Name:	TANDANG, Bernard Jezua R.

Date:	December 19, 2023

Section:	CMSC 150 - BIL

CMSC 150 Lab Project Manual

Imported Files:

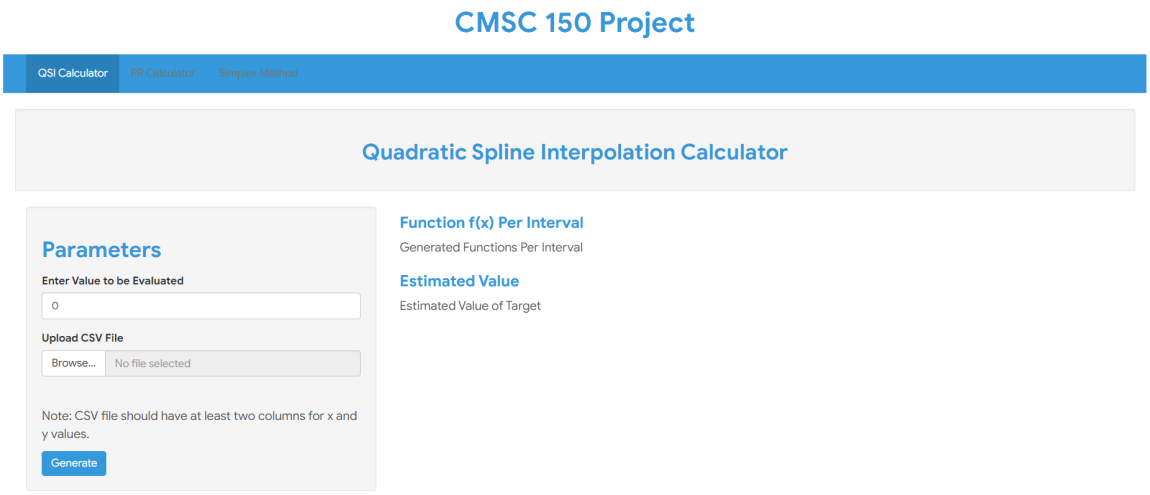
- GaussianElimination.R
- QuadraticSpline.R
- PolynomialReg.R
- FoodItem.csv

R Libraries Used:

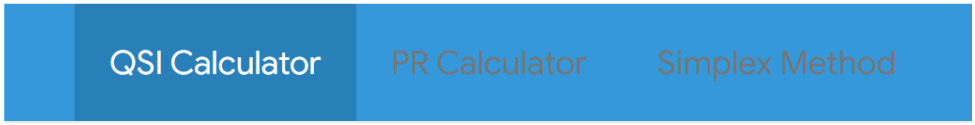
- readr
- R Shiny
- R Shiny JS
- R Shiny Matrix
- R Shiny Themes

User Interface

The opening screen UI can be shown in the figure below when the file "*ui.R*" is run.



The UI mainly involves three tab panels, namely, **QSI Calculator**, **PR Calculator**, and **Simplex Method**. These panels, when clicked, show different types of solvers needed for a problem.

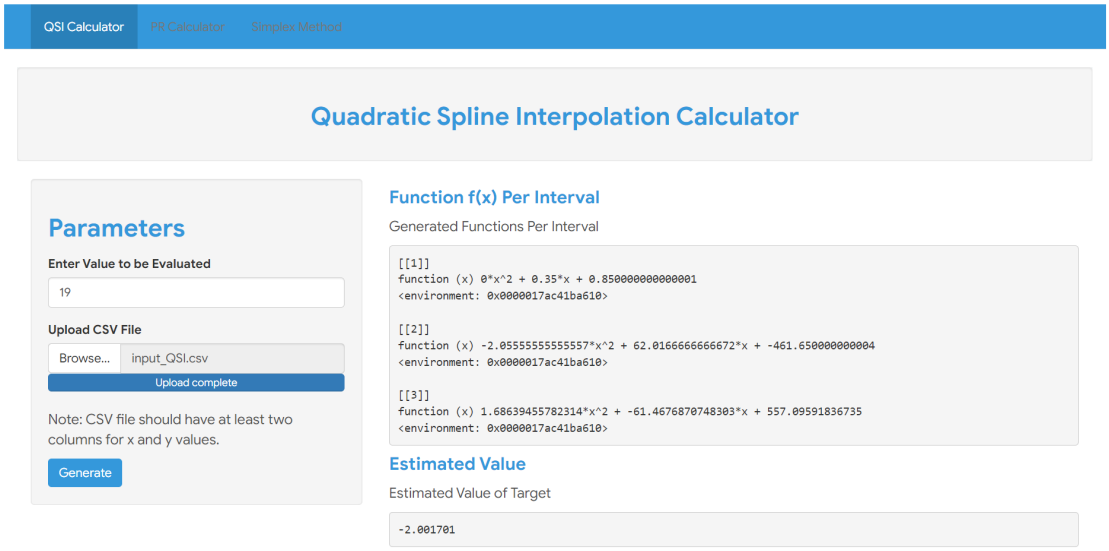


Each panel consists of a side panel which asks the users for certain parameters, and a main panel which shows the outputs (Function f(x) Per Interval, Polynomial Function, and Estimated Value).

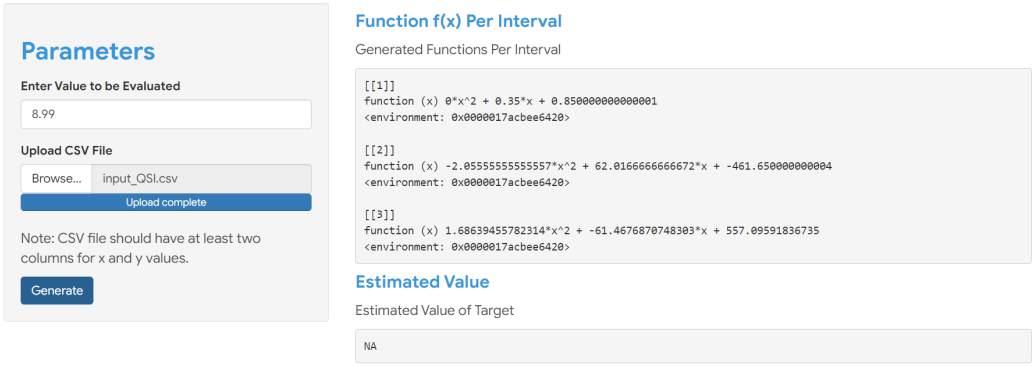
Quadratic Spline Interpolation Calculator

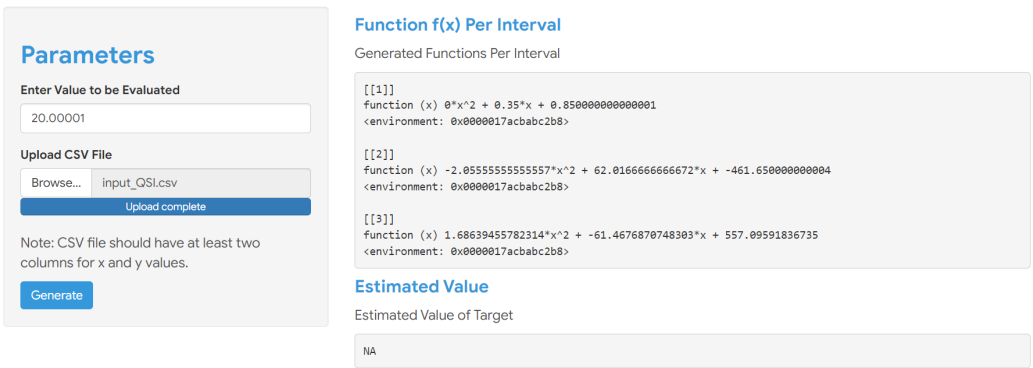
To perform the Quadratic Spline Interpolation, you need to upload the **CSV file** which contains the numeric X and Y values that you want to solve and enter the corresponding **value to be evaluated**.

After the parameters are filled, clicking the **Generate** button will perform the calculations and show the outputs: **Function f(x) Per Interval** and **Estimated Value**. A test case is shown in the figure below.



If the value to be evaluated is not within the range of the X values, then the Estimated Value will print as **NA.** But the f(x) per interval result will still show.

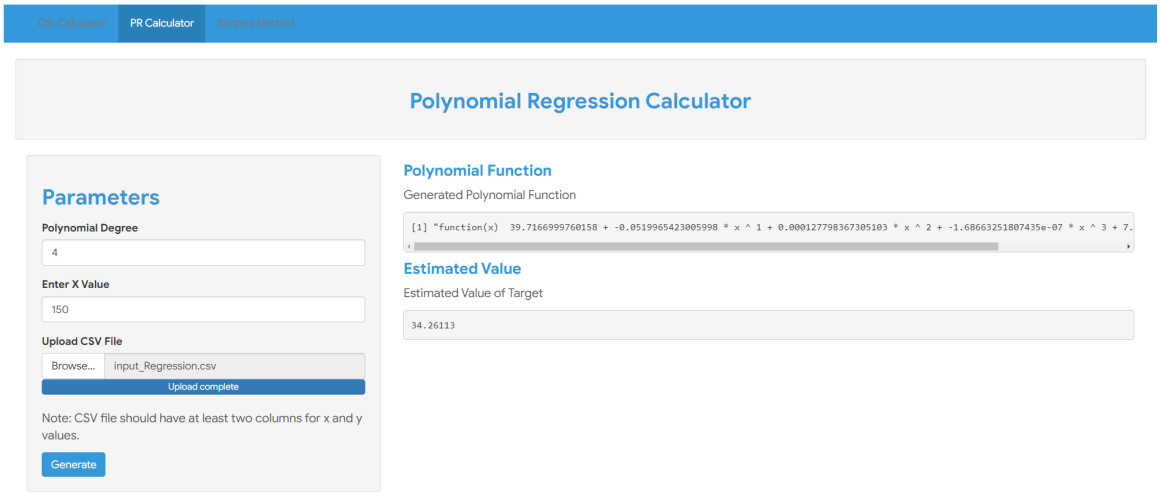




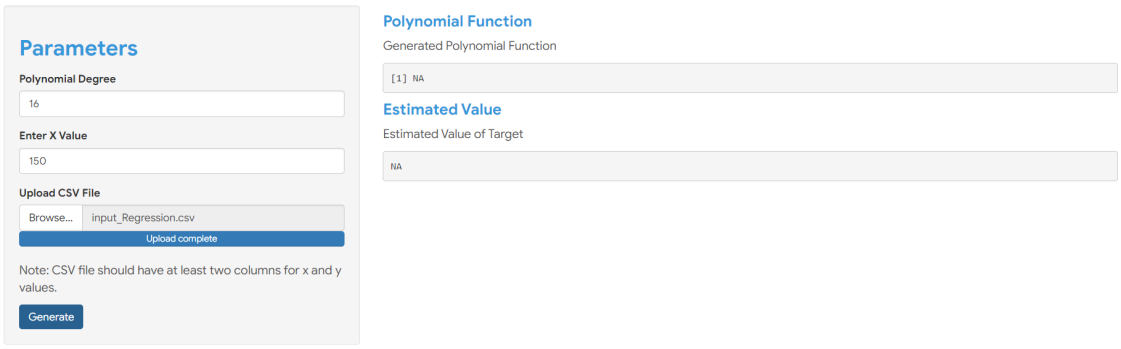
Polynomial Regression Calculator

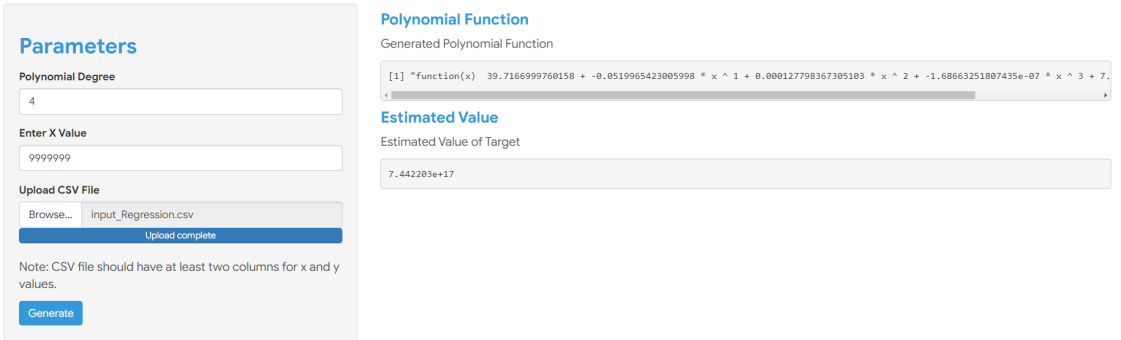
To perform Polynomial Regression, you need to upload the CSV file which contains the numeric X and Y values that you want to solve. Enter the **polynomial degree** and the **value of X** that will be used to substitute the polynomial function and show the estimated value.

After the parameters are filled, clicking the **Generate** button will perform the calculations and show the outputs: **Polynomial Function** and **Estimated Value**. A test case is shown in the figure below.



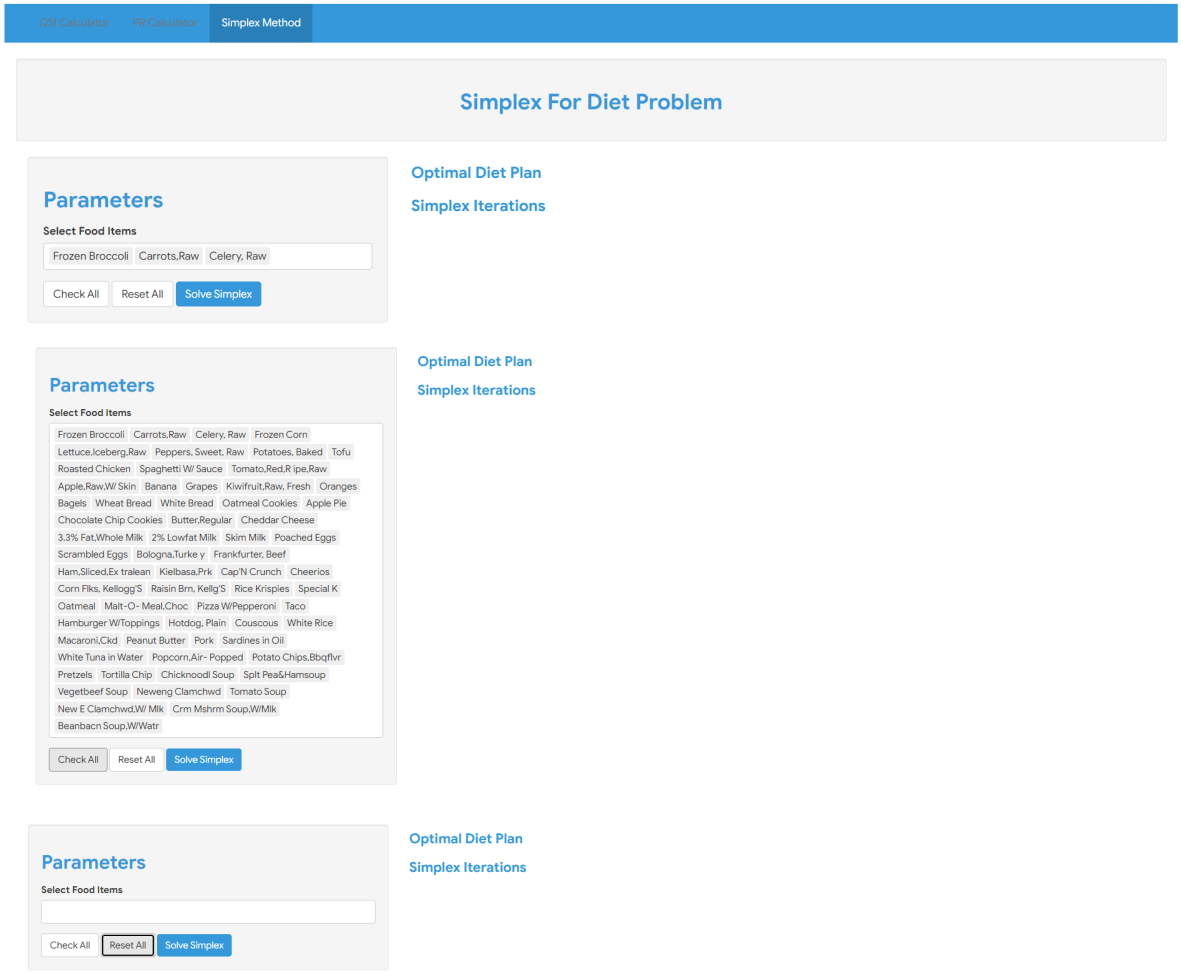
The polynomial degree must be *greater than zero* and not more than the *number of data points - 1*. Otherwise, the polynomial function and/or estimated value will return as NULL values. As for the X value, it can be *any* from *-Inf to +Inf*.





Simplex Method for Diet Problem

To perform the Simplex Method (Minimization), the user must select any food item present in the selection. The user has an option to **check all** items, **reset** them, or continue to **solve**.



Unfortunately, this specification is unfinished due to time constraints and personal reasons. This concludes the manual for my CMSC 150 project. Thank you!