You have until Sunday, March 15, at 9:00 PM to complete and submit Problems 2 and 3 of this exercise using Matlab Grader. Problem 1 does not require check-off, but be sure to do it to learn syntax for accessing subarrays (vectorized code) and 3-d array.

1 Subarrays

Type the following expressions in the MATLAB Command Window. Write the resulting array or answer the question on each blank.

\[
\begin{align*}
m &= \text{rand}(6,5) \\
a &= m(:,2) \quad &\text{What does the colon specify when used in place of an index? } &\text{________} \\
b &= m(2:3,:) \quad &\text{________} \\
p &= \text{rand}(6,5,3) \quad &\text{This is a 3-dimensional array} \\
[\text{nr, nc, np}] &= \text{size}(p) \quad &\text{________} \\
c &= p(:,:,2) \quad &\text{Is this a matrix (2-d) or a 3-d array? } &\text{________} \\
d &= p(4,:,2) \quad &\text{Is this a vector, matrix, or 3-d array? } &\text{________}
\end{align*}
\]

2 Find a value in a matrix

Implement the following function as specified. Use loops in this problem; do not use any built-in functions other than size.

\[
\begin{align*}
\text{function } [\text{rvec, cvec}] &= \text{findInMatrix}(\text{n}, \text{M}) \\
% \text{Find all occurrences of the number } \text{n} \text{ in matrix } \text{M}. \\
% \text{`rvec'} and `cvec' are column vectors of row and column numbers such that \\
% \text{`M(rvec(k),cvec(k))'} is equal to `n'. \\
% The length of `rvec' and `cvec' is the number of times `n' appears in `M'. \\
% If `n' is not found in `M', `rvec' and `cvec' are empty vectors. \\
% Do not use any built-in functions other than `size()'.
\end{align*}
\]

3 Cumulative sums

Implement the following function as specified. Do not use any built-in functions other than size.

\[
\begin{align*}
\text{function } \text{A} &= \text{matrixCSums}(\text{M}) \\
% \text{`M'} is a numeric matrix and `A' has the same size as `M'. Assume `M' \\
% is not empty. Each element in `A' is the sum of the corresponding \\
% element in `M' and all the elements above it. Example: \\
% \text{M} = \begin{bmatrix} 1 & 3; \ldots \end{bmatrix} \quad \text{A} = \begin{bmatrix} 1 & 3; \ldots \end{bmatrix} \\
% \begin{bmatrix} 4 & 5; \ldots \end{bmatrix} \quad \text{then } \begin{bmatrix} 5 & 8; \ldots \end{bmatrix} \\
% \begin{bmatrix} -7 & 2 \end{bmatrix} \quad -2 \begin{bmatrix} 10 \end{bmatrix} \\
% \text{Do not use any built-in functions other than `size()'.}
\end{align*}
\]

Please delete your files from the lab computer before you leave the lab.