PROJECT 1 (5 POINTS, DUE FEB. 6)

- Read the references and compute the following result in R.
  - http://www.programmingr.com/matrix-multiplication/
  - http://www.datasciencemadesimple.com/

a) Let $A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \end{bmatrix}$, $b = \begin{bmatrix} 1 \\ -1 \\ 1 \\ -1 \end{bmatrix}$ and $c = \begin{bmatrix} 2 & -2 & 2 \end{bmatrix}$. Find $A \cdot b$ and $c \cdot A$.

b) Let $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$. Find $\underbrace{A \cdot A \cdot \cdots \cdot A}_{100}$.

PROJECT 1 (BONUS 2 POINTS, DUE FEB. 6)

- Problem 1. Given f(x)=sin(x) and $g(x) = x - \frac{x^3}{6}$ being viewed as an approximation for f(x).
  a) Graph the functions f(x) and g(x) on the same window for $-1 \leq x \leq 3$.
  b) Compute the averaged error of |f(x)-g(x)| for 50 evenly chosen x values in [0,1].
  c) Compute the averaged error of |f(x)-g(x)| for 50 evenly chosen x values in [1,2].
  d) Compare the results from b) and c) with your observation in a). Does the computation match the observation for the graphs?
  e) Combine your previous work and define an R function, called "errsin(g,a,b,n)", for which
     - g = approximating function
     - a and b are boundaries of the interval
     - n = the number of sample points taken in [a,b]
     - The output is the averaged error