CSCI 362: Machine Learning **Assignment 3**
Fall 2023 **Vanilla Gradient Descent**

Please submit a single document for this assignment on Canvas by the beginning of class on Friday, Sept. 22nd.

- Download or cut-and-paste `ols_tensor.py` from our Github repo to your computer.

  Please make sure that you have also downloaded the `csv` file containing the climate data.

- The program `ols_tensor.py` uses gradient descent to train a linear *model* to fit the climate data.

  Run the program to make sure your version executes correctly. Have a close look at the code. Notice that the data are first mean-centered and normalized.

  Also notice that the model found by gradient descent well approximates the one found using the linear algebraic methods from Project 0.

- Modify `ols_tensor.py` so that it mean-centers the climate data but does *not* normalize the climate data. Note: you need only comment out two lines.

  Run your program and observe that the weights of the model now blow up during training instead of converging to the slope and intercept of the least-squares regression line.

- Experiment with the learning rate and/or the number of epochs used for training the model.

  Keep experimenting until you find *learning parameters* that lead again to high-quality convergence (on our now mean-centered and not normalized data).

- Submit a screenshot showing the output of a run of `ols_tensor.py` with the best learning parameters that you found.