In this assignment, demonstrate initial proficiency with the programming tools required in this class. Begin by installing several libraries for Python and implementing two foundational machine learning algorithms. This will ensure that you are ready to tackle more complex challenges throughout this course. Perform the following:

**Part 1 - Tools Readiness - Complete**

Install Python 3.7 (or later) and PyCharm

Add the following libraries: *Numpy*, *Pandas*, *Matplotlib*, and *Scikit-Learn*

Create simple Jupyter notebooks, in which you import the four packages and write minimal Python scripts demonstrating that all libraries have been installed correctly. You may copy examples from the quickstart tutorials for each one of these libraries:

* <https://docs.scipy.org/doc/numpy/user/quickstart.html>
* <https://pandas.pydata.org/pandas-docs/stable/getting_started/>
* <https://matplotlib.org/users/pyplot_tutorial.html>
* <https://elitedatascience.com/python-machine-learning-tutorial-scikit-learn>

**NOTE:***Occasionally, links to packages and manuals change. If you get a broken link, navigate one level up on the respective sites, where the package is located, and look for the link to the reference manual.*

**Part 2 - Review Predictive Models and Python Proficiency – Complete In GitHub Link**

Consider the task of calculating the appreciation of a real estate property over time. Using concepts from previous courses (e.g., linear regression, predictive modeling), create a model to predict the future value of the property using at least three different input variables. You have the freedom to decide what these variables are. Show the following:

* The mathematical model using formal mathematical notation
* An explanation of all variables used
* An implementation of the model in Python (as a Jupyter notebook), including relevant visual output (e.g., graphs)

What factors influence the quality of predictions? Discuss these factors and measure the change in outcome when these factors are modified. Estimate the error in your model, both mathematically and in code.

Your computer program should produce a clear quantitative result, error estimate, and a plot that visualizes the prediction.

Create a private GitHub or Bitbucket repository (you may already have one from a previous class). Then, create a directory for this class and sub-directories for each topic assignments.

Create a README.md file in which you list all the files that make up your submission and the necessary instructions to run the code.

Upload the Python Jupyter notebooks to your repository and submit the link to the learning management system.

[**https://github.com/DouglasBui/GCU/tree/main/DSC-540/Assignment1**](https://github.com/DouglasBui/GCU/tree/main/DSC-540/Assignment1)

**Part 3- Technical Report – Complete In GitHub Link**

Refer to the readings in this topic (textbook and the article *"*The Seven Tools of Causal Inference, with Reflections on Machine Learning,*”* which describe:

* Four forms of learning (supervised, unsupervised, reinforcement, evolutionary)
* Four learning tasks (classification, regression, learning association, clustering)
* Seven tools of causal inference

Examine the article *“*Using Machine Learning to Translate Applicant Work History into Predictors of Performance and Turnover.*”* Write a two-page technical report covering the following:

1. Characterize the article in terms of the forms of learning, learning tasks, and causal inference it reports.
2. Defend your characterization by mapping the concepts onto the specific details mentioned or inferred in the article.
3. Use the GCU digital library to find work describing a form of learning or learning task that is not covered by the categories listed in Part 1. Use your findings to expand your characterization in (2).