CHE 1411L Week 13 Lab Assignment

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Problem 2a) Perform element-by-element operations in Matlab.

```
A = [6 -2;10 3];
B = [9 8;-12 14];
C = A + B
```

```
C =

    15     6
    -2    17
```

Problem 2b) Multiplying a matrix by a scalar w.

```
A = [2 9; 5 -7];
B = 3*A
```

```
B =

     6    27
    15   -21
```

Problem 2c) Matrix

```
A = [6 3] + 2
B = [8 3] - 5
C = [6 5] + [4 8]
D = [6 5] - [4 8]
E = [3 5].*[4 8]
F = [2 5]./[4 8]
G = [2 5].\[4 8]
H = [3 5].^2
I = 2.^[3 5]
J = [3 5].^[2 4]
```

A =

    8   5

B =

    3   -2

C =

   10   13

D =

    2   -3

E =

   12   40

F =

  0.5000   0.6250

G =

  2.0000   1.6000

H =

    9   25

```
I =

     8     32


J =

     9    625
```

Problem 2d) Array or Element-by-element multiplication.

```
X = [2 4 -5];
Y = [-7 3 -8];
Z1 = X.*Y
Z2 = (X').*(Y')
Z3 = X'.*Y
Z4 = Y.*X'


Z1 =

   -14     12     40


Z2 =

   -14
    12
    40


Z3 =

   -14      6    -16
   -28     12    -32
    35    -15     40


Z4 =

   -14      6    -16
   -28     12    -32
    35    -15     40
```

Problem 2e) Find C = A.*B

```
A = [11 5;-9 4];
B = [-7 8;6 2];
```

```
C = A.*B
```

C =

```
    -77     40
    -54      8
```

Problem 2f) Z = X./Y

```
X = [8 12 15];
Y = [-2 6 5];
Z = X./Y
```

Z =

```
    -4      2      3
```

Problem 2g) C = A./B

```
A = [24 20;-9 4];
B = [-4 5;3 2];
C = A./B
```

C =

```
    -6      4
    -3      2
```

Problem 2h) X.^3

```
X = [3 5 8];
Y = X.^3
```

Y =

```
    27    125    512
```

Problem 2i) 3.^p

```
p = [2 4 5];
Y = 3.^p
```

Y =

```
      9    81    243
```

Problem 3a) Matrix multiplication

```
A = [6 -2;10 3;4 7];
B = [9 8;-5 12];
C = A*B
```

```
C =

    64    24
    75   116
     1   116
```

Problem 3b) Show AB =/ BA

```
A = [6 -2;10 3];
B = [9 8;-12 14];
AB = A*B
BA = B.*A
```

```
AB =

    78    20
    54   122
```

```
BA =

    54   -16
  -120    42
```

Problem 3c) Create an identity matrix, and show 0A = A0 = 0; then IA = AI

```
A = [6 -2;10 3];
zero1 = 0*A
zero2 = A*0

I = eye(size(A))
A_i1 = I.*A
A_i2 = A.*I
```

```
zero1 =
```

```
      0       0
      0       0


zero2 =

      0       0
      0       0


I =

      1       0
      0       1


A_i1 =

      6       0
      0       3


A_i2 =

      6       0
      0       3
```

Problem 3d) Create an 3x3 zero matrix, 2x3 zero matrix, and matrix of all zeros having the same dimension as matrix A

```
A = [6 -2;10 3;4 7]

zero_mat_33 = 0*A;
zero = [0;0;0];
zero_mat_33 = [zero_mat_33 zero]

zero_mat_23 = 0*A
zero_mat_same_A = 0*A
```

```
A =

      6      -2
     10       3
      4       7


zero_mat_33 =
```

```
        0       0       0
        0       0       0
        0       0       0


zero_mat_23 =

        0       0
        0       0
        0       0


zero_mat_same_A =

        0       0
        0       0
        0       0
```

Problem 4) Use left division method to solve set of linear equations.

```
A = [6 12 4;7 -2 3;2 8 -9];
B = [70;5;64];
ans_4 = A\B


ans_4 =

     3
     5
    -2
```

Problem 5) Example 6.3 from the Textbook

```
p = [2 10 0 -144];
r = roots(p)
z = polyval(p,2.5)
w = polyval(p,r)


r =

  -4.0000 + 2.8284i
  -4.0000 - 2.8284i
   3.0000 + 0.0000i


z =
```

```
-50.2500
```

```
w =

   1.0e-12 *

   0.0284 - 0.1563i
   0.0284 + 0.1563i
  -0.1137 + 0.0000i
```

Problem 6) For the set of equations: The following statement is true:

a) Only the trivial solution x1 = x2 = x3 = x4 = 0 exists b) There are no solutions c) A unique non-trivial solution exists d) Multiple non-trivial solutions exist

```
A = [1 2 1 4;3 6 3 12];
B = [2;6];
% A system of linear equation with same rank has multiple solutions.
% The system has equal rank; however, that does not equal the number of
% unknowns.

% Therefore, the answer is d.
```

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