Homework #0

- Programming:

1. Using basic programming (for loops, while loops, and if statements), write a function in Matlab that takes as input:
   - dimension $n$;
   - column vector $v$ with $n$ components;
   - column vector $w$ with $n$ components;

and outputs the dot product $v \cdot w$.

   (a) Print out or write out your function.
   (b) Apply your function to the case with vectors $[1; 4; -2; 6]$ and $[8; -2; 1; 5]$ and print out or write out the results.

2. Using basic programming (for loops, while loops, and if statements), write a function in Matlab that takes as input:
   - dimension $n$;
   - $n \times n$ matrix $A$;
   - column vector $x$ with $n$ components;

computes $Ax$ and outputs the number of flops used.

   (a) Print out or write out your function.
   (b) Apply your function to the case with a $100 \times 100$ random matrix and vector and print out or write out the results. Do the same for $200 \times 200$, $400 \times 400$, and $800 \times 800$.

3. Using basic programming (for loops, while loops, and if statements), write a function in Matlab that takes as input:
   - dimension $n$;
   - $n \times n$ matrix $A$;
   - $n \times n$ matrix $B$;

computes $AB$ and outputs:

   - the number of additions/subtractions used;
   - the number of multiplications/divisions used;

   (a) Print out or write out your function.
   (b) Apply your function to the case with a $100 \times 100$ random matrix and vector and print out or write out the results. Do the same for $200 \times 200$, $400 \times 400$, and $800 \times 800$. 