CS101: Homework #5
This assignment is due by 10/29.

2.15 Exercises.

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

\[
\text{Array1} = \begin{bmatrix}
0.0 & 0.5 & 2.1 & -3.5 & 6.0 \\
0.0 & -1.1 & -6.6 & 2.8 & 3.4 \\
2.1 & 0.1 & 0.3 & -0.4 & 1.3 \\
1.1 & 5.1 & 0.0 & 1.1 & -2.0
\end{bmatrix}
\]

(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) \( w = [zeros(1, 3) \ ones(3,1)’ 3:5’]; \)
   (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:

\[
\text{Array1} = \begin{bmatrix}
1.1 & 0.0 & -2.1 & -3.5 & 6.0 \\
0.0 & -3.0 & -5.6 & 2.8 & 4.3 \\
2.1 & 0.3 & 0.1 & -0.4 & 1.3 \\
-1.4 & 5.1 & 0.0 & 1.1 & -3.0
\end{bmatrix}
\]

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

- 2 -
5. Assume that `value` has been initialized to $10\pi$, and determine what is printed out by each of the following statements.
   ```
   disp(['value = ' num2str(value)]);
   disp(['value = ' int2str(value)]);
   fprintf('value = %e\n', value);
   fprintf('value = %f\n', value);
   fprintf('value = %g\n', value);
   fprintf('value = %12.4f\n', value);
   ```

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.
   ```
   a = [ 2 1; -1 4 ]
   b = [-1 3; 0 2]
   c = [2; 1]
   d = eye(2)

   (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) round(-11/5) + 6
   (h) ceil(-11/5) + 6
   (i) floor(-11/5) + 6
   ```

8. Use MATLAB to evaluate each of the following expressions.
   ```
   (a) (3 – 4i)(–4 + 3i)
   (b) \cos^{-1}(1.2)
   ```