Project Part 1

A few practice questions to get you started on using COVIDCast.

COVIDCast only have a small number of methods that you need to learn. The documentation of the methods can be found here: https://cmu-delphi.github.io/covidcast/covidcast-py/html/signals.html

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In [3]:
```
# Installing covidcast
!pip install covidcast
```

```
Requirement already satisfied: covidcast in /Users/annalieseadams/opt/anaconda
3/lib/python3.8/site-packages (0.1.5)
Requirement already satisfied: epiweeks in /Users/annalieseadams/opt/anaconda3
/lib/python3.8/site-packages (from covidcast) (2.1.3)
Requirement already satisfied: imageio in /Users/annalieseadams/opt/anaconda3/
lib/python3.8/site-packages (from covidcast) (2.9.0)
Requirement already satisfied: matplotlib in /Users/annalieseadams/opt/anacond
a3/lib/python3.8/site-packages (from covidcast) (3.3.2)
Requirement already satisfied: imageio-ffmpeg in /Users/annalieseadams/opt/ana
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Requirement already satisfied: requests in /Users/annalieseadams/opt/anaconda3
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3/lib/python3.8/site-packages (from covidcast) (1.1.0)
Requirement already satisfied: tqdm in /Users/annalieseadams/opt/anaconda3/lib
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Requirement already satisfied: pandas in /Users/annalieseadams/opt/anaconda3/l
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3/lib/python3.8/site-packages (from covidcast) (0.10.2)
Requirement already satisfied: delphi-epidata>=0.0.11 in /Users/annalieseadams
/opt/anaconda3/lib/python3.8/site-packages (from covidcast) (0.3.1)
Requirement already satisfied: pillow in /Users/annalieseadams/opt/anaconda3/l
ib/python3.8/site-packages (from imageio->covidcast) (8.0.1)
Requirement already satisfied: kiwisolver>=1.0.1 in /Users/annalieseadams/opt/
anaconda3/lib/python3.8/site-packages (from matplotlib->covidcast) (1.3.0)
Requirement already satisfied: certifi>=2020.06.20 in /Users/annalieseadams/op
t/anaconda3/lib/python3.8/site-packages (from matplotlib->covidcast) (2020.6.2
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Requirement already satisfied: cycler>=0.10 in /Users/annalieseadams/opt/anaco
nda3/lib/python3.8/site-packages (from matplotlib->covidcast) (0.10.0)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.3 in /Us
ers/annalieseadams/opt/anaconda3/lib/python3.8/site-packages (from matplotlib-
>covidcast) (2.4.7)
```

```
Requirement already satisfied: python-dateutil>=2.1 in /Users/annalieseadams/o
pt/anaconda3/lib/python3.8/site-packages (from matplotlib->covidcast) (2.8.1)
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in /Use
rs/annalieseadams/opt/anaconda3/lib/python3.8/site-packages (from requests->co
vidcast) (1.25.11)
Requirement already satisfied: idna<3,>=2.5 in /Users/annalieseadams/opt/anaco
nda3/lib/python3.8/site-packages (from requests->covidcast) (2.10)
Requirement already satisfied: chardet<4,>=3.0.2 in /Users/annalieseadams/opt/
anaconda3/lib/python3.8/site-packages (from requests->covidcast) (3.0.4)
Requirement already satisfied: pytz>=2017.2 in /Users/annalieseadams/opt/anaco
nda3/lib/python3.8/site-packages (from pandas->covidcast) (2020.1)
Requirement already satisfied: fiona>=1.8 in /Users/annalieseadams/opt/anacond
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Requirement already satisfied: pyproj>=2.2.0 in /Users/annalieseadams/opt/anac
onda3/lib/python3.8/site-packages (from geopandas->covidcast) (3.2.1)
Requirement already satisfied: tenacity in /Users/annalieseadams/opt/anaconda3
/lib/python3.8/site-packages (from delphi-epidata>=0.0.11->covidcast) (8.0.1)
Requirement already satisfied: aiohttp in /Users/annalieseadams/opt/anaconda3/
lib/python3.8/site-packages (from delphi-epidata>=0.0.11->covidcast) (3.8.0)
Requirement already satisfied: six in /Users/annalieseadams/opt/anaconda3/lib/
python3.8/site-packages (from cycler>=0.10->matplotlib->covidcast) (1.15.0)
Requirement already satisfied: setuptools in /Users/annalieseadams/opt/anacond
a3/lib/python3.8/site-packages (from fiona>=1.8->geopandas->covidcast) (50.3.1
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Requirement already satisfied: click-plugins>=1.0 in /Users/annalieseadams/opt
/anaconda3/lib/python3.8/site-packages (from fiona>=1.8->geopandas->covidcast)
(1.1.1)
Requirement already satisfied: munch in /Users/annalieseadams/opt/anaconda3/li
b/python3.8/site-packages (from fiona>=1.8->geopandas->covidcast) (2.5.0)
Requirement already satisfied: attrs>=17 in /Users/annalieseadams/opt/anaconda
3/lib/python3.8/site-packages (from fiona>=1.8->geopandas->covidcast) (20.3.0)
Requirement already satisfied: click>=4.0 in /Users/annalieseadams/opt/anacond
a3/lib/python3.8/site-packages (from fiona>=1.8->geopandas->covidcast) (7.1.2)
Requirement already satisfied: cligj>=0.5 in /Users/annalieseadams/opt/anacond
a3/lib/python3.8/site-packages (from fiona>=1.8->geopandas->covidcast) (0.7.2)
Requirement already satisfied: aiosignal>=1.1.2 in /Users/annalieseadams/opt/a
naconda3/lib/python3.8/site-packages (from aiohttp->delphi-epidata>=0.0.11->co
vidcast) (1.2.0)
Requirement already satisfied: frozenlist>=1.1.1 in /Users/annalieseadams/opt/
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ovidcast) (1.2.0)
Requirement already satisfied: yarl<2.0,>=1.0 in /Users/annalieseadams/opt/ana
conda3/lib/python3.8/site-packages (from aiohttp->delphi-epidata>=0.0.11->covi
dcast) (1.7.2)
Requirement already satisfied: charset-normalizer<3.0,>=2.0 in /Users/annalies
eadams/opt/anaconda3/lib/python3.8/site-packages (from aiohttp->delphi-epidata
>=0.0.11->covidcast) (2.0.7)
Requirement already satisfied: async-timeout<5.0,>=4.0.0a3 in /Users/annaliese
adams/opt/anaconda3/lib/python3.8/site-packages (from aiohttp->delphi-epidata>
=0.0.11->covidcast) (4.0.1)
Requirement already satisfied: multidict<7.0,>=4.5 in /Users/annalieseadams/op
t/anaconda3/lib/python3.8/site-packages (from aiohttp->delphi-epidata>=0.0.11-
>covidcast) (5.2.0)
Requirement already satisfied: typing-extensions>=3.6.5 in /Users/annalieseada
ms/opt/anaconda3/lib/python3.8/site-packages (from async-timeout<5.0,>=4.0.0a3
```

```
->aiohttp->delphi-epidata>=0.0.11->covidcast) (3.7.4.3)
```

In [4]:
```
from datetime import date
import covidcast
```

Working with geographic codes

Get the FIPS codes for Los Angeles county, Santa Barbara county, and Orange county.

In [5]:
```
covidcast.name_to_fips("Los Angeles County", ignore_case=False, fixed=False,
```

Out[5]:
```
['06037']
```

In [6]:
```
covidcast.name_to_fips("Santa Barbara County", ignore_case=False, fixed=False
```

Out[6]:
```
['06083']
```

In [10]:
```
covidcast.name_to_fips("Orange County", ignore_case=False, fixed=False, ties_
```

Out[10]:
```
['06059']
```

Find out which counties correspond to the FIPS 06059 and 42003.

In [6]:
```
covidcast.fips_to_name(['06059'],ignore_case=False, fixed=False, ties_method=
```

Out[6]:
```
['Orange County']
```

In [7]:
```
covidcast.fips_to_name(['42003'],ignore_case=False, fixed=False, ties_method=
```

Out[7]:
```
['Allegheny County']
```

Find the FIPS of all counties in California. Create and print out a dictionary that maps county names to FIPS for all the counties in California. Hint: Look at the last example from https://cmu-delphi.github.io/covidcast/covidcast-py/html/getting_started.html.

In [8]:
```
ca_counties = covidcast.fips_to_name("^06.*", ties_method="all")
dict1 = ca_counties[0]
print(dict1)
```

{'06000': ['California'], '06001': ['Alameda County'], '06003': ['Alpine County'], '06005': ['Amador County'], '06007': ['Butte County'], '06009': ['Calaveras County'], '06011': ['Colusa County'], '06013': ['Contra Costa County'], '06015': ['Del Norte County'], '06017': ['El Dorado County'], '06019': ['Fresno County'], '06021': ['Glenn County'], '06023': ['Humboldt County'], '06025': ['Imperial County'], '06027': ['Inyo County'], '06029': ['Kern County'], '06031': ['Kings County'], '06033': ['Lake County'], '06035': ['Lassen County'], '06037': ['Los Angeles County'], '06039': ['Madera County'], '06041': ['Marin County'], '06043': ['Mariposa County'], '06045': ['Mendocino County'], '06047': ['Merced County'], '06049': ['Modoc County'], '06051': ['Mono County'], '06053': ['Monterey County'], '06055': ['Napa County'], '06057': ['Nevada County'], '06059': ['Orange County'], '06061': ['Placer County'], '06063': ['Plumas County'], '06065': ['Riverside County'], '06067': ['Sacramento County'], '06069': ['San Benito County'], '06071': ['San Bernardino County'], '06073': ['San Diego County'], '06075': ['San Francisco County'], '06077': ['San Joaquin County'], '06079': ['San Luis Obispo County'], '06081': ['San Mateo County'], '06083': ['Santa Barbara County'], '06085': ['Santa Clara County'], '06087': ['Santa Cruz County'], '06089': ['Shasta County'], '06091': ['Sierra County'], '06093': ['Siskiyou County'], '06095': ['Solano County'], '06097': ['Sonoma County'], '06099': ['Stanislaus County'], '06101': ['Sutter County'], '06103': ['Tehama County'], '06105': ['Trinity County'], '06107': ['Tulare County'], '06109': ['Tuolumne County'], '06111': ['Ventura County'], '06113': ['Yolo County'], '06115': ['Yuba County']}

Fetching and merging data

Get the number of daily new Covid cases in the California, New York, and Texas from May 2020 to July 2020 by fetching the "US Facts Cases and Deaths" data source (https://cmu-delphi.github.io/delphi-epidata/api/covidcast-signals/usa-facts.html).

In [9]:
```
#fetch the "US Facts Cases and Deaths" data source
#usa-facts
covid = covidcast.signal("usa-facts", "confirmed_incidence_num", date(2020, 5
```

In [15]:
```
covid[["geo_value", "time_value", "value"]]
```

Out[15]:

	geo_value	time_value	value
0	ca	2020-05-01	1913.0
1	ny	2020-05-01	3942.0
2	tx	2020-05-01	1142.0
0	ca	2020-05-02	2213.0
1	ny	2020-05-02	4663.0
...	...	...	...
1	ny	2020-06-30	507.0
2	tx	2020-06-30	6975.0
0	ca	2020-07-01	10529.0
1	ny	2020-07-01	752.0
2	tx	2020-07-01	8076.0

186 rows × 3 columns

Get the daily percentages of doctor visits that are related to Covid in California, New York, and Texas from May 2020 to July 2020 by fetching the "Doctor Visits" data source (https://cmu-delphi.github.io/delphi-epidata/api/covidcast-signals/doctor-visits.html).

In [16]:
```
covid_doctor = covidcast.signal("doctor-visits", "smoothed_cli", date(2020, 5
covid_doctor[["geo_value", "time_value", "value"]]
```

Out[16]:

	geo_value	time_value	value
0	ca	2020-05-01	3.943336
1	ny	2020-05-01	17.837689
2	tx	2020-05-01	3.304991
0	ca	2020-05-02	3.793779
1	ny	2020-05-02	17.737303
...	...	...	...
1	ny	2020-06-30	8.653689
2	tx	2020-06-30	15.473877
0	ca	2020-07-01	7.637207
1	ny	2020-07-01	8.080805
2	tx	2020-07-01	14.290377

186 rows × 3 columns

Merge the two tables using the covidcast.aggregate_signals method.

In [18]:
```
cases_doctor=covidcast.aggregate_signals([covid, covid_doctor],dt=[3,0])
cases_doctor
```

Out[18]:

	geo_value	time_value	usa-facts_confirmed_incidence_num_0_issue	facts_confirmed_incidenc
0	ca	2020-05-01	NaT	
1	ny	2020-05-01	NaT	
2	tx	2020-05-01	NaT	
3	ca	2020-05-02	NaT	
4	ny	2020-05-02	NaT	
...	...	...	...	
190	ny	2020-07-03	2020-10-17	
191	tx	2020-07-03	2021-10-20	
192	ca	2020-07-04	2021-09-16	
193	ny	2020-07-04	2020-10-17	
194	tx	2020-07-04	2021-10-20	

195 rows × 19 columns