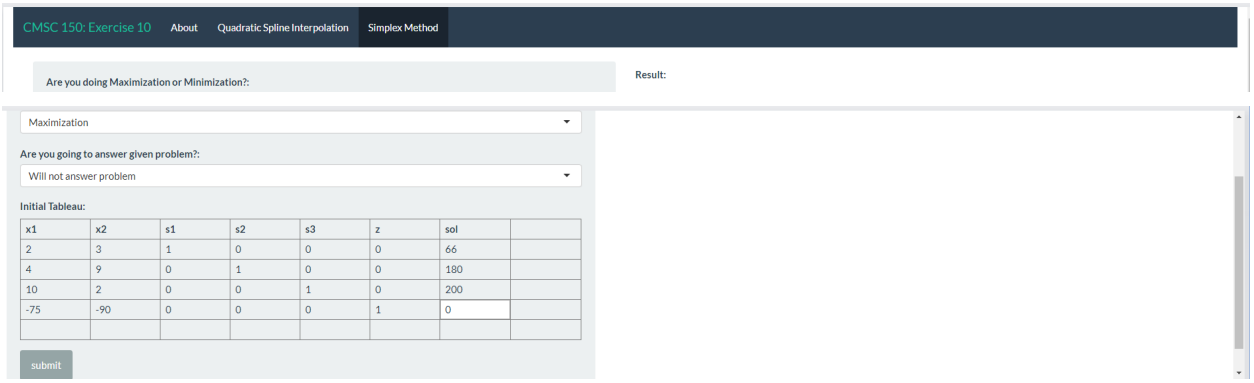



        -

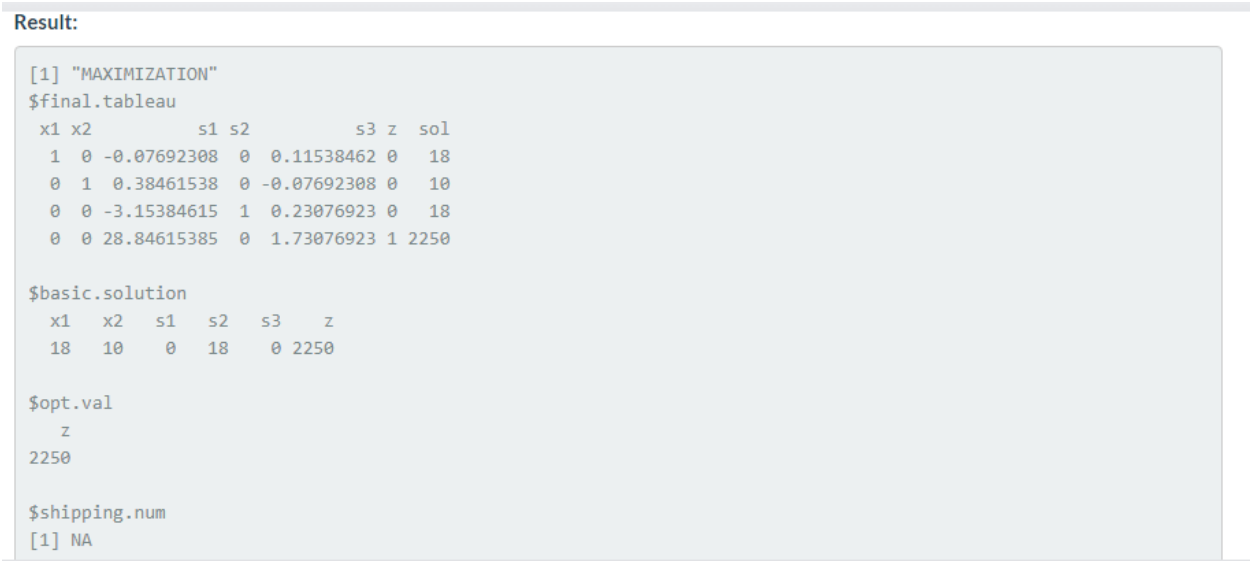
- In addition, you can input column names to each of the columns in the matrix.

- Main Panel
  - **Result**
    - When you are done inputting the necessary values, after clicking submit, the results will be displayed in the main panel, next to the sidebar panel.
    - Initially, it is blank.

## Example Run (Simplex Method - Maximization):




*(Image 3: Inputting values in Simplex Method)*




(Image 3: *: Output of the inputted values after clicking the submit button in QSI)*

## To Note

- Changing values and decreasing size of matrix:
    - If you want to **change any value** from the matrix or text input box, just change the value you want to replace  and click submit again to update the values.
    - If you want to **reduce the size** of the matrix, from an already filled matrix, just remove all the values in the row and the matrix will decrease in size by row.

- Retaining result and values:
    - **Inputted values and results**, if there is one, **will be retained** by the program **despite changing tabs**. Values and results will only be inaccessible if the web application is terminated.