Project: Wrangling and Analyze Data

Data Gathering

In the cell below, gather **all** three pieces of data for this project and load them in the notebook. **Note:** the methods required to gather each data are different.

1. Directly download the WeRateDogs Twitter archive data (twitter_archive_enhanced.csv)

In [65]:

```
import pandas as pd
import numpy as np
import requests
import tweepy
import time
import json
import os
import re
```

In [66]:

```
df1_twitter_archive = pd.read_csv('twitter-archive-enhanced.csv')

df1_twitter_archive.head()
```

Out[66]:

	tweet_id	in_reply_to_status_id	in_reply_to_user_id	timestamp	
0	892420643555336193	NaN	NaN	2017-08-01 16:23:56 +0000	href="http://twitter.com/do
1	892177421306343426	NaN	NaN	2017-08-01 00:17:27 +0000	href="http://twitter.com/do
2	891815181378084864	NaN	NaN	2017-07-31 00:18:03 +0000	href="http://twitter.com/do
3	891689557279858688	NaN	NaN	2017-07-30 15:58:51 +0000	href="http://twitter.com/do
4	891327558926688256	NaN	NaN	2017-07-29 16:00:24 +0000	href="http://twitter.com/do

1. Use the Requests library to download the tweet image prediction (image_predictions.tsv)

In [67]:

```
url = 'https://d17h27t6h515a5.cloudfront.net/topher/2017/August/599fd2ad_image-predict
r = requests.get(url)

with open('image-predictions.tsv', 'wb') as file:
    file.write(r.content)
```

In [68]:

```
df2_image_predictions = pd.read_csv('image-predictions.tsv', delimiter='\t')
df2_image_predictions.head()
```

Out[68]:

	tweet_id	jpg_url	img_num	
0	666020888022790149	https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg	1	Welsh_springer_sp
1	666029285002620928	https://pbs.twimg.com/media/CT42GRgUYAA5iDo.jpg	1	red
2	666033412701032449	https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg	1	German_shep
3	666044226329800704	https://pbs.twimg.com/media/CT5Dr8HUEAA-lEu.jpg	1	Rhodesian_ridge
4	666049248165822465	https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg	1	miniature_pin

1. Use the Tweepy library to query additional data via the Twitter API (tweet_json.txt)

In [69]:

```
#Note: this code is not working for twitter api V2 and some forbidden issues, so we'll
'''

import tweepy
from tweepy import OAuthHandler
import json
from timeit import default_timer as timer

# Query Twitter API for each tweet in the Twitter archive and save JSON in a text file
# These are hidden to comply with Twitter's API terms and conditions
consumer_key = 'HIDDEN'
consumer_secret = 'HIDDEN'
access_token = 'HIDDEN'
access_secret = 'HIDDEN'

auth = OAuthHandler(consumer_key, consumer_secret)
auth.set_access_token(access_token, access_secret)

api = tweepy.API(auth, wait_on_rate_limit=True)

# NOTE TO REVIEWER: this student had mobile verification issues so the following
# Twitter API code was sent to this student from a Udacity instructor
# Tweet IDs for which to gather additional data via Twitter's API
tweet_ids = df1_twitter_archive.tweet_id.values
len(tweet_ids)

# Query Twitter's API for JSON data for each tweet ID in the Twitter archive
count = 0
fails_dict = {}
start = timer()
# Save each tweet's returned JSON as a new line in a .txt file
with open('tweet_json.txt', 'w') as outfile:
    # This loop will likely take 20-30 minutes to run because of Twitter's rate limit
    for tweet_id in tweet_ids:
        count += 1
        print(str(count) + ": " + str(tweet_id))
        try:
            tweet = api.get_status(tweet_id, tweet_mode='extended')
            print("Success")
            json.dump(tweet._json, outfile)
            outfile.write('\n')
        except tweepy.TweepError as e:
            print("Fail")
            fails_dict[tweet_id] = e
            pass
end = timer()
print(end - start)
print(fails_dict)
'''
```

Out[69]:

```
'\n\nimport tweepy\nfrom tweepy import OAuthHandler\nimport json\nfrom timeit import
default_timer as timer\n\n# Query Twitter API for each tweet in the Twitter archive a
nd save JSON in a text file\n# These are hidden to comply with Twitter\'s API terms a
nd conditions\nconsumer_key = \'HIDDEN\'\nconsumer_secret = \'HIDDEN\'\naccess_token
= \'HIDDEN\'\naccess_secret = \'HIDDEN\'\n\nauth = OAuthHandler(consumer_key, consume
r_secret)\nauth.set_access_token(access_token, access_secret)\n\napi = tweepy.API(aut
h, wait_on_rate_limit=True)\n\n# NOTE TO REVIEWER: this student had mobile verificati
on issues so the following\n# Twitter API code was sent to this student from a Udacit
y instructor\n# Tweet IDs for which to gather additional data via Twitter\'s API\ntwe
et_ids = df1_twitter_archive.tweet_id.values\nlen(tweet_ids)\n\n# Query Twitter\'s AP
I for JSON data for each tweet ID in the Twitter archive\ncount = 0\nfails_dict = {}
\nstart = timer()\n# Save each tweet\'s returned JSON as a new line in a .txt file\nw
ith open(\'tweet_json.txt\', \'w\') as outfile:\n    # This loop will likely take 20-
30 minutes to run because of Twitter\'s rate limit\n    for tweet_id in tweet_ids:\n
count += 1\n        print(str(count) + ": " + str(tweet_id))\n        try:\n
tweet = api.get_status(tweet_id, tweet_mode=\'extended\')\n            print("Succes
s")\n            json.dump(tweet._json, outfile)\n            outfile.write(\'\n\')\n
except tweepy.TweepError as e:\n            print("Fail")\n            fails_dict[twe
et_id] = e\n            pass\nend = timer()\nprint(end - start)\nprint(fails_dict)\n'
```

In [70]:

```python
#getting the data from the 'tweet_jason' text file.
collums = ['id', 'favorite_count', 'retweet_count']

with open('tweet_json.txt', 'r') as file:
    data = [json.loads(line) for line in file]

data = [{'tweet_id': tweet['id'], 'favorite_count': tweet['favorite_count'], 'retweet_

df3_twitter_api = pd.DataFrame(data)
df3_twitter_api.head()
```

Out[70]:

	tweet_id	favorite_count	retweet_count
0	892420643555336193	39467	8853
1	892177421306343426	33819	6514
2	891815181378084864	25461	4328
3	891689557279858688	42908	8964
4	891327558926688256	41048	9774

Assessing Data

In this section, detect and document at least **eight (8) quality issues and two (2) tidiness issue**. You must use **both** visual assessment programmatic assessement to assess the data.

Note: pay attention to the following key points when you access the data.

- You only want original ratings (no retweets) that have images. Though there are 5000+ tweets in the dataset, not all are dog ratings and some are retweets.
- Assessing and cleaning the entire dataset completely would require a lot of time, and is not necessary to practice and demonstrate your skills in data wrangling. Therefore, the requirements of this project are only to assess and clean at least 8 quality issues and at least 2 tidiness issues in this dataset.

- The fact that the rating numerators are greater than the denominators does not need to be cleaned. This unique rating system is a big part of the popularity of WeRateDogs.
- You do not need to gather the tweets beyond August 1st, 2017. You can, but note that you won't be able to gather the image predictions for these tweets since you don't have access to the algorithm used.

In [71]:

```
df1_twitter_archive
```

Out[71]:

	tweet_id	in_reply_to_status_id	in_reply_to_user_id	timestamp	
0	892420643555336193	NaN	NaN	2017-08-01 16:23:56 +0000	href="http://twitter.com
1	892177421306343426	NaN	NaN	2017-08-01 00:17:27 +0000	href="http://twitter.com
2	891815181378084864	NaN	NaN	2017-07-31 00:18:03 +0000	href="http://twitter.com
3	891689557279858688	NaN	NaN	2017-07-30 15:58:51 +0000	href="http://twitter.com
4	891327558926688256	NaN	NaN	2017-07-29 16:00:24 +0000	href="http://twitter.com
...	...	...	...	...	
2351	666049248165822465	NaN	NaN	2015-11-16 00:24:50 +0000	href="http://twitter.com
2352	666044226329800704	NaN	NaN	2015-11-16 00:04:52 +0000	href="http://twitter.com
2353	666033412701032449	NaN	NaN	2015-11-15 23:21:54 +0000	href="http://twitter.com
2354	666029285002620928	NaN	NaN	2015-11-15 23:05:30 +0000	href="http://twitter.com
2355	666020888022790149	NaN	NaN	2015-11-15 22:32:08 +0000	href="http://twitter.com

	tweet_id	in_reply_to_status_id	in_reply_to_user_id	timestamp

2356 rows × 17 columns

In [72]:
```
df2_image_predictions
```

Out[72]:

	tweet_id	jpg_url	img_num	
0	666020888022790149	https://pbs.twimg.com/media/CT4udn0WwAA0aMy.jpg	1	Welsh_springe
1	666029285002620928	https://pbs.twimg.com/media/CT42GRgUYAA5iDo.jpg	1	
2	666033412701032449	https://pbs.twimg.com/media/CT4521TWwAEvMyu.jpg	1	German_
3	666044226329800704	https://pbs.twimg.com/media/CT5Dr8HUEAA-lEu.jpg	1	Rhodesian_r
4	666049248165822465	https://pbs.twimg.com/media/CT5IQmsXIAAKY4A.jpg	1	miniature_
...	...	...	...	
2070	891327558926688256	https://pbs.twimg.com/media/DF6hr6BUMAAzZgT.jpg	2	
2071	891689557279858688	https://pbs.twimg.com/media/DF_q7IAWsAEuuN8.jpg	1	pap
2072	891815181378084864	https://pbs.twimg.com/media/DGBdLU1WsAANxJ9.jpg	1	Cl
2073	892177421306343426	https://pbs.twimg.com/media/DGGmoV4XsAAUL6n.jpg	1	Cl
2074	892420643555336193	https://pbs.twimg.com/media/DGKD1-bXoAAIAUK.jpg	1	

2075 rows × 12 columns

In [73]:
```
df3_twitter_api
```

Out[73]:

	tweet_id	favorite_count	retweet_count
0	892420643555336193	39467	8853
1	892177421306343426	33819	6514
2	891815181378084864	25461	4328
3	891689557279858688	42908	8964
4	891327558926688256	41048	9774
...	...	...	...
2349	666049248165822465	111	41
2350	666044226329800704	311	147
2351	666033412701032449	128	47
2352	666029285002620928	132	48
2353	666020888022790149	2535	532

2354 rows × 3 columns

In [74]:

```
df1_twitter_archive.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2356 entries, 0 to 2355
Data columns (total 17 columns):
 #   Column                      Non-Null Count  Dtype  
---  ------                      --------------  -----  
 0   tweet_id                    2356 non-null   int64  
 1   in_reply_to_status_id       78 non-null     float64
 2   in_reply_to_user_id         78 non-null     float64
 3   timestamp                   2356 non-null   object 
 4   source                      2356 non-null   object 
 5   text                        2356 non-null   object 
 6   retweeted_status_id         181 non-null    float64
 7   retweeted_status_user_id    181 non-null    float64
 8   retweeted_status_timestamp  181 non-null    object 
 9   expanded_urls               2297 non-null   object 
 10  rating_numerator            2356 non-null   int64  
 11  rating_denominator          2356 non-null   int64  
 12  name                        1611 non-null   object 
 13  doggo                       97 non-null     object 
 14  floofer                     10 non-null     object 
 15  pupper                      257 non-null    object 
 16  puppo                       30 non-null     object 
dtypes: float64(4), int64(3), object(10)
memory usage: 313.0+ KB
```

In [75]:

```
df2_image_predictions.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2075 entries, 0 to 2074
Data columns (total 12 columns):
 #   Column    Non-Null Count  Dtype  
---  ------    --------------  -----  
 0   tweet_id  2075 non-null   int64  
 1   jpg_url   2075 non-null   object 
 2   img_num   2075 non-null   int64  
 3   p1        2075 non-null   object 
 4   p1_conf   2075 non-null   float64
 5   p1_dog    2075 non-null   bool   
 6   p2        2075 non-null   object 
 7   p2_conf   2075 non-null   float64
 8   p2_dog    2075 non-null   bool   
 9   p3        2075 non-null   object 
 10  p3_conf   2075 non-null   float64
 11  p3_dog    2075 non-null   bool   
dtypes: bool(3), float64(3), int64(2), object(4)
memory usage: 152.1+ KB
```

In [76]:

```
df3_twitter_api.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2354 entries, 0 to 2353
Data columns (total 3 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   tweet_id        2354 non-null   int64
 1   favorite_count  2354 non-null   int64
 2   retweet_count   2354 non-null   int64
dtypes: int64(3)
memory usage: 55.3 KB
```

In [77]:

```
df1_twitter_archive.name.value_counts()
```

Out[77]:

```
name
a             55
Charlie       12
Oliver        11
Cooper        11
Lucy          11
              ..
Aqua           1
Chase          1
Meatball       1
Rorie          1
Christoper     1
Name: count, Length: 956, dtype: int64
```

Quality issues

1. df1: extra data for the retweets, columns: in_reply_to_status_id, in_reply_to_user_id, retweeted_status_id, retweeted_status_user_id and retweeted_status_timestamp.

2. df1: name column has the name 'a' repeated for 55 entries.

3. df1: name column has inconsistent capitalization.

4. df1: timestamp column type is object and should be timestamp.

5. df1: rating_denominator is larger than 10 for 19 tweets.

6. df1: expanded_urls column has 59 null values.

7. df1: some rating_denominator values are zero.

8. df2: p1, p2, p3 have inconsistent capitalization.

Tidiness issues

1. df1: doggo, floofer, pupper, puppo better to be in one column..

2. df3 better be merged with df2 and df1 to be as one master table.

Cleaning Data

In this section, clean **all** of the issues you documented while assessing.

Note: Make a copy of the original data before cleaning. Cleaning includes merging individual pieces of data according to the rules of tidy data. The result should be a high-quality and tidy master pandas DataFrame (or DataFrames, if appropriate).

In [78]:

```
# Make copies of original pieces of data
df1 = df1_twitter_archive.copy()
df2 = df2_image_predictions.copy()
df3 = df3_twitter_api.copy()
```

Quality

Issue #1:

Define:

df1:extra data for the retweets, columns: in_reply_to_status_id, in_reply_to_user_id, retweeted_status_id, retweeted_status_user_id and retweeted_status_timestamp. we will drop the columns after taking only null row.

Code

In [79]:

```
df1 = df1[(df1['retweeted_status_id'].isna()) & (df1['in_reply_to_status_id'].isna())]
df1.drop(['in_reply_to_status_id', 'in_reply_to_user_id', 'retweeted_status_id', 'retw
```

Test

In [80]:

```
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 2097 entries, 0 to 2355
Data columns (total 12 columns):
 #   Column              Non-Null Count  Dtype 
---  ------              --------------  ----- 
 0   tweet_id            2097 non-null   int64 
 1   timestamp           2097 non-null   object
 2   source              2097 non-null   object
 3   text                2097 non-null   object
 4   expanded_urls       2094 non-null   object
 5   rating_numerator    2097 non-null   int64 
 6   rating_denominator  2097 non-null   int64 
 7   name                1494 non-null   object
 8   doggo               83 non-null     object
 9   floofer             10 non-null     object
 10  pupper              230 non-null    object
 11  puppo               24 non-null     object
dtypes: int64(3), object(9)
memory usage: 213.0+ KB
```

Issue #2:

Define

df1: name column has the name 'a' repeated for 55 entries. take only rows unequal to 'a'.

Code

In [81]:

```
df1 = df1[df1['name'] != 'a']
```

Test

In [82]:

```
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 2042 entries, 0 to 2355
Data columns (total 12 columns):
 #   Column              Non-Null Count  Dtype 
---  ------              --------------  ----- 
 0   tweet_id            2042 non-null   int64 
 1   timestamp           2042 non-null   object
 2   source              2042 non-null   object
 3   text                2042 non-null   object
 4   expanded_urls       2039 non-null   object
 5   rating_numerator    2042 non-null   int64 
 6   rating_denominator  2042 non-null   int64 
 7   name                1439 non-null   object
 8   doggo               83 non-null     object
 9   floofer             10 non-null     object
 10  pupper              226 non-null    object
 11  puppo               24 non-null     object
dtypes: int64(3), object(9)
memory usage: 207.4+ KB
```

Issue #3:

Define

df1: name column has inconsistance capitalization. we will capitalize all rows.

Code

In [83]:

```
df1['name'] = df1['name'].str.upper()
```

Test

In [84]:

```
df1['name'].str.islower().sum()
```

Out[84]:

```
0
```

Issue #4:

Define

df1: timestamp column type is object and should be timestamp.

Code

In [85]:

```
df1['timestamp'] = pd.to_datetime(df1['timestamp'])
```

Test

In [86]:

```
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 2042 entries, 0 to 2355
Data columns (total 12 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   tweet_id            2042 non-null   int64
 1   timestamp           2042 non-null   datetime64[ns, UTC]
 2   source              2042 non-null   object
 3   text                2042 non-null   object
 4   expanded_urls       2039 non-null   object
 5   rating_numerator    2042 non-null   int64
 6   rating_denominator  2042 non-null   int64
 7   name                1439 non-null   object
 8   doggo               83 non-null     object
 9   floofer             10 non-null     object
 10  pupper              226 non-null    object
 11  puppo               24 non-null     object
dtypes: datetime64[ns, UTC](1), int64(3), object(8)
memory usage: 207.4+ KB
```

Issue #5:

Define

df1: some rating_denominator is larger than 10. we will replace any value greater than 10 with 10.

Code

In [87]:

```
df1.loc[(df1.rating_denominator > 10), 'rating_denominator'] = 10
```

Test

In [88]:

```
df1[df1['rating_denominator'] > 10].count()
```

Out[88]:

```
tweet_id              0
timestamp             0
source                0
text                  0
expanded_urls         0
rating_numerator      0
rating_denominator    0
name                  0
doggo                 0
floofer               0
pupper                0
puppo                 0
dtype: int64
```

Issue #6:

Define

df1: expanded_urls column has 59 null values. we will drop na values from the dataframe.

Code

In [89]:

```
df1 = df1[df1['expanded_urls'].notna()]
```

Test

In [90]:

```
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 2039 entries, 0 to 2355
Data columns (total 12 columns):
 #   Column              Non-Null Count  Dtype              
---  ------              --------------  -----              
 0   tweet_id            2039 non-null   int64              
 1   timestamp           2039 non-null   datetime64[ns, UTC]
 2   source              2039 non-null   object             
 3   text                2039 non-null   object             
 4   expanded_urls       2039 non-null   object             
 5   rating_numerator    2039 non-null   int64              
 6   rating_denominator  2039 non-null   int64              
 7   name                1439 non-null   object             
 8   doggo               83 non-null     object             
 9   floofer             10 non-null     object             
 10  pupper              225 non-null    object             
 11  puppo               24 non-null     object             
dtypes: datetime64[ns, UTC](1), int64(3), object(8)
memory usage: 207.1+ KB
```

Issue #7:

Define

df1: some rating_denominator values are zero. we will replace zero with 10.

Code

In [91]:

```
df1.loc[(df1.rating_denominator == 0), 'rating_denominator'] = 10
```

Test

In [92]:

```
df1[df1.rating_denominator == 0].count()
```

Out[92]:

```
tweet_id              0
timestamp             0
source                0
text                  0
expanded_urls         0
rating_numerator      0
rating_denominator    0
name                  0
doggo                 0
floofer               0
pupper                0
puppo                 0
dtype: int64
```

Issue #8:

Define

df2: p1, p2, p3 have inconsistance capitalization. we will capitalize all values in the three columns.

Code

In [93]:

```
df2['p1'] = df2['p1'].str.upper()
df2['p2'] = df2['p2'].str.upper()
df2['p3'] = df2['p3'].str.upper()
```

Test

In [94]:

```
print(df2['p1'].str.islower().sum())
print(df2['p2'].str.islower().sum())
print(df2['p3'].str.islower().sum())
```

```
0
0
0
```

tidiness

Issue #1:

Define

df1: doggo, floofer, pupper, puppo better to be in one column name 'stage'. we will merge the four columns in one, then drop the original four.

Code

In [95]:

```
# Replace None values with empty ''

df1.loc[(df1.doggo.isna()), 'doggo'] = ''
df1.loc[(df1.floofer.isna()), 'floofer'] = ''
df1.loc[(df1.pupper.isna()), 'pupper'] = ''
df1.loc[(df1.puppo.isna()), 'puppo'] = ''


# merge all in 'dog_state'
df1['dog_stage'] = df1.doggo + df1.floofer + df1.pupper + df1.puppo

df1.drop(columns=['doggo','floofer','pupper','puppo'], inplace=True)

df1.loc[df1.dog_stage == 'doggopupper', 'dog_stage'] = 'doggo, pupper'
df1.loc[df1.dog_stage == 'doggopuppo', 'dog_stage'] = 'doggo, puppo'
df1.loc[df1.dog_stage == 'doggofloofer', 'dog_stage'] = 'doggo, floofer'
```

Test

In [96]:

```
print(df1['dog_stage'].value_counts())
print(df1.info())
```

```
dog_stage
                  1708
pupper             216
doggo               72
puppo               23
floofer              9
doggo, pupper        9
doggo, puppo         1
doggo, floofer       1
Name: count, dtype: int64
<class 'pandas.core.frame.DataFrame'>
Index: 2039 entries, 0 to 2355
Data columns (total 9 columns):
 #   Column              Non-Null Count  Dtype
---  ------              --------------  -----
 0   tweet_id            2039 non-null   int64
 1   timestamp           2039 non-null   datetime64[ns, UTC]
 2   source              2039 non-null   object
 3   text                2039 non-null   object
 4   expanded_urls       2039 non-null   object
 5   rating_numerator    2039 non-null   int64
 6   rating_denominator  2039 non-null   int64
 7   name                1439 non-null   object
 8   dog_stage           2039 non-null   object
dtypes: datetime64[ns, UTC](1), int64(3), object(5)
memory usage: 159.3+ KB
None
```

Issue #2:

Define

df3 better be merged with df2 and df1 to be as one master table.

Code

In [97]:

```
master_df = pd.merge(pd.merge(df1, df2, on= ['tweet_id']), df3, on= ['tweet_id'])
```

Test

In [98]:

```
master_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1916 entries, 0 to 1915
Data columns (total 22 columns):
 #   Column              Non-Null Count  Dtype              
---  ------              --------------  -----              
 0   tweet_id            1916 non-null   int64              
 1   timestamp           1916 non-null   datetime64[ns, UTC]
 2   source              1916 non-null   object             
 3   text                1916 non-null   object             
 4   expanded_urls       1916 non-null   object             
 5   rating_numerator    1916 non-null   int64              
 6   rating_denominator  1916 non-null   int64              
 7   name                1392 non-null   object             
 8   dog_stage           1916 non-null   object             
 9   jpg_url             1916 non-null   object             
 10  img_num             1916 non-null   int64              
 11  p1                  1916 non-null   object             
 12  p1_conf             1916 non-null   float64            
 13  p1_dog              1916 non-null   bool               
 14  p2                  1916 non-null   object             
 15  p2_conf             1916 non-null   float64            
 16  p2_dog              1916 non-null   bool               
 17  p3                  1916 non-null   object             
 18  p3_conf             1916 non-null   float64            
 19  p3_dog              1916 non-null   bool               
 20  favorite_count      1916 non-null   int64              
 21  retweet_count       1916 non-null   int64              
dtypes: bool(3), datetime64[ns, UTC](1), float64(3), int64(6), object(9)
memory usage: 290.1+ KB
```

Storing Data

Save gathered, assessed, and cleaned master dataset to a CSV file named "twitter_archive_master.csv".

In [99]:

```
master_df.to_csv('twitter_archive_master.csv', index= False)
```

Analyzing and Visualizing Data

In this section, analyze and visualize your wrangled data. You must produce at least **three (3) insights and one (1) visualization.**

In [100…

```
master_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1916 entries, 0 to 1915
Data columns (total 22 columns):
 #   Column              Non-Null Count  Dtype              
---  ------              --------------  -----              
 0   tweet_id            1916 non-null   int64              
 1   timestamp           1916 non-null   datetime64[ns, UTC]
 2   source              1916 non-null   object             
 3   text                1916 non-null   object             
 4   expanded_urls       1916 non-null   object             
 5   rating_numerator    1916 non-null   int64              
 6   rating_denominator  1916 non-null   int64              
 7   name                1392 non-null   object             
 8   dog_stage           1916 non-null   object             
 9   jpg_url             1916 non-null   object             
 10  img_num             1916 non-null   int64              
 11  p1                  1916 non-null   object             
 12  p1_conf             1916 non-null   float64            
 13  p1_dog              1916 non-null   bool               
 14  p2                  1916 non-null   object             
 15  p2_conf             1916 non-null   float64            
 16  p2_dog              1916 non-null   bool               
 17  p3                  1916 non-null   object             
 18  p3_conf             1916 non-null   float64            
 19  p3_dog              1916 non-null   bool               
 20  favorite_count      1916 non-null   int64              
 21  retweet_count       1916 non-null   int64              
dtypes: bool(3), datetime64[ns, UTC](1), float64(3), int64(6), object(9)
memory usage: 290.1+ KB
```

Insights:

1. Top 10 dogs favorite count

2. Top 10 dogs with highest rate

3. Top 10 breeds favorite count

In [101…

```
top_fav_dogs = master_df.groupby('name')['favorite_count'].sum().sort_values(ascending
top_fav_dogs
```

Out[101]:

```
name
BO          185922
CHARLIE     115468
ZOEY        113581
LUCY        110523
DUDDLES     107956
QUITE       107309
STEPHAN     107015
JAMESY      106827
PENNY       102986
STANLEY      99345
Name: favorite_count, dtype: int64
```

In [102…

```
top_rate_dogs = master_df.groupby('name')['rating_numerator'].mean().sort_values(ascen
top_rate_dogs
```

Out[102]:

```
name
ATTICUS     893.5
THIS        204.0
LOGAN        75.0
BLUEBERT     50.0
SAM          17.0
SOPHIE       15.0
DOOBERT      14.0
SUNDANCE     14.0
CLIFFORD     14.0
KUYU         14.0
Name: rating_numerator, dtype: float64
```

In [103…

```
top_fav_breed = master_df.groupby('p1')['favorite_count'].sum().sort_values(ascending
top_fav_breed
```

Out[103]:

```
p1
GOLDEN_RETRIEVER      1687194
LABRADOR_RETRIEVER    1116362
PEMBROKE               974752
CHIHUAHUA              670961
SAMOYED                491651
FRENCH_BULLDOG         465738
CHOW                   401840
PUG                    317761
COCKER_SPANIEL         315525
POMERANIAN             295176
Name: favorite_count, dtype: int64
```

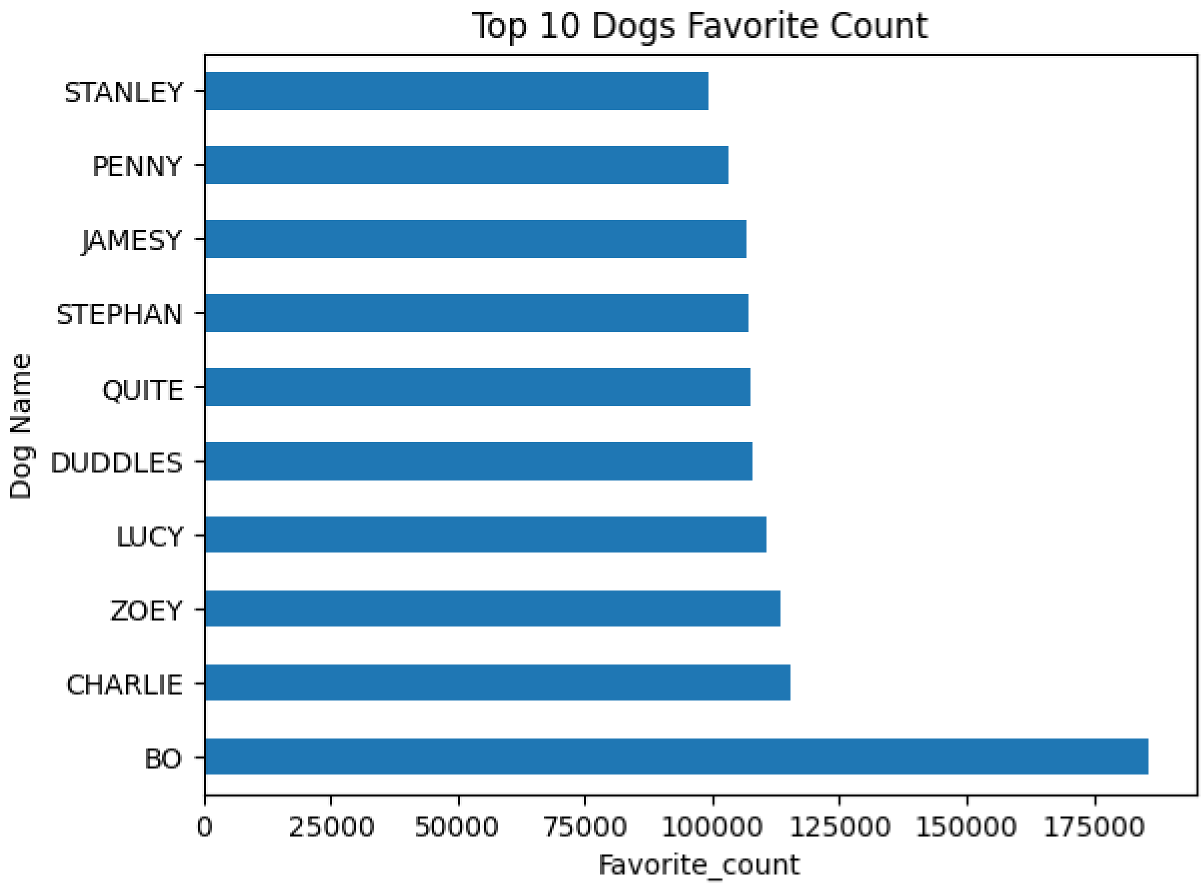
Visualization

In [104…

```
import matplotlib.pyplot as plt

%matplotlib inline
```

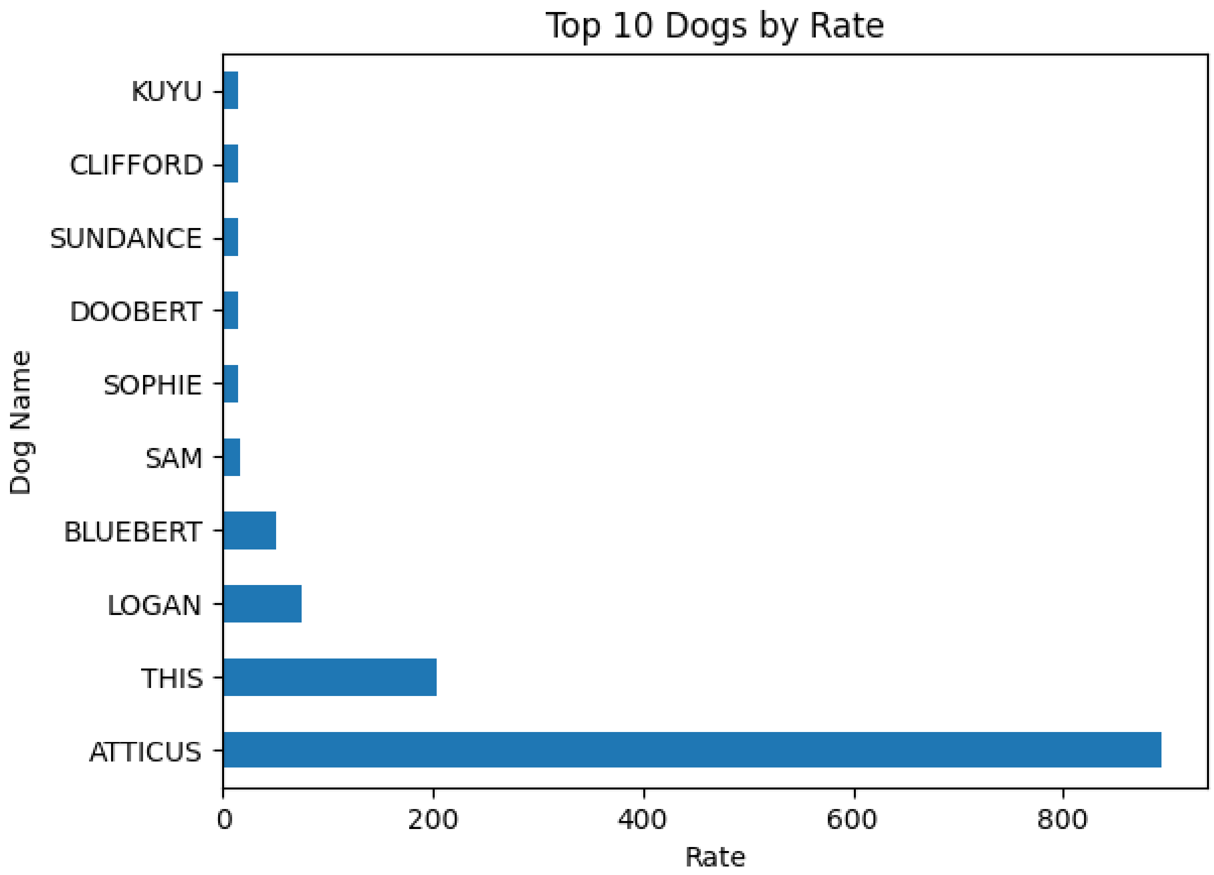
In [105…

```
top_fav_dogs.plot.barh()

plt.xlabel("Favorite_count")
plt.ylabel("Dog Name")
plt.title("Top 10 Dogs Favorite Count")
plt.show()
```



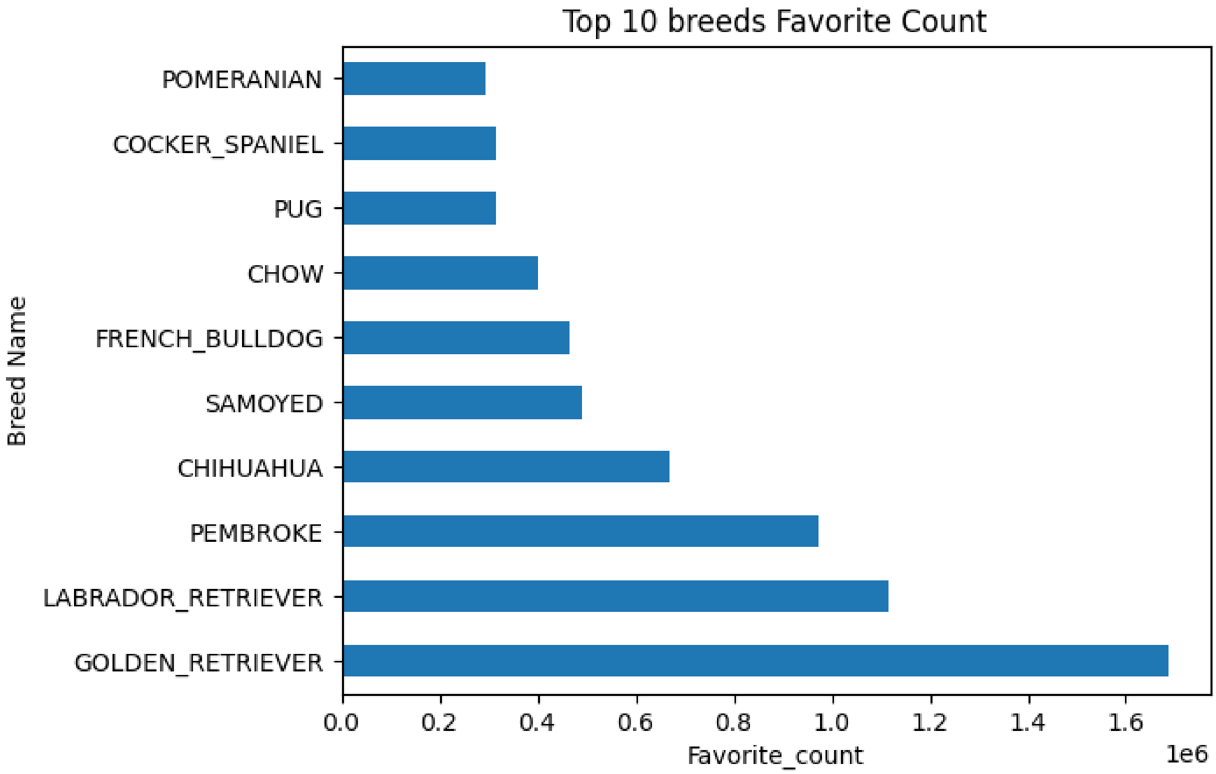
In [106…

```
top_rate_dogs.plot.barh()

plt.xlabel("Rate")
plt.ylabel("Dog Name")
plt.title("Top 10 Dogs by Rate")
plt.show()
```



In [107…

```
top_fav_breed.plot.barh()

plt.xlabel("Favorite_count")
plt.ylabel("Breed Name")
plt.title("Top 10 breeds Favorite Count")
plt.show()
```


Top 10 breeds Favorite Count
Breed Name
POMERANIAN
COCKER_SPANIEL
PUG
CHOW
FRENCH_BULLDOG
SAMOYED
CHIHUAHUA
PEMBROKE
LABRADOR_RETRIEVER
GOLDEN_RETRIEVER
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1e6
Favorite_count