Homework #1

• Textbook: 1.2.4, 1.2.16, 1.2.17, 1.2.18, 1.2.19, 1.2.20, 1.3.4, 1.3.17
(For these problems, excluding 1.3.4 and 1.3.17, if you are asked to solve a linear
system, you can do it any way, including using Matlab)

• Programming:

  1. Using basic programming (for loops, while loops, and if statements), write two
     functions in Matlab, both taking as input:
     – dimension $n$;
     – $n \times n$ matrix $A$;
     – $n \times n$ matrix $B$;
     – $n \times 1$ vector $x$.
     Have the first function compute $ABx$ through $(AB)x$ and the second compute
     $ABx$ through $A(Bx)$. Have both output:
     – the number of flops used.

     (a) Print out or write out the first function.
     (b) Print out or write out the second function.
     (c) Apply both your functions to the case with random matrices and vectors for
         $n = 100$ and print out or write out the results. Do the same for $200 \times 200$,
         $400 \times 400$, and $800 \times 800$. Which approach of computing $ABx$ is faster?