Final Project

Specifications

Generic Solvers

Quadratic Spline Interpolation Solver

Input:

- ➔ CSV file that contains the data points to be modeled
- ➔ real number x

Output:

- ➔ function per interval
- ➔ an estimate of f(x)

Polynomial Regression Solver

Input:

- ➔ CSV file that contains the data points to be modeled
- ➔ order n
- ➔ real number x

Output:

- ➔ nth order function that will model the data
- ➔ an estimate of f(x)

Simplex Solver

ASSESSING THE VALUE OF SUPPLY CHAIN MANAGEMENT OPTIMIZING SHIPMENTS

One of the main products of the Fairway Woods Company is custom-made golf clubs. The clubs are manufactured at three plants (Denver, Colorado; Phoenix, Arizona; and Dallas, Texas) and are then shipped by truck to five distribution warehouses in Sacramento, California; Salt Lake City, Utah; Albuquerque, New Mexico; Chicago, Illinois; and New York City, New York. Because shipping costs are a major expense, management is investigating a way to reduce them. For the upcoming golf season, an estimate has been created as to the total output needed from each manufacturing plant and how each warehouse will require satisfying its customers. The CIO from Fairway Woods Company has created a spreadsheet of the shipping costs from each manufacturing plant to each warehouse as a baseline analysis.

Main Goal: Minimize total shipping cost.

Restrictions/Requirements:

- ➔ Total shipped must be less than or equal to supply at the plant.
- ➔ Total shipped to warehouses must be greater than or equal to demand at warehouses.

➔ The number to ship must be greater than or equal to 0.

Number to ship from plant to warehouse						
	Total	Sacramento	Salt Lake	Albuquerque	Chicago	New York
Denver	?	?	?	?	?	?
Phoenix	?	?	?	?	?	?
Dallas	?	?	?	?	?	?
Total		?	?	?	?	?
Constraints						
	Demands by:	180	80	200	160	220
Plants	Supply	Shipping costs from plant to warehouse				
Denver	310	10	8	6	5	4
Phoenix	260	6	5	4	3	6
Dallas	280	3	4	5	5	9
Shipping	$?	$?	$?	$?	$?	$?

Minimum Requirements

➔ Make sure to provide a graphical interface that would facilitate easy uploading of inputs for the generic solvers.
➔ An interface must also be provided to easily change the constraints and objective function for the optimization problem.
➔ There must be an option to display or hide the tableau and basic solution (initial and per iteration).
➔ All functionalities must be in one system/program.
➔ Any programming language (or a combination) may be used.
➔ The use of built-in functions of CMSC 150 methods is NOT ALLOWED. These functions should be implemented from scratch.
➔ Prepare a printed User's Manual containing information about your system. The manual must contain How to Use, About, and other sections that are useful to the users.

Grading Scheme

Component		Points
User's Manual		1
Quadratic Spline Interpolation		3
Polynomial Regression		2
Simplex		9
Initial Tableau	2	
Basic Solution per Iteration	3	
Correct Final Solution	4	
TOTAL		**15**