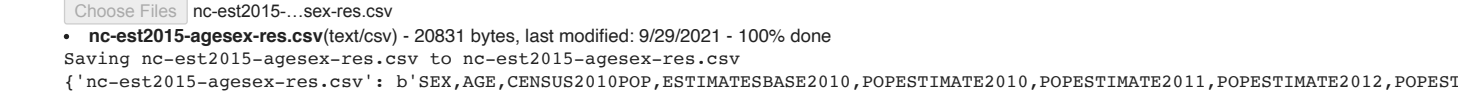
```
import numpy as np
import pandas as pd
from datascience import *
import matplotlib.pyplot as plt
%matplotlib inline
plt.style.use('fivethirtyeight')
from google.colab import files
```

```
files.upload()
```




```
# steps 1,2,3

table1 = Table.read_table('nc-est2015-agesex-res.csv')
us_pop = table1.relabeled('POPESTIMATE2010','2010').relabeled('POPESTIMATE2015','2015').select('SEX','AGE','2010','2015')
us_pop
```

SEX	AGE	2010	2015
0	0	3951330	3978038
0	1	3957888	3968564
0	2	4090862	3966583
0	3	4111920	3974061
0	4	4077551	4020035
0	5	4064653	4018158
0	6	4073013	4019207
0	7	4043046	4148360
0	8	4025604	4167887
0	9	4125415	4133564

... (296 rows omitted)

```
# steps 4,5,6

change = []
total_growth = []
for j in us_pop.rows:
  change.append(j[3]-j[2])
  total_growth.append((j[3]/j[2])-1)

census = us_pop.with_column('Change', change).with_column('Total Growth', total_growth)
census = census.sort('Change', descending=True)
census
```

SEX	AGE	2010	2015	Change	Total Growth
0	999	309346863	321418820	12071957	0.039024
1	999	152088043	158229297	6141254	0.0403796
2	999	157258820	163189523	5930703	0.037713
0	68	2359816	3436357	1076541	0.456197
0	64	2706055	3536156	830101	0.306757
0	65	2678525	3450043	771518	0.288038
0	66	2621335	3344134	722799	0.275737
0	67	2693707	3304187	610480	0.226632
0	72	1883820	2469605	585785	0.310956
2	68	1254117	1812428	558311	0.445183

... (296 rows omitted)

```
# steps 7,8

t = 5    # 5 year difference (2015-2010 = 5)
annual_growth = []
for i in census.rows:
  annual_growth.append(((i[2]/i[3])**(1/t)) - 1)

census = census.with_column('Annual Growth', annual_growth)
census = census.sort('Annual Growth', descending=True)
census
```

SEX	AGE	2010	2015	Change	Total Growth	Annual Growth
2	39	2175745	1944284	-231461	-0.106382	0.0227504
2	47	2297533	2054083	-243450	-0.105961	0.0226541
0	39	4324463	3870862	-453601	-0.104892	0.0224096
1	39	2148718	1926578	-222140	-0.103383	0.0220651
2	48	2299367	2062616	-236751	-0.102964	0.0219696
0	47	4535473	4073685	-461788	-0.101817	0.0217086
2	49	2336640	2099680	-236960	-0.101411	0.0216161
0	48	4534663	4077689	-456974	-0.100774	0.0214713
1	48	2235296	2015073	-220223	-0.0985207	0.0209603
1	47	2237940	2019602	-218338	-0.097562	0.0207433

... (296 rows omitted)

```
# steps 9,10,11,12,13

step9 = census.drop('2010').where('AGE', are.below(999)).where('SEX', are.above(0))
males = step9.where('SEX', 1)
females = step9.where('SEX', 2)
combined = males.join('AGE', females)

age = []
males_arr = []
females_arr = []

#print(combined.row(0))   ## To see layout of 'combined'

for i in combined.rows:
  age.append(i[0])
  males_arr.append(i[2])
  females_arr.append(i[7])

fig, ax = plt.subplots()
ax.plot(age, females_arr, label='Females', color='k')
ax.plot(age, males_arr, label='Males', color='orange')
ax.set_title('Male and Female Populations by Age (2015)\n')
ax.legend()
plt.show()
```