Operations

There are lots of operations with pandas that will be really useful to you, but don't fall into any distinct category. Let's show them here in this lecture:

In [28]:
```
import pandas as pd
df = pd.DataFrame({'col1':[1,2,3,4],'col2':[444,555,666,444],'col3':['abc','def','ghi','xyz']})
df.head()
```

Out[28]:

	col1	col2	col3
0	1	444	abc
1	2	555	def
2	3	666	ghi
3	4	444	xyz

Info on Unique Values

In [29]:
```
df['col2'].unique()
```

Out[29]:
```
array([444, 555, 666], dtype=int64)
```

In [30]:
```
df['col2'].nunique()
```

Out[30]:
```
3
```

In [31]:
```
df['col2'].value_counts()
```

Out[31]:
```
444    2
555    1
666    1
Name: col2, dtype: int64
```

Selecting Data

In [32]:
```
#Select from DataFrame using criteria from multiple columns
newdf = df[(df['col1']>2) & (df['col2']==444)]
```

In [33]:
```
newdf
```

Out[33]:

	col1	col2	col3
3	4	444	xyz

Applying Functions

In [34]:
```
def times2(x):
    return x*2
```

In [35]:
```
df['col1'].apply(times2)
```

Out[35]:
```
0    2
1    4
2    6
3    8
Name: col1, dtype: int64
```

In [38]:
```
df
```

Out[38]:

	col1	col2	col3
0	1	444	abc
1	2	555	def
2	3	666	ghi
3	4	444	xyz

In [40]:
```
df['col3'].apply(len)
```

Out[40]:
```
0    3
1    3
2    3
3    3
Name: col3, dtype: int64
```

In [41]:
```
df['col1'].sum()
```

Out[41]:
```
10
```

Permanently Removing a Column

In [11]:
```
del df['col1']
```

In [12]:
```
df
```

Out[12]:

	col2	col3
0	444	abc
1	555	def
2	666	ghi
3	444	xyz

Get column and index names:

In [13]:
```
df.columns
```

Out[13]:
```
Index(['col2', 'col3'], dtype='object')
```

In [14]:
```
df.index
```

Out[14]:
```
RangeIndex(start=0, stop=4, step=1)
```

Sorting and Ordering a DataFrame:

In [15]:
```
df
```

Out[15]:

	col2	col3
0	444	abc
1	555	def
2	666	ghi
3	444	xyz

In [16]:
```
df.sort_values(by='col2') #inplace=False by default
```

Out[16]:

	col2	col3
0	444	abc
3	444	xyz
1	555	def
2	666	ghi

Find Null Values or Check for Null Values

In [17]:
```
df.isnull()
```

Out[17]:

	col2	col3
0	False	False
1	False	False
2	False	False
3	False	False

In [18]:
```
# Drop rows with NaN Values
df.dropna()
```

Out[18]:

	col2	col3
0	444	abc
1	555	def
2	666	ghi
3	444	xyz

Filling in NaN values with something else:

In [19]:
```
import numpy as np
```

In [20]:
```
df = pd.DataFrame({'col1':[1,2,3,np.nan],
                   'col2':[np.nan,555,666,444],
                   'col3':['abc','def','ghi','xyz']})
df.head()
```

Out[20]:

	col1	col2	col3
0	1.0	NaN	abc
1	2.0	555.0	def
2	3.0	666.0	ghi
3	NaN	444.0	xyz

In [21]:
```
df.fillna('FILL')
```

Out[21]:

	col1	col2	col3
0	1.0	FILL	abc
1	2.0	555.0	def
2	3.0	666.0	ghi
3	FILL	444.0	xyz

Data Input and Output

This notebook is the reference code for getting input and output, pandas can read a variety of file types using its pd.read_ methods. Let's take a look at the most common data types:

In [1]:
```
import numpy as np
import pandas as pd
```

CSV

CSV Input

In [2]:
```
df = pd.read_csv('example')
df
```

Out[2]:

	a	b	c	d
0	0	1	2	3
1	4	5	6	7
2	8	9	10	11
3	12	13	14	15

CSV Output

In [3]:
```
df.to_csv('example.csv',index=False)
```

Excel

Pandas can read and write excel files, keep in mind, this only imports data. Not formulas or images, having images or macros may cause this read_excel method to crash.

Excel Input

In [64]:
```
pd.read_excel('Excel_Sample.xlsx',sheet_name='Sheet1')
```

Out[64]:

	Unnamed: 0	Company	Person	Sales
0	0	GOOG	Sam	200
1	1	GOOG	Charlie	120
2	2	MSFT	Amy	340
3	3	MSFT	Vanessa	124
4	4	FB	Carl	243
5	5	FB	Sarah	350

In [ ]:

Excel Output

In [47]:
```
data = {'Company':['GOOG','GOOG','MSFT','MSFT','FB','FB'],
        'Person':['Sam','Charlie','Amy','Vanessa','Carl','Sarah'],
        'Sales':[200,120,340,124,243,350]}
```

In [48]:
```
df = pd.DataFrame(data)
```

In [49]:
```
df
```

Out[49]:

	Company	Person	Sales
0	GOOG	Sam	200
1	GOOG	Charlie	120
2	MSFT	Amy	340
3	MSFT	Vanessa	124
4	FB	Carl	243
5	FB	Sarah	350

In [50]:
```
df.to_excel('Excel_output.xlsx',sheet_name='Sheet1')
```

HTML

You may need to install htmllib5,lxml, and BeautifulSoup4. In your terminal/command prompt run:

```
conda install lxml
conda install html5lib
conda install BeautifulSoup4
```

Then restart Jupyter Notebook. (or use pip install if you aren't using the Anaconda Distribution)

Pandas can read table tabs off of html. For example:

HTML Input

Pandas read_html function will read tables off of a webpage and return a list of DataFrame objects:

In [55]:
```
df =pd.read_html('https://en.wikipedia.org/wiki/Minnesota')
```

In [56]:
```
df
```

Out[56]:
```
[                                          Minnesota  \
0                                              State
1   .mw-parser-output .ib-settlement-cols{text-ali...
2   Nickname(s): Land of 10,000 Lakes; North Star ...
3   Motto: L'Étoile du Nord (French: The Star of t...
4                           Anthem: "Hail! Minnesota"
5   Map of the United States with Minnesota highli...
6                                            Country
7                                  Before statehood
8                              Admitted to the Union
9                                            Capital
10                                       Largest city
11                     Largest metro and urban areas
12                                         Government
13                                          • Governor
14                             • Lieutenant Governor
15                                       Legislature
16                                     • Upper house
17                                     • Lower house
18                                         Judiciary
19                                     U.S. senators
20                             U.S. House delegation
21                                              Area
22                                           • Total
23                                            • Land
24                                           • Water
25                                            • Rank
26                                        Dimensions
27                                          • Length
28                                           • Width
29                                         Elevation
30          Highest elevation (Eagle Mountain[1][a])
31         Lowest elevation (Lake Superior[1][a][2])
32                                 Population (2022)
33                                           • Total
34                                            • Rank
35                                         • Density
36                                            • Rank
37                          • Median household income
38                                     • Income rank
39                                           Demonym
40                                          Language
41                               • Official language
42                                 • Spoken language
43                                         Time zone
44                                    • Summer (DST)
45                                 USPS abbreviation
46                                     ISO 3166 code
47                           Traditional abbreviation
48                                          Latitude
49                                         Longitude
50                                           Website

                                        Minnesota.1
0                                              State
1   .mw-parser-output .ib-settlement-cols{text-ali...
2   Nickname(s): Land of 10,000 Lakes; North Star ...
3   Motto: L'Étoile du Nord (French: The Star of t...
4                           Anthem: "Hail! Minnesota"
5   Map of the United States with Minnesota highli...
6                                       United States
7                                 Minnesota Territory
8               May 11, 1858 (32nd State in the Union)
9                                          Saint Paul
10                                        Minneapolis
11                            Minneapolis–Saint Paul
12                                         Government
13                                     Tim Walz (DFL)
14                                Peggy Flanagan (DFL)
15                              Minnesota Legislature
```

```
16                                          Senate
17                          House of Representatives
18                           Minnesota Supreme Court
19               Amy Klobuchar (DFL) Tina Smith (DFL)
20                   4 Democrats 4 Republicans (list)
21                                             Area
22                      86,935.83 sq mi (225,163 km2)
23                      79,626.74 sq mi (206,232 km2)
24                  7,309.09 sq mi (18,930 km2) 8.40%
25                                             12th
26                                       Dimensions
27                            about 400 mi (640 km)
28                          200–350 mi (320–560 km)
29                                 1,200 ft (370 m)
30                                 2,301 ft (701 m)
31                                   602 ft (183 m)
32                               Population (2022)
33                                    5,717,184[3]
34                                             22nd
35                             68.9/sq mi (26.6/km2)
36                                36th (2020 census)
37                                        $74,593[4]
38                                             13th
39                                       Minnesotan
40                                         Language
41                                             none
42              English 88.9% Spanish Somali Hmong[5]
43                              UTC− 06:00 (Central)
44                                  UTC− 05:00 (CDT)
45                                               MN
46                                           US-MN
47                                           Minn.
48                           43° 30′ N to 49° 23′ N
49                           89° 29′ W to 97° 14′ W
50                                          mn.gov  ,
                   List of state symbols  \
                         Living insignia
0                                   Bird
1                              Butterfly
2                                   Fish
3                                 Flower
4                               Mushroom
5                                   Tree
6                     Inanimate insignia
7                               Beverage
8                                   Food
9                               Gemstone
10                                 Other
11                        State quarter
12                     Released in 2005
13  Lists of United States state symbols


                                  Living insignia.1
0                                       Common loon
1                                           Monarch
2                                           Walleye
3                      Pink-and-white lady's slipper
4                  Common morel (Morchella esculenta)
5                                     Norway pine[6]
6                                 Inanimate insignia
7                                             Milk
8   .mw-parser-output .plainlist ol,.mw-parser-out...
9                                Lake Superior agate
10                                 Photograph: Grace
11                                     State quarter
12                                  Released in 2005
13               Lists of United States state symbols  ,
              Location July (°F) July (°C) January (°F) January (°C)
0          Minneapolis     83/64     28/18         23/7       −4/−13
```

```
1          Saint Paul     83/63     28/17         23/6       -5/-14
2           Rochester     82/63     28/17         23/3       -5/-16
3              Duluth     76/55     24/13         19/1       -7/-17
4           St. Cloud     81/58     27/14        18/-1       -7/-18
5             Mankato     86/62     30/16         23/3       -5/-16
6  International Falls     77/52     25/11        15/-6       -9/-21,
   Largest cities or towns in Minnesota Source:[81]                        \
                                 Unnamed: 0_level_1                   Rank
0                            Minneapolis Saint Paul                      1
1                            Minneapolis Saint Paul                      2
2                            Minneapolis Saint Paul                      3
3                            Minneapolis Saint Paul                      4
4                            Minneapolis Saint Paul                      5
5                            Minneapolis Saint Paul                      6
6                            Minneapolis Saint Paul                      7
7                            Minneapolis Saint Paul                      8
8                            Minneapolis Saint Paul                      9
9                            Minneapolis Saint Paul                     10
10                           Minneapolis Saint Paul  Rochester Bloomington

                                                                     \
             Name      County      Pop.     Unnamed: 5_level_1
0     Minneapolis    Hennepin  425336.0  Rochester Bloomington
1      Saint Paul      Ramsey  307193.0  Rochester Bloomington
2       Rochester     Olmsted  121465.0  Rochester Bloomington
3     Bloomington    Hennepin   89298.0  Rochester Bloomington
4          Duluth   St. Louis   86372.0  Rochester Bloomington
5   Brooklyn Park    Hennepin   84526.0  Rochester Bloomington
6        Plymouth    Hennepin   79828.0  Rochester Bloomington
7        Woodbury  Washington   76990.0  Rochester Bloomington
8       Lakeville      Dakota   72812.0  Rochester Bloomington
9          Blaine       Anoka   70935.0  Rochester Bloomington
10            NaN         NaN       NaN                    NaN


   Unnamed: 6_level_1 Unnamed: 7_level_1 Unnamed: 8_level_1 Unnamed: 9_level_1
0                 NaN                NaN                NaN                NaN
1                 NaN                NaN                NaN                NaN
2                 NaN                NaN                NaN                NaN
3                 NaN                NaN                NaN                NaN
4                 NaN                NaN                NaN                NaN
5                 NaN                NaN                NaN                NaN
6                 NaN                NaN                NaN                NaN
7                 NaN                NaN                NaN                NaN
8                 NaN                NaN                NaN                NaN
9                 NaN                NaN                NaN                NaN
10                NaN                NaN                NaN                NaN  ,
                                    Census  \
0                                    1850
1                                    1860
2                                    1870
3                                    1880
4                                    1890
5                                    1900
6                                    1910
7                                    1920
8                                    1930
9                                    1940
10                                   1950
11                                   1960
12                                   1970
13                                   1980
14                                   1990
15                                   2000
16                                   2010
17                                   2020
18                             2022 (est.)
19  Source: 1910-2020[82] 2022 Estimate[3]

                                     Pop.  \
```

```
0                                    6077
1                                  172023
2                                  439706
3                                  780773
4                                 1310283
5                                 1751394
6                                 2075708
7                                 2387125
8                                 2563953
9                                 2792300
10                                2982483
11                                3413864
12                                3804971
13                                4075970
14                                4375099
15                                4919479
16                                5303925
17                                5706494
18                                5717184
19  Source: 1910–2020[82] 2022 Estimate[3]

   .mw-parser-output .sr-only{border:0;clip:rect(0,0,0,0);clip-path:polygon(0px 0px,0px 0px,0px 0px);h
eight:1px;margin:-1px;overflow:hidden;padding:0;position:absolute;width:1px;white-space:nowrap}Note  \
0                                                NaN
1                                                NaN
2                                                NaN
3                                                NaN
4                                                NaN
5                                                NaN
6                                                NaN
7                                                NaN
8                                                NaN
9                                                NaN
10                                               NaN
11                                               NaN
12                                               NaN
13                                               NaN
14                                               NaN
15                                               NaN
16                                               NaN
17                                               NaN
18                                               NaN
19             Source: 1910–2020[82] 2022 Estimate[3]

                                        %±
0                                        –
1                                 2,730.7%
2                                   155.6%
3                                    77.6%
4                                    67.8%
5                                    33.7%
6                                    18.5%
7                                    15.0%
8                                     7.4%
9                                     8.9%
10                                    6.8%
11                                   14.5%
12                                   11.5%
13                                    7.1%
14                                    7.3%
15                                   12.4%
16                                    7.8%
17                                    7.6%
18                                    0.2%
19  Source: 1910–2020[82] 2022 Estimate[3]  ,
                        Race Percentage
0                      White      77.5%
1  Black or African American       7.0%
2            American Indian       1.2%
3                      Asian       5.3%
```

```
4           Pacific Islander       0.1%
5                 Other race       3.2%
6          Two or more races       6.1%,
    Year Republican         Democratic         Third party
    Year        No.       %        No.       %         No.       %
0   2020    1484065  45.28%    1717077  52.40%       76029   2.32%
1   2016    1323232  44.93%    1367825  46.44%      254176   8.63%
2   2012    1320225  44.96%    1546167  52.65%       70169   2.39%
3   2008    1275409  43.82%    1573354  54.06%       61606   2.12%
4   2004    1346695  47.61%    1445014  51.09%       36678   1.30%
5   2000    1109659  45.50%    1168266  47.91%      160760   6.59%
6   1996     766476  34.96%    1120438  51.10%      305726  13.94%
7   1992     747841  31.85%    1020997  43.48%      579110  24.66%
8   1988     962337  45.90%    1109471  52.91%       24982   1.19%
9   1984    1032603  49.54%    1036364  49.72%       15482   0.74%
10  1980     873241  42.56%     954174  46.50%      224538  10.94%
11  1976     819395  42.02%    1070440  54.90%       60096   3.08%
12  1972     898269  51.58%     802346  46.07%       41037   2.36%
13  1968     658643  41.46%     857738  54.00%       72129   4.54%
14  1964     559624  36.00%     991117  63.76%        3721   0.24%
15  1960     757915  49.16%     779933  50.58%        4039   0.26%
16  1956     719302  53.68%     617525  46.08%        3178   0.24%
17  1952     763211  55.33%     608458  44.11%        7814   0.57%
18  1948     483617  39.89%     692966  57.16%       35643   2.94%
19  1944     527416  46.86%     589864  52.41%        8249   0.73%
20  1940     596274  47.66%     644196  51.49%       10718   0.86%
21  1936     350461  31.01%     698811  61.84%       80703   7.14%
22  1932     363959  36.29%     600806  59.91%       38078   3.80%
23  1928     560977  57.77%     396451  40.83%       13548   1.40%
24  1924     420759  51.18%      55913   6.80%      345474  42.02%
25  1920     519421  70.59%     142994  19.43%       73423   9.98%
26  1916     179544  46.35%     179152  46.25%       28668   7.40%
27  1912      64334  19.25%     106426  31.84%      163459  48.91%
28  1908     195843  59.11%     109401  33.02%       26060   7.87%
29  1904     216651  73.98%      55187  18.84%       21022   7.18%
30  1900     190461  60.21%     112901  35.69%       12949   4.09%
31  1896     193503  56.62%     139735  40.89%        8524   2.49%
32  1892     122823  45.96%     100920  37.76%       43495  16.28%
33  1888     142492  54.12%     104385  39.65%       16408   6.23%
34  1884     111685  58.78%      70065  36.87%        8267   4.35%
35  1880      93902  62.28%      53315  35.36%        3553   2.36%
36  1876      72955  58.80%      48587  39.16%        2533   2.04%
37  1872      55708  61.27%      35211  38.73%           0   0.00%
38  1868      43722  60.88%      28096  39.12%           0   0.00%
39  1864      25055  59.06%      17367  40.94%           0   0.00%
40  1860      22069  63.53%      11920  34.31%         748   2.15%,
                      0                                                    1  \
0  Preceded byCalifornia  List of U.S. states by date of statehood Admit...

                   2
0  Succeeded byOregon  ,
      Topics related to Minnesota Land of 10,000 Lakes  \
0    .mw-parser-output .hlist dl,.mw-parser-output ...
1    .mw-parser-output .navbar{display:inline;font-...
2                                Saint Paul (capital)
3                                              Topics
4                                             Society
..                                                ...
98                                   Federal district
99                                      Insular areas
100                                  Outlying islands
101                               Indian reservations
102                                            Others

    Topics related to Minnesota Land of 10,000 Lakes.1
0    .mw-parser-output .hlist dl,.mw-parser-output ...
1    .mw-parser-output .navbar{display:inline;font-...
2                                Saint Paul (capital)
3    Index Outline Biking/Cycling Cities Climate (C...
4    Culture Crime Demographics Economy Education L...
```

```
..                                                  ...
98                                    Washington, D.C.
99   American Samoa Guam Northern Mariana Islands P...
100  Baker Island Howland Island Jarvis Island John...
101                        List of Indian reservations
102                                     Federal enclave

[103 rows x 2 columns],
  .mw-parser-output .navbar{display:inline;font-size:88%;font-weight:normal}.mw-parser-output .navbar-
collapse{float:left;text-align:left}.mw-parser-output .navbar-boxtext{word-spacing:0}.mw-parser-output
.navbar ul{display:inline-block;white-space:nowrap;line-height:inherit}.mw-parser-output .navbar-bracke
ts::before{margin-right:-0.125em;content:"[ "}.mw-parser-output .navbar-brackets::after{margin-left:-0.
125em;content:" ]"}.mw-parser-output .navbar li{word-spacing:-0.125em}.mw-parser-output .navbar a>spa
n,.mw-parser-output .navbar a>abbr{text-decoration:inherit}.mw-parser-output .navbar-mini abbr{font-var
iant:small-caps;border-bottom:none;text-decoration:none;cursor:inherit}.mw-parser-output .navbar-ct-ful
l{font-size:114%;margin:0 7em}.mw-parser-output .navbar-ct-mini{font-size:114%;margin:0 4em}vteState of
Minnesota  \
0                               Saint Paul (capital)
1                                             Topics
2                                            Society
3                                            Regions
4                    Largest cities pop. over 25,000
5                                           Counties
6                                         Attractions
7                                           Festivals
8                                               Other
9                                   Minnesota portal

  .mw-parser-output .navbar{display:inline;font-size:88%;font-weight:normal}.mw-parser-output .navbar-
collapse{float:left;text-align:left}.mw-parser-output .navbar-boxtext{word-spacing:0}.mw-parser-output
.navbar ul{display:inline-block;white-space:nowrap;line-height:inherit}.mw-parser-output .navbar-bracke
ts::before{margin-right:-0.125em;content:"[ "}.mw-parser-output .navbar-brackets::after{margin-left:-0.
125em;content:" ]"}.mw-parser-output .navbar li{word-spacing:-0.125em}.mw-parser-output .navbar a>spa
n,.mw-parser-output .navbar a>abbr{text-decoration:inherit}.mw-parser-output .navbar-mini abbr{font-var
iant:small-caps;border-bottom:none;text-decoration:none;cursor:inherit}.mw-parser-output .navbar-ct-ful
l{font-size:114%;margin:0 7em}.mw-parser-output .navbar-ct-mini{font-size:114%;margin:0 4em}vteState of
Minnesota.1
0                               Saint Paul (capital)
1  Index Outline Biking/Cycling Cities Climate (C...
2  Culture Crime Demographics Economy Education L...
3  Arrowhead Boundary Waters Buffalo Ridge Centra...
4  Andover Apple Valley Blaine Bloomington Brookl...
5  Aitkin Anoka Becker Beltrami Benton Big Stone ...
6         Festivals State Fair Other Mall of America
7                                         State Fair
8                                     Mall of America
9                                   Minnesota portal
,
           0               1
0  Festivals       State Fair
1      Other  Mall of America,
  vteMayors of cities with populations exceeding 100,000 in Minnesota  \
0  Jacob Frey (DFL) (Minneapolis) Melvin Carter (...

  vteMayors of cities with populations exceeding 100,000 in Minnesota.1
0  Jacob Frey (DFL) (Minneapolis) Melvin Carter (...                    ,
              vteProtected areas of Minnesota  \
0                                     National
1                                        Parks
2                                    Monuments
3                                       Rivers
4                               Scenic Trails
5                           Wildlife Refuges
6                Wetland Management Districts
7                                      Forests
8                            Natural Landmarks
9                                   Wilderness
10                                       State
11                                       Parks
12                          Recreation Areas
```

```
13                                 Waysides
14                                  Forests
15              Scientific and Natural Areas
16                                    Local
17                                    Parks
18                                    Other
19              Minnesota Historical Society
20                            Nature centers
21                                   Hiking
22  Minnesota Department of Natural Resources

                   vteProtected areas of Minnesota.1
0   Parks Voyageurs Monuments Grand Portage Pipest...
1                                          Voyageurs
2                             Grand Portage Pipestone
3   Mississippi National River and Recreation Area...
4                                North Country Trail
5   Agassiz Big Stone Crane Meadows Glacial Ridge ...
6   Big Stone Detroit Lakes Fergus Falls Litchfiel...
7                                 Chippewa Superior
8   Ancient River Warren Channel Cedar Creek Ecosy...
9         Agassiz Boundary Waters Canoe Area Tamarac
10  Parks Afton Banning Bear Head Lake Beaver Cree...
11  Afton Banning Bear Head Lake Beaver Creek Vall...
12  Big Bog Cuyuna Country Garden Island Greenleaf...
13  Caribou Falls Devils Track Falls Flood Bay Ins...
14  Badoura Battleground Bear Island Beltrami Isla...
15              List of scientific and natural areas
16  Parks County and regional parks Three Rivers P...
17  County and regional parks Three Rivers Park Di...
18  Minnesota Historical Society Alexander Ramsey ...
19  Alexander Ramsey House Birch Coulee Battlefiel...
20                            List of nature centers
21                             List of hiking trails
22         Minnesota Department of Natural Resources  ,
                                 0  \
0                          Parks
1                      Monuments
2                         Rivers
3                  Scenic Trails
4               Wildlife Refuges
5  Wetland Management Districts
6                        Forests
7              Natural Landmarks
8                     Wilderness

                                                   1
0                                          Voyageurs
1                             Grand Portage Pipestone
2  Mississippi National River and Recreation Area...
3                                North Country Trail
4  Agassiz Big Stone Crane Meadows Glacial Ridge ...
5  Big Stone Detroit Lakes Fergus Falls Litchfiel...
6                                 Chippewa Superior
7  Ancient River Warren Channel Cedar Creek Ecosy...
8         Agassiz Boundary Waters Canoe Area Tamarac  ,
                                 0  \
0                          Parks
1               Recreation Areas
2                       Waysides
3                        Forests
4  Scientific and Natural Areas

                                                   1
0  Afton Banning Bear Head Lake Beaver Creek Vall...
1  Big Bog Cuyuna Country Garden Island Greenleaf...
2  Caribou Falls Devils Track Falls Flood Bay Ins...
3  Badoura Battleground Bear Island Beltrami Isla...
4               List of scientific and natural areas  ,
       0                                                   1
```

```
0  Parks  County and regional parks Three Rivers Park Di...,
                              0  \
0  Minnesota Historical Society
1                Nature centers
2                        Hiking

                                                   1
0  Alexander Ramsey House Birch Coulee Battlefiel...
1                            List of nature centers
2                             List of hiking trails  ,
  vteMidwestern United States  \
0                      Topics
1                      States
2                Major cities
3              State capitals

                      vteMidwestern United States.1
0  Culture Geography Economy Government and polit...
1  Ohio Indiana Michigan Illinois Missouri Iowa W...
2  Chicago Detroit Minneapolis St. Paul St. Louis...
3  Columbus Indianapolis Lansing Springfield Jeff...  ,
         vteNew France                                     vteNew France.1
0               History  French colonization of the Americas French col...
1              Colonies  Acadia (1604–1713) Canada (1608–1763) Terre-Ne...
2   Towns and  villages  Acadie Port Royal Canada Quebec City Trois-Riv...
3                 Forts  List of French forts in North America Fort Rou...
4           Governments  Canada Governor General Intendant Sovereign Co...
5                  Laws  Custom of Paris in New France Seigneurial syst...
6               Economy  Chemin du Roy Fur trade Coureur des bois Voyag...
7               Society  Population 1666 census Habitants Canadiens Kin...
8     Missionary groups  Jesuit missions Récollets Grey Nuns Ursulines ...
9                  Wars  Military of New France Military history of the...
10             Category                                           Category,
                            vteNew Spain (1521–1821)  \
0                                          Conflicts
1   Spanish conquest of the Aztec Empire → Spanish...
2   Conflicts with indigenous peoples during colon...
3              Central government and  administration
4                                     Habsburg Spain
5                                      Bourbon Spain
6                              Viceroys of New Spain
7                                         Audiencias
8                                 Captancies General
9                                         Intendancy
10                                          Politics
11                                          Treaties
12         Notable cities, provinces, and territories
13                                            Cities
14                          Provinces and territories
15                                       Other areas
16           Explorers, adventurers and conquistadors
17                            Pre-New Spain explorers
18                        Explorers and conquistadors
19                       Catholic Church in New Spain
20                  Spanish missions in the Americas
21              Friars, fathers, priests, and bishops
22                                     Other events
23                                Society and culture
24                                 Indigenous peoples
25                                       Mesoamerican
26                                          Caribbean
27                                         California
28                        Oasisamerica (Southwest US)
29                                       Aridoamerica
30                                     Southern Plains
31                            Southeastern Woodlands
32                                          Filipinos
33                                             Others
34                                       Architecture
35                                 Trade and economy
```

```
36                                 People and classes
37                                             People
38                                           Category

                           vteNew Spain (1521–1821).1
0   Spanish conquest of the Aztec Empire → Spanish...
1   Spanish conquest of the Aztec Empire → Spanish...
2   Mixtón War → Yaqui Wars → Chichimeca War → Phi...
3   Habsburg Spain Charles I Joanna of Castile Phi...
4   Charles I Joanna of Castile Philip II Philp II...
5   Philip V (also reigned after Louis I) Louis I ...
6                       List of viceroys of New Spain
7   Guadalajara Captaincy General of Guatemala Man...
8   Cuba Guatemala Philippines Puerto Rico Santo D...
9   Havana New Orleans State of Mexico Chiapas Com...
10  Viceroy Gobernaciones Adelantado Captain gener...
11  Treaty of Tordesillas Treaty of Zaragoza Peace...
12  Cities Mexico City Veracruz Xalapa Puebla Tolu...
13  Mexico City Veracruz Xalapa Puebla Toluca Cuer...
14  Louisiana La Florida (Florida) Las Californias...
15                                   Spanish Formosa
16  Pre-New Spain explorers Christopher Columbus F...
17  Christopher Columbus Ferdinand Magellan Juan S...
18  Hernán Cortés Juan Ponce de León Nuño de Guzmá...
19  Spanish missions in the Americas Spanish missi...
20  Spanish missions in Arizona Spanish missions i...
21  Pedro de Gante Gerónimo de Aguilar Toribio de ...
22  Our Lady of Guadalupe Suppression of the Jesui...
23  Indigenous peoplesMesoamerican Aztecs Maya Hua...
24  Mesoamerican Aztecs Maya Huastec Mixtec P'urhé...
25  Aztecs Maya Huastec Mixtec P'urhépecha Totonac...
26                        Arawak Ciboney Guanahatabey
27  Mission Indians Cahuilla Chumash Cupeño Juaneñ...
28  Akimel O'odham Apache Hopi Hualapai Navajo Pue...
29  Acaxee Chichimeca Coahuiltecan Cochimí Cocopah...
30  Caddo Comanche Lipan Apache Plains Apache Tonk...
31  Indigenous people during De Soto's travels Apa...
32  Negrito Igorot Mangyan Peoples of Palawan Ati ...
33       Taiwanese indigenous peoples Chamorro people
34  Spanish Colonial style by country Colonial Bar...
35  Real Columbian exchange Manila galleon Triangu...
36  Casta Peninsulares Criollo Indios Mestizo Cast...
37  Juan Bautista de Anza Juan Rodríguez Cabrillo ...
38                                           Category  ,
                                                     0  \
0  Spanish conquest of the Aztec Empire → Spanish...
1  Conflicts with indigenous peoples during colon...

                                                     1
0  Spanish conquest of the Aztec Empire → Spanish...
1  Mixtón War → Yaqui Wars → Chichimeca War → Phi...  ,
                     0                                                1
0        Habsburg Spain  Charles I Joanna of Castile Philip II Philp II...
1         Bourbon Spain  Philip V (also reigned after Louis I) Louis I ...
2  Viceroys of New Spain                      List of viceroys of New Spain
3            Audiencias  Guadalajara Captaincy General of Guatemala Man...
4    Captancies General  Cuba Guatemala Philippines Puerto Rico Santo D...
5            Intendancy  Havana New Orleans State of Mexico Chiapas Com...
6              Politics  Viceroy Gobernaciones Adelantado Captain gener...
7              Treaties  Treaty of Tordesillas Treaty of Zaragoza Peace...,
                         0  \
0                    Cities
1  Provinces and territories
2               Other areas

                                                     1
0  Mexico City Veracruz Xalapa Puebla Toluca Cuer...
1  Louisiana La Florida (Florida) Las Californias...
2                                   Spanish Formosa  ,
                            0  \
```

```
0     Pre-New Spain explorers
1  Explorers and conquistadors

                                                   1
0  Christopher Columbus Ferdinand Magellan Juan S...
1  Hernán Cortés Juan Ponce de León Nuño de Guzmá...  ,
                                         0  \
0      Spanish missions in the Americas
1  Friars, fathers, priests, and bishops
2                          Other events

                                                   1
0  Spanish missions in Arizona Spanish missions i...
1  Pedro de Gante Gerónimo de Aguilar Toribio de ...
2  Our Lady of Guadalupe Suppression of the Jesui...  ,
                                0  \
0           Indigenous peoples
1                 Mesoamerican
2                    Caribbean
3                   California
4   Oasisamerica (Southwest US)
5                 Aridoamerica
6              Southern Plains
7       Southeastern Woodlands
8                    Filipinos
9                       Others
10                Architecture
11           Trade and economy
12          People and classes
13                      People

                                                    1
0   Mesoamerican Aztecs Maya Huastec Mixtec P'urhé...
1   Aztecs Maya Huastec Mixtec P'urhépecha Totonac...
2                        Arawak Ciboney Guanahatabey
3   Mission Indians Cahuilla Chumash Cupeño Juaneñ...
4   Akimel O'odham Apache Hopi Hualapai Navajo Pue...
5   Acaxee Chichimeca Coahuiltecan Cochimí Cocopah...
6   Caddo Comanche Lipan Apache Plains Apache Tonk...
7   Indigenous people during De Soto's travels Apa...
8   Negrito Igorot Mangyan Peoples of Palawan Ati ...
9       Taiwanese indigenous peoples Chamorro people
10  Spanish Colonial style by country Colonial Bar...
11  Real Columbian exchange Manila galleon Triangu...
12  Casta Peninsulares Criollo Indios Mestizo Cast...
13  Juan Bautista de Anza Juan Rodríguez Cabrillo ...  ,
                                0  \
0                Mesoamerican
1                   Caribbean
2                  California
3  Oasisamerica (Southwest US)
4                Aridoamerica
5             Southern Plains
6       Southeastern Woodlands
7                   Filipinos
8                      Others

                                                   1
0  Aztecs Maya Huastec Mixtec P'urhépecha Totonac...
1                        Arawak Ciboney Guanahatabey
2  Mission Indians Cahuilla Chumash Cupeño Juaneñ...
3  Akimel O'odham Apache Hopi Hualapai Navajo Pue...
4  Acaxee Chichimeca Coahuiltecan Cochimí Cocopah...
5  Caddo Comanche Lipan Apache Plains Apache Tonk...
6  Indigenous people during De Soto's travels Apa...
7  Negrito Igorot Mangyan Peoples of Palawan Ati ...
8      Taiwanese indigenous peoples Chamorro people  ,
  vtePolitical divisions of the United States  \
0             List of states and territories
1                                     States
```

```
2                          Federal district
3                             Insular areas
4                          Outlying islands
5                        Indian reservations
6                                    Others

       vtePolitical divisions of the United States.1
0                     List of states and territories
1  Alabama Alaska Arizona Arkansas California Col...
2                                 Washington, D.C.
3  American Samoa Guam Northern Mariana Islands P...
4  Baker Island Howland Island Jarvis Island John...
5                       List of Indian reservations
6                           Federal enclave  ,
  Authority control                                Authority control.1
0     International                                            ISNI VIAF
1          National  France BnF data Germany Israel United States C...
2        Geographic                                   MusicBrainz area
3             Other                                               NARA]
```

In [58]:
```
len(df)
```

Out[58]:
```
29
```

In [65]:
```
df[1]
```

Out[65]:

	List of state symbols	
	Living insignia	**Living insignia.1**
0	Bird	Common loon
1	Butterfly	Monarch
2	Fish	Walleye
3	Flower	Pink-and-white lady's slipper
4	Mushroom	Common morel (Morchella esculenta)
5	Tree	Norway pine[6]
6	Inanimate insignia	Inanimate insignia
7	Beverage	Milk
8	Food	.mw-parser-output .plainlist ol,.mw-parser-out...
9	Gemstone	Lake Superior agate
10	Other	Photograph: Grace
11	State quarter	State quarter
12	Released in 2005	Released in 2005
13	Lists of United States state symbols	Lists of United States state symbols

In [77]:
```
df=pd.read_csv('movies.csv')
```

In [78]:
```
df
```

Out[78]:

	Film	Genre	Lead Studio	Audience score %	Profitability	Rotten Tomatoes %	Worldwide Gross	Year
0	Zack and Miri Make a Porno	Romance	The Weinstein Company	70	1.747542	64	$41.94	2008
1	Youth in Revolt	Comedy	The Weinstein Company	52	1.090000	68	$19.62	2010
2	You Will Meet a Tall Dark Stranger	Comedy	Independent	35	1.211818	43	$26.66	2010
3	When in Rome	Comedy	Disney	44	0.000000	15	$43.04	2010
4	What Happens in Vegas	Comedy	Fox	72	6.267647	28	$219.37	2008
...	...	...	...	...	...	...	...	...
72	Across the Universe	romance	Independent	84	0.652603	54	$29.37	2007
73	A Serious Man	Drama	Universal	64	4.382857	89	$30.68	2009
74	A Dangerous Method	Drama	Independent	89	0.448645	79	$8.97	2011
75	27 Dresses	Comedy	Fox	71	5.343622	40	$160.31	2008
76	(500) Days of Summer	comedy	Fox	81	8.096000	87	$60.72	2009

77 rows × 8 columns

In [72]:
```
romantic=df.query('Genre =="Romance"')
```

In [73]:
```
romantic
```

Out[73]:

	Film	Genre	Lead Studio	Audience score %	Profitability	Rotten Tomatoes %	Worldwide Gross	Year
0	Zack and Miri Make a Porno	Romance	The Weinstein Company	70	1.747542	64	$41.94	2008
7	Waitress	Romance	Independent	67	11.089742	89	$22.18	2007
8	Waiting For Forever	Romance	Independent	53	0.005000	6	$0.03	2011
10	Tyler Perry's Why Did I get Married	Romance	Independent	47	3.724192	46	$55.86	2007
11	Twilight: Breaking Dawn	Romance	Independent	68	6.383364	26	$702.17	2011
12	Twilight	Romance	Summit	82	10.180027	49	$376.66	2008
23	Something Borrowed	Romance	Independent	48	1.719514	15	$60.18	2011
31	P.S. I Love You	Romance	Independent	82	5.103117	21	$153.09	2007
34	One Day	Romance	Independent	54	3.682733	37	$55.24	2011
38	New Year's Eve	Romance	Warner Bros.	48	2.536429	8	$142.04	2011
40	Music and Lyrics	Romance	Warner Bros.	70	3.647411	63	$145.90	2007
41	Monte Carlo	Romance	20th Century Fox	50	1.983200	38	$39.66	2011
57	Jane Eyre	Romance	Universal	77	0.000000	85	$30.15	2011

In [87]:
```
rating=df[(df['Rotten Tomatoes %']>60)]
```

In [91]:
```
rating.sort_values(by='Rotten Tomatoes %',ascending=False)
```

Out[91]:

	Film	Genre	Lead Studio	Audience score %	Profitability	Rotten Tomatoes %	Worldwide Gross	Year
6	WALL-E	Animation	Disney	89	2.896019	96	$521.28	2008
43	Midnight in Paris	Romence	Sony	84	8.744706	93	$148.66	2011
69	Enchanted	Comedy	Disney	80	4.005737	93	$340.49	2007
54	Knocked Up	Comedy	Universal	83	6.636402	91	$219	2007
7	Waitress	Romance	Independent	67	11.089742	89	$22.18	2007
73	A Serious Man	Drama	Universal	64	4.382857	89	$30.68	2009
22	Tangled	Animation	Disney	88	1.365692	89	$355.01	2010
76	(500) Days of Summer	comedy	Fox	81	8.096000	87	$60.72	2009
57	Jane Eyre	Romance	Universal	77	0.000000	85	$30.15	2011
29	Rachel Getting Married	Drama	Independent	61	1.384167	85	$16.61	2008
71	Beginners	Comedy	Independent	80	4.471875	84	$14.31	2011
39	My Week with Marilyn	Drama	The Weinstein Company	84	0.825800	83	$8.26	2011
74	A Dangerous Method	Drama	Independent	89	0.448645	79	$8.97	2011
42	Miss Pettigrew Lives for a Day	Comedy	Independent	70	0.252895	78	$15.17	2008
37	Nick and Norah's Infinite Playlist	Comedy	Sony	67	3.352729	73	$33.53	2008
20	The Curious Case of Benjamin Button	Fantasy	Warner Bros.	81	1.783944	73	$285.43	2008
59	I Love You Phillip Morris	Comedy	Independent	57	1.340000	71	$20.10	2010
1	Youth in Revolt	Comedy	The Weinstein Company	52	1.090000	68	$19.62	2010
60	High School Musical 3: Senior Year	Comedy	Disney	76	22.913136	65	$252.04	2008
0	Zack and Miri Make a Porno	Romance	The Weinstein Company	70	1.747542	64	$41.94	2008
40	Music and Lyrics	Romance	Warner Bros.	70	3.647411	63	$145.90	2007
44	Marley and Me	Comedy	Fox	77	3.746782	63	$206.07	2008

In [ ]: