

Code Practice 3

Question 1

In [2]:

```
import pandas as pd
data = {'BRA': [13.37, 13.30, 14.34, 15.07, 15.46, 15.98, 16.10],
        'JPN': [33.43, 31.83, 33.71, 34.29, 35.60, 36.79, 37.39],
        'USA': [48.30, 46.91, 48.31, 49.72, 51.41, 52.94, 54.60],
        'Year': [2008, 2009, 2010, 2011, 2012, 2013, 2014]}
weo = pd.DataFrame(data)
weo
```

Out[2]:

	BRA	JPN	USA	Year
0	13.37	33.43	48.30	2008
1	13.30	31.83	46.91	2009
2	14.34	33.71	48.31	2010
3	15.07	34.29	49.72	2011
4	15.46	35.60	51.41	2012
5	15.98	36.79	52.94	2013
6	16.10	37.39	54.60	2014

a.

This is a convention that loads the pandas library and calls the pandas methods with pd.

b.

In [3]:

```
whos
```

Variable	Type	Data/Info
-----	-----	-----
data	dict	n=4
pd	module	<module 'pandas' from '/U<...>ages/pandas/__init__.py'>
weo	DataFrame	BRA JPN USA Y<...>16.10 37.39
		54.60 2014

Data is a dictionary.

c.

This is so that it is within a pandas function.

d.

weo is a DataFrame.

e.

It has 7 rows and 4 columns.

In [4]:

```
count_row = weo.shape[0]
count_col = weo.shape[1]
print(count_row)
print(count_col)
```

```
7
4
```

In [5]:

```
weo.shape
```

Out[5]:

```
(7, 4)
```

f.

In [5]:

```
weo.dtypes
```

Out[5]:

```
BRA      float64
JPN      float64
USA      float64
Year     int64
dtype: object
```

The variables in the columns BRA, JPN, USA, below their appropriate titles, are floats, and the variables in the column Year are integers.

g.

In [7]:

```
weo['Year']
```

Out[7]:

```
0    2008  
1    2009  
2    2010  
3    2011  
4    2012  
5    2013  
6    2014  
Name: Year, dtype: int64
```

These are all integers.

In [6]:

```
type(weo['Year'])
```

Out[6]:

```
pandas.core.series.Series
```

In [10]:

```
weo[['Year']]
```

Out[10]:

	Year
0	2008
1	2009
2	2010
3	2011
4	2012
5	2013
6	2014

In [7]:

```
type(weo[['Year']])
```

Out[7]:

```
pandas.core.frame.DataFrame
```

In [8]:

```
type(weo[[3]])
```

```
-----
KeyError                                 Traceback (most recent call
l last)
<ipython-input-8-b85a8f7e505e> in <module>()
----> 1 type(weo[[3]])

~/anaconda3/lib/python3.6/site-packages/pandas/core/frame.py in __ge
titem__(self, key)
 1956         if isinstance(key, (Series, np.ndarray, Index, list))
):
 1957             # either boolean or fancy integer index
-> 1958                 return self._getitem_array(key)
 1959             elif isinstance(key, DataFrame):
 1960                 return self._getitem_frame(key)

~/anaconda3/lib/python3.6/site-packages/pandas/core/frame.py in _get
item_array(self, key)
 2000         return self.take(indexer, axis=0, convert=False)
 2001     else:
-> 2002         indexer = self.loc._convert_to_indexer(key, axis
=1)
 2003         return self.take(indexer, axis=1, convert=True)
 2004

~/anaconda3/lib/python3.6/site-packages/pandas/core/indexing.py in _c
onvert_to_indexer(self, obj, axis, is_setter)
 1229             mask = check == -1
 1230             if mask.any():
-> 1231                 raise KeyError('%s not in index' % obj)
r[mask])
 1232
 1233             return _values_from_object(indexer)
```

KeyError: '[3] not in index'

w eo['Year']

is a Series.

w eo[['Year']]

is a DataFrame.

w eo[[3]]

does not exist because [3] is not in the index.

h.

In [10]:

```
weo['Year'].astype(float)
```

Out[10]:

```
0    2008.0  
1    2009.0  
2    2010.0  
3    2011.0  
4    2012.0  
5    2013.0  
6    2014.0  
Name: Year, dtype: float64
```

i.

In [11]:

```
t = weo.tail(3)
```

In [12]:

```
type(t)
```

Out[12]:

```
pandas.core.frame.DataFrame
```

t is a DataFrame

In [13]:

```
t
```

Out[13]:

	BRA	JPN	USA	Year
4	15.46	35.60	51.41	2012
5	15.98	36.79	52.94	2013
6	16.10	37.39	54.60	2014

j.

In [14]:

```
h = weo.head(4)
```

In [15]:

```
h
```

Out[15]:

	BRA	JPN	USA	Year
0	13.37	33.43	48.30	2008
1	13.30	31.83	46.91	2009
2	14.34	33.71	48.31	2010
3	15.07	34.29	49.72	2011

k.

In [16]:

```
weo['BRA']
```

Out[16]:

```
0    13.37
1    13.30
2    14.34
3    15.07
4    15.46
5    15.98
6    16.10
Name: BRA, dtype: float64
```

In [17]:

```
type(weo['BRA'])
```

Out[17]:

```
pandas.core.series.Series
```

```
weo['BRA']
```

is a Series.

l.

In [18]:

```
weo['BRA_JPN_Ratio'] = weo['BRA']/ weo['JPN']
```

In [19]:

```
weo['BRA_JPN_Ratio']
```

Out[19]:

```
0    0.399940
1    0.417845
2    0.425393
3    0.439487
4    0.434270
5    0.434357
6    0.430596
Name: BRA_JPN_Ratio, dtype: float64
```

In [20]:

```
weo
```

Out[20]:

	BRA	JPN	USA	Year	BRA_JPN_Ratio
0	13.37	33.43	48.30	2008	0.399940
1	13.30	31.83	46.91	2009	0.417845
2	14.34	33.71	48.31	2010	0.425393
3	15.07	34.29	49.72	2011	0.439487
4	15.46	35.60	51.41	2012	0.434270
5	15.98	36.79	52.94	2013	0.434357
6	16.10	37.39	54.60	2014	0.430596

M.

In [21]:

```
weo = weo.drop("BRA_JPN_Ratio", 1)
```

In [22]:

weo

Out[22]:

	BRA	JPN	USA	Year
0	13.37	33.43	48.30	2008
1	13.30	31.83	46.91	2009
2	14.34	33.71	48.31	2010
3	15.07	34.29	49.72	2011
4	15.46	35.60	51.41	2012
5	15.98	36.79	52.94	2013
6	16.10	37.39	54.60	2014

N.

In [23]:

weo.index

Out[23]:

RangeIndex(start=0, stop=7, step=1)

In [24]:

list(weo.index)

Out[24]:

[0, 1, 2, 3, 4, 5, 6]

In [25]:

weo.columns.get_values()

Out[25]:

array(['BRA', 'JPN', 'USA', 'Year'], dtype=object)

Weo's rows are [0, 1, 2, 3, 4, 5, 6] and weo's columns are ['BRA', 'JPN', 'USA', 'Year'].

O.

In [26]:

weo.index = weo['Year']

In [27]:

```
list(weo.index)
```

Out[27]:

```
[2008, 2009, 2010, 2011, 2012, 2013, 2014]
```

P.

In [28]:

```
weo=weo.rename(columns = {'BRA':'Brazil', 'JPN':'Japan', 'USA':'United States'})
```

In [29]:

```
weo
```

Out[29]:

	Brazil	Japan	United States	Year
Year				
2008	13.37	33.43	48.30	2008
2009	13.30	31.83	46.91	2009
2010	14.34	33.71	48.31	2010
2011	15.07	34.29	49.72	2011
2012	15.46	35.60	51.41	2012
2013	15.98	36.79	52.94	2013
2014	16.10	37.39	54.60	2014

Q.

In [30]:

```
from pandas import ExcelWriter

writer = ExcelWriter('CodePractice3.xlsx', engine='xlsxwriter')
wyo.to_excel(writer, sheet_name='Sheet1')
writer.save()
```

In [31]:

```
writer
```

Out[31]:

```
<pandas.io.excel._XlsxWriter at 0x1100396a0>
```

R.

In [32]:

```
weo['Brazil'].mean()
```

Out[32]:

```
14.802857142857144
```

In [125]:

```
weo.mean()
```

Out[125]:

```
Brazil          14.802857
Japan           34.720000
United States   50.312857
Year            2011.000000
dtype: float64
```

S.

In [33]:

```
weo.mean(axis=1)
```

Out[33]:

```
Year
2008    525.7750
2009    525.2600
2010    526.5900
2011    527.5200
2012    528.6175
2013    529.6775
2014    530.5225
dtype: float64
```

T.

In [34]:

```
import matplotlib.pyplot as plt
```

In [35]:

```
weo = weo.drop('Year', 1)
```

In [36]:

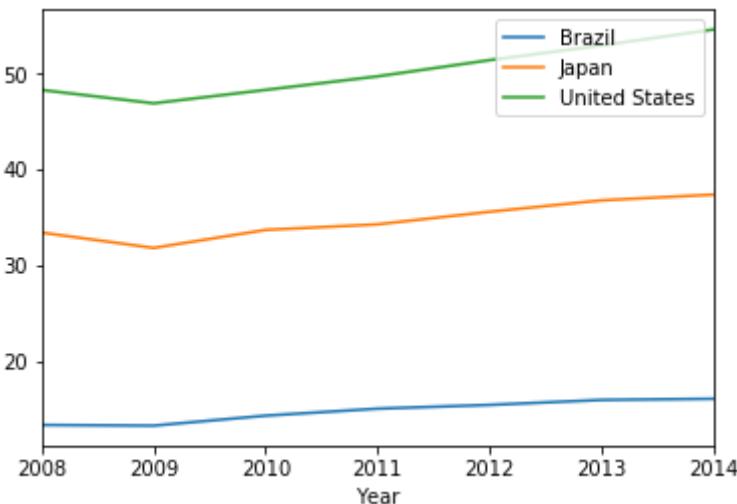
```
weo
```

Out[36]:

	Brazil	Japan	United States
Year			
2008	13.37	33.43	48.30
2009	13.30	31.83	46.91
2010	14.34	33.71	48.31
2011	15.07	34.29	49.72
2012	15.46	35.60	51.41
2013	15.98	36.79	52.94
2014	16.10	37.39	54.60

In [37]:

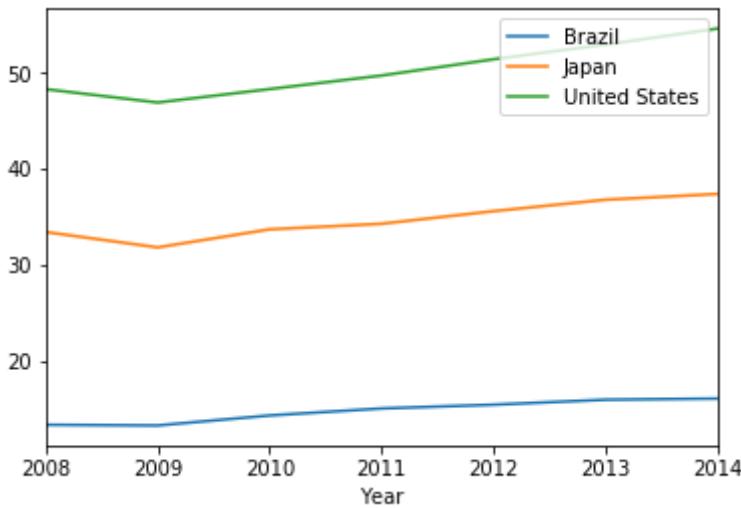
```
weo.plot()  
plt.show()
```



U.

In [38]:

```
weo.plot()  
plt.show()
```

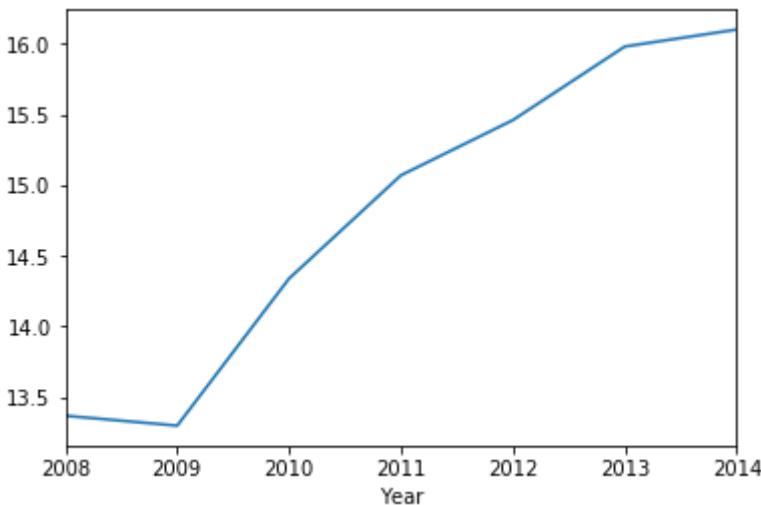


V.

W.

In [170]:

```
weo['Brazil'].plot()  
plt.show()
```



Question 2

A.

In [41]:

```
import os
import pandas as pd
data = pd.read_csv("https://raw.githubusercontent.com/NYUDataBootcamp/Materials/
master/Data/entry_poll_fall16.csv")
```

In [42]:

```
data
```

Out[42] :

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
0	2016-08-16 12:55:02	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Analytics or other quant
1	2016-08-31 05:54:00	I heard it was fun	Other undergraduate	None	None	NaN
2	2016-09-01 19:43:56	I like a challenge	Other undergraduate	None	I have taken one probability or statistics course	Politics
3	2016-09-01 20:00:08	I heard it was fun	Other undergraduate	None	I have taken many courses and/or have extensively	Economics & Mathematics
4	2016-09-01 20:00:52	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
5	2016-09-01 20:56:31	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken many courses and/or have extensively	Economic Theory
6	2016-09-01 22:30:33	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Politics, minor in Economic

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
7	2016-09-01 22:31:14	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Finance
8	2016-09-02 01:09:15	I lost my mind for a minute	Undergraduate business	None	I have taken one probability or statistics course	Finance
9	2016-09-02 10:25:48	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
10	2016-09-02 11:54:33	To help with my career	Other undergraduate	I have taken one programming course	I have taken one probability or statistics course	Analytics or other quant
11	2016-09-02 13:06:15	To help with my career	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Analytics or other quant
12	2016-09-02 16:00:37	To help with my career	Undergraduate business	I have taken many courses and forgotten most o...	I have taken one probability or statistics course	Finance
13	2016-09-02 20:10:36	I heard it was fun	Other undergraduate	None	None	Analytics or other quant
14	2016-09-02 21:56:44	I code/build websites in my spare time as a hobby	Undergraduate business	I have taken many courses and forgotten most o...	I have taken many courses and/or have extensively used them in my work	Management

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
15	2016-09-03 09:45:56	To help with my career	Gallatin	None	I have taken one probability or statistics course	Analytics or other quant
16	2016-09-04 10:53:37	I lost my mind for a minute	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
17	2016-09-04 12:44:53	I heard it was fun	Undergraduate business	I have taken many courses and/or have extensively studied them.	I have taken one probability or statistics course	Finance
18	2016-09-04 15:39:17	To help with my career	Undergraduate business	None	I have taken many courses and forgotten most of them.	Economics
19	2016-09-04 20:27:46	To help with my career	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Marketing
20	2016-09-05 13:41:18	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Economics
21	2016-09-05 15:34:56	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	NaN

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
22	2016-09-05 22:10:23	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
23	2016-09-06 01:47:21	To help with my career	Undergraduate Gallatin	None	I have taken one probability or statistics course	Analytics or other quant
24	2016-09-06 10:42:42	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Econ and Politics
25	2016-09-06 13:42:48	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Math & Economics
26	2016-09-06 14:12:46	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Economics
27	2016-09-06 15:35:15	To help with my career	Undergraduate business	I have taken many courses and forgotten most o...	I have taken one probability or statistics course	Finance
28	2016-09-06 17:11:46	To help with my career	Other undergraduate	None	I have taken many courses and forgotten most o...	Finance

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
29	2016-09-06 17:42:10	Recommended by a professor.	Undergraduate business	None	I have taken one probability or statistics course	Finance
...
55	2016-09-19 22:41:01	i am living in Santiago de Chile	Sin plata para MBA	I have taken many courses and/or have extensiv...	I have taken many courses and/or have extensiv...	Analytics or other quant
56	2016-09-20 07:28:38	To help with my career	MBA	None	I have taken many courses and/or have extensiv...	Analytics or other quant
57	2016-09-20 07:57:45	I heard it was fun	MBA	I have taken one programming course	I have taken many courses and forgotten most o...	Management
58	2016-09-20 12:48:45	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensiv...	Analytics or other quant
59	2016-09-20 13:01:39	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
60	2016-09-20 16:45:07	To help with my career	MBA	None	I have taken one probability or statistics course	Analytics or other quant

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
61	2016-09-20 18:03:44	To help with my career	MBA	None	I have taken one probability or statistics course	Analytics or other quant
62	2016-09-20 18:53:11	I lost my mind for a minute	MBA	None	I have taken one probability or statistics course	Finance
63	2016-09-20 21:15:40	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
64	2016-09-20 21:50:04	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
65	2016-09-21 12:47:49	I lost my mind for a minute	MBA	None	I have taken one probability or statistics course	Finance
66	2016-09-21 13:12:07	To help with my career	MBA	None	I have taken one probability or statistics course	Marketing
67	2016-09-21 13:22:54	I heard it was fun	MBA	I have taken one programming course	I have taken one probability or statistics course	Finance
68	2016-09-21 14:32:33	To help with my career	MBA	None	I have taken one probability or statistics course	Marketing

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
69	2016-09-21 15:16:42	To help with my career	MBA	None	I have taken one probability or statistics course	strategy
70	2016-09-21 15:56:03	To help with my career	MBA	None	I have taken one probability or statistics course	Economics
71	2016-09-21 16:29:42	To help with my career	MBA	None	I have taken many courses and forgotten most of them	Finance
72	2016-09-21 17:24:33	I heard it was fun	MBA	None	I have taken one probability or statistics course	Analytics or other quant
73	2016-09-21 17:29:33	To help with my career	MBA	None	I have taken many courses and forgotten most of them	Finance
74	2016-09-21 18:11:38	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensive experience	Entertainment
75	2016-09-21 18:15:15	To help with my career	MBA	None	I have taken one probability or statistics course	Strategy

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
76	2016-09-21 18:34:58	I lost my mind for a minute	MBA	None	I have taken many courses and forgotten most o...	Management
77	2016-09-22 09:03:40	To help with my career	MBA	None	I have taken many courses and/or have extensively...	Analytics or other quant
78	2016-09-23 14:33:06	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensively...	Analytics or other quant
79	2016-09-24 12:36:46	To help with my career	MBA	None	I have taken many courses and forgotten most o...	Analytics or other quant
80	2016-09-25 22:27:59	To help with my career	MBA	None	I have taken one probability or statistics course	Management
81	2016-09-26 13:44:20	To help with my career	MBA	I have taken one programming course	I have taken many courses and forgotten most o...	Finance
82	2016-09-27 15:05:34	To help with my career	Management of Technology	I have taken one programming course	I have taken one probability or statistics course	Management

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
83	2016-09-28 14:47:25	To help with my career	MBA	I have taken many courses and forgotten most o...	I have taken many courses and/or have extensiv...	Analytics or other quant
84	2016-09-28 18:35:45	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensiv...	Management

85 rows × 10 columns

In [43]:

```
pd
```

Out[43]:

```
<module 'pandas' from '/Users/rachelrub/anaconda3/lib/python3.6/site-packages/pandas/__init__.py'>
```

In [45]:

```
pd.read_csv("https://raw.githubusercontent.com/NYUDataBootcamp/Materials/master/  
Data/entry_poll_fall16.csv")
```

Out[45] :

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
0	2016-08-16 12:55:02	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Analytics or other quant
1	2016-08-31 05:54:00	I heard it was fun	Other undergraduate	None	None	NaN
2	2016-09-01 19:43:56	I like a challenge	Other undergraduate	None	I have taken one probability or statistics course	Politics
3	2016-09-01 20:00:08	I heard it was fun	Other undergraduate	None	I have taken many courses and/or have extensively	Economics & Mathematics
4	2016-09-01 20:00:52	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
5	2016-09-01 20:56:31	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken many courses and/or have extensively	Economic Theory
6	2016-09-01 22:30:33	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Politics, minor in Economic

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
7	2016-09-01 22:31:14	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Finance
8	2016-09-02 01:09:15	I lost my mind for a minute	Undergraduate business	None	I have taken one probability or statistics course	Finance
9	2016-09-02 10:25:48	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
10	2016-09-02 11:54:33	To help with my career	Other undergraduate	I have taken one programming course	I have taken one probability or statistics course	Analytics or other quant
11	2016-09-02 13:06:15	To help with my career	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Analytics or other quant
12	2016-09-02 16:00:37	To help with my career	Undergraduate business	I have taken many courses and forgotten most o...	I have taken one probability or statistics course	Finance
13	2016-09-02 20:10:36	I heard it was fun	Other undergraduate	None	None	Analytics or other quant
14	2016-09-02 21:56:44	I code/build websites in my spare time as a hobby	Undergraduate business	I have taken many courses and forgotten most o...	I have taken many courses and/or have extensively used them in my work	Management

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
15	2016-09-03 09:45:56	To help with my career	Gallatin	None	I have taken one probability or statistics course	Analytics or other quant
16	2016-09-04 10:53:37	I lost my mind for a minute	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
17	2016-09-04 12:44:53	I heard it was fun	Undergraduate business	I have taken many courses and/or have extensively studied them.	I have taken one probability or statistics course	Finance
18	2016-09-04 15:39:17	To help with my career	Undergraduate business	None	I have taken many courses and forgotten most of them.	Economics
19	2016-09-04 20:27:46	To help with my career	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Marketing
20	2016-09-05 13:41:18	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Economics
21	2016-09-05 15:34:56	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Nan

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
22	2016-09-05 22:10:23	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
23	2016-09-06 01:47:21	To help with my career	Undergraduate Gallatin	None	I have taken one probability or statistics course	Analytics or other quant
24	2016-09-06 10:42:42	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Econ and Politics
25	2016-09-06 13:42:48	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Math & Economics
26	2016-09-06 14:12:46	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Economics
27	2016-09-06 15:35:15	To help with my career	Undergraduate business	I have taken many courses and forgotten most o...	I have taken one probability or statistics course	Finance
28	2016-09-06 17:11:46	To help with my career	Other undergraduate	None	I have taken many courses and forgotten most o...	Finance

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
29	2016-09-06 17:42:10	Recommended by a professor.	Undergraduate business	None	I have taken one probability or statistics course	Finance
...
55	2016-09-19 22:41:01	i am living in Santiago de Chile	Sin plata para MBA	I have taken many courses and/or have extensiv...	I have taken many courses and/or have extensiv...	Analytics or other quant
56	2016-09-20 07:28:38	To help with my career	MBA	None	I have taken many courses and/or have extensiv...	Analytics or other quant
57	2016-09-20 07:57:45	I heard it was fun	MBA	I have taken one programming course	I have taken many courses and forgotten most o...	Management
58	2016-09-20 12:48:45	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensiv...	Analytics or other quant
59	2016-09-20 13:01:39	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
60	2016-09-20 16:45:07	To help with my career	MBA	None	I have taken one probability or statistics course	Analytics or other quant

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
61	2016-09-20 18:03:44	To help with my career	MBA	None	I have taken one probability or statistics course	Analytics or other quant
62	2016-09-20 18:53:11	I lost my mind for a minute	MBA	None	I have taken one probability or statistics course	Finance
63	2016-09-20 21:15:40	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
64	2016-09-20 21:50:04	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
65	2016-09-21 12:47:49	I lost my mind for a minute	MBA	None	I have taken one probability or statistics course	Finance
66	2016-09-21 13:12:07	To help with my career	MBA	None	I have taken one probability or statistics course	Marketing
67	2016-09-21 13:22:54	I heard it was fun	MBA	I have taken one programming course	I have taken one probability or statistics course	Finance
68	2016-09-21 14:32:33	To help with my career	MBA	None	I have taken one probability or statistics course	Marketing

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
69	2016-09-21 15:16:42	To help with my career	MBA	None	I have taken one probability or statistics course	strategy
70	2016-09-21 15:56:03	To help with my career	MBA	None	I have taken one probability or statistics course	Economics
71	2016-09-21 16:29:42	To help with my career	MBA	None	I have taken many courses and forgotten most of them	Finance
72	2016-09-21 17:24:33	I heard it was fun	MBA	None	I have taken one probability or statistics course	Analytics or other quant
73	2016-09-21 17:29:33	To help with my career	MBA	None	I have taken many courses and forgotten most of them	Finance
74	2016-09-21 18:11:38	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensive experience	Entertainment
75	2016-09-21 18:15:15	To help with my career	MBA	None	I have taken one probability or statistics course	Strategy

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
76	2016-09-21 18:34:58	I lost my mind for a minute	MBA	None	I have taken many courses and forgotten most o...	Management
77	2016-09-22 09:03:40	To help with my career	MBA	None	I have taken many courses and/or have extensively...	Analytics or other quant
78	2016-09-23 14:33:06	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensively...	Analytics or other quant
79	2016-09-24 12:36:46	To help with my career	MBA	None	I have taken many courses and forgotten most o...	Analytics or other quant
80	2016-09-25 22:27:59	To help with my career	MBA	None	I have taken one probability or statistics course	Management
81	2016-09-26 13:44:20	To help with my career	MBA	I have taken one programming course	I have taken many courses and forgotten most o...	Finance
82	2016-09-27 15:05:34	To help with my career	Management of Technology	I have taken one programming course	I have taken one probability or statistics course	Management

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
83	2016-09-28 14:47:25	To help with my career	MBA	I have taken many courses and forgotten most o...	I have taken many courses and/or have extensiv...	Analytics or other quant
84	2016-09-28 18:35:45	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensiv...	Management

85 rows × 10 columns

In [46]:

```
ep = pd.read_csv("https://raw.githubusercontent.com/NYUDataBootcamp/Materials/master/Data/entry_poll_fall16.csv")
```

In [47]:

```
ep
```

Out[47]:

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
0	2016-08-16 12:55:02	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Analytics or other quant
1	2016-08-31 05:54:00	I heard it was fun	Other undergraduate	None	None	NaN
2	2016-09-01 19:43:56	I like a challenge	Other undergraduate	None	I have taken one probability or statistics course	Politics
3	2016-09-01 20:00:08	I heard it was fun	Other undergraduate	None	I have taken many courses and/or have extensively	Economics & Mathematics
4	2016-09-01 20:00:52	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
5	2016-09-01 20:56:31	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken many courses and/or have extensively	Economic Theory
6	2016-09-01 22:30:33	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Politics, minor in Economic

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
7	2016-09-01 22:31:14	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Finance
8	2016-09-02 01:09:15	I lost my mind for a minute	Undergraduate business	None	I have taken one probability or statistics course	Finance
9	2016-09-02 10:25:48	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
10	2016-09-02 11:54:33	To help with my career	Other undergraduate	I have taken one programming course	I have taken one probability or statistics course	Analytics or other quant
11	2016-09-02 13:06:15	To help with my career	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Analytics or other quant
12	2016-09-02 16:00:37	To help with my career	Undergraduate business	I have taken many courses and forgotten most o...	I have taken one probability or statistics course	Finance
13	2016-09-02 20:10:36	I heard it was fun	Other undergraduate	None	None	Analytics or other quant
14	2016-09-02 21:56:44	I code/build websites in my spare time as a hobby	Undergraduate business	I have taken many courses and forgotten most o...	I have taken many courses and/or have extensiv...	Management

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
15	2016-09-03 09:45:56	To help with my career	Gallatin	None	I have taken one probability or statistics course	Analytics or other quant
16	2016-09-04 10:53:37	I lost my mind for a minute	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
17	2016-09-04 12:44:53	I heard it was fun	Undergraduate business	I have taken many courses and/or have extensively studied them.	I have taken one probability or statistics course	Finance
18	2016-09-04 15:39:17	To help with my career	Undergraduate business	None	I have taken many courses and forgotten most of them.	Economics
19	2016-09-04 20:27:46	To help with my career	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Marketing
20	2016-09-05 13:41:18	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Economics
21	2016-09-05 15:34:56	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Nan

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
22	2016-09-05 22:10:23	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
23	2016-09-06 01:47:21	To help with my career	Undergraduate Gallatin	None	I have taken one probability or statistics course	Analytics or other quant
24	2016-09-06 10:42:42	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Econ and Politics
25	2016-09-06 13:42:48	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Math & Economics
26	2016-09-06 14:12:46	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Economics
27	2016-09-06 15:35:15	To help with my career	Undergraduate business	I have taken many courses and forgotten most o...	I have taken one probability or statistics course	Finance
28	2016-09-06 17:11:46	To help with my career	Other undergraduate	None	I have taken many courses and forgotten most o...	Finance

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
29	2016-09-06 17:42:10	Recommended by a professor.	Undergraduate business	None	I have taken one probability or statistics course	Finance
...
55	2016-09-19 22:41:01	i am living in Santiago de Chile	Sin plata para MBA	I have taken many courses and/or have extensiv...	I have taken many courses and/or have extensiv...	Analytics or other quant
56	2016-09-20 07:28:38	To help with my career	MBA	None	I have taken many courses and/or have extensiv...	Analytics or other quant
57	2016-09-20 07:57:45	I heard it was fun	MBA	I have taken one programming course	I have taken many courses and forgotten most o...	Management
58	2016-09-20 12:48:45	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensiv...	Analytics or other quant
59	2016-09-20 13:01:39	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
60	2016-09-20 16:45:07	To help with my career	MBA	None	I have taken one probability or statistics course	Analytics or other quant

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
61	2016-09-20 18:03:44	To help with my career	MBA	None	I have taken one probability or statistics course	Analytics or other quant
62	2016-09-20 18:53:11	I lost my mind for a minute	MBA	None	I have taken one probability or statistics course	Finance
63	2016-09-20 21:15:40	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
64	2016-09-20 21:50:04	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
65	2016-09-21 12:47:49	I lost my mind for a minute	MBA	None	I have taken one probability or statistics course	Finance
66	2016-09-21 13:12:07	To help with my career	MBA	None	I have taken one probability or statistics course	Marketing
67	2016-09-21 13:22:54	I heard it was fun	MBA	I have taken one programming course	I have taken one probability or statistics course	Finance
68	2016-09-21 14:32:33	To help with my career	MBA	None	I have taken one probability or statistics course	Marketing

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
69	2016-09-21 15:16:42	To help with my career	MBA	None	I have taken one probability or statistics course	strategy
70	2016-09-21 15:56:03	To help with my career	MBA	None	I have taken one probability or statistics course	Economics
71	2016-09-21 16:29:42	To help with my career	MBA	None	I have taken many courses and forgotten most of them	Finance
72	2016-09-21 17:24:33	I heard it was fun	MBA	None	I have taken one probability or statistics course	Analytics or other quant
73	2016-09-21 17:29:33	To help with my career	MBA	None	I have taken many courses and forgotten most of them	Finance
74	2016-09-21 18:11:38	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensive experience	Entertainment
75	2016-09-21 18:15:15	To help with my career	MBA	None	I have taken one probability or statistics course	Strategy

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
76	2016-09-21 18:34:58	I lost my mind for a minute	MBA	None	I have taken many courses and forgotten most o...	Management
77	2016-09-22 09:03:40	To help with my career	MBA	None	I have taken many courses and/or have extensively...	Analytics or other quant
78	2016-09-23 14:33:06	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensively...	Analytics or other quant
79	2016-09-24 12:36:46	To help with my career	MBA	None	I have taken many courses and forgotten most o...	Analytics or other quant
80	2016-09-25 22:27:59	To help with my career	MBA	None	I have taken one probability or statistics course	Management
81	2016-09-26 13:44:20	To help with my career	MBA	I have taken one programming course	I have taken many courses and forgotten most o...	Finance
82	2016-09-27 15:05:34	To help with my career	Management of Technology	I have taken one programming course	I have taken one probability or statistics course	Management

	TimeStamp	Why have you enrolled in this course?	What program are you enrolled in?	How much programming experience have you had?	How much experience with probability and statistics have you had?	What is your major concentration?
83	2016-09-28 14:47:25	To help with my career	MBA	I have taken many courses and forgotten most o...	I have taken many courses and/or have extensiv...	Analytics or other quant
84	2016-09-28 18:35:45	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensiv...	Management

85 rows × 10 columns

B.

In [48]:

```
ep.index
```

Out[48]:

```
RangeIndex(start=0, stop=85, step=1)
```

In [49]:

```
ep.columns.get_values()
```

Out[49]:

```
array(['TimeStamp', 'Why have you enrolled in this course? ',  
       'What program are you enrolled in?',  
       'How much programming experience have you had?',  
       'How much experience with probability and statistics have you  
had?',  
       'What is your expected major or concentration? ',  
       'What career path most interests you? ',  
       'Do you use social media for information purposes? Check all  
that apply.',  
       'What kinds of data most interest you? List any that cross y  
our mind. ',  
       'If we have time -- and we may not -- what special topics wou  
ld interest you? Check all that apply.'], dtype=object)
```

In [50]:

```
count_row = ep.shape[0]  
count_col = ep.shape[1]  
print(count_row)  
print(count_col)
```

```
85  
10
```

The variables are the questions that head each column, such as 'TimeStamp', 'Why have you enrolled in this course?', 'What program are you enrolled in?', 'How much programming experience have you had?', 'How much experience with probability and statistics have you had?', 'What is your expected major or concentration?', 'What career path most interests you?', 'Do you use social media for information purposes? Check all that apply.', 'What kinds of data most interest you? List any that cross your mind. ', 'If we have time -- and we may not -- what special topics would interest you? Check all that apply.' The answers are recorded in the 85 rows that are filled with 85 different responses for each of the aforementioned questions.

C.

In [51]:

```
ep.dtypes
```

Out[51]:

```
TimeStamp
```

```
object
```

```
Why have you enrolled in this course?
```

```
object
```

```
What program are you enrolled in?
```

```
object
```

```
How much programming experience have you had?
```

```
object
```

```
How much experience with probability and statistics have you had?
```

```
object
```

```
What is your expected major or concentration?
```

```
object
```

```
What career path most interests you?
```

```
object
```

```
Do you use social media for information purposes? Check all that apply.
```

```
object
```

```
What kinds of data most interest you? List any that cross your mind.
```

```
object
```

```
If we have time -- and we may not -- what special topics would interest you? Check all that apply.
```

```
object
```

```
dtype: object
```

The variables are all objects

In [58]:

```
ep=ep.rename(columns = {'Why have you enrolled in this course? ':'Reason for enrollment.',
                       'What program are you enrolled in?':'Program of enrollment.',
                       'How much programming experience have you had?':'Programming experience',
                       'How much experience with probability and statistics have you had?':'Probability and statistics experience.',
                       'What is your expected major or concentration? ':'Major or concentration.',
                       'What career path most interests you? ':'Career of interest.',
                       'Do you use social media for information purposes? Check all that apply.':'Social media use.',
                       'What kinds of data most interest you? List any that cross your mind. ':'Data interests.',
                       'If we have time -- and we may not -- what special topics would interest you? Check all that apply.':'Special topics interests.'})
```

In [59]:

```
ep
```

Out[59] :

	TimeStamp	Reason for enrollment.	Program of enrollment.	Programming experience	Probability and statistics experience.	Major concentrat
0	2016-08-16 12:55:02	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Analytics or other quant
1	2016-08-31 05:54:00	I heard it was fun	Other undergraduate	None	None	Nan
2	2016-09-01 19:43:56	I like a challenge	Other undergraduate	None	I have taken one probability or statistics course	Politics
3	2016-09-01 20:00:08	I heard it was fun	Other undergraduate	None	I have taken many courses and/or have extensiv...	Economics Mathematic
4	2016-09-01 20:00:52	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
5	2016-09-01 20:56:31	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken many courses and/or have extensiv...	Economic Theory
6	2016-09-01 22:30:33	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Politics, mir in Economic
7	2016-09-01 22:31:14	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Finance

	TimeStamp	Reason for enrollment.	Program of enrollment.	Programming experience	Probability and statistics experience.	Majo concentrat
8	2016-09-02 01:09:15	I lost my mind for a minute	Undergraduate business	None	I have taken one probability or statistics course	Finance
9	2016-09-02 10:25:48	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
10	2016-09-02 11:54:33	To help with my career	Other undergraduate	I have taken one programming course	I have taken one probability or statistics course	Analytics or other quant
11	2016-09-02 13:06:15	To help with my career	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Analytics or other quant
12	2016-09-02 16:00:37	To help with my career	Undergraduate business	I have taken many courses and forgotten most o...	I have taken one probability or statistics course	Finance
13	2016-09-02 20:10:36	I heard it was fun	Other undergraduate	None	None	Analytics or other quant
14	2016-09-02 21:56:44	I code/build websites in my spare time as a hobby	Undergraduate business	I have taken many courses and forgotten most o...	I have taken many courses and/or have extensiv...	Managemer
15	2016-09-03 09:45:56	To help with my career	Gallatin	None	I have taken one probability or statistics course	Analytics or other quant

	TimeStamp	Reason for enrollment.	Program of enrollment.	Programming experience	Probability and statistics experience.	Majo concentrat
16	2016-09-04 10:53:37	I lost my mind for a minute	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
17	2016-09-04 12:44:53	I heard it was fun	Undergraduate business	I have taken many courses and/or have extensiv...	I have taken one probability or statistics course	Finance
18	2016-09-04 15:39:17	To help with my career	Undergraduate business	None	I have taken many courses and forgotten most o...	Economics
19	2016-09-04 20:27:46	To help with my career	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Marketing
20	2016-09-05 13:41:18	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Economics
21	2016-09-05 15:34:56	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Nan
22	2016-09-05 22:10:23	I heard it was fun	Undergraduate business	I have taken one programming course	I have taken one probability or statistics course	Finance
23	2016-09-06 01:47:21	To help with my career	Undergraduate Gallatin	None	I have taken one probability or statistics course	Analytics or other quant

	TimeStamp	Reason for enrollment.	Program of enrollment.	Programming experience	Probability and statistics experience.	Major concentrat
24	2016-09-06 10:42:42	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Econ and Politics
25	2016-09-06 13:42:48	To help with my career	Undergraduate business	None	I have taken one probability or statistics course	Math & Economics
26	2016-09-06 14:12:46	To help with my career	Other undergraduate	None	I have taken one probability or statistics course	Economics
27	2016-09-06 15:35:15	To help with my career	Undergraduate business	I have taken many courses and forgotten most o...	I have taken one probability or statistics course	Finance
28	2016-09-06 17:11:46	To help with my career	Other undergraduate	None	I have taken many courses and forgotten most o...	Finance
29	2016-09-06 17:42:10	Recommended by a professor.	Undergraduate business	None	I have taken one probability or statistics course	Finance
...
55	2016-09-19 22:41:01	i am living in Santiago de Chile	Sin plata para MBA	I have taken many courses and/or have extensiv...	I have taken many courses and/or have extensiv...	Analytics or other quant
56	2016-09-20 07:28:38	To help with my career	MBA	None	I have taken many courses and/or have extensiv...	Analytics or other quant

	TimeStamp	Reason for enrollment.	Program of enrollment.	Programming experience	Probability and statistics experience.	Majo concentrat
57	2016-09-20 07:57:45	I heard it was fun	MBA	I have taken one programming course	I have taken many courses and forgotten most o...	Management
58	2016-09-20 12:48:45	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensiv...	Analytics or other quant
59	2016-09-20 13:01:39	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
60	2016-09-20 16:45:07	To help with my career	MBA	None	I have taken one probability or statistics course	Analytics or other quant
61	2016-09-20 18:03:44	To help with my career	MBA	None	I have taken one probability or statistics course	Analytics or other quant
62	2016-09-20 18:53:11	I lost my mind for a minute	MBA	None	I have taken one probability or statistics course	Finance
63	2016-09-20 21:15:40	To help with my career	MBA	None	I have taken one probability or statistics course	Finance
64	2016-09-20 21:50:04	To help with my career	MBA	None	I have taken one probability or statistics course	Finance

	TimeStamp	Reason for enrollment.	Program of enrollment.	Programming experience	Probability and statistics experience.	Major concentrat
65	2016-09-21 12:47:49	I lost my mind for a minute	MBA	None	I have taken one probability or statistics course	Finance
66	2016-09-21 13:12:07	To help with my career	MBA	None	I have taken one probability or statistics course	Marketing
67	2016-09-21 13:22:54	I heard it was fun	MBA	I have taken one programming course	I have taken one probability or statistics course	Finance
68	2016-09-21 14:32:33	To help with my career	MBA	None	I have taken one probability or statistics course	Marketing
69	2016-09-21 15:16:42	To help with my career	MBA	None	I have taken one probability or statistics course	strategy
70	2016-09-21 15:56:03	To help with my career	MBA	None	I have taken one probability or statistics course	Economics
71	2016-09-21 16:29:42	To help with my career	MBA	None	I have taken many courses and forgotten most o...	Finance
72	2016-09-21 17:24:33	I heard it was fun	MBA	None	I have taken one probability or statistics course	Analytics or other quant

	TimeStamp	Reason for enrollment.	Program of enrollment.	Programming experience	Probability and statistics experience.	Major concentrat
73	2016-09-21 17:29:33	To help with my career	MBA	None	I have taken many courses and forgotten most o...	Finance
74	2016-09-21 18:11:38	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensiv...	Entertainme
75	2016-09-21 18:15:15	To help with my career	MBA	None	I have taken one probability or statistics course	Strategy
76	2016-09-21 18:34:58	I lost my mind for a minute	MBA	None	I have taken many courses and forgotten most o...	Managemer
77	2016-09-22 09:03:40	To help with my career	MBA	None	I have taken many courses and/or have extensiv...	Analytics or other quant
78	2016-09-23 14:33:06	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensiv...	Analytics or other quant
79	2016-09-24 12:36:46	To help with my career	MBA	None	I have taken many courses and forgotten most o...	Analytics or other quant
80	2016-09-25 22:27:59	To help with my career	MBA	None	I have taken one probability or statistics course	Managemer

	TimeStamp	Reason for enrollment.	Program of enrollment.	Programming experience	Probability and statistics experience.	Majo concentrat
81	2016-09-26 13:44:20	To help with my career	MBA	I have taken one programming course	I have taken many courses and forgotten most o...	Finance
82	2016-09-27 15:05:34	To help with my career	Management of Technology	I have taken one programming course	I have taken one probability or statistics course	Managemer
83	2016-09-28 14:47:25	To help with my career	MBA	I have taken many courses and forgotten most o...	I have taken many courses and/or have extensiv...	Analytics or other quant
84	2016-09-28 18:35:45	To help with my career	MBA	I have taken one programming course	I have taken many courses and/or have extensiv...	Managemer

85 rows × 10 columns

E.

In [60]:

```
ep[list(ep)[1]].value_counts()
```

Out[60]:

To help with my career	60
I heard it was fun	14
I lost my mind for a minute	5
i am living in Santiago de Chile	1
I like a challenge	1
To finish my major	1
I code/build websites in my spare time as a hobby	1
Wanted to try something completely different	1
Recommended by a professor.	1

Name: Reason for enrollment., dtype: int64

This code scrapes through the responses to the first question: 'Why have you enrolled in this course', and then counts how many of each response there are.

Question 3.

A.

In [62]:

```
url1 = 'https://raw.githubusercontent.com/fivethirtyeight/data/master/'  
url2 = 'college-majors/recent-grads.csv'  
url = url1 + url2
```

In [66]:

```
df538 = pd.read_csv(url)
```

In [67]:

```
df538
```

Out[67]:

	Rank	Major_code	Major	Total	Men	Women	Major_category
0	1	2419	PETROLEUM ENGINEERING	2339.0	2057.0	282.0	Engineering
1	2	2416	MINING AND MINERAL ENGINEERING	756.0	679.0	77.0	Engineering
2	3	2415	METALLURGICAL ENGINEERING	856.0	725.0	131.0	Engineering
3	4	2417	NAVAL ARCHITECTURE AND MARINE ENGINEERING	1258.0	1123.0	135.0	Engineering
4	5	2405	CHEMICAL ENGINEERING	32260.0	21239.0	11021.0	Engineering
5	6	2418	NUCLEAR ENGINEERING	2573.0	2200.0	373.0	Engineering
6	7	6202	ACTUARIAL SCIENCE	3777.0	2110.0	1667.0	Business
7	8	5001	ASTRONOMY AND ASTROPHYSICS	1792.0	832.0	960.0	Physical Sciences
8	9	2414	MECHANICAL ENGINEERING	91227.0	80320.0	10907.0	Engineering
9	10	2408	ELECTRICAL ENGINEERING	81527.0	65511.0	16016.0	Engineering
10	11	2407	COMPUTER ENGINEERING	41542.0	33258.0	8284.0	Engineering
11	12	2401	AEROSPACE ENGINEERING	15058.0	12953.0	2105.0	Engineering
12	13	2404	BIOMEDICAL ENGINEERING	14955.0	8407.0	6548.0	Engineering
13	14	5008	MATERIALS SCIENCE	4279.0	2949.0	1330.0	Engineering
14	15	2409	ENGINEERING MECHANICS PHYSICS AND SCIENCE	4321.0	3526.0	795.0	Engineering
15	16	2402	BIOLOGICAL ENGINEERING	8925.0	6062.0	2863.0	Engineering

	Rank	Major_code	Major	Total	Men	Women	Major_category
16	17	2412	INDUSTRIAL AND MANUFACTURING ENGINEERING	18968.0	12453.0	6515.0	Engineering
17	18	2400	GENERAL ENGINEERING	61152.0	45683.0	15469.0	Engineering
18	19	2403	ARCHITECTURAL ENGINEERING	2825.0	1835.0	990.0	Engineering
19	20	3201	COURT REPORTING	1148.0	877.0	271.0	Law & Public Policy
20	21	2102	COMPUTER SCIENCE	128319.0	99743.0	28576.0	Computers & Mathematics
21	22	1104	FOOD SCIENCE	Nan	Nan	Nan	Agriculture & Natural Resources
22	23	2502	ELECTRICAL ENGINEERING TECHNOLOGY	11565.0	8181.0	3384.0	Engineering
23	24	2413	MATERIALS ENGINEERING AND MATERIALS SCIENCE	2993.0	2020.0	973.0	Engineering
24	25	6212	MANAGEMENT INFORMATION SYSTEMS AND STATISTICS	18713.0	13496.0	5217.0	Business
25	26	2406	CIVIL ENGINEERING	53153.0	41081.0	12072.0	Engineering
26	27	5601	CONSTRUCTION SERVICES	18498.0	16820.0	1678.0	Industrial Arts Consumer Services
27	28	6204	OPERATIONS LOGISTICS AND E-COMMERCE	11732.0	7921.0	3811.0	Business
28	29	2499	MISCELLANEOUS ENGINEERING	9133.0	7398.0	1735.0	Engineering
29	30	5402	PUBLIC POLICY	5978.0	2639.0	3339.0	Law & Public Policy
...
143	144	1105	PLANT SCIENCE AND AGRONOMY	7416.0	4897.0	2519.0	Agriculture & Natural Resources

	Rank	Major_code	Major	Total	Men	Women	Major_category
144	145	2308	SCIENCE AND COMPUTER TEACHER EDUCATION	6483.0	2049.0	4434.0	Education
145	146	5200	PSYCHOLOGY	393735.0	86648.0	307087.0	Psychology & Social Work
146	147	6002	MUSIC	60633.0	29909.0	30724.0	Arts
147	148	2306	PHYSICAL AND HEALTH EDUCATION TEACHING	28213.0	15670.0	12543.0	Education
148	149	6006	ART HISTORY AND CRITICISM	21030.0	3240.0	17790.0	Humanities & Liberal Arts
149	150	6000	FINE ARTS	74440.0	24786.0	49654.0	Arts
150	151	2901	FAMILY AND CONSUMER SCIENCES	58001.0	5166.0	52835.0	Industrial Arts Consumer Services
151	152	5404	SOCIAL WORK	53552.0	5137.0	48415.0	Psychology & Social Work
152	153	1103	ANIMAL SCIENCES	21573.0	5347.0	16226.0	Agriculture & Natural Resources
153	154	6003	VISUAL AND PERFORMING ARTS	16250.0	4133.0	12117.0	Arts
154	155	2312	TEACHER EDUCATION: MULTIPLE LEVELS	14443.0	2734.0	11709.0	Education
155	156	5299	MISCELLANEOUS PSYCHOLOGY	9628.0	1936.0	7692.0	Psychology & Social Work
156	157	5403	HUMAN SERVICES AND COMMUNITY ORGANIZATION	9374.0	885.0	8489.0	Psychology & Social Work
157	158	3402	HUMANITIES	6652.0	2013.0	4639.0	Humanities & Liberal Arts
158	159	4901	THEOLOGY AND RELIGIOUS VOCATIONS	30207.0	18616.0	11591.0	Humanities & Liberal Arts
159	160	6007	STUDIO ARTS	16977.0	4754.0	12223.0	Arts
160	161	2201	COSMETOLOGY SERVICES AND CULINARY ARTS	10510.0	4364.0	6146.0	Industrial Arts Consumer Services

	Rank	Major_code	Major	Total	Men	Women	Major_category
161	162	1199	MISCELLANEOUS AGRICULTURE	1488.0	404.0	1084.0	Agriculture & Natural Resources
162	163	5502	ANTHROPOLOGY AND ARCHEOLOGY	38844.0	11376.0	27468.0	Humanities & Liberal Arts
163	164	6102	COMMUNICATION DISORDERS SCIENCES AND SERVICES	38279.0	1225.0	37054.0	Health
164	165	2307	EARLY CHILDHOOD EDUCATION	37589.0	1167.0	36422.0	Education
165	166	2603	OTHER FOREIGN LANGUAGES	11204.0	3472.0	7732.0	Humanities & Liberal Arts
166	167	6001	DRAMA AND THEATER ARTS	43249.0	14440.0	28809.0	Arts
167	168	3302	COMPOSITION AND RHETORIC	18953.0	7022.0	11931.0	Humanities & Liberal Arts
168	169	3609	ZOOLOGY	8409.0	3050.0	5359.0	Biology & Life Science
169	170	5201	EDUCATIONAL PSYCHOLOGY	2854.0	522.0	2332.0	Psychology & Social Work
170	171	5202	CLINICAL PSYCHOLOGY	2838.0	568.0	2270.0	Psychology & Social Work
171	172	5203	COUNSELING PSYCHOLOGY	4626.0	931.0	3695.0	Psychology & Social Work
172	173	3501	LIBRARY SCIENCE	1098.0	134.0	964.0	Education

173 rows × 21 columns

The dimensions are 173 rows by 12 columns

B.

In [68]:

df538.head(10)

Out[68]:

	Rank	Major_code	Major	Total	Men	Women	Major_category	SI
0	1	2419	PETROLEUM ENGINEERING	2339.0	2057.0	282.0	Engineering	0.
1	2	2416	MINING AND MINERAL ENGINEERING	756.0	679.0	77.0	Engineering	0.
2	3	2415	METALLURGICAL ENGINEERING	856.0	725.0	131.0	Engineering	0.
3	4	2417	NAVAL ARCHITECTURE AND MARINE ENGINEERING	1258.0	1123.0	135.0	Engineering	0.
4	5	2405	CHEMICAL ENGINEERING	32260.0	21239.0	11021.0	Engineering	0.
5	6	2418	NUCLEAR ENGINEERING	2573.0	2200.0	373.0	Engineering	0.
6	7	6202	ACTUARIAL SCIENCE	3777.0	2110.0	1667.0	Business	0.
7	8	5001	ASTRONOMY AND ASTROPHYSICS	1792.0	832.0	960.0	Physical Sciences	0.
8	9	2414	MECHANICAL ENGINEERING	91227.0	80320.0	10907.0	Engineering	0.
9	10	2408	ELECTRICAL ENGINEERING	81527.0	65511.0	16016.0	Engineering	0.

10 rows × 21 columns

C.

In [71]:

```
list(df538.index)
```

Out[71]:

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```

In [93]:

```
df538.iloc[[2, 4, 15, 16, 17],
           [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19,
            20]]
```

Out[93]:

	Rank	Major_code	Major	Total	Men	Women	Major_category
2	3	2415	METALLURGICAL ENGINEERING	856.0	725.0	131.0	Engineering
4	5	2405	CHEMICAL ENGINEERING	32260.0	21239.0	11021.0	Engineering
15	16	2402	BIOLOGICAL ENGINEERING	8925.0	6062.0	2863.0	Engineering
16	17	2412	INDUSTRIAL AND MANUFACTURING ENGINEERING	18968.0	12453.0	6515.0	Engineering
17	18	2400	GENERAL ENGINEERING	61152.0	45683.0	15469.0	Engineering

5 rows × 21 columns

These variables represent rows

D.

In [100]:

```
major = df538.index
```

In [101]:

```
major
```

Out[101]:

```
RangeIndex(start=0, stop=173, step=1)
```

E.

In [125]:

```
df538.sort_values(by='Total')
```

Out[125] :

	Rank	Major_code	Major	Total	Men	Women	Major_cat
73	74	3801	MILITARY TECHNOLOGIES	124.0	124.0	0.0	Industrial & Consumer Services
52	53	4005	MATHEMATICS AND COMPUTER SCIENCE	609.0	500.0	109.0	Computers & Mathematics
112	113	1106	SOIL SCIENCE	685.0	476.0	209.0	Agriculture & Natural Resources
33	34	2411	GEOLOGICAL AND GEOPHYSICAL ENGINEERING	720.0	488.0	232.0	Engineering
1	2	2416	MINING AND MINERAL ENGINEERING	756.0	679.0	77.0	Engineering
120	121	2301	EDUCATIONAL ADMINISTRATION AND SUPERVISION	804.0	280.0	524.0	Education
55	56	2303	SCHOOL STUDENT COUNSELING	818.0	119.0	699.0	Education
2	3	2415	METALLURGICAL ENGINEERING	856.0	725.0	131.0	Engineering
172	173	3501	LIBRARY SCIENCE	1098.0	134.0	964.0	Education
19	20	3201	COURT REPORTING	1148.0	877.0	271.0	Law & Public Policy
3	4	2417	NAVAL ARCHITECTURE AND MARINE ENGINEERING	1258.0	1123.0	135.0	Engineering
83	84	3602	BOTANY	1329.0	626.0	703.0	Biology & Life Sciences
91	92	5206	SOCIAL PSYCHOLOGY	1386.0	413.0	973.0	Psychology & Social Work
72	73	5000	PHYSICAL SCIENCES	1436.0	894.0	542.0	Physical Sciences
161	162	1199	MISCELLANEOUS AGRICULTURE	1488.0	404.0	1084.0	Agriculture & Natural Resources
48	49	3607	PHARMACOLOGY	1762.0	515.0	1247.0	Biology & Life Sciences

	Rank	Major_code	Major	Total	Men	Women	Major_cate
7	8	5001	ASTRONOMY AND ASTROPHYSICS	1792.0	832.0	960.0	Physical Sciences
90	91	5005	GEOSCIENCES	1978.0	809.0	1169.0	Physical Sciences
39	40	5102	NUCLEAR, INDUSTRIAL RADIOLOGY, AND BIOLOGICAL ...	2116.0	528.0	1588.0	Physical Sciences
0	1	2419	PETROLEUM ENGINEERING	2339.0	2057.0	282.0	Engineering
49	50	5006	OCEANOGRAPHY	2418.0	752.0	1666.0	Physical Sciences
75	76	5701	ELECTRICAL, MECHANICAL, AND PRECISION TECHNOLO...	2435.0	1869.0	566.0	Industrial And Consumer Services
71	72	1102	AGRICULTURAL ECONOMICS	2439.0	1749.0	690.0	Agriculture Natural Resources
5	6	2418	NUCLEAR ENGINEERING	2573.0	2200.0	373.0	Engineering
18	19	2403	ARCHITECTURAL ENGINEERING	2825.0	1835.0	990.0	Engineering
170	171	5202	CLINICAL PSYCHOLOGY	2838.0	568.0	2270.0	Psychology Social Work
169	170	5201	EDUCATIONAL PSYCHOLOGY	2854.0	522.0	2332.0	Psychology Social Work
50	51	2501	ENGINEERING AND INDUSTRIAL MANAGEMENT	2906.0	2400.0	506.0	Engineering
23	24	2413	MATERIALS ENGINEERING AND MATERIALS SCIENCE	2993.0	2020.0	973.0	Engineering
70	71	5205	INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY	3014.0	1075.0	1939.0	Psychology Social Work
...
17	18	2400	GENERAL ENGINEERING	61152.0	45683.0	15469.0	Engineering
97	98	5098	MULTI-DISCIPLINARY OR GENERAL SCIENCE	62052.0	27015.0	35037.0	Physical Sciences

	Rank	Major_code	Major	Total	Men	Women	Major_cate
74	75	5003	CHEMISTRY	66530.0	32923.0	33607.0	Physical Sciences
140	141	3401	LIBERAL ARTS	71369.0	22339.0	49030.0	Humanities Liberal Arts
41	42	3700	MATHEMATICS	72397.0	39956.0	32441.0	Computers Mathematic
96	97	1902	JOURNALISM	72619.0	23736.0	48883.0	Communic & Journalist
149	150	6000	FINE ARTS	74440.0	24786.0	49654.0	Arts
9	10	2408	ELECTRICAL ENGINEERING	81527.0	65511.0	16016.0	Engineering
8	9	2414	MECHANICAL ENGINEERING	91227.0	80320.0	10907.0	Engineering
95	96	6004	COMMERCIAL ART AND GRAPHIC DESIGN	103480.0	32041.0	71439.0	Arts
124	125	5507	SOCIOLOGY	115433.0	32510.0	82923.0	Social Scier
139	140	4101	PHYSICAL FITNESS PARKS RECREATION AND LEISURE	125074.0	62181.0	62893.0	Industrial A Consumer Services
20	21	2102	COMPUTER SCIENCE	128319.0	99743.0	28576.0	Computers Mathematic
36	37	5501	ECONOMICS	139247.0	89749.0	49498.0	Social Scier
114	115	6402	HISTORY	141951.0	78253.0	63698.0	Humanities Liberal Arts
113	114	2300	GENERAL EDUCATION	143718.0	26893.0	116825.0	Education
94	95	5301	CRIMINAL JUSTICE AND FIRE PROTECTION	152824.0	80231.0	72593.0	Law & Publ Policy
138	139	2304	ELEMENTARY EDUCATION	170862.0	13029.0	157833.0	Education
35	36	6207	FINANCE	174506.0	115030.0	59476.0	Business
78	79	5506	POLITICAL SCIENCE AND GOVERNMENT	182621.0	93880.0	88741.0	Social Scier
137	138	3301	ENGLISH LANGUAGE AND LITERATURE	194673.0	58227.0	136446.0	Humanities Liberal Arts
40	41	6201	ACCOUNTING	198633.0	94519.0	104114.0	Business

	Rank	Major_code	Major	Total	Men	Women	Major_cate
77	78	6206	MARKETING AND MARKETING RESEARCH	205211.0	78857.0	126354.0	Business
34	35	6107	NURSING	209394.0	21773.0	187621.0	Health
93	94	1901	COMMUNICATIONS	213996.0	70619.0	143377.0	Communications & Journalist
57	58	6200	GENERAL BUSINESS	234590.0	132238.0	102352.0	Business
123	124	3600	BIOLOGY	280709.0	111762.0	168947.0	Biology & Life Science
76	77	6203	BUSINESS MANAGEMENT AND ADMINISTRATION	329927.0	173809.0	156118.0	Business
145	146	5200	PSYCHOLOGY	393735.0	86648.0	307087.0	Psychology Social Work
21	22	1104	FOOD SCIENCE	NaN	NaN	NaN	Agriculture Natural Resources

173 rows × 21 columns

G.

In [126]:

```
dfhead = df538.head(10)
```

In [127]:

dfhead

Out[127]:

	Rank	Major_code	Major	Total	Men	Women	Major_category	St
0	1	2419	PETROLEUM ENGINEERING	2339.0	2057.0	282.0	Engineering	0.
1	2	2416	MINING AND MINERAL ENGINEERING	756.0	679.0	77.0	Engineering	0.
2	3	2415	METALLURGICAL ENGINEERING	856.0	725.0	131.0	Engineering	0.
3	4	2417	NAVAL ARCHITECTURE AND MARINE ENGINEERING	1258.0	1123.0	135.0	Engineering	0.
4	5	2405	CHEMICAL ENGINEERING	32260.0	21239.0	11021.0	Engineering	0.
5	6	2418	NUCLEAR ENGINEERING	2573.0	2200.0	373.0	Engineering	0.
6	7	6202	ACTUARIAL SCIENCE	3777.0	2110.0	1667.0	Business	0.
7	8	5001	ASTRONOMY AND ASTROPHYSICS	1792.0	832.0	960.0	Physical Sciences	0.
8	9	2414	MECHANICAL ENGINEERING	91227.0	80320.0	10907.0	Engineering	0.
9	10	2408	ELECTRICAL ENGINEERING	81527.0	65511.0	16016.0	Engineering	0.

10 rows × 21 columns

In [176]:

```
dfmedian = dfhead.sort_values(by='Median')
dfmedian
dfmedian = dfmedian.rename(index= {8:0, 9:1, 6:2, 7:3, 4:4, 5:5, 3:6, 2:7, 1:8,
0:9})
dfmedian
```

Out[176]:

	Rank	Major_code	Major	Total	Men	Women	Major_category	SI
0	9	2414	MECHANICAL ENGINEERING	91227.0	80320.0	10907.0	Engineering	0.
1	10	2408	ELECTRICAL ENGINEERING	81527.0	65511.0	16016.0	Engineering	0.
2	7	6202	ACTUARIAL SCIENCE	3777.0	2110.0	1667.0	Business	0.
3	8	5001	ASTRONOMY AND ASTROPHYSICS	1792.0	832.0	960.0	Physical Sciences	0.
4	5	2405	CHEMICAL ENGINEERING	32260.0	21239.0	11021.0	Engineering	0.
5	6	2418	NUCLEAR ENGINEERING	2573.0	2200.0	373.0	Engineering	0.
6	4	2417	NAVAL ARCHITECTURE AND MARINE ENGINEERING	1258.0	1123.0	135.0	Engineering	0.
7	3	2415	METALLURGICAL ENGINEERING	856.0	725.0	131.0	Engineering	0.
8	2	2416	MINING AND MINERAL ENGINEERING	756.0	679.0	77.0	Engineering	0.
9	1	2419	PETROLEUM ENGINEERING	2339.0	2057.0	282.0	Engineering	0.

10 rows × 21 columns

In [137]:

```
dfp25th = dfhead.sort_values(by='P25th')
```

In [180]:

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

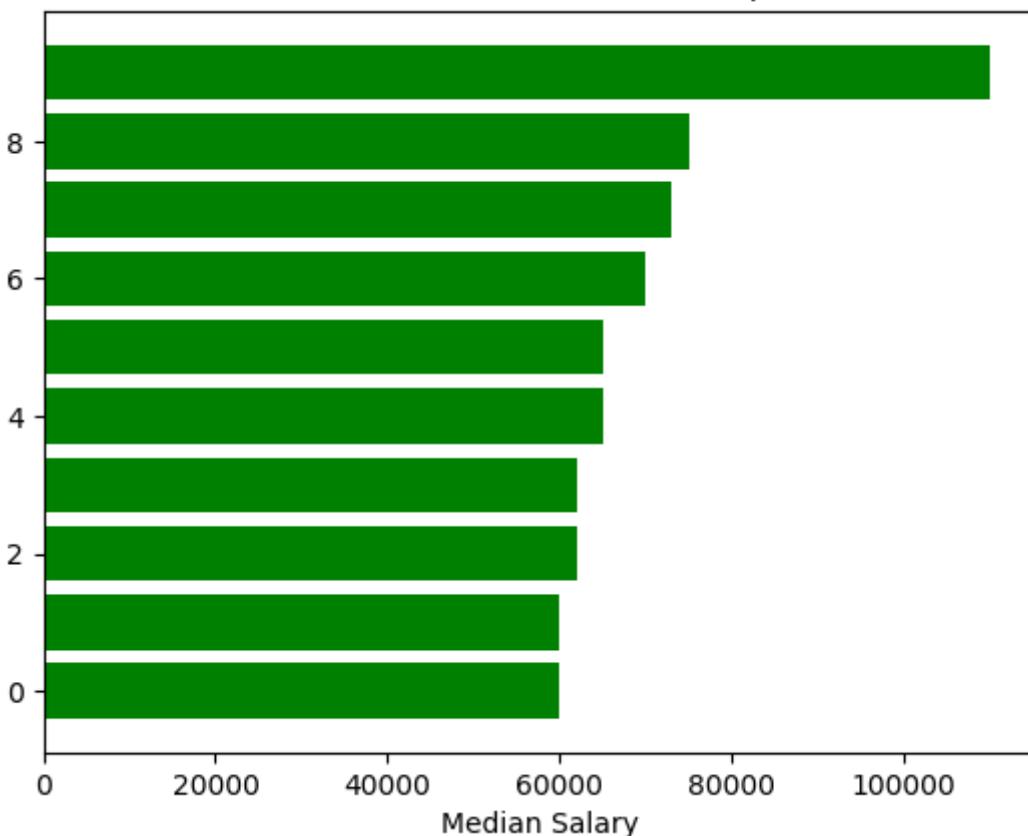
fig, ax = plt.subplots()

ax.barh(range(len(dfmedian['Major'])), dfmedian['Median'], color='green')
ax.set_xlabel('Median Salary')

ax.set_title('What are the median salaries of the top 10 careers?')

plt.show()
```

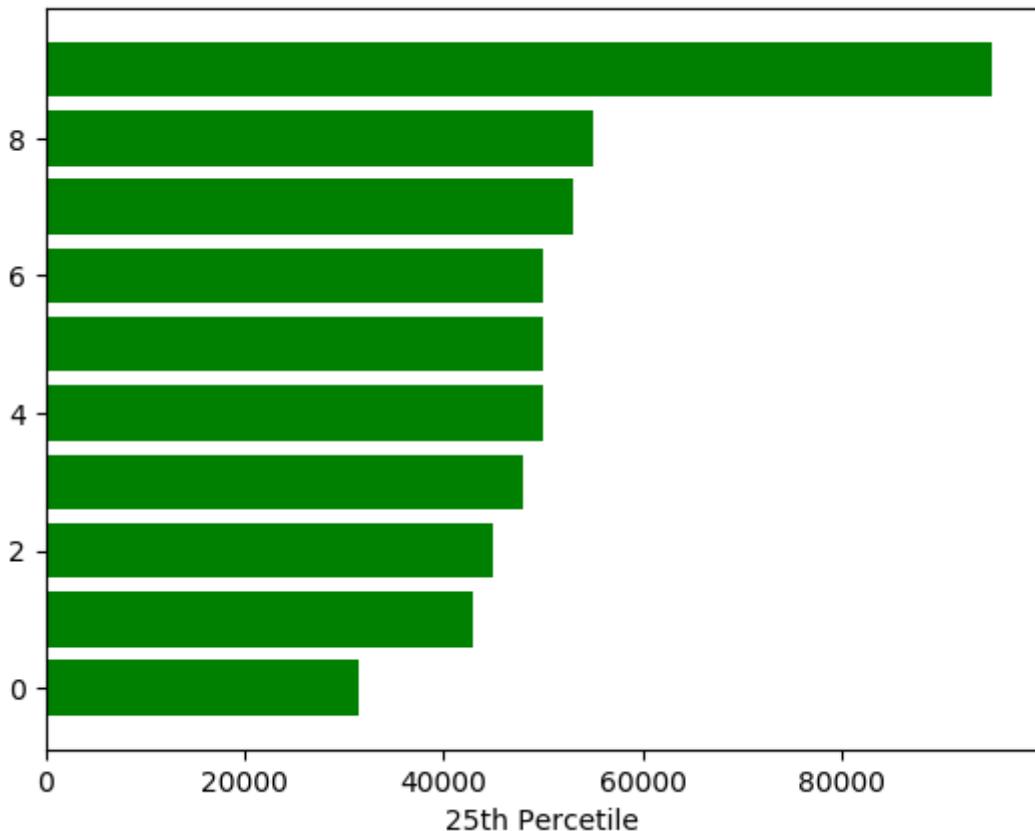
What are the median salaries of the top 10 careers?



In [182]:

```
plt.rcParams()  
fig, ax = plt.subplots()  
dfp25th = dfhead.sort_values(by='P25th')  
ax.barh(range(len(dfp25th['Major'])), dfp25th['P25th'], color='green')  
ax.set_xlabel('25th Percentile')  
ax.set_title('25th Percentile')  
  
plt.show()
```

25th Percentile



In [155]:

```
Major = dfhead[ 'Major' ]  
Major
```

Out[155]:

```
0 PETROLEUM ENGINEERING  
1 MINING AND MINERAL ENGINEERING  
2 METALLURGICAL ENGINEERING  
3 NAVAL ARCHITECTURE AND MARINE ENGINEERING  
4 CHEMICAL ENGINEERING  
5 NUCLEAR ENGINEERING  
6 ACTUARIAL SCIENCE  
7 ASTRONOMY AND ASTROPHYSICS  
8 MECHANICAL ENGINEERING  
9 ELECTRICAL ENGINEERING  
Name: Major, dtype: object
```