Armstrong State University
Engineering Studies
MATLAB Marina – 2D Arrays and Matrices Exercises

1. From the MATLAB Command Window, execute the MATLAB statements in Figure 1 paying attention to the variables and their values in the MATLAB Workspace window.

```
clear all;
clc;
A1 = [ 2, -1, 4, 3; 4, 13, 5 -8 ];
A2 = [1:2:9 ; 5:-1:1];
length(A1)
size(A1)
A1(1,1)
A1(1,:)
A1(:,:)
A1(1:2,2:3)
```

Figure 1, MATLAB Statements for Exercise 1

2. From the MATLAB Command Window, execute the MATLAB statements in Figure 2 paying attention to the variables and their values in the MATLAB Workspace window. You can also use MATLAB's built in `disp` function to display arrays in the Command Window.

```
clear all;
clc;
AA = zeros(3,4);
AA(2, :) = [1, 2, 3, 4];
AA(:, 4) = 5;
```

Figure 2, MATLAB Statements for Exercise 2

3. Enter MATLAB statements in the Command Window to perform the following operations:
   a) Create a 4 by 5 array `z4by5` of all zeros. Hint: use the built in MATLAB function `zeros`.
   b) Create an 8 by 2 array `o8by2` of all ones. Hint: use the built in MATLAB function `ones`.
   c) Create a 3 by 2 array AA containing the values $AA = \begin{pmatrix} 5 & 4 \\ 7 & 0 \\ -2 & 3 \end{pmatrix}$.
   a) Create a 2 by 3 array named BB with the values $BB = \begin{pmatrix} 0 & 2 & -1 \\ 7 & -5 & 4 \end{pmatrix}$.
   b) Determine the indices of the elements in BB that have values less than zero.
   c) Replace the values of the elements of BB that are less than zero with value zero. Leave the other elements unchanged.

4. From the MATLAB Command Window, execute the MATLAB statements in Figure 3 paying attention to the variables and their values in the MATLAB Workspace window.

```
clear all;
clc;
BB = [1:1:5; zeros(1,5)];
BB(2,:) = 2*BB(1,:) + 3;
BB2 = [1:1:5; 2*(1:1:5)+3];
```

Figure 3, MATLAB Statements for Exercise 4

5. Write a MATLAB program that will:
   a) Create two-dimensional array named `data` with 10 rows and 3 columns. The first column should contain the values from 1 to 10 with an increment of 1; the second column should be the values from -2.5 to 2.0 with an increment of 0.5; and the third column should contain the values in the second column squared.
   b) Index the second column of the array `data` and save it in the variable `col2`.
   c) Index the third column of the array `data` and save it in the variable `col3`.
   d) Plot the values in the second column versus the values in third column using the data in the variables `col2` and `col3`.
   e) Replot the values in the second column versus the values in third column using the original variable `data` instead of the `col2` and `col3` variables.
6. From the MATLAB Command Window, execute the MATLAB statements in Figure 4 paying attention to the variables and their values in the MATLAB Workspace window. Some of the statements will generate syntax errors. Make sure you understand why the statements result in errors.

```
clear all;
clc;
CC = [1:1:3; 4:1:6];
DD = CC';
CC + ones(2,2)
CC + 2;
CC/4
4/CC
CC*CC
CC.*CC
CC+CC
```

Figure 4, MATLAB Statements for Exercise 7

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