In [5]:
```
import pandas as pd
listings = pd.read_csv(r'C:\Users\pseudomonger\source\repos\analytics\airbnbPYTHON\
listings.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 279712 entries, 0 to 279711
Data columns (total 33 columns):
 #   Column                       Non-Null Count   Dtype
---  ------                       --------------   -----
 0   listing_id                   279712 non-null  int64
 1   name                         279537 non-null  object
 2   host_id                      279712 non-null  int64
 3   host_since                   279547 non-null  object
 4   host_location                278872 non-null  object
 5   host_response_time           150930 non-null  object
 6   host_response_rate           150930 non-null  float64
 7   host_acceptance_rate         166625 non-null  float64
 8   host_is_superhost            279547 non-null  object
 9   host_total_listings_count    279547 non-null  float64
 10  host_has_profile_pic         279547 non-null  object
 11  host_identity_verified       279547 non-null  object
 12  neighbourhood                279712 non-null  object
 13  district                     37012 non-null   object
 14  city                         279712 non-null  object
 15  latitude                     279712 non-null  float64
 16  longitude                    279712 non-null  float64
 17  property_type                279712 non-null  object
 18  room_type                    279712 non-null  object
 19  accommodates                 279712 non-null  int64
 20  bedrooms                     250277 non-null  float64
 21  amenities                    279712 non-null  object
 22  price                        279712 non-null  int64
 23  minimum_nights               279712 non-null  int64
 24  maximum_nights               279712 non-null  int64
 25  review_scores_rating         188307 non-null  float64
 26  review_scores_accuracy       187999 non-null  float64
 27  review_scores_cleanliness    188047 non-null  float64
 28  review_scores_checkin        187941 non-null  float64
 29  review_scores_communication  188025 non-null  float64
 30  review_scores_location       187937 non-null  float64
 31  review_scores_value          187927 non-null  float64
 32  instant_bookable             279712 non-null  object
dtypes: float64(13), int64(6), object(14)
memory usage: 70.4+ MB
```

In [6]:
```
#cast host_since, was object want datetime
listings["host_since"] = pd.to_datetime(listings["host_since"])
listings.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 279712 entries, 0 to 279711
Data columns (total 33 columns):
 #   Column                       Non-Null Count   Dtype
---  ------                       --------------   -----
 0   listing_id                   279712 non-null  int64
 1   name                         279537 non-null  object
 2   host_id                      279712 non-null  int64
 3   host_since                   279547 non-null  datetime64[ns]
 4   host_location                278872 non-null  object
 5   host_response_time           150930 non-null  object
 6   host_response_rate           150930 non-null  float64
 7   host_acceptance_rate         166625 non-null  float64
 8   host_is_superhost            279547 non-null  object
 9   host_total_listings_count    279547 non-null  float64
 10  host_has_profile_pic         279547 non-null  object
 11  host_identity_verified       279547 non-null  object
 12  neighbourhood                279712 non-null  object
 13  district                     37012 non-null   object
 14  city                         279712 non-null  object
 15  latitude                     279712 non-null  float64
 16  longitude                    279712 non-null  float64
 17  property_type                279712 non-null  object
 18  room_type                    279712 non-null  object
 19  accommodates                 279712 non-null  int64
 20  bedrooms                     250277 non-null  float64
 21  amenities                    279712 non-null  object
 22  price                        279712 non-null  int64
 23  minimum_nights               279712 non-null  int64
 24  maximum_nights               279712 non-null  int64
 25  review_scores_rating         188307 non-null  float64
 26  review_scores_accuracy       187999 non-null  float64
 27  review_scores_cleanliness    188047 non-null  float64
 28  review_scores_checkin        187941 non-null  float64
 29  review_scores_communication  188025 non-null  float64
 30  review_scores_location       187937 non-null  float64
 31  review_scores_value          187927 non-null  float64
 32  instant_bookable             279712 non-null  object
dtypes: datetime64[ns](1), float64(13), int64(6), object(13)
memory usage: 70.4+ MB
```

In [7]:
```
#only want paris related listings data
paris_listings = listings.query("city == 'Paris'").loc[:, ["host_since", "neighbour
paris_listings.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 64690 entries, 0 to 279711
Data columns (total 5 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   host_since     64657 non-null  datetime64[ns]
 1   neighbourhood  64690 non-null  object
 2   city           64690 non-null  object
 3   accommodates   64690 non-null  int64
 4   price          64690 non-null  int64
dtypes: datetime64[ns](1), int64(2), object(2)
memory usage: 3.0+ MB
```

In [20]:
```
# check for missing vals
paris_listings.isna().sum()
```

Out[20]:
```
host_since       33
neighbourhood     0
city              0
accommodates      0
price             0
dtype: int64
```

In [21]:
```
# check if reasonable
paris_listings.describe()
# minimum price zero? probably bad
```

Out[21]:

	host_since	accommodates	price
count	64657	64690.000000	64690.000000
mean	2015-11-01 11:06:05.528867584	3.037997	113.096445
min	2008-08-30 00:00:00	0.000000	0.000000
25%	2014-03-09 00:00:00	2.000000	59.000000
50%	2015-07-07 00:00:00	2.000000	80.000000
75%	2017-05-29 00:00:00	4.000000	120.000000
max	2021-02-07 00:00:00	16.000000	12000.000000
std	NaN	1.588766	214.433668

In [22]:
```
paris_listings.query("accommodates == 0 and price == 0").count()
#54 counts of both, 62 for price, but an insubstantial count considering the size o
```

Out[22]:
```
host_since       54
neighbourhood    54
city             54
accommodates     54
price            54
dtype: int64
```

In [19]:
```
# find price by neighborhood, price by accommodation, and listings over time so tha
# sorting neighbourhood by price
```

```
paris_listings_neighbourhood = (paris_listings.groupby("neighbourhood").agg({"price
paris_listings_neighbourhood.tail()
```

Out[19]:

neighbourhood	price
Luxembourg	155.638639
Palais-Bourbon	156.856578
Passy	161.144635
Louvre	175.379972
Elysee	210.536765

In [18]:
```
paris_listings_accommodate = (paris_listings.query("neighbourhood == 'Elysee'").gro
paris_listings_accommodate.tail()#16 accommodations cheaper than 14?
```

Out[18]:

accommodates	price
12	529.625
16	800.000
11	805.000
13	842.500
14	971.000

In [ ]:
```
paris_listings_accommodate = (paris_listings.query("neighbourhood == 'Elysee'").gro
paris_listings_accommodate.tail()
#only one listing at 16 so probably normal price variation
```

In [16]:
```
paris_listings_over_time = (paris_listings.set_index("host_since").resample("Y").ag
paris_listings_over_time.head()
```

```
C:\Users\pseudomonger\AppData\Local\Temp\ipykernel_2308\2158420489.py:1: FutureWarni
ng: 'Y' is deprecated and will be removed in a future version, please use 'YE' inste
ad.
  paris_listings_over_time = (paris_listings.set_index("host_since").resample("Y").a
gg({"neighbourhood" : "count", "price":"mean"}))
```

Out[16]:

host_since	neighbourhood	price
2008-12-31	4	77.750000
2009-12-31	106	159.641509
2010-12-31	416	125.031250
2011-12-31	1339	124.828230
2012-12-31	4592	111.578615

In [24]:
```
from matplotlib import style
```

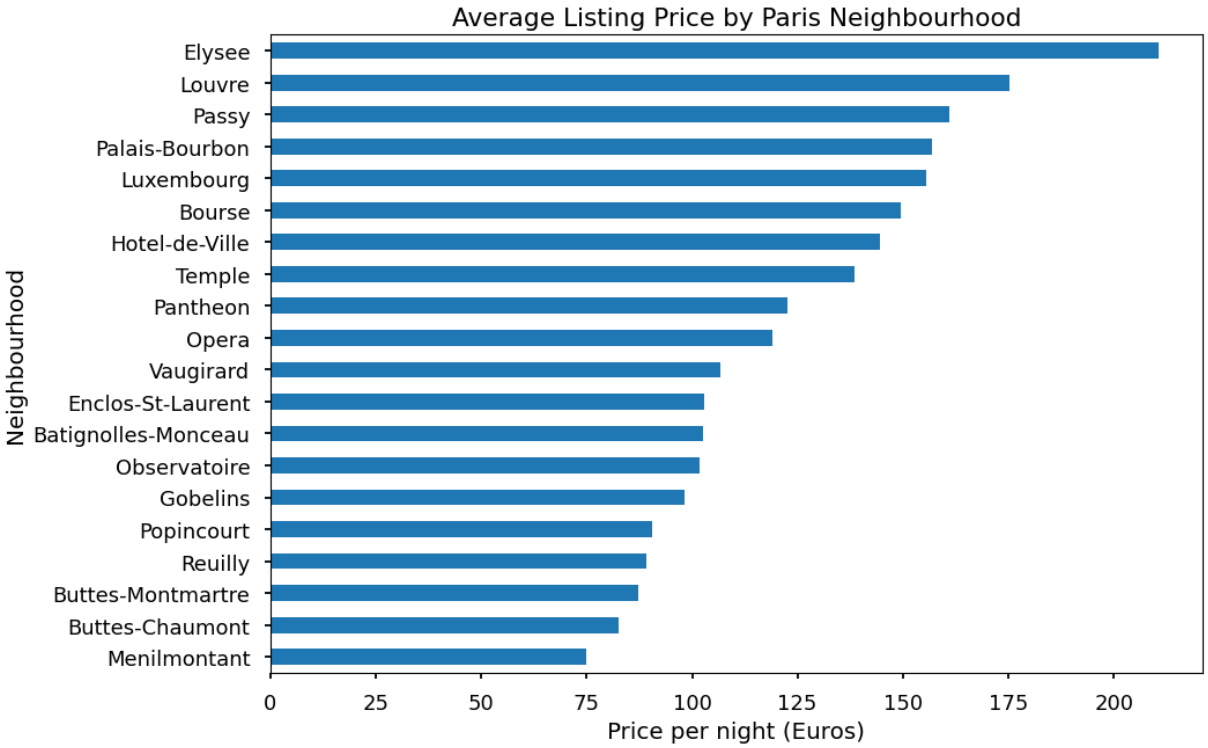
In [25]:
```
style.available
```

Out[25]:
```
['Solarize_Light2',
 '_classic_test_patch',
 '_mpl-gallery',
 '_mpl-gallery-nogrid',
 'bmh',
 'classic',
 'dark_background',
 'fast',
 'fivethirtyeight',
 'ggplot',
 'grayscale',
 'seaborn-v0_8',
 'seaborn-v0_8-bright',
 'seaborn-v0_8-colorblind',
 'seaborn-v0_8-dark',
 'seaborn-v0_8-dark-palette',
 'seaborn-v0_8-darkgrid',
 'seaborn-v0_8-deep',
 'seaborn-v0_8-muted',
 'seaborn-v0_8-notebook',
 'seaborn-v0_8-paper',
 'seaborn-v0_8-pastel',
 'seaborn-v0_8-poster',
 'seaborn-v0_8-talk',
 'seaborn-v0_8-ticks',
 'seaborn-v0_8-white',
 'seaborn-v0_8-whitegrid',
 'tableau-colorblind10']
```

In [86]:
```
style.use("seaborn-v0_8-talk")
```

In [87]:
```
(paris_listings_neighbourhood.plot.barh(title="Average Listing Price by Paris Neigh
```

Out[87]:
```
<Axes: title={'center': 'Average Listing Price by Paris Neighbourhood'}, xlabel='P
rice per night (Euros)', ylabel='Neighbourhood'>
```



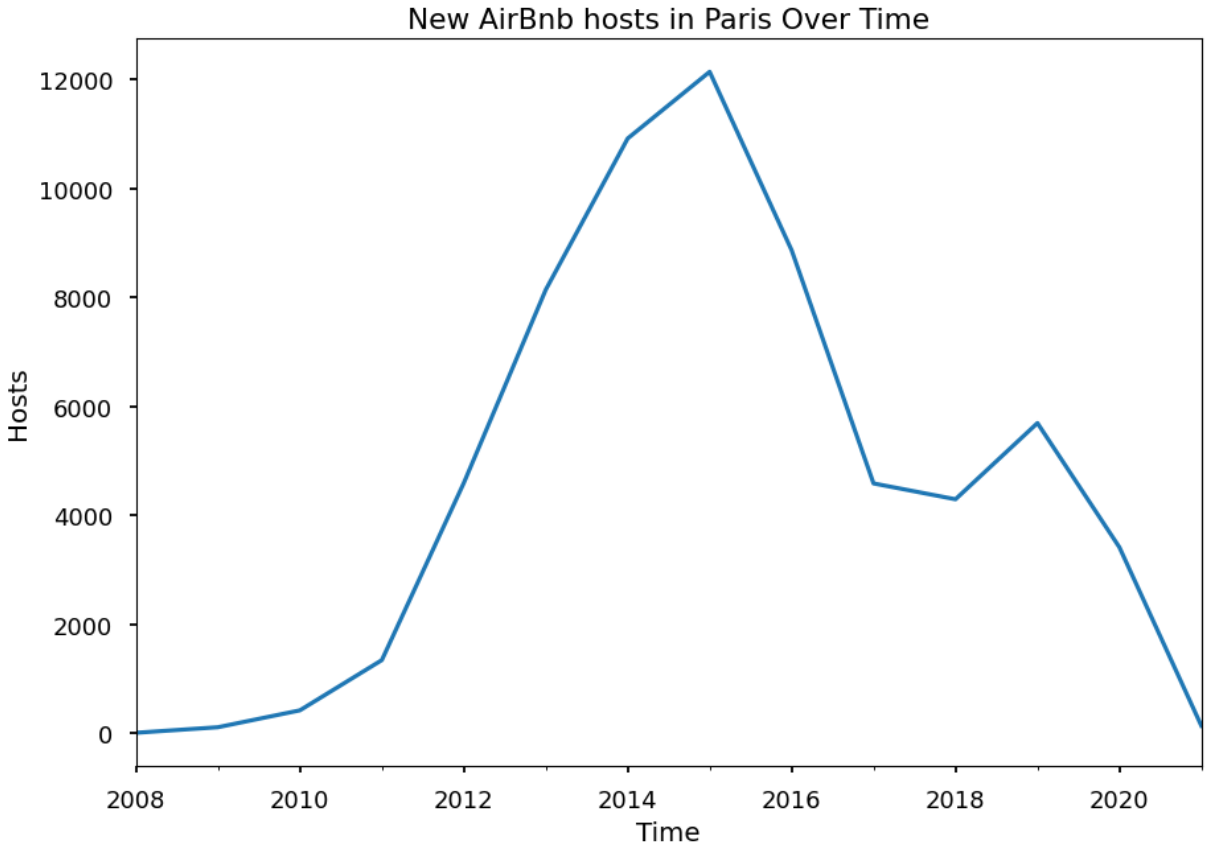
In [88]:
```
(paris_listings_accommodate.plot.barh(title="Average Listing Price by Accommodation
```

Out[88]:
```
<Axes: title={'center': 'Average Listing Price by Accommodation Capacity'}, xlabel
='Price per night (Euros)', ylabel='Accommodation capacity'>
```

In [89]:
```
paris_listings_over_time["neighbourhood"].plot(ylabel="Hosts",xlabel="Time", title
```

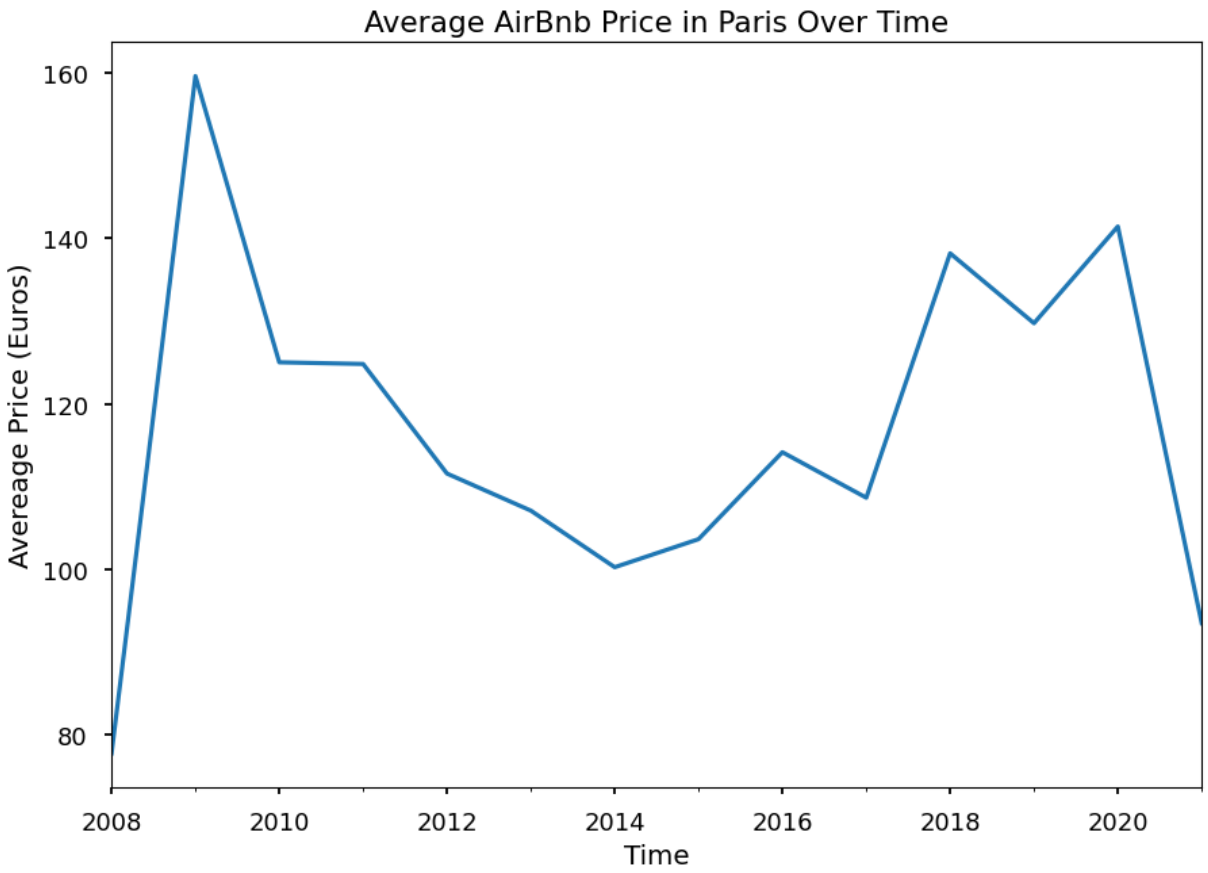
```
#Large peak at 2015 with a steep decline post restriction
```

Out[89]:
```
<Axes: title={'center': 'New AirBnb hosts in Paris Over Time'}, xlabel='Time', yla
bel='Hosts'>
```



In [90]:
```
paris_listings_over_time["price"].plot(ylabel="Avereage Price (Euros)",xlabel="Time
#As things got more competative prices decreased then rise again post regulation, t
```

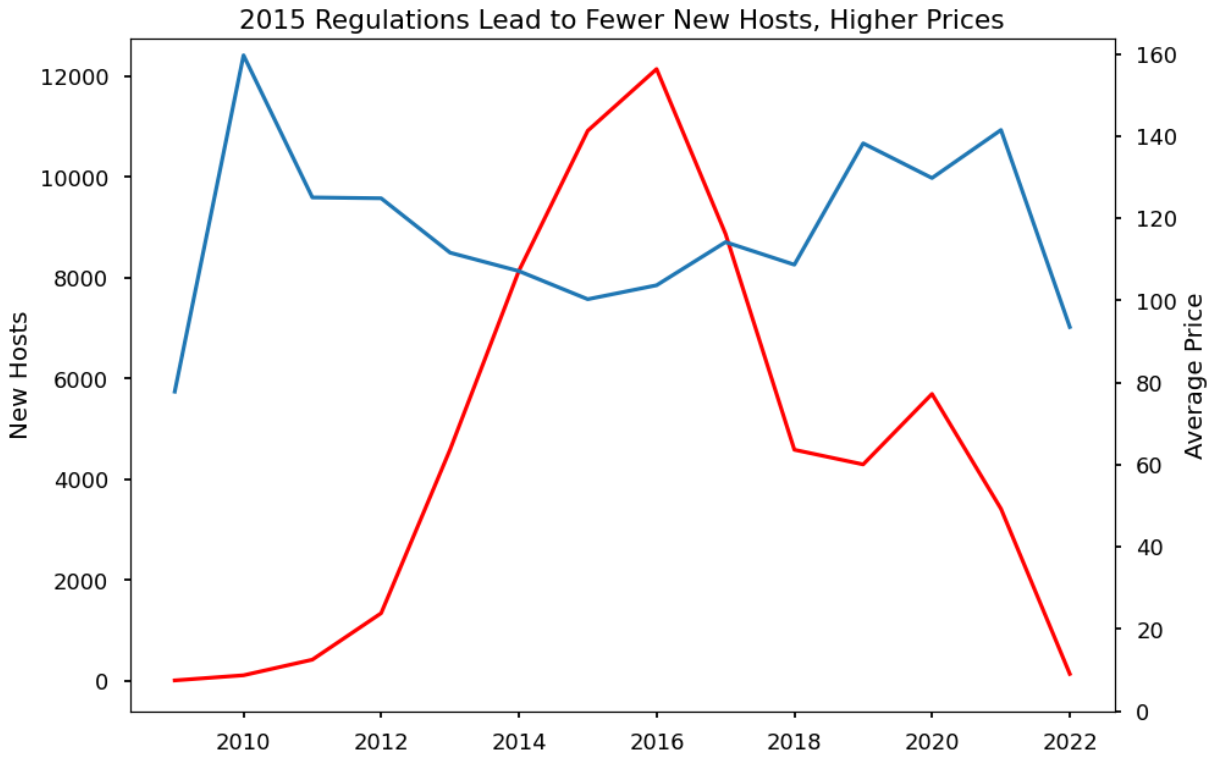
Out[90]:
```
<Axes: title={'center': 'Average AirBnb Price in Paris Over Time'}, xlabel='Time',
ylabel='Avereage Price (Euros)'>
```



In [92]:
```
import matplotlib.pyplot as plt
fig, ax = plt.subplots()
ax.plot(paris_listings_over_time.index, paris_listings_over_time["neighbourhood"],l
ax.set_ylabel ("New Hosts")

ax2 = ax.twinx()
ax2.plot(paris_listings_over_time.index, paris_listings_over_time["price"],label="A
ax2.set_ylim(0)
ax2.set_ylabel ("Average Price")
ax.set_title("2015 Regulations Lead to Fewer New Hosts, Higher Prices")
```

Out[92]:
```
Text(0.5, 1.0, '2015 Regulations Lead to Fewer New Hosts, Higher Prices')
```


2015 Regulations Lead to Fewer New Hosts, Higher Prices
New Hosts
Average Price
0
2000
4000
6000
8000
10000
12000
0
20
40
60
80
100
120
140
160
2010
2012
2014
2016
2018
2020
2022