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Math 18 B01

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Exercise 3.1:
a.

```
c = [1 1; 100 100]

c =

     1     1
   100   100

>> inv(c)
Warning: Matrix is singular to working precision.


ans =

   Inf   Inf
   Inf   Inf
```

b.

```
>> A = [5 3; 7 4]
>> B = inv(A)

B =

   -4.0000    3.0000
    7.0000   -5.0000


>> B*A

ans =

    1.0000         0
   -0.0000    1.0000
```

```
>> A*B

ans =

    1.0000         0
         0    1.0000
```

c.

```
x = [2; 3]
x =

     2
     3

>> y = A*x

y =

    19
    26

>>
```

d.
I think we will get the matrix x. Because y is a multiple of A and x, multiplying it by the inverse of A will likely reduce it back down to x.

e.

```
>> B*y

ans =

     2
     3
```

Exercise 3.2
Exactly 2 stops without repeating cities:
San Diego>Los Angeles>Shanghai>Manila
San Diego>Los Angeles>Tokyo>Manila
San Diego>Los Angeles>Seattle>Manila
San Diego>Seattle>Shanghai>Manila
San Diego>Seattle>Tokyo>Manila

Exercise 3.3
a.

```
>> A = [0 1 0 0 0 1; 1 0 1 1 1 1; 0 1 0 1 1 1; 0 1 1 0 1 1; 0 0 1 1 0 0; 1 1 1 1 0 0]

A =

     0     1     0     0     0     1
     1     0     1     1     1     1
     0     1     0     1     1     1
     0     1     1     0     1     1
     0     0     1     1     0     0
     1     1     1     1     0     0

>> A^3

ans =

     2     7     5     5     5     7
     7    10    12    12    10    11
     4    11     9    10     9    11
     4    11    10     9     9    11
     4     4     7     7     4     4
     7     9    12    12     7     8
```

As we can see from the first row and fifth column, our answer is 5 which corresponds to our answer in exercise 3.2.

b.

```
>> A^2+A^3+A^4+A^5

ans =

    56   108   110   110    90   108
   112   204   218   218   174   204
    96   184   192   192   156   184
    96   184   192   192   156   184
    56    96   108   108    84    96
   104   180   198   198   154   180
```

When looking at the data set, we find that the number of ways to get from Manilla to Seattle with at most four stops is 96 (5th row to 6th column).

Exercise 3.4
a.
Function: (P^N)*x0 = Prediction for election N

```
>> (P^3)*x0

ans =

   0.3926
   0.4007
   0.1099
   0.0968

>> (P^6)*x0

ans =

   0.3617
   0.3629
   0.1418
   0.1336

>> (P^10)*x0

ans =

   0.3540
   0.3407
   0.1534
   0.1518
```

b.

```
>> (P^30)*x0

ans =

   0.3546
   0.3285
   0.1570
   0.1599

>> (P^60)*x0
```

```
ans =

    0.3547
    0.3285
    0.1570
    0.1599

>> (P^100)*x0

ans =

    0.3547
    0.3285
    0.1570
    0.1599
```

As our number of elections gets larger our resulting party affiliation will gradually fall towards the trends of our current election. However, this change will begin to level off once the distribution becomes more normalized (at around N=40). This can be seen in our last three results, as they hardly differ from each other.