```
In [44]: """
         EXERCISE

         Techniques used:
         - read_csv
         - unique()
         - .map()
         - .value_counts()
         - Boolean Indexing
         - Data cleaning
         - GroupBy
         - .plot()
         """
```

```
Out[44]: '\nEXERCISE\n\nTechniques used:\n- read_csv\n- unique()\n- .map()\n- .val
         ue_counts()\n- Boolean Indexing\n- Data cleaning\n- GroupBy\n- .plot()\n'
```

```
In [45]: %matplotlib inline

         import matplotlib
         import numpy as np
         import pandas as pd
         import matplotlib.pyplot as plt
```

```
In [46]: # 2012 election donation dataset
         fec = pd.read_csv('data/2012-election.csv', low_memory=False)

         # Inspect random row
         fec.ix[123]
```

```
Out[46]: cmte_id                          C00410118
         cand_id                          P20002978
         cand_nm                 Bachmann, Michelle
         contbr_nm                  RAINEY, PATRICK
         contbr_city                  WINTER GARDEN
         contbr_st                               FL
         contbr_zip                       347771599
         contbr_employer       INTL TRADING COMPANY
         contbr_occupation                   BROKER
         contb_receipt_amt                      250
         contb_receipt_dt                 20-JUN-11
         receipt_desc                           NaN
         memo_cd                                NaN
         memo_text                              NaN
         form_tp                              SA17A
         file_num                            736166
         Name: 123, dtype: object
```

```
In [47]: candidates = fec.cand_nm.unique()
         candidates
```

```
Out[47]: array(['Bachmann, Michelle', 'Romney, Mitt', 'Obama, Barack',
                "Roemer, Charles E. 'Buddy' III", 'Pawlenty, Timothy',
                'Johnson, Gary Earl', 'Paul, Ron', 'Santorum, Rick', 'Cain, Herma
         n',
                'Gingrich, Newt', 'McCotter, Thaddeus G', 'Huntsman, Jon',
                'Perry, Rick'], dtype=object)
```

```
In [48]: # Map candidates to parties
         parties = {'Bachmann, Michelle': 'Republican',
                    'Cain, Herman': 'Republican',
                    'Gingrich, Newt': 'Republican',
                    'Huntsman, Jon': 'Republican',
                    'Johnson, Gary Earl': 'Republican',
                    'McCotter, Thaddeus G': 'Republican',
                    'Obama, Barack': 'Democrat',
                    'Paul, Ron': 'Republican',
                    'Perry, Rick': 'Republican',
                    "Roemer, Charles E. 'Buddy' III": 'Republican',
                    'Romney, Mitt': 'Republican',
                    'Santorum, Rick': 'Republican'}
```

```
In [49]: # Add party column to dataframe
         fec['party'] = fec.cand_nm.map(parties)
```

```
In [50]: # How many individual donations by party
         fec['party'].value_counts()
```

```
Out[50]: Democrat      593746
         Republican    403430
         dtype: int64
```

```
In [51]: # Dataset include refunds (negative contributions)
         (fec.contb_receipt_amt > 0).value_counts()
```

```
Out[51]: True     991475
         False     10256
         dtype: int64
```

```
In [52]: # Simplify dataset to just positive contributions and Barack Obama, and Mitt
         data = fec[fec.contb_receipt_amt > 0]
         nominees_data = fec[fec.cand_nm.isin(['Obama, Barack', 'Romney, Mitt'])]
```

In [53]:
```
# Donation Stats by Occupation
data.contbr_occupation.value_counts()[:10]
```

Out[53]:
```
RETIRED                                    233990
INFORMATION REQUESTED                       35107
ATTORNEY                                    34286
HOMEMAKER                                   29931
PHYSICIAN                                   23432
INFORMATION REQUESTED PER BEST EFFORTS      21138
ENGINEER                                    14334
TEACHER                                     13990
CONSULTANT                                  13273
PROFESSOR                                   12555
dtype: int64
```

In [54]:
```
# Clean data
occupation_map = {
    'INFORMATION REQUESTED PER BEST EFFORTS': 'NOT PROVIDED',
    'INFORMATION REQUESTED': 'NOT PROVIDED',
    'INFORMATION REQUESTED (BEST EFFORTS)': 'NOT PROVIDED',
    'C.E.O.': 'CEO'
}

# If no mapping, pass through original value
f = lambda x: occupation_map.get(x, x)
data.contbr_occupation = data.contbr_occupation.map(f)

employer_map = {
    'INFORMATION REQUESTED PER BEST EFFORTS': 'NOT PROVIDED',
    'INFORMATION REQUESTED': 'NOT PROVIDED',
    'SELF': 'SELF-EMPLOYED',
    'SELF EMPLOYED': 'SELF-EMPLOYED',
}
f = lambda x: employer_map.get(x, x)
data.contbr_employer = data.contbr_employer.map(f)
```

In [61]:
```
by_occupation = data.pivot_table('contb_receipt_amt',
                                 index='contbr_occupation',
                                 columns='party', aggfunc='sum')
by_occupation.head()
```

Out[61]:

party	Democrat	Republican
contbr_occupation		
MIXED-MEDIA ARTIST / STORYTELLER	100	NaN
AREA VICE PRESIDENT	250	NaN
RESEARCH ASSOCIATE	100	NaN
TEACHER	500	NaN
THERAPIST	3900	NaN

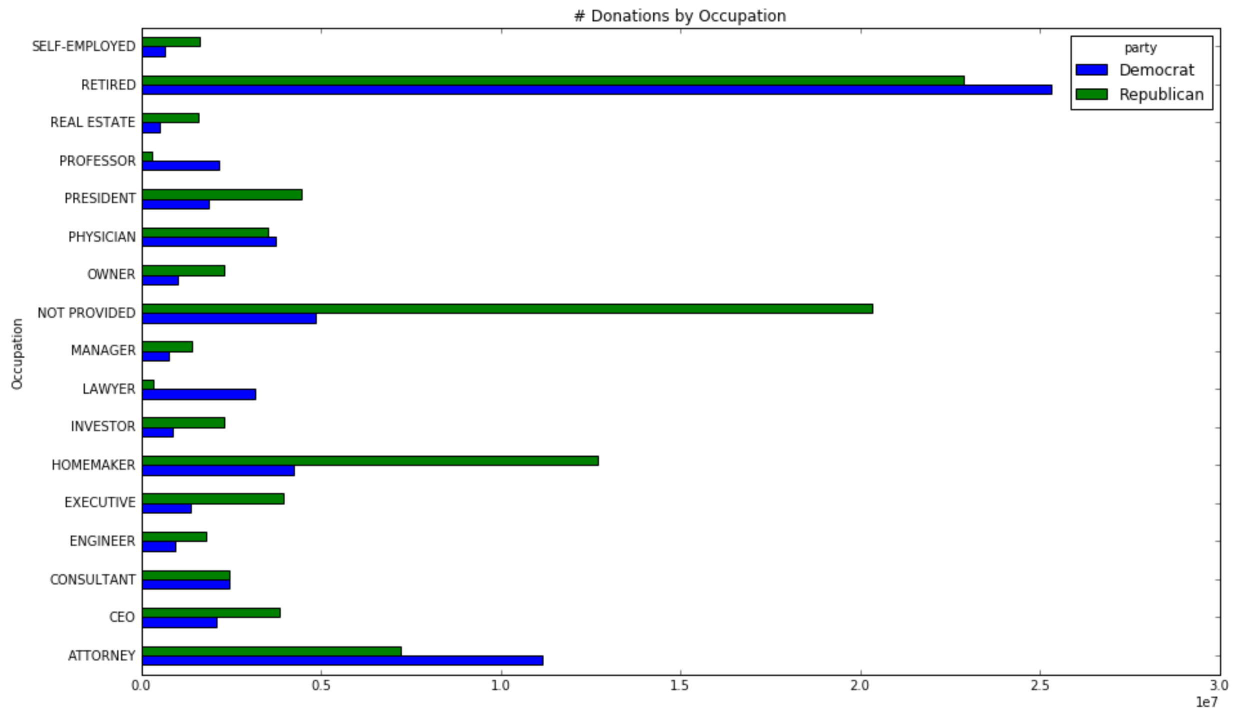
```
In [56]: over_2mm = by_occupation[by_occupation.sum(1) > 2000000]
         over_2mm
```

Out[56]:

party	Democrat	Republican
contbr_occupation		
ATTORNEY	11141982.97	7214482.230000
CEO	2074974.79	3862590.520000
CONSULTANT	2459912.71	2434349.400000
ENGINEER	951525.55	1802248.700000
EXECUTIVE	1355161.05	3964650.090000
HOMEMAKER	4248875.80	12715782.760000
INVESTOR	884133.00	2295168.920000
LAWYER	3160478.87	327224.320000
MANAGER	762883.22	1394467.370000
NOT PROVIDED	4866973.96	20337131.830000
OWNER	1001567.36	2294861.920000
PHYSICIAN	3735124.94	3539687.170000
PRESIDENT	1878509.95	4464514.840000
PROFESSOR	2165071.08	294922.730000
REAL ESTATE	528902.09	1585502.250000
RETIRED	25305116.38	22863149.489999
SELF-EMPLOYED	672393.40	1606652.540000

```
In [57]: # We can quickly visualize this with a barchart
         ax = over_2mm.plot(kind='barh', figsize=(15,9), title="# Donations by Occupat
         ax.set_ylabel('Occupation')

Out[57]: <matplotlib.text.Text at 0x104ea6590>
```



```
In [58]: # Get top donor occupations and companies for Obama and Romney
         def get_top_amounts(group, key, n=5):
             totals = group.groupby(key)['contb_receipt_amt'].sum()
             return totals.order(ascending=False)[:n]
```

```
In [59]: grouped = nominees_data.groupby('cand_nm')

         # Top 10 donors by occupation
         grouped.apply(get_top_amounts, 'contbr_occupation', n=10)
```

```
Out[59]: cand_nm        contbr_occupation
         Obama, Barack  RETIRED                                   25270507.23
                        ATTORNEY                                  11126932.97
                        INFORMATION REQUESTED                      4849801.96
                        HOMEMAKER                                  4243394.30
                        PHYSICIAN                                  3732387.44
                        LAWYER                                     3159391.87
                        CONSULTANT                                 2459812.71
                        PROFESSOR                                  2163571.08
                        CEO                                        2069784.79
                        PRESIDENT                                  1878009.95
         Romney, Mitt   RETIRED                                   11266949.23
                        INFORMATION REQUESTED PER BEST EFFORTS    11173374.84
                        HOMEMAKER                                  8037250.86
                        ATTORNEY                                   5302578.82
                        PRESIDENT                                  2403439.77
                        EXECUTIVE                                  2230653.79
                        C.E.O.                                     1893931.11
                        INVESTOR                                   1494725.12
                        CONSULTANT                                 1404576.94
                        PHYSICIAN                                  1332996.34
         Name: contb_receipt_amt, dtype: float64
```

```
In [60]: # Top 10 donors by employer
         grouped.apply(get_top_amounts, 'contbr_employer', n=10)
```

```
Out[60]: cand_nm        contbr_employer
         Obama, Barack  RETIRED                                   22665902.20
                        SELF-EMPLOYED                             17038455.96
                        NOT EMPLOYED                               8584118.70
                        INFORMATION REQUESTED                      5036178.37
                        HOMEMAKER                                  2599987.04
                        SELF                                       1076531.20
                        SELF EMPLOYED                               469290.00
                        STUDENT                                     318831.45
                        VOLUNTEER                                   257104.00
                        MICROSOFT                                   215585.36
         Romney, Mitt   INFORMATION REQUESTED PER BEST EFFORTS    11827237.12
                        RETIRED                                   11264701.35
                        HOMEMAKER                                  8037000.86
                        SELF-EMPLOYED                              7260882.29
                        STUDENT                                     488642.82
                        CREDIT SUISSE                               265650.00
                        MORGAN STANLEY                              262266.00
                        GOLDMAN SACH & CO.                          233250.00
                        BARCLAYS CAPITAL                            162750.00
                        H.I.G. CAPITAL                              139500.00
         Name: contb_receipt_amt, dtype: float64
```

```
In [ ]:
```