2.15 Exercises.

1. Answer the following questions for the array shown here.

\[
\begin{bmatrix}
0.0 & 0.5 & 2.1 & -3.5 & 6.0 \\
0.0 & -1.1 & -6.6 & 2.8 & 3.4 \\
2.1 & 0.1 & 0.3 & -0.4 & 1.3 \\
1.1 & 5.1 & 0.0 & 1.1 & -2.0
\end{bmatrix}
\]

(a) What is the size of array1?
(b) What is the value of array1( 1, 4 )?
(c) What is the size and value of array1( :, 1:2:5 )?
(d) What is the size and value of array1( [1 3], end )?

2. Are the following MATLAB variable names legal or illegal? Why?
   (a) dog1
   (b) 1dog
   (c) Do_you_know_the_way_to_san_jose
   (d) _help
   (e) What’s_up?

3. Determine this size and contents of the following arrays. Note that the later arrays may depend on the definitions of arrays defined earlier in this exercise.
   (a) \( a = 2:3:8; \)
   (b) \( b = [a' \ a' \ a']; \)
   (c) \( c = b(1:2:3, 1:2:3); \)
   (d) \( d = a + b(2,:); \)
   (e) \( w = [\text{zeros}(1,3) \ \text{ones}(3,1)' \ 3:5'] \)
   (f) \( b([1 \ 3], 2) = b([3 \ 1], 2); \)
   (g) \( e = 1:-1:5; \)

4. Assume that array array1 is defined as shown, and determine the contents of the following subarrays:

\[
\begin{bmatrix}
1.1 & 0.0 & -2.1 & -3.5 & 6.0 \\
0.0 & -3.0 & -5.6 & 2.8 & 4.3 \\
2.1 & 0.3 & 0.1 & -0.4 & 1.3 \\
-1.4 & 5.1 & 0.0 & 1.1 & -3.0
\end{bmatrix}
\]

(a) array1( 3, : )
(b) array1( :, 3)
(c) array1( 1:2:3, [3 3 4] )
(d) array1( [1 1], : )

5. Assume that \texttt{value} has been initialized to \(10\pi\), and determine what is printed out by each of the following statements.

\begin{verbatim}
disp( ['value = ' num2str(value)] );
disp( ['value = ' int2str(value)] );
fprintf( 'value = %e
', value);
fprintf( 'value = %f
', value);
fprintf( 'value = %g
', value);
fprintf( 'value = %12.4f
', value);
\end{verbatim}

6. Assume that \(a, b, c,\) and \(d\) are defined as follows, and calculate the results of the following operations if they are legal. If an operation is illegal, explain why it is illegal.

\begin{align*}
a &= \begin{bmatrix} 2 & 1 \\ -1 & 4 \end{bmatrix} \quad b &= \begin{bmatrix} -1 & 3 \\ 0 & 2 \end{bmatrix} \quad c &= \begin{bmatrix} 2 \\ 1 \end{bmatrix} \quad d &= \text{eye}(2)
\end{align*}

(a) results = a + b;
(b) results = a * d;
(c) results = a .* d;
(d) results = a * c;
(e) results = a .* c;
(f) results = a \ b;
(g) results = a .\ b;
(h) results = a .^ b

7. Evaluate each of the following expressions:

(a) \(11 / 5 + 6\)
(b) \((11 / 5) + 6\)
(c) \(11 / (5 + 6)\)
(d) \(3 ^ 2 ^ 3\)
(e) \(3 ^ (2 ^ 3)\)
(f) \((3 ^ 2) ^ 3\)
(g) \(\text{round}(-11/5) + 6\)
(h) \(\text{ceil}(-11/5) + 6\)
(i) \(\text{floor}(-11/5) + 6\)

8. Use MATLAB to evaluate each of the following expressions.

(a) \((3 - 4i)( -4 + 3i)\)
(b) \(\cos^{-1} (1.2)\)