#Using the NCEI API

In [2]:
```
import requests
def make_request(endpoint, payload=None):
  """
  Make a request to a specific endpoint on the weather API
  passing headers and optional payload.
  Parameters:
  - endpoint: The endpoint of the API you want to
  make a GET request to.
  - payload: A dictionary of data to pass along
  with the request.
  Returns:
    Response object.
  """
  return requests.get(
      f'https://www.ncdc.noaa.gov/cdo-web/api/v2/{endpoint}',
      headers={
          'token': 'apmaMuyEvjemFkHtorrzrCtQyOwNRTeM'
          },
      params=payload
    )
```

#See what datasets are available

In [3]:
```
response = make_request('datasets', {'startdate':'2018-10-01'})
response.status_code
```

Out[3]:
```
200
```

#Get the keys of the result

In [4]:
```
response.json().keys()
```

Out[4]:
```
dict_keys(['metadata', 'results'])
```

In [5]:
```
response.json()['metadata']
```

Out[5]:
```
{'resultset': {'offset': 1, 'count': 11, 'limit': 25}}
```

#Figure out what data is in the result

In [6]:
```
response.json()['results'][0].keys()
```

Out[6]:
```
dict_keys(['uid', 'mindate', 'maxdate', 'name', 'datacoverage', 'id'])
```

#Parse the result

In [7]:
```
[(data['id'], data['name']) for data in response.json()['results']]
```

Out[7]:
```
[('GHCND', 'Daily Summaries'),
 ('GSOM', 'Global Summary of the Month'),
 ('GSOY', 'Global Summary of the Year'),
 ('NEXRAD2', 'Weather Radar (Level II)'),
 ('NEXRAD3', 'Weather Radar (Level III)'),
 ('NORMAL_ANN', 'Normals Annual/Seasonal'),
 ('NORMAL_DLY', 'Normals Daily'),
 ('NORMAL_HLY', 'Normals Hourly'),
 ('NORMAL_MLY', 'Normals Monthly'),
 ('PRECIP_15', 'Precipitation 15 Minute'),
 ('PRECIP_HLY', 'Precipitation Hourly')]
```

#Figure out which data category we want

In [9]:
```
response = make_request(
    'datacategories',
    payload={
        'datasetid' : 'GHCND'
        }
    )
response.status_code
```

Out[9]:
```
200
```

In [10]:
```
response.json()['results']
```

Out[10]:
```
[{'name': 'Evaporation', 'id': 'EVAP'},
 {'name': 'Land', 'id': 'LAND'},
 {'name': 'Precipitation', 'id': 'PRCP'},
 {'name': 'Sky cover & clouds', 'id': 'SKY'},
 {'name': 'Sunshine', 'id': 'SUN'},
 {'name': 'Air Temperature', 'id': 'TEMP'},
 {'name': 'Water', 'id': 'WATER'},
 {'name': 'Wind', 'id': 'WIND'},
 {'name': 'Weather Type', 'id': 'WXTYPE'}]
```

#Grab the data type ID for the Temperature category

In [29]:
```
response = make_request(
    'datatypes',
    payload={
         'datacategoryid': 'TEMP',
        'limit' : 100
    }
)
response.status_code
```

Out[29]:
```
200
```

In [14]:
```
[(datatype['id'], datatype['maxdate']) for datatype in response.json()['results
```

Out[14]:
```
[('MNTM', 'Monthly mean temperature'),
 ('TAVG', 'Average Temperature.'),
 ('TMAX', 'Maximum temperature'),
 ('TMIN', 'Minimum temperature'),
 ('TOBS', 'Temperature at the time of observation')]
```

#Determine which Location Category we want

In [15]:
```
response = make_request(
    'locationcategories',
    {
        'datasetid' : 'GHCND'
    }
)
response.status_code
```

Out[15]:
```
200
```

In [16]:
```
import pprint
pprint.pprint(response.json())
```

```
{'metadata': {'resultset': {'count': 12, 'limit': 25, 'offset': 1}},
 'results': [{'id': 'CITY', 'name': 'City'},
             {'id': 'CLIM_DIV', 'name': 'Climate Division'},
             {'id': 'CLIM_REG', 'name': 'Climate Region'},
             {'id': 'CNTRY', 'name': 'Country'},
             {'id': 'CNTY', 'name': 'County'},
             {'id': 'HYD_ACC', 'name': 'Hydrologic Accounting Unit'},
             {'id': 'HYD_CAT', 'name': 'Hydrologic Cataloging Unit'},
             {'id': 'HYD_REG', 'name': 'Hydrologic Region'},
             {'id': 'HYD_SUB', 'name': 'Hydrologic Subregion'},
             {'id': 'ST', 'name': 'State'},
             {'id': 'US_TERR', 'name': 'US Territory'},
             {'id': 'ZIP', 'name': 'Zip Code'}]}
```

In [ ]:
```
#[(datatype['id'], datatype['name']) for datatype in response.json()['results']
response.json(['results'][0])
```

#Get NYC Location ID

In [17]:

```
def get_item(name, what, endpoint, start=1, end=None):
  """
  Grab the JSON payload for a agiven field by name using binary search.

  Parameters:
      - name: The item to look for.
      - what: Dictionary specifying what the item in `name` is.
      - endpoint: Where to look for the item.
      - start: The position to start at. We don't need to touch this, but the
      function will manipulate this with recursion.
      - end: The last position of the cities. Used to find the midpoint, but
      like `start` this is not something we need to worry about.
  Returns:
      Dictionary of the information for the item if found otherwise an empty di
  """
  # find the midpoint which we use to cut the data in half each time
  mid = (start + (end if end else 1)) // 2
  # lowercase the name so this is not case-sensitive
  name = name.lower()
  # define the payload we will send with each request
  payload = {
     'datasetid' : 'GHCND',
     'sortfield' : 'name',
     'offset' : mid, # we will change the offset each time
     'limit' : 1 # we only want one value back
  }
  # make our request adding any additional filter parameters from `what`
  response = make_request(endpoint, {**payload, **what})
  if response.ok:
    # if response is ok, grab the end index from the response metadata the firs
    end = end if end else response.json()['metadata']['resultset']['count']

    # grab the lowercase version of the current name
    current_name = response.json()['results'][0]['name'].lower()

    # if what we are searching for is in the current name, we have found our it
    if name in current_name:
      return response.json()['results'][0] # return the found item
    else:
      if start >= end:
         #if our start index is greater than or equal to our end, we couldn't f
         return {}
      elif name < current_name:
        # our name comes before the current name in the alphabet, so we search
        return get_item(name, what, endpoint, start, mid - 1)
      elif name > current_name:
        # our name comes after the current name in the alphabet, so we search f
        return get_item(name, what, endpoint, mid + 1, end)
  else:
    # response wasn't ok, use code to determine why
    print(f'Response not OK, status: {response.status_code}')

def get_location(name):
  """
  Grab the JSON payload for the location by name using binary search.
  Parameters:
    - name: The city to look for.
```

```
    Returns:
        Dictionary of the information for the city if found otherwise
        an empty dictionary.
    """
    return get_item(name, {'locationcategoryid' : 'CITY'}, 'locations')
```

In [18]:
```
#get NYC id
nyc = get_location('New York')
nyc
```

Out[18]:
```
{'mindate': '1869-01-01',
 'maxdate': '2024-03-11',
 'name': 'New York, NY US',
 'datacoverage': 1,
 'id': 'CITY:US360019'}
```

#Get the station ID for Central Park

In [19]:
```
central_park = get_item('NY City Central Park', {'locationid' : nyc['id']}, 'st
central_park
```

Out[19]:
```
{'elevation': 42.7,
 'mindate': '1869-01-01',
 'maxdate': '2024-03-10',
 'latitude': 40.77898,
 'name': 'NY CITY CENTRAL PARK, NY US',
 'datacoverage': 1,
 'id': 'GHCND:USW00094728',
 'elevationUnit': 'METERS',
 'longitude': -73.96925}
```

#Request the temperature data

In [28]:
```
# get NYC daily summaries data
response = make_request(
    'data',
     {
         'datasetid' : 'GHCND',
         'stationid' : central_park['id'],
         'locationid' : nyc['id'],
         'startdate' : '2018-10-01',
         'enddate' : '2018-10-31',
         'datatypeid' : ['TMIN', 'TMAX', 'TOBS'], # temperature at time of obse
         'units' : 'metric',
         'limit' : 1000
    }
)
response.status_code
```

Out[28]:
```
200
```

#Create a DataFrame

In [21]:
```
import pandas as pd

df = pd.DataFrame(response.json()['results'])
df.head()
```

Out[21]:

	date	datatype	station	attributes	value
0	2018-10-01T00:00:00	TMAX	GHCND:USW00094728	,,W,2400	24.4
1	2018-10-01T00:00:00	TMIN	GHCND:USW00094728	,,W,2400	17.2
2	2018-10-02T00:00:00	TMAX	GHCND:USW00094728	,,W,2400	25.0
3	2018-10-02T00:00:00	TMIN	GHCND:USW00094728	,,W,2400	18.3
4	2018-10-03T00:00:00	TMAX	GHCND:USW00094728	,,W,2400	23.3

#Using a different station

In [22]:
```
laguardia = get_item(
    'LaGuardia', {'locationid' : nyc['id']}, 'stations'
)
laguardia
```

Out[22]:
```
{'elevation': 3,
 'mindate': '1939-10-07',
 'maxdate': '2024-03-11',
 'latitude': 40.77945,
 'name': 'LAGUARDIA AIRPORT, NY US',
 'datacoverage': 1,
 'id': 'GHCND:USW00014732',
 'elevationUnit': 'METERS',
 'longitude': -73.88027}
```

In [23]:
```
# get NYC daily summaries data
response = make_request(
    'data',
     {
         'datasetid' : 'GHCND',
         'stationid' : laguardia['id'],
         'locationid' : nyc['id'],
         'startdate' : '2018-10-01',
         'enddate' : '2018-10-31',
         'datatypeid' : ['TMIN', 'TMAX', 'TAVG'], # temperature at time of obse
         'units' : 'metric',
         'limit' : 1000
    }
)
response.status_code
```

Out[23]: 200

In [24]:
```
df = pd.DataFrame(response.json()['results'])
df.head()
```

Out[24]:

	date	datatype	station	attributes	value
0	2018-10-01T00:00:00	TAVG	GHCND:USW00014732	H,,S,	21.2
1	2018-10-01T00:00:00	TMAX	GHCND:USW00014732	,,W,2400	25.6
2	2018-10-01T00:00:00	TMIN	GHCND:USW00014732	,,W,2400	18.3
3	2018-10-02T00:00:00	TAVG	GHCND:USW00014732	H,,S,	22.7
4	2018-10-02T00:00:00	TMAX	GHCND:USW00014732	,,W,2400	26.1

In [25]:
```
df.datatype.value_counts()
```

Out[25]:
```
TAVG    31
TMAX    31
TMIN    31
Name: datatype, dtype: int64
```

In [26]:
```
df.to_csv('data.nyc_temperatures.csv', index=False)
```