**Programming Assignment 2**

You may complete this assignment individually or in a group of up to three students. If submitting in a group, only one member of the group needs to submit on Canvas. Please make sure to include all student names on every document you turn in.

1. [20 pts] A production and inventory model.

You were recently hired by Wood & Stuff, a home goods e-commerce company headquartered in Lawrenceville, GA. As an optimization expert, you are put in charge of all production and inventory decisions in the Southern market for the next months. Wood & Stuff produces different kinds of products, indexed by . You are given the following information:

* In each month , Wood & Stuff must exactly satisfy a demand of units of each product .
* In each month , Wood & Stuff can produce units of each product at a cost of dollars per unit.
* In each month , Wood & Stuff can carry over units of each product to month , at a cost of per unit. We assume that Wood & Stuff begins the planning horizon with no on-hand inventory of any product. However, the amount of inventory carried over from month to month is limited by the total volume of the warehouse, which is cubic feet. Each unit of product has a volume of cubic feet.

Formulate a linear program to minimize production and inventory costs for Wood & Stuff over the next months.

1. [20 pts] Solving the model.

Using Python, write a program to solve the above optimization model. Your program should read in the following CSV files:

* “demand\_data.csv” contains the demand information for each product in each month
* “cost\_data.csv” contains the production cost information for each product in each month
* “product\_data.csv” contains static product information, including inventory cost and volume.
* “volume\_data.csv” contains the warehouse volume information

We have provided example files with this assignment, corresponding to an instance of the problem above. However, we will grade the assignment by running your code on a different problem instance. The input files will be formatted identically, but the demands, costs, and volumes (as well as the number of months and products) could change. Consequently, please make sure to write your code to a sufficient level of generality (read all data from CSV, no hard coding).

Your program should print the optimal objective value, in dollars, of the optimization problem.

You must submit two documents: 1) your .py code and 2) a typed PDF file containing your model and the optimal objective function value.