Chris LaVoy
Tuesday 3:00PM

MAT 343 MATLAB Assignment # 1

Question 1

```
A = [2 6;3 9]
A =
    2    6
    3    9
B = [1 2;3 4]
B =
    1    2
    3    4
C = [-5 5;5 3]
C =
   -5    5
    5    3
```

Question 2 (a)

```
A + B
ans =
    3    8
    6   13
B + A
ans =
    3    8
    6   13
```

The results are the same, matrix addition is commutative.

Question 2 (b)

```
(A + B) + C
ans =
   -2   13
   11   16
A + (B + C)
ans =
   -2   13
   11   16
```

The results are the same, matrix addition is associative.

Question 2 (c)

```
5*(A + B)
ans =
   15   40
   30   65
5*A + 5*B
ans =
   15   40
   30   65
```

The results are the same, matrix multiplication with a scalar is distributive.

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Question 2 (d)

```
A*(B + C)
ans =
   40   56
   60   84
A*B + A*C
ans =
   40   56
   60   84
```

The results are the same, matrix multiplication is distributive.

Question 2 (e) [i]

```
A * B
ans =
   20   28
   30   42
A * C
ans =
   20   28
   30   42
```

The results are the same, it appears to be true for matricies.

Question 2 (e) [ii]

```
A * B
ans =
   20   28
   30   42
B*A
ans =
    8   24
   18   54
```

The results are not the same, matrix products do not commute.

Question 3

```
M = zeros
M =
    0
M = zeros(2,3)
M =
    0    0    0
    0    0    0
N = eye(3,3) * 5
N =
    5    0    0
    0    5    0
    0    0    5
P = ones(2,2) * 3
P =
```

```
   3   3
   3   3
Q = triu(ones(3,3))
Q =
   1   1   1
   0   1   1
   0   0   1
```

Question 4

```
G = [A zeros(2,2) eye(2,2); zeros(2,2) B zeros(2,2); eye(2,2) zeros(2,2) C]
G =
   2   6   0   0   1   0
   3   9   0   0   0   1
   0   0   1   2   0   0
   0   0   3   4   0   0
   1   0   0   0  -5   5
   0   1   0   0   5   3
```

Question 5 (a)

```
H = G(1:4,1:4)
H =
   2   6   0   0
   3   9   0   0
   0   0   1   2
   0   0   3   4
```

Question 5 (b)

```
G(5,5) = 4
G =
   2   6   0   0   1   0
   3   9   0   0   0   1
   0   0   1   2   0   0
   0   0   3   4   0   0
   1   0   0   0   4   5
   0   1   0   0   5   3
```

Question 5 (c)

```
G(:,:)
ans =
```

It returns the number in every row and every column.

```
G(:)
ans =
```

It returns every element of the matrix vertically.

Question 5 (d)

```
G(7)
ans =
   6
```

```
G(16)
ans =
    3
```

It got the element at the 7th index.

Question 5 (e)

```
G(12,1)
{Index exceeds matrix dimensions.}
```

It returns and error because there is no 12th row.

Question 5 (f)

```
G(G>5)
ans =
    6
    9
```

It looked for any element that is greater than 5.

```
G(G>5) = 100
G =
    2   100     0     0     1     0
    3   100     0     0     0     1
    0     0     1     2     0     0
    0     0     3     4     0     0
    1     0     0     0     4     5
    0     1     0     0     5     3
```

It replaced all instances of an element being greater than 5 with 100.

Question 5 (g)

```
G(6,:) = []
G =
    2   100     0     0     1     0
    3   100     0     0     0     1
    0     0     1     2     0     0
    0     0     3     4     0     0
    1     0     0     0     4     5
G(:,6) = []
G =
    2   100     0     0     1
    3   100     0     0     0
    0     0     1     2     0
    0     0     3     4     0
    1     0     0     0     4
```

Question 6

```
A = ones(20)
A =

A(6:15, 6:15) = 0
A =
```

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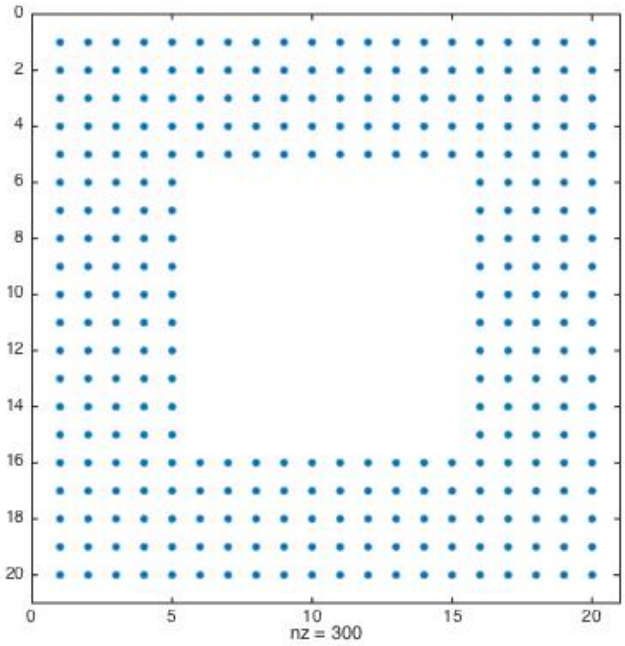
spy(A)



A(16:20, 1:5) = 0
A =

A(1:5, 16:20) = 0
A =

spy(A)

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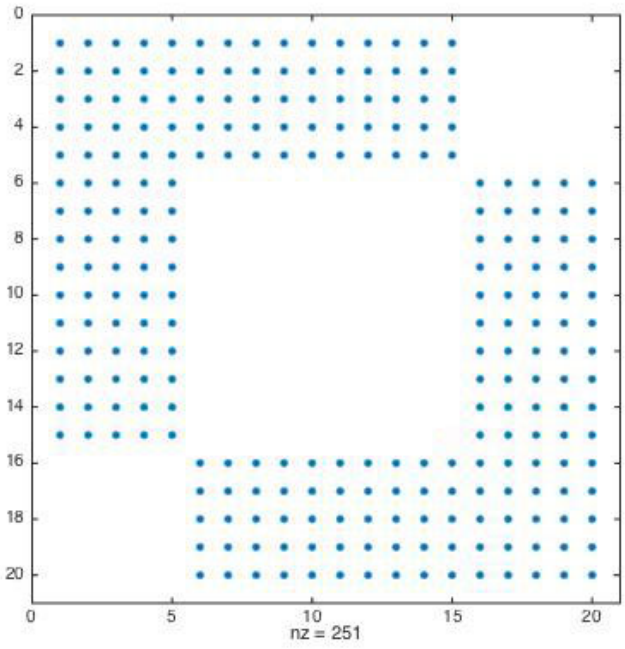

Question 7

```
A = diag(1:6) + diag(7:11, 1) + diag(12:15, 2)
A =
    1    7   12    0    0    0
    0    2    8   13    0    0
    0    0    3    9   14    0
    0    0    0    4   10   15
    0    0    0    0    5   11
    0    0    0    0    0    6
A = A + triu(A, 1)'
A =
    1    7   12    0    0    0
    7    2    8   13    0    0
   12    8    3    9   14    0
    0   13    9    4   10   15
    0    0   14   10    5   11
    0    0    0   15   11    6
```

Question 8 (a)

```
A = rand(10)
A =
  Columns 1 through 9
    0.8147    0.1576    0.6557    0.7060    0.4387    0.2760    0.7513    0.8407    0.3517
    0.9058    0.9706    0.0357    0.0318    0.3816    0.6797    0.2551    0.2543    0.8308
    0.1270    0.9572    0.8491    0.2769    0.7655    0.6551    0.5060    0.8143    0.5853
    0.9134    0.4854    0.9340    0.0462    0.7952    0.1626    0.6991    0.2435    0.5497
    0.6324    0.8003    0.6787    0.0971    0.1869    0.1190    0.8909    0.9293    0.9172
```

```
  0.0975   0.1419   0.7577   0.8235   0.4898   0.4984   0.9593   0.3500   0.2858
  0.2785   0.4218   0.7431   0.6948   0.4456   0.9597   0.5472   0.1966   0.7572
  0.5469   0.9157   0.3922   0.3171   0.6463   0.3404   0.1386   0.2511   0.7537
  0.9575   0.7922   0.6555   0.9502   0.7094   0.5853   0.1493   0.6160   0.3804
  0.9649   0.9595   0.1712   0.0344   0.7547   0.2238   0.2575   0.4733   0.5678
 Column 10
  0.0759
  0.0540
  0.5308
  0.7792
  0.9340
  0.1299
  0.5688
  0.4694
  0.0119
  0.3371
A = A * 100
A =
  81.4724  15.7613  65.5741  70.6046  43.8744  27.6025  75.1267  84.0717
35.1660   7.5854
  90.5792  97.0593   3.5712   3.1833  38.1558  67.9703  25.5095  25.4282
83.0829   5.3950
  12.6987  95.7167  84.9129  27.6923  76.5517  65.5098  50.5957  81.4285
58.5264  53.0798
  91.3376  48.5376  93.3993   4.6171  79.5200  16.2612  69.9077  24.3525
54.9724  77.9167
  63.2359  80.0280  67.8735   9.7132  18.6873  11.8998  89.0903  92.9264
91.7194  93.4011
   9.7540  14.1886  75.7740  82.3458  48.9764  49.8364  95.9291  34.9984
28.5839  12.9906
  27.8498  42.1761  74.3132  69.4829  44.5586  95.9744  54.7216  19.6595
75.7200  56.8824
  54.6882  91.5736  39.2227  31.7099  64.6313  34.0386  13.8624  25.1084
75.3729  46.9391
  95.7507  79.2207  65.5478  95.0222  70.9365  58.5268  14.9294  61.6045
38.0446   1.1902
  96.4889  95.9492  17.1187   3.4446  75.4687  22.3812  25.7508  47.3289
56.7822  33.7123
A = fix(A)
A =
  81   15   65   70   43   27   75   84   35    7
  90   97    3    3   38   67   25   25   83    5
  12   95   84   27   76   65   50   81   58   53
  91   48   93    4   79   16   69   24   54   77
  63   80   67    9   18   11   89   92   91   93
   9   14   75   82   48   49   95   34   28   12
```

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```
  27   42   74   69   44   95   54   19   75   56
  54   91   39   31   64   34   13   25   75   46
  95   79   65   95   70   58   14   61   38    1
  96   95   17    3   75   22   25   47   56   33
```

Question 8 (b)

```
A(A<10) = 0
A =
  81   15   65   70   43   27   75   84   35    0
  90   97    0    0   38   67   25   25   83    0
  12   95   84   27   76   65   50   81   58   53
  91   48   93    0   79   16   69   24   54   77
  63   80   67    0   18   11   89   92   91   93
   0   14   75   82   48   49   95   34   28   12
  27   42   74   69   44   95   54   19   75   56
  54   91   39   31   64   34   13   25   75   46
  95   79   65   95   70   58   14   61   38    0
  96   95   17    0   75   22   25   47   56   33
```

Question 8 (c)

```
A(A>90) = inf
A =
  81   15   65   70   43   27   75   84   35    0
  90  Inf    0    0   38   67   25   25   83    0
  12  Inf   84   27   76   65   50   81   58   53
 Inf   48  Inf    0   79   16   69   24   54   77
  63   80   67    0   18   11   89  Inf  Inf  Inf
   0   14   75   82   48   49  Inf   34   28   12
  27   42   74   69   44  Inf   54   19   75   56
  54  Inf   39   31   64   34   13   25   75   46
 Inf   79   65  Inf   70   58   14   61   38    0
 Inf  Inf   17    0   75   22   25   47   56   33
```

Question 8 (d)

```
b = A(A>=30 & A<=50)'
b =
  48   42   39   31   43   38   48   44   49   34   50   34   47   35   38   46   33
```