

User's Guide on how to use Aranton_Ex10.R

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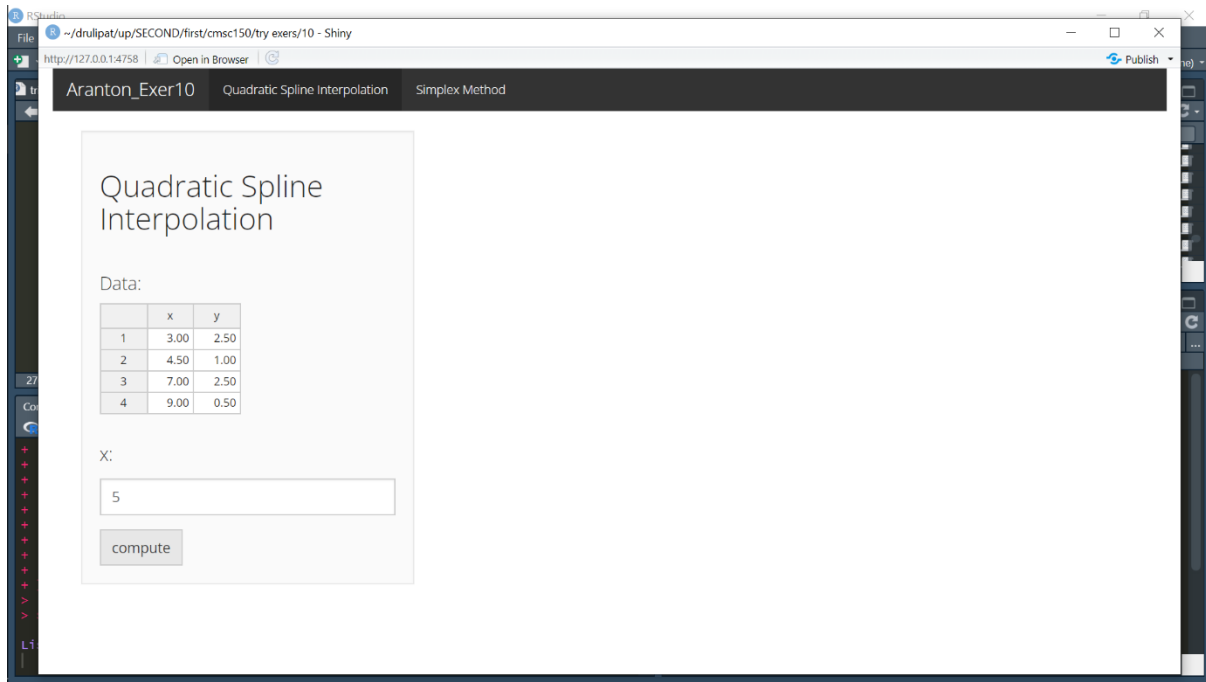
Some notes

- 1) Aside from shiny, the following libraries are needed to make the program functional:
 - shinythemes
 - rhandsontable
 - shinyalert
- 2) I don't claim that the results from this program are 100% accurate, but it seems to be working fine using my test cases.
- 3) As I didn't have much time making this, I'm not sure if there would be cases where the program will crash. If it crashes, then please re-launch the program and make sure that the inputs were correct.
- 4) Thank you!

Quadratic Spline Interpolation Solver

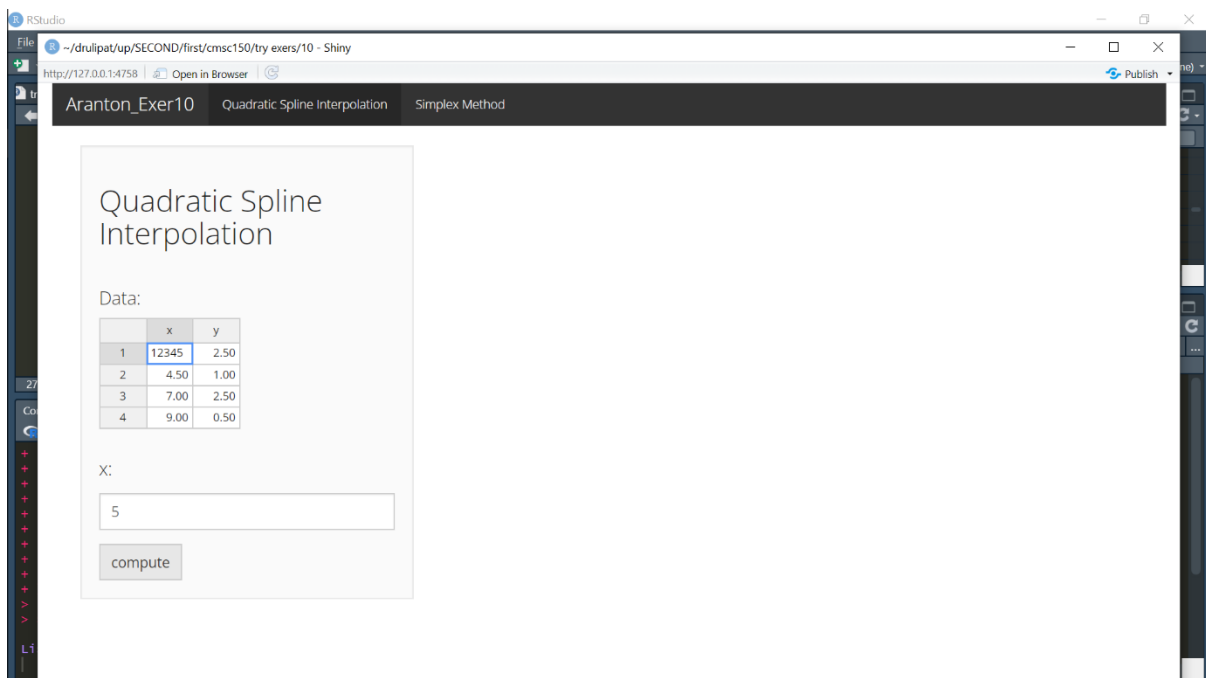
Intro

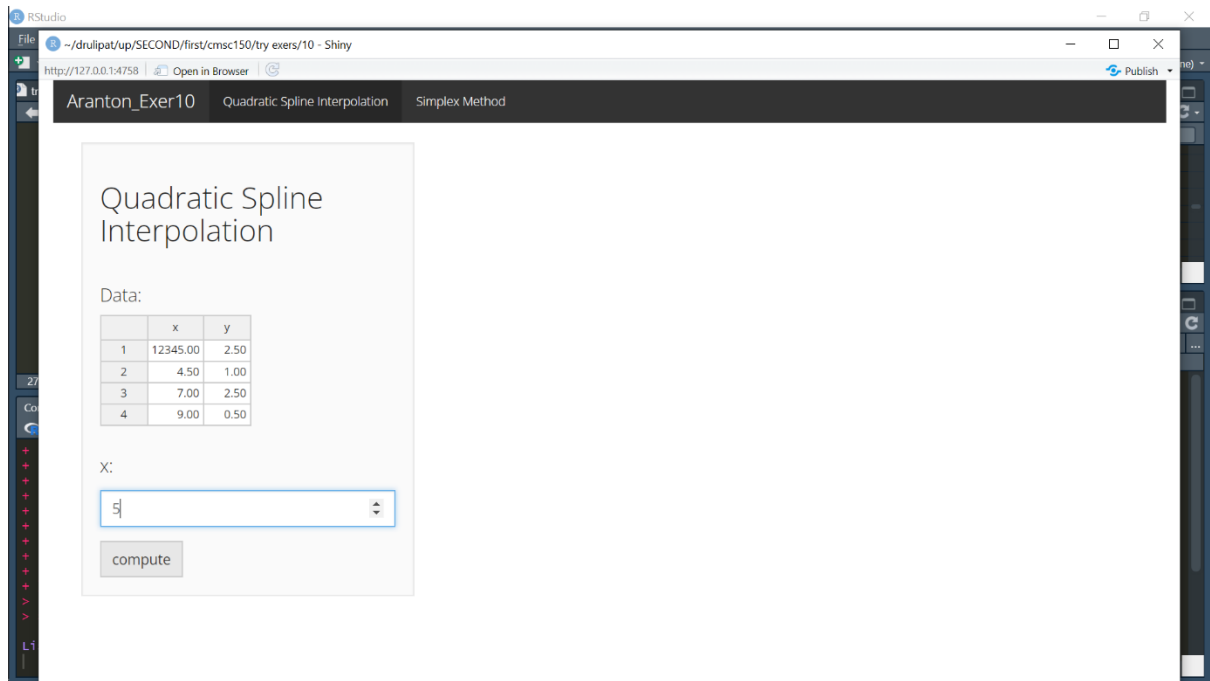
Upon running the application, the Quadratic Spline Interpolation Solver will show up. Note that a sample test case from the lecture is already preloaded.



Editing data values

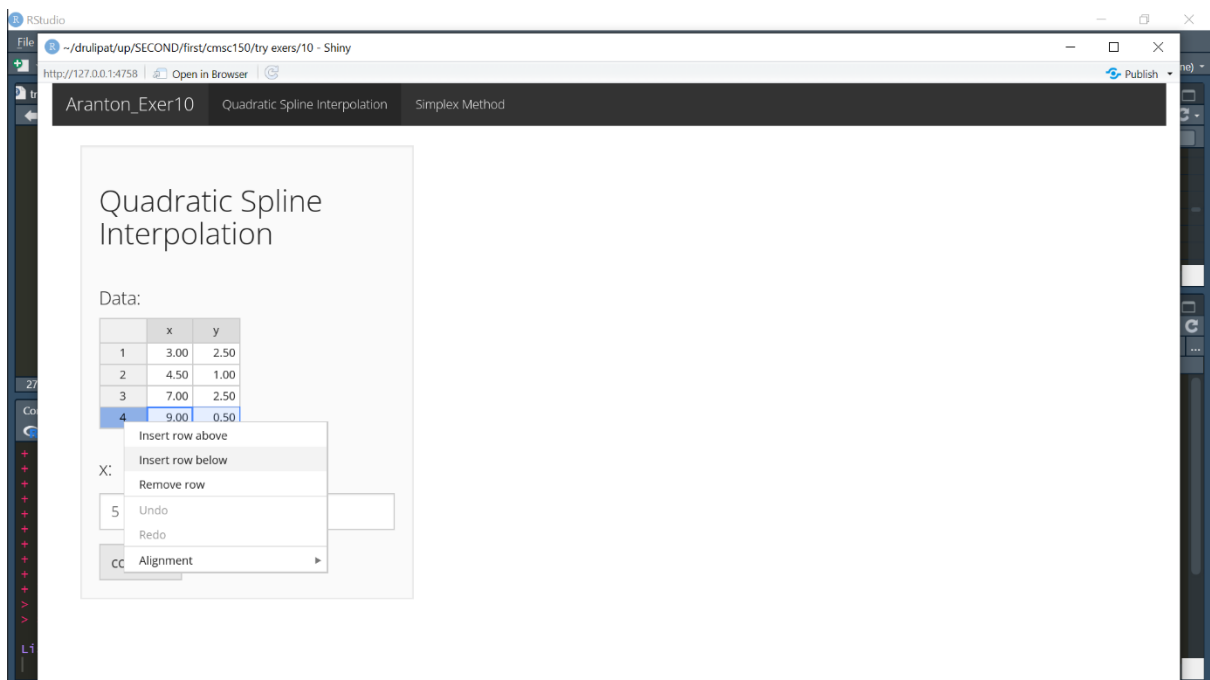
To edit the data of the table, just single left click or double left click the cell of the table. For the x to find, you can also just click to edit.

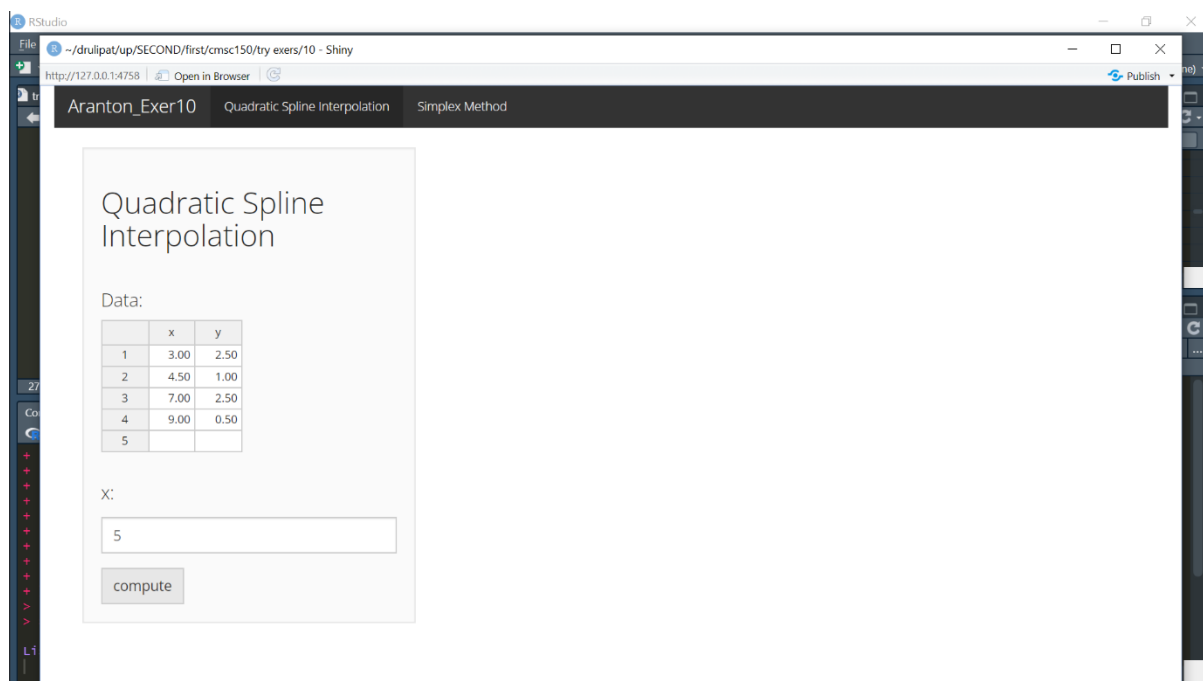




Adding/Deleting rows

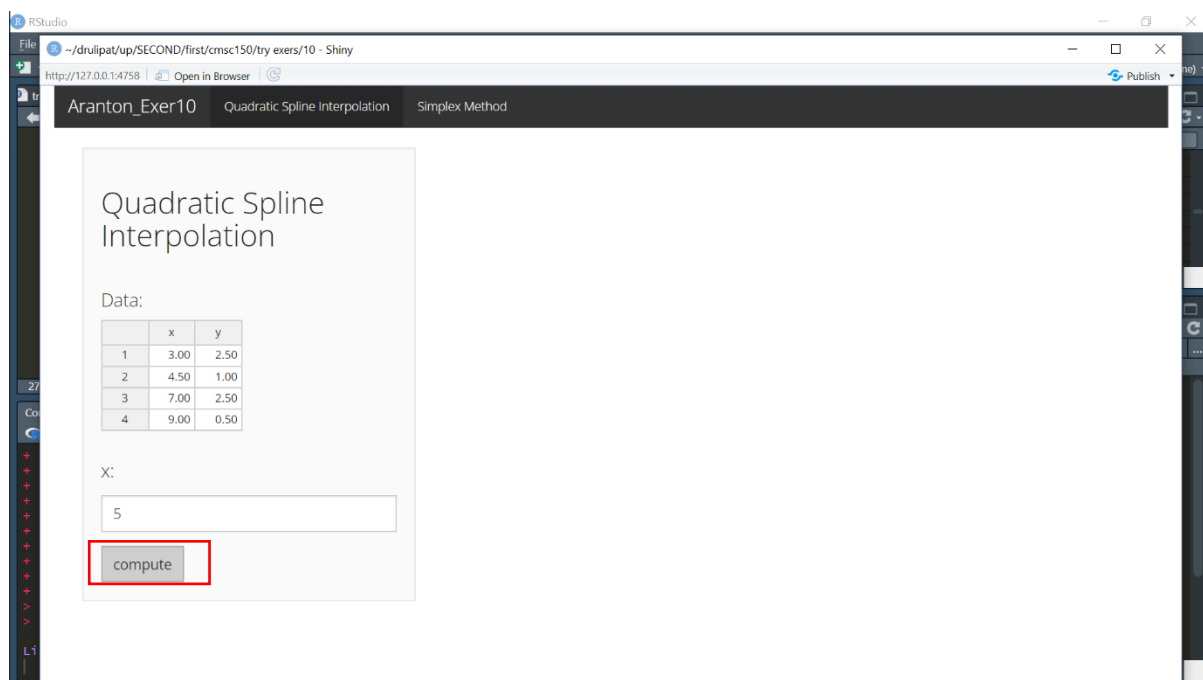
To add or delete a row, just right click a row and select the operation that you want to do. Note that you cannot add nor delete columns.





Solving

To solve, just click the “compute” button.



Quadratic Spline Interpolation

Data:

	x	y
1	3.00	2.50
2	4.50	1.00
3	7.00	2.50
4	9.00	0.50

X:

compute

When x = 5:

QSI Functions:

```

1. function (x) -1 * x + 5.5
2. function (x) 0.639999999999999 * x^2 + -6.75999999999999 * x + 18.46
3. function (x) -1.59999999999999 * x^2 + 24.5999999999999 * x + -91.2999999999997

```

Value of y:

0.660000000000029

Error alerts

An alert will pop up whenever the x input is empty or is out of bounds.


Quadratic Spline Interpolation

Data:

	x	y
1	3.00	2.50
2	4.50	1.00
3	7.00	2.50
4	9.00	0.50

X:

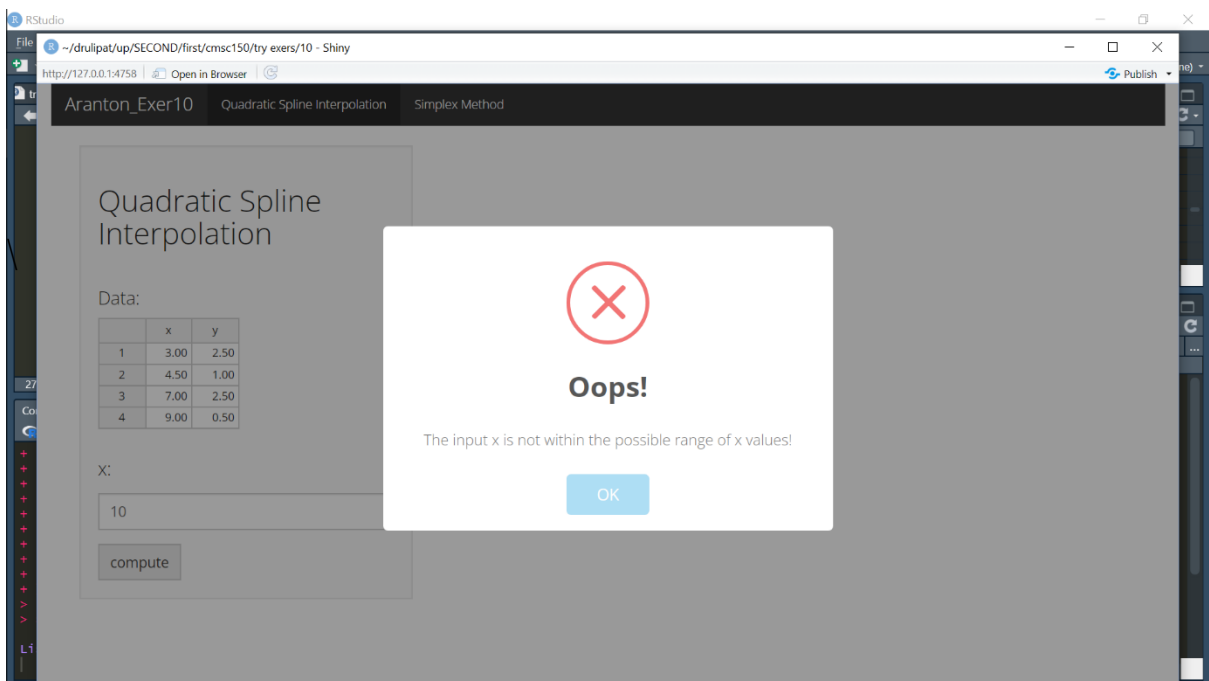
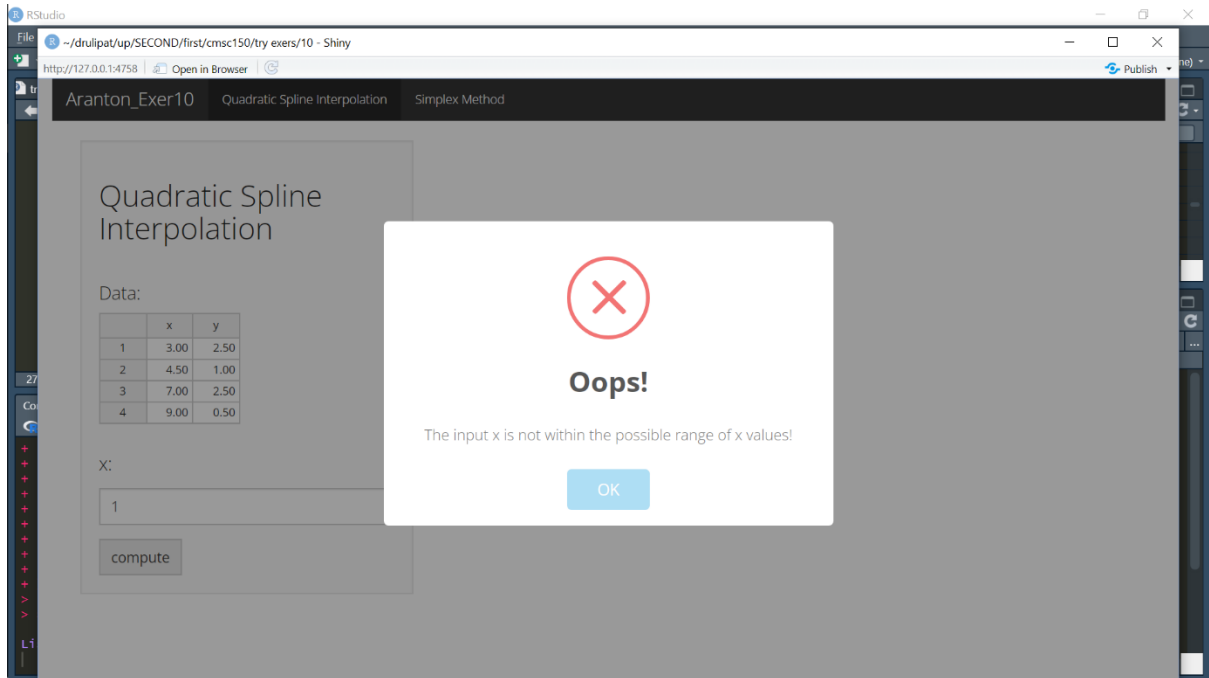
compute



Oops!

x must not be blank!

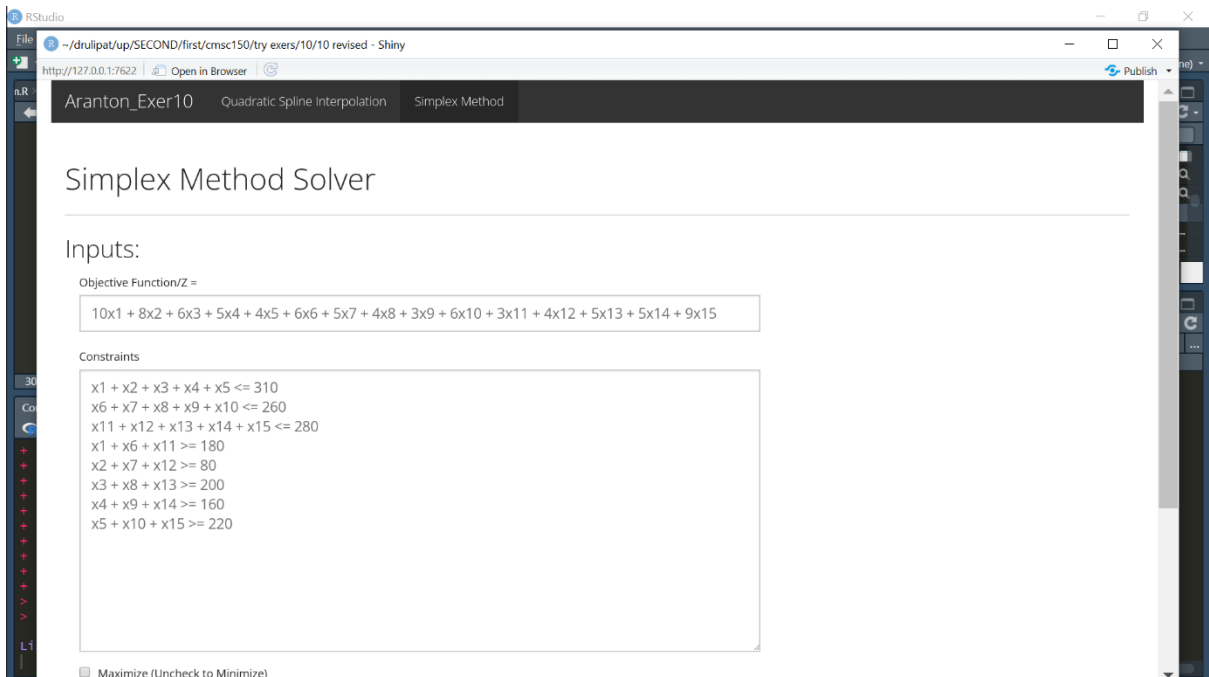
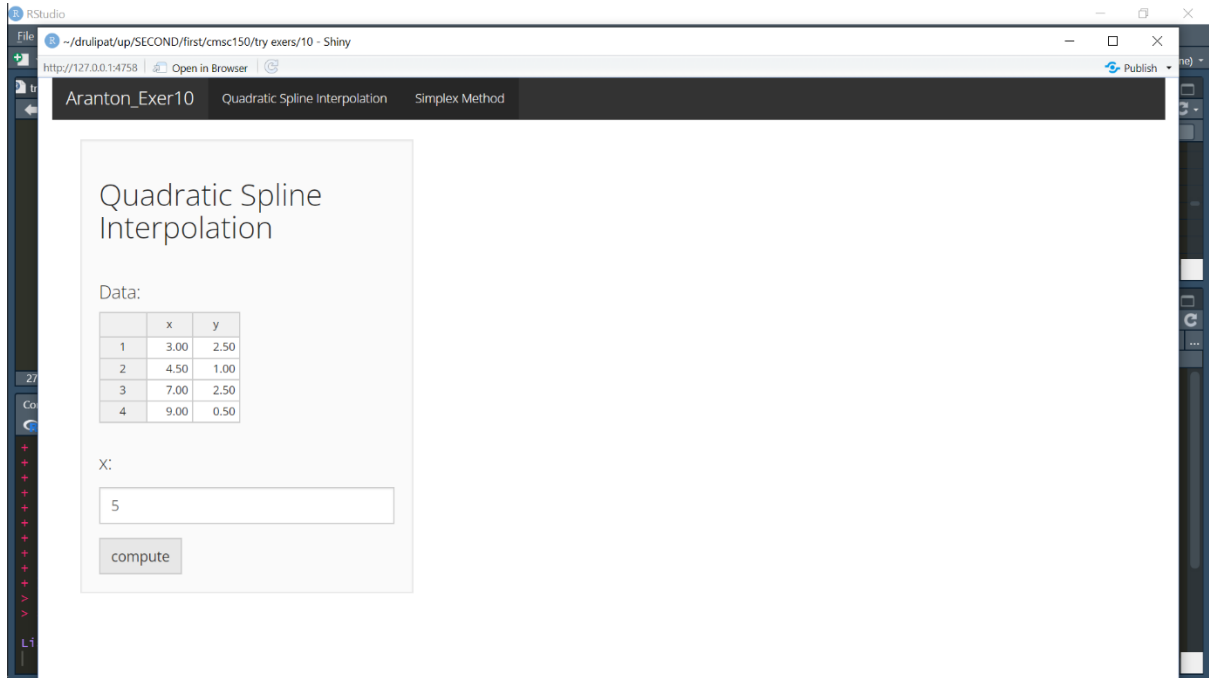
OK



Simplex Method Solver

Intro

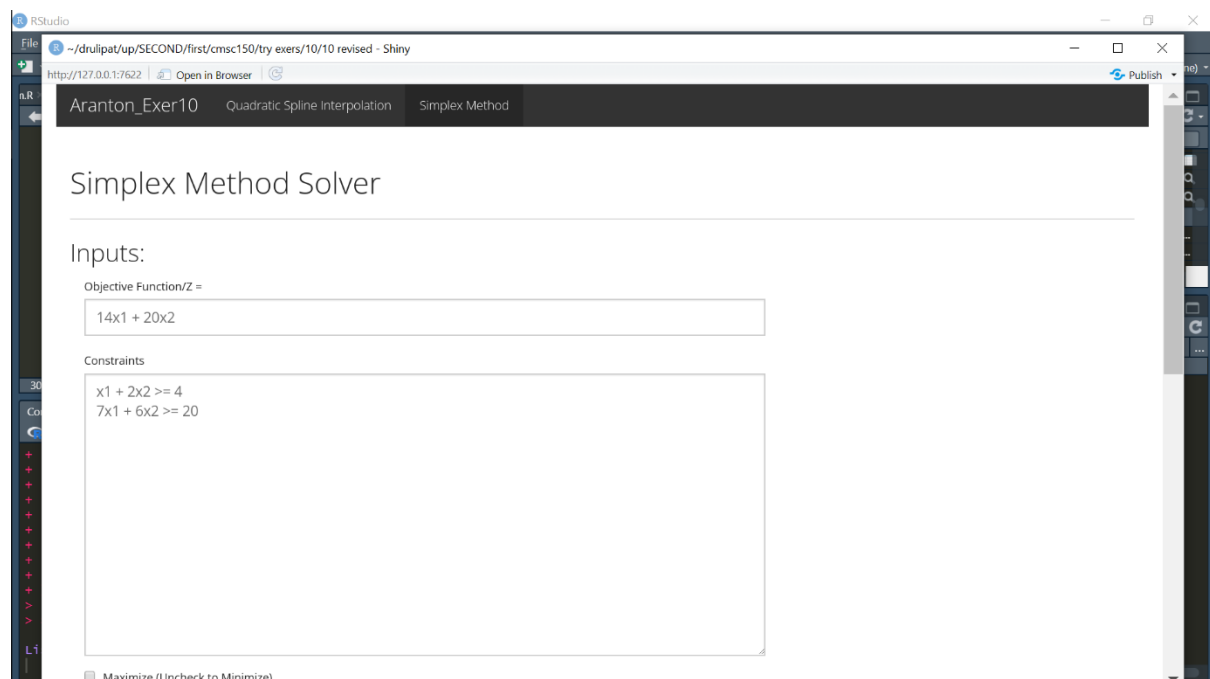
To go to the simplex method, click the “Simplex Method” on the TabPane. Note that the exer 09 problem is already preloaded.



Editing the values/inputs

To edit the values/inputs, just click the box of the values that you want to edit. Note that you need to **strictly follow the format** of the preloaded values.

- The variable must always be in the form of “x”.
- The coefficient followed by x then followed by the variable number (ex. $7x_1$). If the coefficient is one(1), you have to choice to write the number “1” or just proceed with x then the variable number(ex. $1x_3$ and x_3 is both accepted).
- The terms must be separated by a plus sign(+) and if it’s the constraints, then the “ \leq ” or “ \geq ” symbol must be used before the constant and;
- Finally write the constant value(if it is a constraint).
- Spacing must also be the same as in the preloaded values. An example of another set of inputs is as follows:



The screenshot shows a web browser window displaying the 'Simplex Method Solver' application. The browser's address bar shows the URL 'http://127.0.0.1:7622'. The application has a dark header bar with the title 'Aranton_Exer10' and two tabs: 'Quadratic Spline Interpolation' and 'Simplex Method'. The main content area is titled 'Simplex Method Solver' and contains an 'Inputs:' section. Under 'Inputs:', there is a text box for the 'Objective Function/Z =' containing the expression '14x1 + 20x2'. Below this is a larger text box for 'Constraints' containing two lines: 'x1 + 2x2 >= 4' and '7x1 + 6x2 >= 20'. At the bottom left of the application area, there is a checkbox labeled 'Maximize (Uncheck to Minimize)' which is currently checked.

Choosing between Maximization and Minimization

Keep the first checkbox unchecked if you want to perform minimization. Otherwise, check it for maximization.

RStudio

File | http://127.0.0.1:7622 | Open in Browser | Publish

Inputs:

Objective Function/Z =

14x1 + 20x2

Constraints

x1 + 2x2 >= 4
7x1 + 6x2 >= 20

☐ Maximize (Uncheck to Minimize)

☐ Show shipping num (Must only be checked if the problem is the Exer09 Lab Problem)

solve

Show the shipping numbers

To show the number of items shipped from a plant to a warehouse, keep the second checkbox checked. Note that this is only for the exer9 problem and its other testcases. Checking it for problems aside from the mentioned will be useless.

RStudio

File | http://127.0.0.1:7622 | Open in Browser | Publish

Inputs:

Objective Function/Z =

14x1 + 20x2

Constraints

x1 + 2x2 >= 4
7x1 + 6x2 >= 20

☐ Maximize (Uncheck to Minimize)

☐ Show shipping num (Must only be checked if the problem is the Exer09 Lab Problem)

solve

Solving

Click the “solve” button to solve the problem.

Inputs:

Objective Function/Z =

$$10x_1 + 8x_2 + 6x_3 + 5x_4 + 4x_5 + 6x_6 + 5x_7 + 4x_8 + 3x_9 + 6x_{10} + 3x_{11} + 4x_{12} + 5x_{13} + 5x_{14} + 9x_{15}$$

Constraints

$$\begin{aligned} x_1 + x_2 + x_3 + x_4 + x_5 &\leq 310 \\ x_6 + x_7 + x_8 + x_9 + x_{10} &\leq 260 \\ x_{11} + x_{12} + x_{13} + x_{14} + x_{15} &\leq 280 \\ x_1 + x_6 + x_{11} &\geq 180 \\ x_2 + x_7 + x_{12} &\geq 80 \\ x_3 + x_8 + x_{13} &\geq 200 \\ x_4 + x_9 + x_{14} &\geq 160 \\ x_5 + x_{10} + x_{15} &\geq 220 \end{aligned}$$

☐ Maximize (Uncheck to Minimize)

☒ Show shipping num (Must only be checked if the problem is the Exer09 Lab Problem)

solve

Solution

Final Tableau:

	S1	S2	S3	S4	S5	S6	S7	S8	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X
constraint 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	0.00	1.
constraint 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	1.
constraint 3	-1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.
constraint 4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.00	1.00	0.00	0.00	0.00	1.00	-1.00	0.00	0.00	0.00	0.
constraint 5	-1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.
constraint 6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	-1.00	0.00	0.00	-1.00	0.00	1.
constraint 7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	-1.00	0.00	0.00	0.00	-1.00	1.
constraint 8	-1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.
constraint 9	-1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	-1.00	1.00	0.00	0.00	0.00	0.
constraint 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	-1.00	0.00	0.00	-1.00	0.00	1.00	0.00	0.00	0.

