CS101: Homework #5

This assignment is due by 11/06 for all sections.
For section 007/009, homework should send to ssv33@njit.edu
For section 011/101, homework should send to xw29@njit.edu
with a subject line read as: CS101/section HW#05

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) \( w = [\text{zeros}(1, 3) \text{ ones}(3,1)'; 3:5']; \)
   (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:

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

   (a) array1(3, :)

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5. Assume that `value` has been initialized to $10\pi$, and determine what is printed out by each of the following statements.

```matlab
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);
```

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.

```matlab
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) \(\text{round}(-11/5) + 6\)
(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) \(\cos^{-1}(1.2)\)