jupyter Airbnb Analysis for Paris Last Checkpoint: 2 hours ago (unsaved changes)

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Run Code

In [1]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [4]:
```
listing = pd.read_csv('Listings.csv', encoding="ISO-8859-1", low_memory=False)
```

In [6]:
```
listing.head()
```

Out[6]:

	listing_id	name	host_id	host_since	host_location	host_response_time	host_response_rate	host_acceptance_rate	host_is_superhost	host_total_list
0	281420	Beautiful Flat in le Village Montmartre, Paris	1466919	2011-12-03	Paris, Ile-de-France, France	NaN	NaN	NaN	f	
1	3705183	39 mÃ□Â² Paris (Sacre CÃ□ â□□ur)	10328771	2013-11-29	Paris, Ile-de-France, France	NaN	NaN	NaN	f	
2	4082273	Lovely apartment with Terrace, 60m2	19252768	2014-07-31	Paris, Ile-de-France, France	NaN	NaN	NaN	f	
3	4797344	Cosy studio (close to Eiffel tower)	10668311	2013-12-17	Paris, Ile-de-France, France	NaN	NaN	NaN	f	
4	4823489	Close to Eiffel Tower - Beautiful flat : 2 rooms	24837558	2014-12-14	Paris, Ile-de-France, France	NaN	NaN	NaN	f	

5 rows × 33 columns

In [9]:
```
listing.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 [8]:
```
listing['host_since'] = pd.to_datetime(listing['host_since']) # Typecasting the host_since column to datetime datatype
```

In [12]:
```
paris_listing = (
    listing
    .query("city == 'Paris'")
    .loc[:, ['host_since', 'neighbourhood', 'city', 'accommodates', 'price']]
)
paris_listing.info()

# Filtering down the columns for the analysis
```

```
<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 [15]:
```
paris_listing.dropna() # Dropping the null rows
```

Out[15]:

	host_since	neighbourhood	city	accommodates	price
0	2011-12-03	Buttes-Montmartre	Paris	2	53
1	2013-11-29	Buttes-Montmartre	Paris	2	120
2	2014-07-31	Elysee	Paris	2	89
3	2013-12-17	Vaugirard	Paris	2	58
4	2014-12-14	Passy	Paris	2	60
...	...	...	...	...	...
279707	2015-04-13	Observatoire	Paris	2	120
279708	2013-11-27	Buttes-Montmartre	Paris	2	60
279709	2012-04-27	Buttes-Montmartre	Paris	2	50
279710	2015-07-16	Popincourt	Paris	2	105
279711	2013-06-17	Enclos-St-Laurent	Paris	2	70

64657 rows × 5 columns

In [20]:
```
paris_listing.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 [25]:
```
paris_listing[['accommodates','price']].describe()
```

Out[25]:

	accommodates	price
count	64690.000000	64690.000000
mean	3.037997	113.096445
std	1.588766	214.433668
min	0.000000	0.000000
25%	2.000000	59.000000
50%	2.000000	80.000000
75%	4.000000	120.000000
max	16.000000	12000.000000

In [33]:
```
paris_listing.query('price == 0').count()
```

Out[33]:
```
host_since       62
neighbourhood    62
city             62
accommodates     62
price            62
dtype: int64
```

In [36]:
```
paris_listing_neighbourhood = (
    paris_listing
    .groupby('neighbourhood')
    .agg({'price':'mean'})
    .sort_values('price')
)

paris_listing_neighbourhood.tail()
```

Out[36]:

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

In [39]:
```
paris_listing_accommodates = (
    paris_listing
    .query("neighbourhood == 'Elysee'")
    .groupby('accommodates')
    .agg({'price':'mean'})
    .sort_values('price')
)

paris_listing_accommodates.head()
```

Out[39]:

accommodates	price
0	0.000000
1	79.522222
3	152.828767
2	155.103352
4	212.096070

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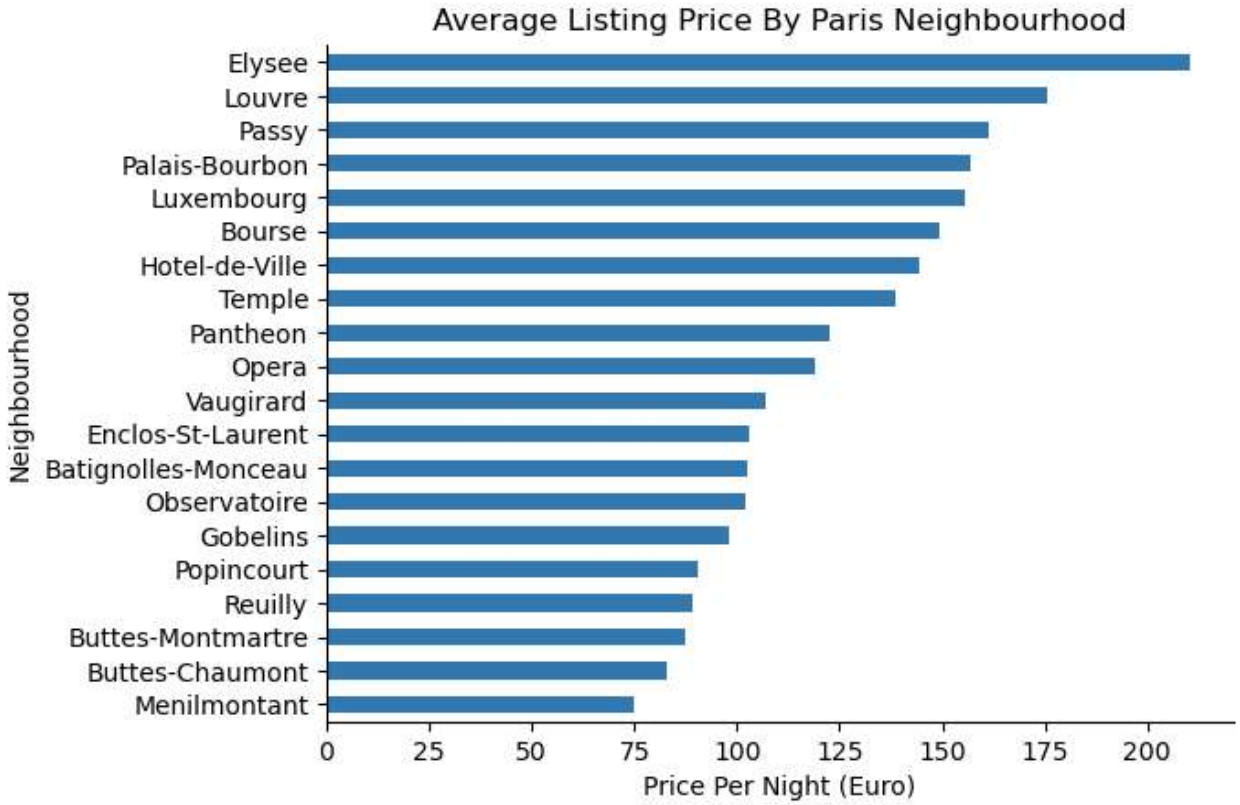
In [45]:
```
paris_listing_over_time = (
    paris_listing
    .set_index('host_since')
    .resample('Y')
    .agg({
        'neighbourhood':'count',
        'price':'mean'
    })
)
paris_listing_over_time.head()
```

Out[45]:

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

Visualizations

In [60]:
```
(paris_listing_neighbourhood
 .plot
 .barh(
    title='Average Listing Price By Paris Neighbourhood',
    xlabel='Price Per Night (Euro)',
    ylabel='Neighbourhood',
    legend=False
 )
)
sns.despine()
```



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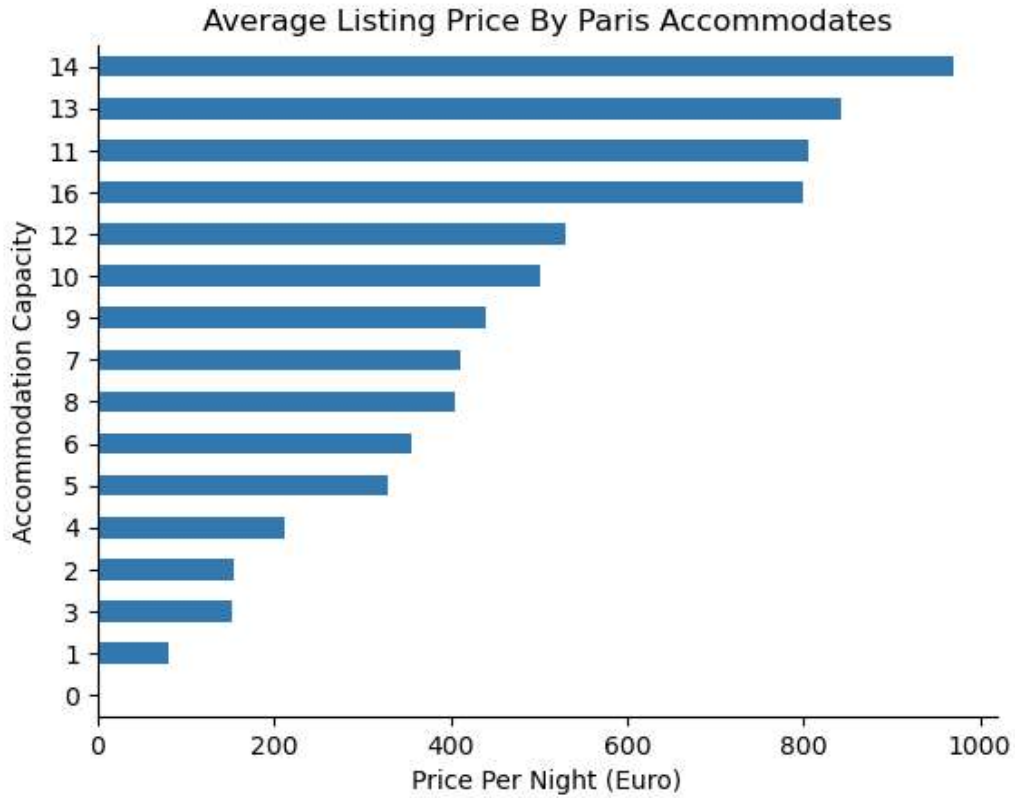
Run Code

In [64]:
```
(paris_listing_accommodates
 .plot
 .barh(
    title='Average Listing Price By Paris Accommodates',
    xlabel='Price Per Night (Euro)',
    ylabel='Accommodation Capacity',
    legend=False
 )
)
sns.despine()
```



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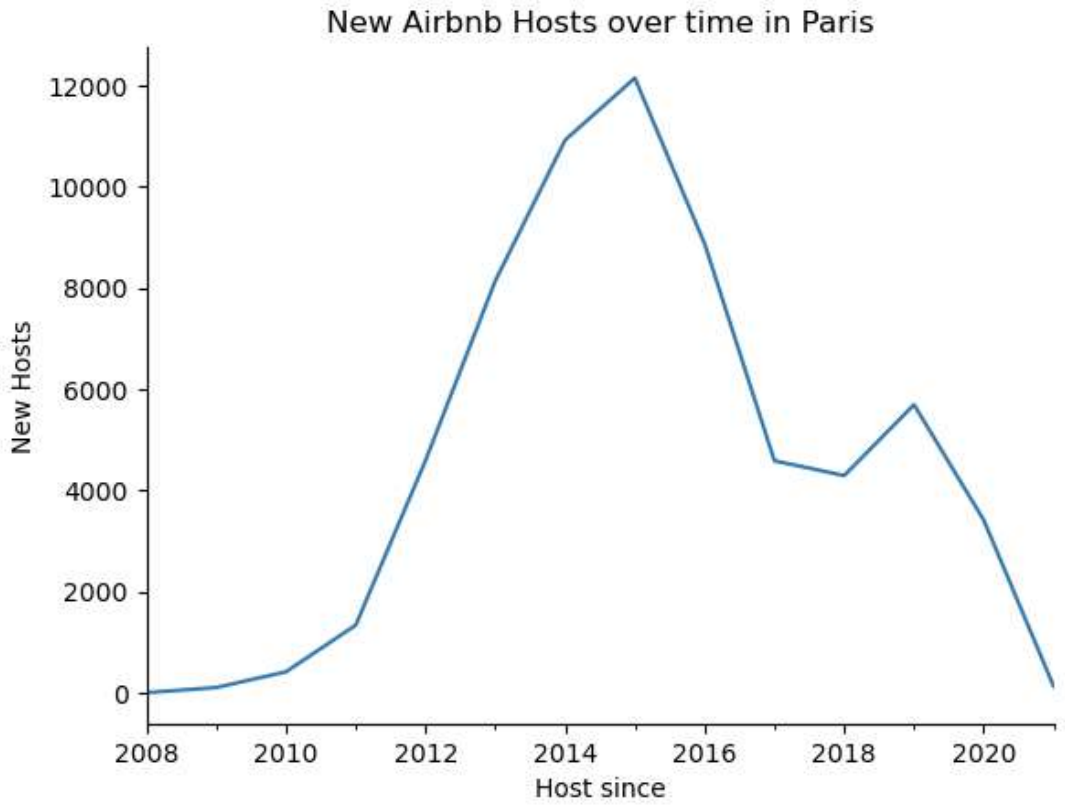
Run Code

In [79]:
```
paris_listing_over_time['neighbourhood'].plot(
    ylabel='New Hosts',
    xlabel='Host since',
    title='New Airbnb Hosts over time in Paris'

)
sns.despine()
```



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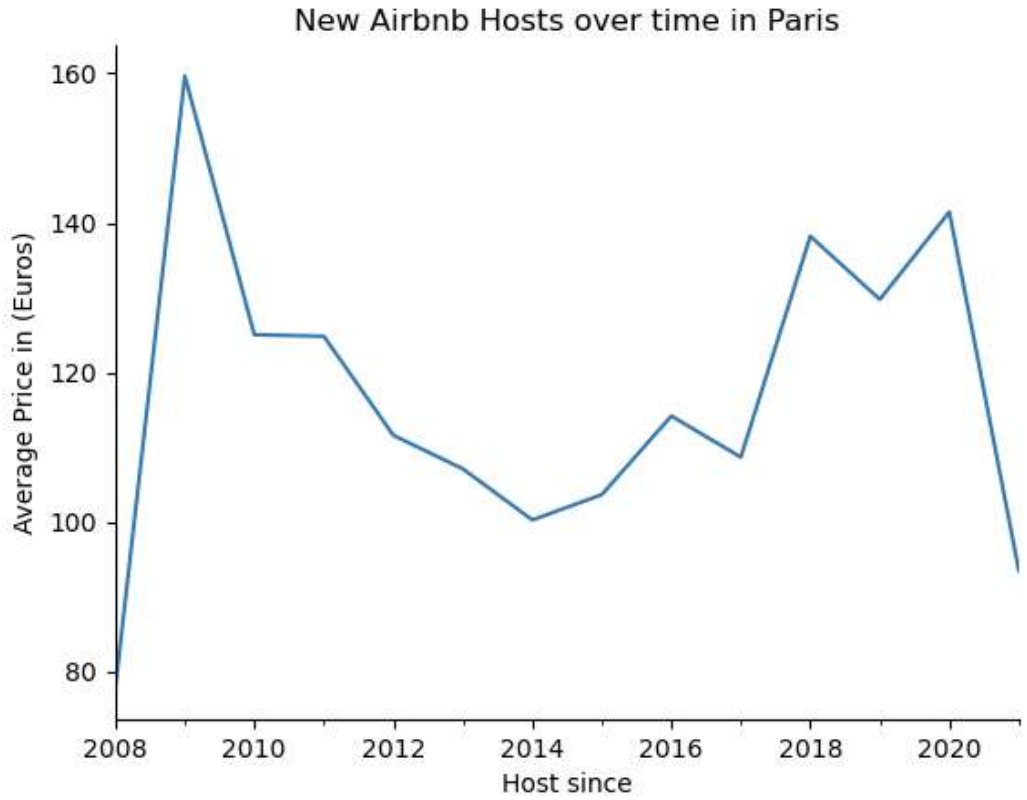
Trusted Python 3 (ipykernel)

Run Code

In [78]:
```
paris_listing_over_time['price'].plot(
    ylabel='Average Price in (Euros)',
    xlabel='Host since',
    title='New Airbnb Hosts over time in Paris'

)
sns.despine()
```



In [92]:
```
fig, ax = plt.subplots()

ax.plot(
    paris_listing_over_time.index,
    paris_listing_over_time['neighbourhood'],
    label='New Hosts',
    c='Pink'
)

ax.set_ylabel('New Hosts')
ax.set_xlabel('Year')

ax2 = ax.twinx()

ax2.plot(
    paris_listing_over_time.index,
    paris_listing_over_time['price'],
    label='Average Price'

)
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 ')