[Prepared by: Malonzo, Marlon R – AB-3L]

**CMSC 150 PROJECT MANUAL**

**A.Y. 2019-2020**

STARTING OFF:

-Make sure you have R studio in your PC. If not, go to the internet and download it in the official R studio website. It’s completely free and will take only a short amount of time to download.

-Open R studio and install RShiny by typing in the terminal install.packages(“shiny”). It will take a few minutes to install depending on your internet.

-Next up open the folder of my project (most probably named “Malonzo\_project”). It will contain four R files but only open the R file named “PROJECT”. If you’re not a professor or a Computer Science student, don’t mind with the other three R files.

-After opening the “PROJECT” R file, it should take you to R studio where you will the GUI code of the file. Again, if you’re not a professor and don’t know coding, ignore that and go the green triangle button named “Run App” and just like it says, run the app.

-After you click the “Run App” button, another window should appear (if not, you’ve not properly installed Rshiny) and it should take you to the main program.

**MAIN PROGRAM:**

-You will have three choices of problem solver to pick from namely, **Polynomial Regression**, **Quadratic Spline**, and of course the **Simplex Method**. The default one that will open at first will be the Polynomial Regression, but you can change it anytime by clicking the title of the solver at the top that you want to use

POLYNOMIAL REGRESSION:

-In the left hand side of the program, you can see the inputs needed for you to solve your problem and at the right hand side are the answers (Answer in accordance to the estimated value you’ve given and the function built by the program).

-First off, the input side (left hand side). In the **browse widget** (slightly below the “File to solve” title, the first widget you’ll see in the section), you need to browse a CSV file (comma separated file) of the problem you want to solve. **\*It is VERY IMPORTANT that your csv file has a title on its topmost or very first row (an example of a title is x|f(x) on the two cols or a|b) or the program will think of the first two values as the title and will not include it.** We don’t want wrong answers in our problems, don’t we?

-Second is the **degree input** (slightly below the browse widget). Insert the degree of the problem you want to solve. The default value of the degree is 1. Just make sure that your degree does not equal or exceed the number of inputs you’ve given. The max number of degree you can make is “# of inputs-1”. You remember that right? And just make sure not to put a degree less than 1, just trust me on this okay?

-The last input you will need is your **estimated value input** of the problem. Just type it and voila, you have a function that has your estimated value and answer. The default value of this is also 1.

-You should have the answer of your problem in the right hand side and if not, that means that you did not follow my instructions exactly. Try reading this manual again.

QUADRATIC SPLINE:

-Just like in the previous problem solver(polynomial regression), the Quadratic Spline is split into two sections. First in the left hand side is the input section, and second in the right hand side is the output section of the program.

-In the input section we only have 2 widgets (buttons), unlike the polynomial regression. First off is we have the **browse widget** where you will need to select a CSV file for your problem to solve. **I can’t state enough that** **your file should have a title in its top most row (in the two cols) or the program will disregard your first two inputs.** Just put a title on it okay?

-The second widget in the input section is the **estimated value input.** Remember that when selecting an estimated value in your quadratic spline problem, **it needs to be at least in between of the minimum and maximum value of your independent values** and the program knows this. If you try to insert an estimated value that is not in the interval of your given independent values, the program will opt you to change the estimated value until you’ve given an accepted one.

- Now in the output section, just like in the polynomial regression, you will have two outputs, the answer based on the estimated value you’ve given, and the function built based on your given csv or problem. If the program is outputting NA or it’s saying that you should change your estimated value, that means that you have not followed this guide carefully and you should probably follow what the program is saying and change the estimated value.

**SIMPLEX METHOD**

-Now here it is, the big boy problem solver worth 9% of my Lab grade. This problem solver is unlike the two and is not divided into two sections. It also does not accept a csv file but instead, it has an editable table of values (kind of a table). Just make sure to maximize the screen of the program to see the values well. If not, you probably won’t understand what you’re doing because the data won’t fit in your screen (unless you’re using a 72-inch TV as your pc monitor which is what??).

-The **table of values** can be changed but it has a default value from the main problem given for this project. You can change it by typing to the fields the value that you want to change and watch the reactive outputs also change like magic! Just be sure and exact on the values that you type to the fields because the program knows if you’re just typing random numbers and will print an error on the later outputs that you need (Tables). Also please don’t put negative values in the table. The program will be able to solve it, but the data would be really unrealistic.

-The **objective function** and **constraints** outputs should output your objective output and constraints based on the inputs you’ve put in the table. I never get bored watching them change as I change the values on my table. Hooray for reactive values!!

-The next widget you may encounter after the three is the **show table checkmark.** You can uncheck it if you don’t want to see your tables and check it again if you want to see. It is checked by default to display the tables.

-The **initial tableau output** just literally shows you the first table that is created after you’ve put in your values in the last table. This is the initial table before solving it in the simplex, simple as that.

-The **tableau of simplex** is where you can see how the program altered the table and applied the **DUAL SIMPLEX METHOD** to solve the problem. You can choose what state of the table it is you want to see by updating its iteration but be aware that **the max number of iterations it took to solve the problem is stated beside the iteration input and if you type and exceed more than that, it will likely result to an error**. Imagine accessing a void/black hole, you will get in trouble will you not?

-Finally, is the **Minimized Cost Output.** This output just shows the main answer to the problem and the minimized cost it would take for you to ship all the golf clubs to those 5 cities from the three factories. Wait you don’t know what I’m talking about?? Well you better read the original problem then!

* I sincerely hope this manual has helped you and has been helpful to you user. I’ve tried to make it as elaborate and as helpful as I can and tried to add a little bit of humor here and there because we all know how manuals can be so boring right? Hope you have fun with my program and please don’t change the codes if you don’t know what you’re doing! Jokes aside, that’s all. Thanks for reading this manual!