ASEN 3502 Computational Methods
Homework 0

See Gradescope for Due Date

The purpose of this assignment is to help you dust off your programming skills after the break and familiarize yourself with some of the infrastructure for the class. You will write a function that computes the matrix-vector product of $[A]$ and $\{x\}$ working with the elements of $[A]$ and $\{x\}$ individually[1]. Recall that, if $\{b\} = [A]\{x\}$, then

$$b_i = \sum_j a_{ij} x_j.$$

Complete the following tasks. If you have any trouble, come to the first lab session, ask on slack, or get an explanation from AI in accordance with the course AI policy.

1. Write a function that computes $\{b\} = [A]\{x\}$, where $[A]$ is a square matrix and $\{b\}$ and $\{x\}$ are column vectors. This function should take two arguments, `A`, and `x`, and return `b`. The function can be written in any programming language, but within the body of the function, you may only interact with `A` and `x` by accessing individual elements, e.g. `A(i,j)` in Matlab.
2. Write a script that reads in `A1.csv` and `x1.csv`, calls the function, and writes `b1.csv`. The script should do the same for `A2` and `A3` and their partners. All of these files are comma-separated text files; each vector is written with one entry per line.
3. Run `evaluate('your.gradescope.email@colorado.edu')` in Matlab to check that your code has written correct values to `b1.csv`, `b2.csv`, and `b3.csv`.

Deliverables

Please submit the following on Gradescope:

- One or more source code files containing the script and the function. If you did the assignment in Matlab and used the starter code, this should be `script.m` and `multiply.m`
- `results.json` generated with the `evaluate` matlab command.

Please ensure that the autograder on gradescope runs to completion - it should say "Submission Successful! You received 50.0/50.0 autograder points."

[1] The book uses a somewhat odd convention denoting matrices with [ ] and column vectors with { }.