

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 [2]:

```
1 import numpy as np
2 import pandas as pd
```

In [3]:

```
1 df = pd.read_csv('example')
```

In [4]:

```
1 df
```

Out[4]:

	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

CSV Input

In []:

```
1
```

In [5]:

```
1 df = pd.read_csv('example')
2 df
```

Out[5]:

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

In [6]:

```
1 df
```

Out[6]:

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

In [7]:

```
1 df.to_csv('test',index=False)
```

In []:

```
1
```

CSV Output

In [24]:

```
1 df.to_csv('example',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 [10]:

```
1 df_1 = pd.read_excel('Excel_Sample.xlsx',sheet_name='Sheet1')
2
3 df_1
```

Out[10]:

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

Excel Output

In [33]:

```
1 df.to_excel('Excel_Sample.xlsx', sheet_name='Sheet1')
```

HTML

You may need to install `html5lib`, `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 [11]:

```
1 df = pd.read_html('http://www.fdic.gov/bank/individual/failed/banklist.html')
```

In [14]:

```
1 print(df)
```

	City \	Bank Name	
0	rsville	The First State Bank	Barbou
1	Ericson	Ericson State Bank	
2	Newark	City National Bank of New Jersey	
3	Maumee	Resolute Bank	
4	Louisa	Louisa Community Bank	
5	Cooper	The Enloe State Bank	
6	Chicago	Washington Federal Bank for Savings	
7	Argonia	The Farmers and Merchants State Bank of Argonia	
8		Fayette County Bank	Sai

In [15]:

1 df[0]

Out[15]:

	Bank Name	City	ST	CERT	Acquiring Institution	Closing Date
0	The First State Bank	Barboursville	WV	14361	MVB Bank, Inc.	April 3, 2020
1	Ericson State Bank	Ericson	NE	18265	Farmers and Merchants Bank	February 14, 2020
2	City National Bank of New Jersey	Newark	NJ	21111	Industrial Bank	November 1, 2019
3	Resolute Bank	Maumee	OH	58317	Buckeye State Bank	October 25, 2019
4	Louisa Community Bank	Louisa	KY	58112	Kentucky Farmers Bank Corporation	October 25, 2019
5	The Enloe State Bank	Cooper	TX	10716	Legend Bank, N. A.	May 31, 2019
6	Washington Federal Bank for Savings	Chicago	IL	30570	Royal Savings Bank	December 15, 2017
7	The Farmers and Merchants State Bank of Argonia	Argonia	KS	17719	Conway Bank	October 13, 2017
8	Fayette County Bank	Saint Elmo	IL	1802	United Fidelity Bank, fsb	May 26, 2017
9	Guaranty Bank, (d/b/a BestBank in Georgia & Mi...	Milwaukee	WI	30003	First-Citizens Bank & Trust Company	May 5, 2017
10	First NBC Bank	New Orleans	LA	58302	Whitney Bank	April 28, 2017
11	Proficio Bank	Cottonwood Heights	UT	35495	Cache Valley Bank	March 3, 2017
12	Seaway Bank and Trust Company	Chicago	IL	19328	State Bank of Texas	January 27, 2017
13	Harvest Community Bank	Pennsville	NJ	34951	First-Citizens Bank & Trust Company	January 13, 2017
14	Allied Bank	Mulberry	AR	91	Today's Bank	September 23, 2016
15	The Woodbury Banking Company	Woodbury	GA	11297	United Bank	August 19, 2016
16	First CornerStone Bank	King of Prussia	PA	35312	First-Citizens Bank & Trust Company	May 6, 2016
17	Trust Company Bank	Memphis	TN	9956	The Bank of Fayette County	April 29, 2016
18	North Milwaukee State Bank	Milwaukee	WI	20364	First-Citizens Bank & Trust Company	March 11, 2016
19	Hometown National Bank	Longview	WA	35156	Twin City Bank	October 2, 2015
20	The Bank of Georgia	Peachtree City	GA	35259	Fidelity Bank	October 2, 2015
21	Premier Bank	Denver	CO	34112	United Fidelity Bank, fsb	July 10, 2015

	Bank Name	City	ST	CERT	Acquiring Institution	Closing Date
22	Edgebrook Bank	Chicago	IL	57772	Republic Bank of Chicago	May 8, 2015
23	Doral Bank En Español	San Juan	PR	32102	Banco Popular de Puerto Rico	February 27, 2015
24	Capitol City Bank & Trust Company	Atlanta	GA	33938	First-Citizens Bank & Trust Company	February 13, 2015
25	Highland Community Bank	Chicago	IL	20290	United Fidelity Bank, fsb	January 23, 2015
26	First National Bank of Crestview	Crestview	FL	17557	First NBC Bank	January 16, 2015
27	Northern Star Bank	Mankato	MN	34983	BankVista	December 19, 2014
28	Frontier Bank, FSB D/B/A El Paseo Bank	Palm Desert	CA	34738	Bank of Southern California, N.A.	November 7, 2014
29	The National Republic Bank of Chicago	Chicago	IL	916	State Bank of Texas	October 24, 2014
...
531	ANB Financial, NA	Bentonville	AR	33901	Pulaski Bank and Trust Company	May 9, 2008
532	Hume Bank	Hume	MO	1971	Security Bank	March 7, 2008
533	Douglass National Bank	Kansas City	MO	24660	Liberty Bank and Trust Company	January 25, 2008
534	Miami Valley Bank	Lakeview	OH	16848	The Citizens Banking Company	October 4, 2007
535	NetBank	Alpharetta	GA	32575	ING DIRECT	September 28, 2007
536	Metropolitan Savings Bank	Pittsburgh	PA	35353	Allegheny Valley Bank of Pittsburgh	February 2, 2007
537	Bank of Ephraim	Ephraim	UT	1249	Far West Bank	June 25, 2004
538	Reliance Bank	White Plains	NY	26778	Union State Bank	March 19, 2004
539	Guaranty National Bank of Tallahassee	Tallahassee	FL	26838	Hancock Bank of Florida	March 12, 2004
540	Dollar Savings Bank	Newark	NJ	31330	No Acquirer	February 14, 2004
541	Pulaski Savings Bank	Philadelphia	PA	27203	Earthstar Bank	November 14, 2003
542	First National Bank of Blanchardville	Blanchardville	WI	11639	The Park Bank	May 9, 2003
543	Southern Pacific Bank	Torrance	CA	27094	Beal Bank	February 7, 2003
544	Farmers Bank of Cheneyville	Cheneyville	LA	16445	Sabine State Bank & Trust	December 17, 2002
545	Bank of Alamo	Alamo	TN	9961	No Acquirer	November 8, 2002
546	AmTrade International Bank En Español	Atlanta	GA	33784	No Acquirer	September 30, 2002

	Bank Name	City	ST	CERT	Acquiring Institution	Closing Date
547	Universal Federal Savings Bank	Chicago	IL	29355	Chicago Community Bank	June 27, 2002
548	Connecticut Bank of Commerce	Stamford	CT	19183	Hudson United Bank	June 26, 2002
549	New Century Bank	Shelby Township	MI	34979	No Acquirer	March 28, 2002
550	Net 1st National Bank	Boca Raton	FL	26652	Bank Leumi USA	March 1, 2002
551	NextBank, NA	Phoenix	AZ	22314	No Acquirer	February 7, 2002
552	Oakwood Deposit Bank Co.	Oakwood	OH	8966	The State Bank & Trust Company	February 1, 2002
553	Bank of Sierra Blanca	Sierra Blanca	TX	22002	The Security State Bank of Pecos	January 18, 2002
554	Hamilton Bank, NA En Español	Miami	FL	24382	Israel Discount Bank of New York	January 11, 2002
555	Sinclair National Bank	Gravette	AR	34248	Delta Trust & Bank	September 7, 2001
556	Superior Bank, FSB	Hinsdale	IL	32646	Superior Federal, FSB	July 27, 2001
557	Malta National Bank	Malta	OH	6629	North Valley Bank	May 3, 2001
558	First Alliance Bank & Trust Co.	Manchester	NH	34264	Southern New Hampshire Bank & Trust	February 2, 2001
559	National State Bank of Metropolis	Metropolis	IL	3815	Banterra Bank of Marion	December 14, 2000
560	Bank of Honolulu	Honolulu	HI	21029	Bank of the Orient	October 13, 2000

561 rows × 6 columns

In [16]:

1 df[0]

Out[16]:

	Bank Name	City	ST	CERT	Acquiring Institution	Closing Date
0	The First State Bank	Barboursville	WV	14361	MVB Bank, Inc.	April 3, 2020
1	Ericson State Bank	Ericson	NE	18265	Farmers and Merchants Bank	February 14, 2020
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6	Washington Federal Bank for Savings	Chicago	IL	30570	Royal Savings Bank	December 15, 2017
7	The Farmers and Merchants State Bank of Argonia	Argonia	KS	17719	Conway Bank	October 13, 2017
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12	Seaway Bank and Trust Company	Chicago	IL	19328	State Bank of Texas	January 27, 2017
13	Harvest Community Bank	Pennsville	NJ	34951	First-Citizens Bank & Trust Company	January 13, 2017
14	Allied Bank	Mulberry	AR	91	Today's Bank	September 23, 2016
15	The Woodbury Banking Company	Woodbury	GA	11297	United Bank	August 19, 2016
16	First CornerStone Bank	King of Prussia	PA	35312	First-Citizens Bank & Trust Company	May 6, 2016
17	Trust Company Bank	Memphis	TN	9956	The Bank of Fayette County	April 29, 2016
18	North Milwaukee State Bank	Milwaukee	WI	20364	First-Citizens Bank & Trust Company	March 11, 2016
19	Hometown National Bank	Longview	WA	35156	Twin City Bank	October 2, 2015
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27	Northern Star Bank	Mankato	MN	34983	BankVista	December 19, 2014
28	Frontier Bank, FSB D/B/A El Paseo Bank	Palm Desert	CA	34738	Bank of Southern California, N.A.	November 7, 2014
29	The National Republic Bank of Chicago	Chicago	IL	916	State Bank of Texas	October 24, 2014
...
531	ANB Financial, NA	Bentonville	AR	33901	Pulaski Bank and Trust Company	May 9, 2008
532	Hume Bank	Hume	MO	1971	Security Bank	March 7, 2008
533	Douglass National Bank	Kansas City	MO	24660	Liberty Bank and Trust Company	January 25, 2008
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538	Reliance Bank	White Plains	NY	26778	Union State Bank	March 19, 2004
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542	First National Bank of Blanchardville	Blanchardville	WI	11639	The Park Bank	May 9, 2003
543	Southern Pacific Bank	Torrance	CA	27094	Beal Bank	February 7, 2003
544	Farmers Bank of Cheneyville	Cheneyville	LA	16445	Sabine State Bank & Trust	December 17, 2002
545	Bank of Alamo	Alamo	TN	9961	No Acquirer	November 8, 2002
546	AmTrade International Bank En Español	Atlanta	GA	33784	No Acquirer	September 30, 2002

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550	Net 1st National Bank	Boca Raton	FL	26652	Bank Leumi USA	March 1, 2002
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552	Oakwood Deposit Bank Co.	Oakwood	OH	8966	The State Bank & Trust Company	February 1, 2002
553	Bank of Sierra Blanca	Sierra Blanca	TX	22002	The Security State Bank of Pecos	January 18, 2002
554	Hamilton Bank, NA En Español	Miami	FL	24382	Israel Discount Bank of New York	January 11, 2002
555	Sinclair National Bank	Gravette	AR	34248	Delta Trust & Bank	September 7, 2001
556	Superior Bank, FSB	Hinsdale	IL	32646	Superior Federal, FSB	July 27, 2001
557	Malta National Bank	Malta	OH	6629	North Valley Bank	May 3, 2001
558	First Alliance Bank & Trust Co.	Manchester	NH	34264	Southern New Hampshire Bank & Trust	February 2, 2001
559	National State Bank of Metropolis	Metropolis	IL	3815	Banterra Bank of Marion	December 14, 2000
560	Bank of Honolulu	Honolulu	HI	21029	Bank of the Orient	October 13, 2000

561 rows × 6 columns

In [19]:

```
1 df[0].columns
```

Out[19]:

```
Index(['Bank Name', 'City', 'ST', 'CERT', 'Acquiring Institution',
      'Closing Date'],
      dtype='object')
```

In [21]:

```
1 df[0][['City', 'Closing Date']]
```

Out[21]:

	City	Closing Date
0	Barboursville	April 3, 2020
1	Ericson	February 14, 2020
2	Newark	November 1, 2019
3	Maumee	October 25, 2019
4	Louisa	October 25, 2019
5	Cooper	May 31, 2019
6	Chicago	December 15, 2017
7	Argonia	October 13, 2017
8	Saint Elmo	May 26, 2017
9	Milwaukee	May 5, 2017
10	New Orleans	April 28, 2017
11	Cottonwood Heights	March 3, 2017
12	Chicago	January 27, 2017
13	Pennsville	January 13, 2017
14	Mulberry	September 23, 2016
15	Woodbury	August 19, 2016
16	King of Prussia	May 6, 2016
17	Memphis	April 29, 2016
18	Milwaukee	March 11, 2016
19	Longview	October 2, 2015
20	Peachtree City	October 2, 2015
21	Denver	July 10, 2015
22	Chicago	May 8, 2015
23	San Juan	February 27, 2015
24	Atlanta	February 13, 2015
25	Chicago	January 23, 2015
26	Crestview	January 16, 2015
27	Mankato	December 19, 2014
28	Palm Desert	November 7, 2014
29	Chicago	October 24, 2014
...
531	Bentonville	May 9, 2008
532	Hume	March 7, 2008
533	Kansas City	January 25, 2008

	City	Closing Date
534	Lakeview	October 4, 2007
535	Alpharetta	September 28, 2007
536	Pittsburgh	February 2, 2007
537	Ephraim	June 25, 2004
538	White Plains	March 19, 2004
539	Tallahassee	March 12, 2004
540	Newark	February 14, 2004
541	Philadelphia	November 14, 2003
542	Blanchardville	May 9, 2003
543	Torrance	February 7, 2003
544	Cheneyville	December 17, 2002
545	Alamo	November 8, 2002
546	Atlanta	September 30, 2002
547	Chicago	June 27, 2002
548	Stamford	June 26, 2002
549	Shelby Township	March 28, 2002
550	Boca Raton	March 1, 2002
551	Phoenix	February 7, 2002
552	Oakwood	February 1, 2002
553	Sierra Blanca	January 18, 2002
554	Miami	January 11, 2002
555	Gravette	September 7, 2001
556	Hinsdale	July 27, 2001
557	Malta	May 3, 2001
558	Manchester	February 2, 2001
559	Metropolis	December 14, 2000
560	Honolulu	October 13, 2000

561 rows × 2 columns

SQL (Optional)

- Note: If you are completely unfamiliar with SQL you can check out my other course: "Complete SQL Bootcamp" to learn SQL.

The `pandas.io.sql` module provides a collection of query wrappers to both facilitate data retrieval and to reduce dependency on DB-specific API. Database abstraction is provided by SQLAlchemy if installed. In addition you will need a driver library for your database. Examples of such drivers are `psycopg2` for PostgreSQL or `pymysql` for MySQL. For SQLite this is included in Python's standard library by default. You can find an overview of supported drivers for each SQL dialect in the SQLAlchemy docs.

If SQLAlchemy is not installed, a fallback is only provided for `sqlite` (and for `mysql` for backwards compatibility, but this is deprecated and will be removed in a future version). This mode requires a Python database adapter which respect the Python DB-API.

See also some cookbook examples for some advanced strategies.

The key functions are:

- `read_sql_table(table_name, con[, schema, ...])`
 - Read SQL database table into a DataFrame.
- `read_sql_query(sql, con[, index_col, ...])`
 - Read SQL query into a DataFrame.
- `read_sql(sql, con[, index_col, ...])`
 - Read SQL query or database table into a DataFrame.
- `DataFrame.to_sql(name, con[, flavor, ...])`
 - Write records stored in a DataFrame to a SQL database.

In [36]:

```
1 from sqlalchemy import create_engine
```

In [37]:

```
1 engine = create_engine('sqlite:///memory:')
```

In [40]:

```
1 df.to_sql('data', engine)
```

In [42]:

```
1 sql_df = pd.read_sql('data', con=engine)
```

In [43]:

```
1 sql_df
```

Out[43]:

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

Great Job!

