

Problems 1 and 2 of this homework will ONLY be graded for completion (10pts each). You can use the pseudocodes found in the textbook, but note you will have to translate them to MATLAB. You may also use the example we did in class. Upload your solutions to these two problems to Gradescope.

Problem 3 is a “tell me about yourself” survey, which you can find in Canvas under “quizzes”. It is worth 10pts and graded automatically by Canvas.

Q1. (10 pts) Write a MATLAB function with inputs

- a matrix A of size $m \times n$,
- a vector x of size $n \times 1$,

and which outputs the product vector $A \times x$ (note that the size of this vector should be $m \times 1$). Your code should check that the sizes of the inputs are right and then do the multiplication using two nested “for” loops.

- Run your code on $A = \text{rand}(10)$ and $x = \text{rand}(10,1)$ (the command “rand” produces a random matrix). Compare the output of your function to the result when you type $A * x$ into MATLAB (the results should be the same!).
- How many floating point operations (additions and multiplications) does the code use? Find a **formula** in terms of m and n . (Similar to how we found that a vector-vector multiplication takes $2n$ operations, where n is the vector length.)

Q2. (10 pts)

Write a MATLAB function with inputs

- a matrix A of size $m \times n$,
- a matrix B of size $n \times p$,

and which outputs the product matrix $A \times B$ (note that the size of this matrix should be $m \times p$). Your code should check that the sizes are right and then do the multiplication using three nested “for” loops.

- Run your code on $A = \text{rand}(10,5)$ and $B = \text{rand}(5,7)$ (the command “rand” produces a random matrix). Compare the output of your function to the result when you type $A * B$ into MATLAB (the results should be the same!).
- How many floating point operations (additions and multiplications) does the code use? Find a formula in terms of m , n , and p .

Q3. (10 pts) Go to Canvas quizzes and take the survey “First Day Survey: Tell Me About Yourself #FinAid”. Note that you have unlimited attempts, except you must be done by Friday, January 13, at 11:59pm).