



GREATEST INCREASE IN HOUSING PRICES IN  
LONDON BOROUGHS

# GOAL

DETERMINING WHICH BOROUGHS OF LONDON  
HAVE SEEN THE GREATEST INCREASE IN HOUSING  
PRICES, ON AVERAGE, OVER THE LAST TWO  
DECades AND FINDING THE MOST DESIRABLE  
AREA TO LIVE IN

# PROJECT MODULES:



1. Sourcing and loading



2. Cleaning, transforming, and visualizing



3. Modeling



4. Evaluating and concluding

- Data comes from the [London Datastore]  
<https://data.london.gov.uk/download/uk-house-price-index/70ac0766-8902-4eb5-aab5-01951aaed773/UK%20House%20price%20index.xls>, A free, open-source data-sharing portal for London-oriented datasets.
- There are total 32 London Boroughs and the City of London which is not a borough.



## DATA RESOURCE

# DATASET OVERVIEW:

	properties														
	Unnamed: 0	City of London	Barking & Dagenham	Barnet	Bexley	Brent	Bromley	Camden	Croydon	Ealing	...	NORTH WEST	YOR HUN		
0	NaT	E09000001	E09000002	E09000003	E09000004	E09000005	E09000006	E09000007	E09000008	E09000009	...	E12000002	E1200		
1	1995-01-01	91448.98487	50460.2266	93284.51832	64958.09036	71306.56698	81671.47692	120932.8881	69158.16225	79885.89069	...	43958.48001	44803.4		
2	1995-02-01	82202.77314	51085.77983	93190.16963	64787.92069	72022.26197	81657.55944	119508.8622	68951.09542	80897.06551	...	43925.42289	44528.8		
3	1995-03-01	79120.70256	51268.96956	92247.52435	64367.49344	72015.76274	81449.31143	120282.2131	68712.44341	81379.86288	...	44434.8681	45200.4		
4	1995-04-01	77101.20804	53133.50526	90762.87492	64277.66881	72965.63094	81124.41227	120097.899	68610.04641	82188.90498	...	44267.7796	45614.3		
...	...	...	...	...	...	...	...	...	...	...	...	...	...		
309	2020-09-01	802639.2193	302467.2267	535670.7428	344894.5466	519981.998	435694.0058	835801.3995	376580.3304	490241.5419	...	174735.4557	172440.		
310	2020-10-01	841259.367	305283.3674	532216.6334	345811.9576	524109.2806	440851.7119	833114.3028	378474.99	494602.9743	...	178929.2529	176336.		
311	2020-11-01	785324.8035	307227.2138	533278.8532	349115.6473	516904.2295	453183.0453	833793.7395	383437.5172	503837.3795	...	180060.5249	180153.		
312	2020-12-01	816515.2248	312097.9694	534575.8532	355021.5579	498290.5734	462648.5709	819717.7946	385369.7799	506893.9309	...	183035.5427	181792.		
313	2021-01-01	781788.495	316257.3035	544918.1601	359197.4087	519354.799	465317.6645	864667.6987	390092.7077	501151.1669	...	184233.5214	179248.		

314 rows × 49 columns

# CHALLENGES

Non-London Boroughs and the missing Values were present in the dataset. Thus, removed all the null values and Non-London Boroughs to filter the dataset for getting relevant information.

Also, Instead of taking the average price of houses for every single month of the year from 2000 to 2018 we calculated the Average Price of houses every year to limit the number of data points.

# TRANSFORMING THE DATA

- Melting the DataFrame

	London_Boroughs	ID	Month of Year	Average Price
0	City of London	E09000001	1995-01-01	91448.98487
1	Barking & Dagenham	E09000002	1995-01-01	50460.2266
2	Barnet	E09000003	1995-01-01	93284.51832
3	Bexley	E09000004	1995-01-01	64958.09036
4	Brent	E09000005	1995-01-01	71306.56698
...	...	...	...	...
15019	LONDON	E12000007	2021-01-01	501320.0732
15020	SOUTH EAST	E12000008	2021-01-01	342420.4024
15021	SOUTH WEST	E12000009	2021-01-01	274648.2412
15022	Unnamed: 47	NaN	2021-01-01	NaN
15023	England	E92000001	2021-01-01	266532.1431

15024 rows × 4 columns

# CLEANING THE DATA

- Here we have records which are not a London Borough.
- Also, we have null values in the dataset.

```
melted_properties['London_Boroughs'].unique()
```

```
array(['City of London', 'Barking & Dagenham', 'Barnet', 'Bexley',  
      'Brent', 'Bromley', 'Camden', 'Croydon', 'Ealing', 'Enfield',  
      'Greenwich', 'Hackney', 'Hammersmith & Fulham', 'Haringey',  
      'Harrow', 'Havering', 'Hillingdon', 'Hounslow', 'Islington',  
      'Kensington & Chelsea', 'Kingston upon Thames', 'Lambeth',  
      'Lewisham', 'Merton', 'Newham', 'Redbridge',  
      'Richmond upon Thames', 'Southwark', 'Sutton', 'Tower Hamlets',  
      'Waltham Forest', 'Wandsworth', 'Westminster', 'Unnamed: 34',  
      'Inner London', 'Outer London', 'Unnamed: 37', 'NORTH EAST',  
      'NORTH WEST', 'YORKS & THE HUMBER', 'EAST MIDLANDS',  
      'WEST MIDLANDS', 'EAST OF ENGLAND', 'LONDON', 'SOUTH EAST',  
      'SOUTH WEST', 'Unnamed: 47', 'England'], dtype=object)
```

```
# Checking what ID's have Nan Values
```

```
melted_properties[melted_properties['ID'].isna()]
```

	London_Boroughs	ID	Month of Year	Average Price
33	Unnamed: 34	NaN	1995-01-01	NaN
36	Unnamed: 37	NaN	1995-01-01	NaN
46	Unnamed: 47	NaN	1995-01-01	NaN
81	Unnamed: 34	NaN	1995-02-01	NaN
84	Unnamed: 37	NaN	1995-02-01	NaN
...	...	...	...	...
14964	Unnamed: 37	NaN	2020-12-01	NaN
14974	Unnamed: 47	NaN	2020-12-01	NaN
15009	Unnamed: 34	NaN	2021-01-01	NaN
15012	Unnamed: 37	NaN	2021-01-01	NaN
15022	Unnamed: 47	NaN	2021-01-01	NaN

939 rows × 4 columns

# COMPARISON

```
notBoroughsList = ['Unnamed: 34', 'Inner London', 'Outer London', 'Unnamed: 37', 'NORTH  
YORKS & THE HUMBER', 'EAST MIDLANDS', 'WEST MIDLANDS', 'EAST OF ENGLA  
'SOUTH EAST', 'SOUTH WEST', 'Unnamed: 47', 'England']
```

```
Non_NaN[Non_NaN.London_Boroughs.isin(notBoroughsList)]
```

	London_Boroughs	ID	Month of Year	Average Price
34	Inner London	E13000001	1995-01-01	78251.97650
35	Outer London	E13000002	1995-01-01	72958.79836
37	NORTH EAST	E12000001	1995-01-01	42076.35411
38	NORTH WEST	E12000002	1995-01-01	43958.48001
39	YORKS & THE HUMBER	E12000003	1995-01-01	44803.42878
...	...	...	...	...
15018	EAST OF ENGLAND	E12000006	2021-01-01	310638.94240
15019	LONDON	E12000007	2021-01-01	501320.07320
15020	SOUTH EAST	E12000008	2021-01-01	342420.40240
15021	SOUTH WEST	E12000009	2021-01-01	274648.24120
15023	England	E92000001	2021-01-01	266532.14310

3756 rows × 4 columns

	London_Boroughs	ID	Month of Year	Average Price
0	City of London	E09000001	1995-01-01	91448.98487
1	Barking & Dagenham	E09000002	1995-01-01	50460.22660
2	Barnet	E09000003	1995-01-01	93284.51832
3	Bexley	E09000004	1995-01-01	64958.09036
4	Brent	E09000005	1995-01-01	71306.56698
...	...	...	...	...
15004	Sutton	E09000029	2021-01-01	385231.03630
15005	Tower Hamlets	E09000030	2021-01-01	457731.29780
15006	Waltham Forest	E09000031	2021-01-01	478186.23350
15007	Wandsworth	E09000032	2021-01-01	598546.67460
15008	Westminster	E09000033	2021-01-01	956658.38610

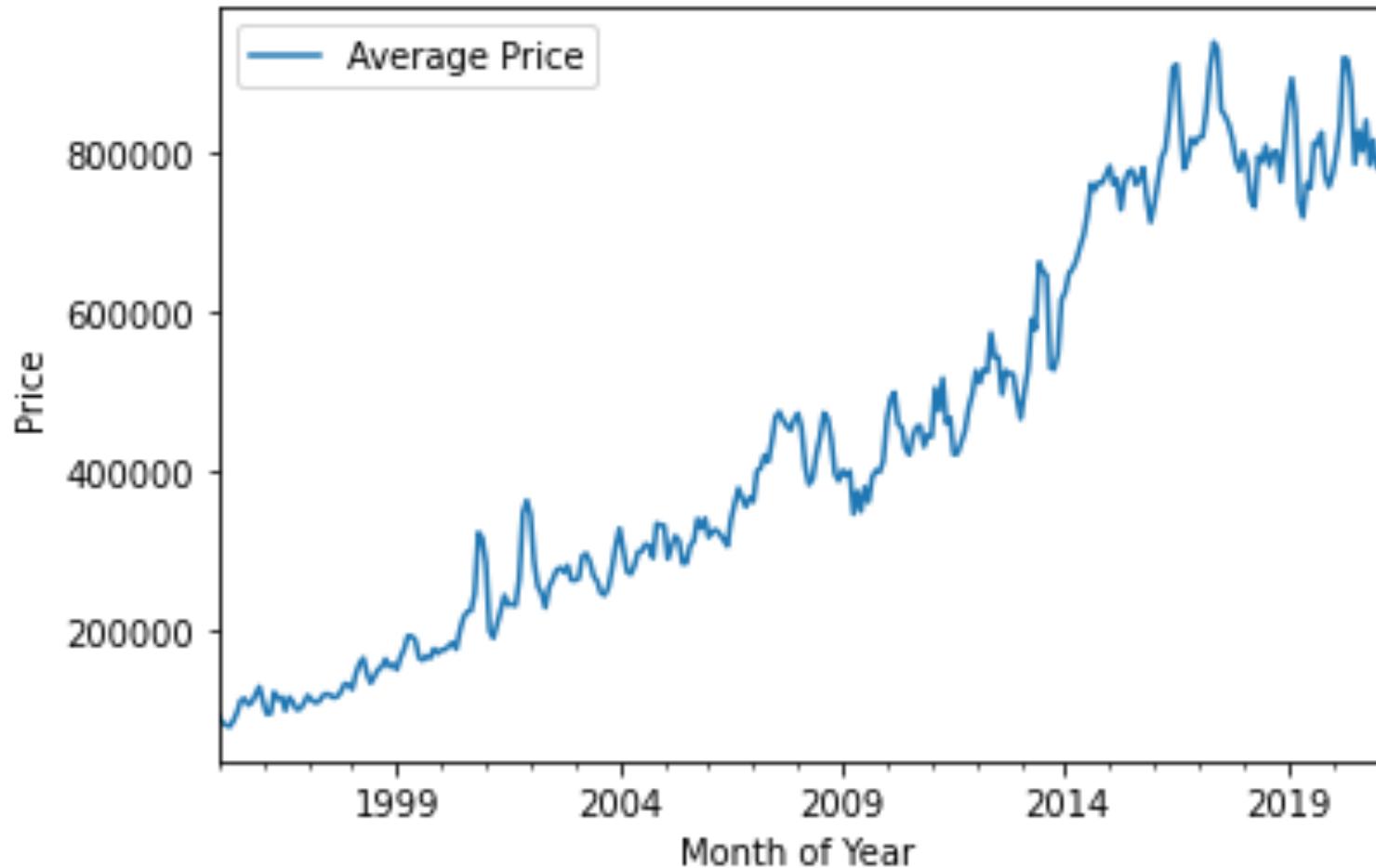
10329 rows × 4 columns

# Here we can see if we have only the 33 unique London Boroughs

```
Non_NaN['London_Boroughs'].unique()
```

```
array(['City of London', 'Barking & Dagenham', 'Barnet', 'Bexley',  
'Brent', 'Bromley', 'Camden', 'Croydon', 'Ealing', 'Enfield',  
'Greenwich', 'Hackney', 'Hammersmith & Fulham', 'Haringey',  
'Harrow', 'Havering', 'Hillingdon', 'Hounslow', 'Islington',  
'Kensington & Chelsea', 'Kingston upon Thames', 'Lambeth',  
'Lewisham', 'Merton', 'Newham', 'Redbridge',  
'Richmond upon Thames', 'Southwark', 'Sutton', 'Tower Hamlets',  
'Waltham Forest', 'Wandsworth', 'Westminster'], dtype=object)
```

# PRICE INCREASE IN CITY OF LONDON



During the Analysis, we compared the price of houses in 1998 to the price in 2018 and found that house prices in London have increased equally almost across all London boroughs but the prices increased rapidly from year 2014-2018

# AVERAGE PRICE INCREASE FOR EACH BOROUGH DURING LAST TWO DECADES

**London\_Boroughs   Year**

Barking & Dagenham	1995	5.181797e+04
	1996	5.171819e+04
	1997	5.597426e+04
	1998	6.028582e+04
	1999	6.532093e+04
...	...	...

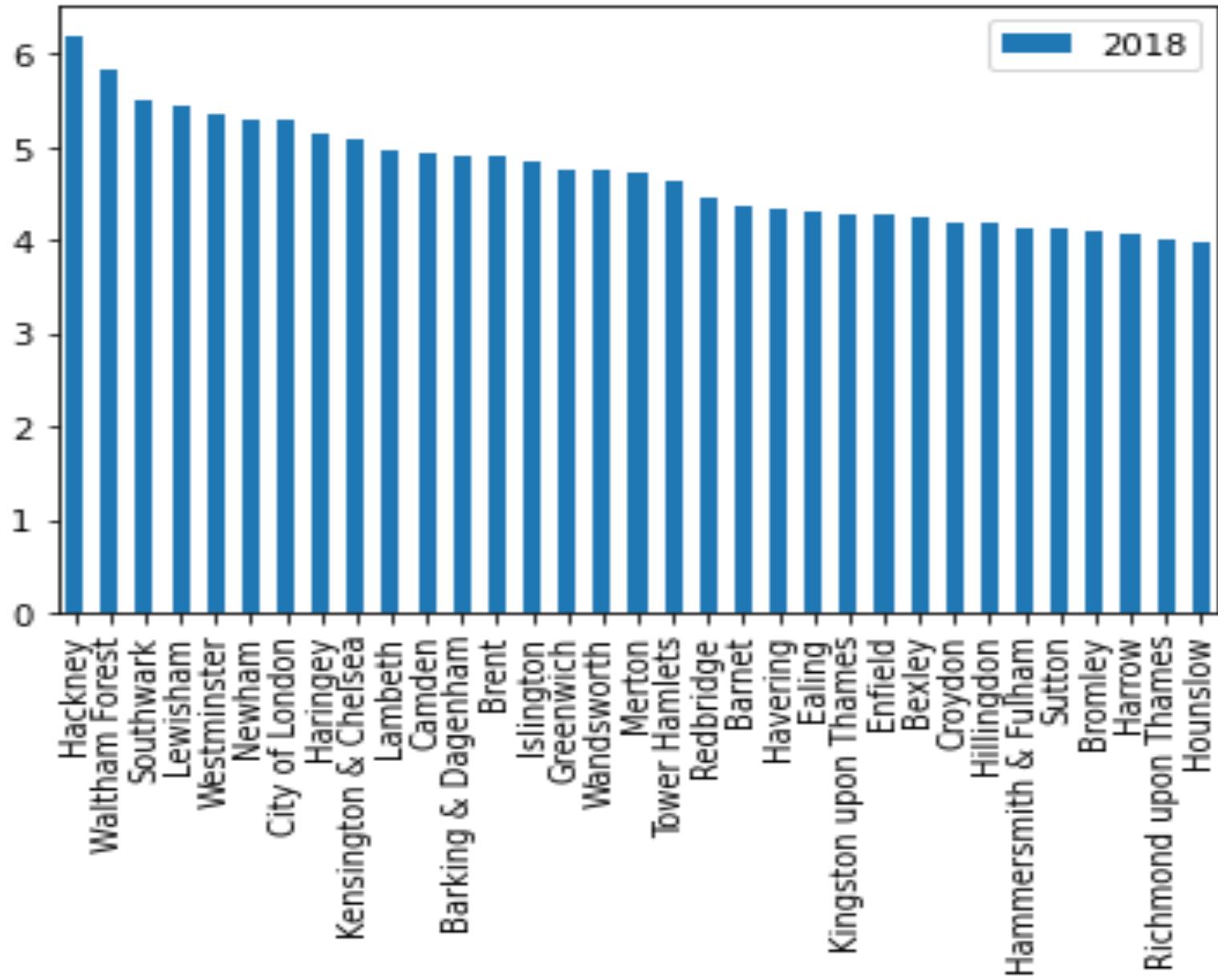
Westminster	2017	1.064772e+06
	2018	1.020025e+06
	2019	9.559986e+05
	2020	9.630865e+05
	2021	9.566584e+05

**df1.sample(10)**

		Average Price	
London_Boroughs	Year	Brent	1996
Brent	1996	75235.918367	
Havering	2008	231473.737725	
Islington	2017	650114.629192	
Lambeth	2018	511536.396992	
Greenwich	1995	63389.786578	
Barking & Dagenham	2009	156446.896358	
Haringey	2012	339685.912767	
Bexley	2005	186512.186267	
Havering	2018	370248.750770	
Merton	2005	246252.810042	

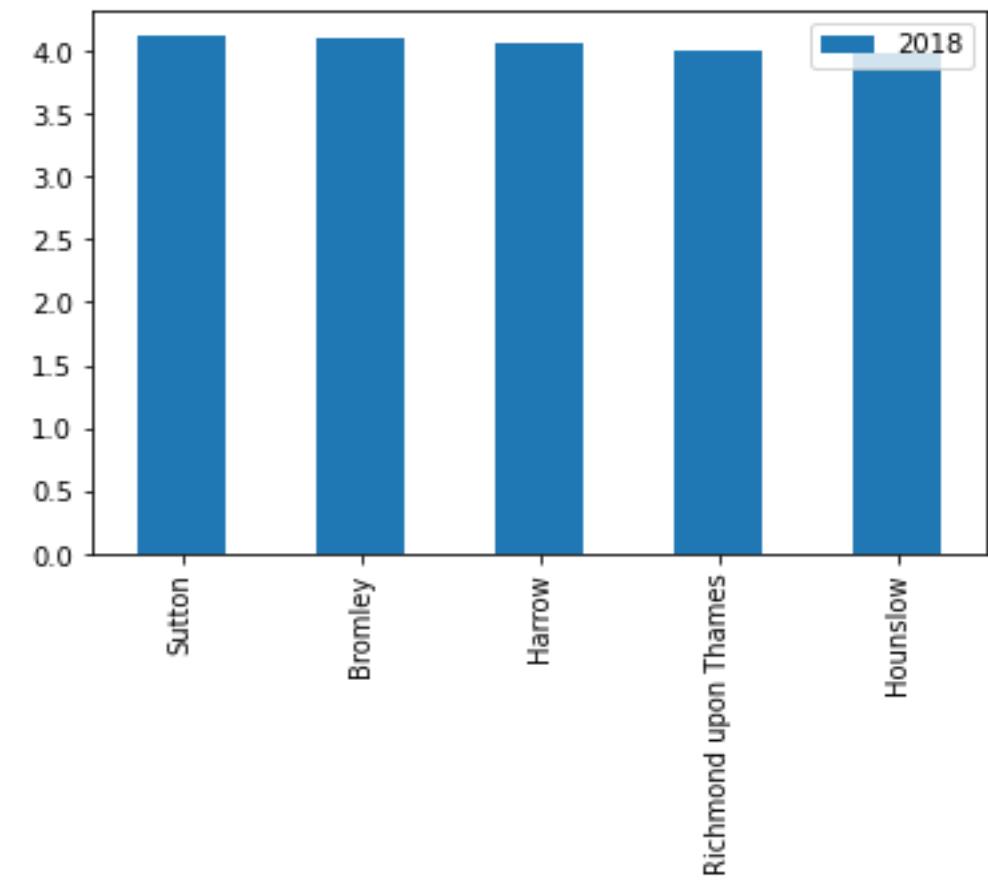
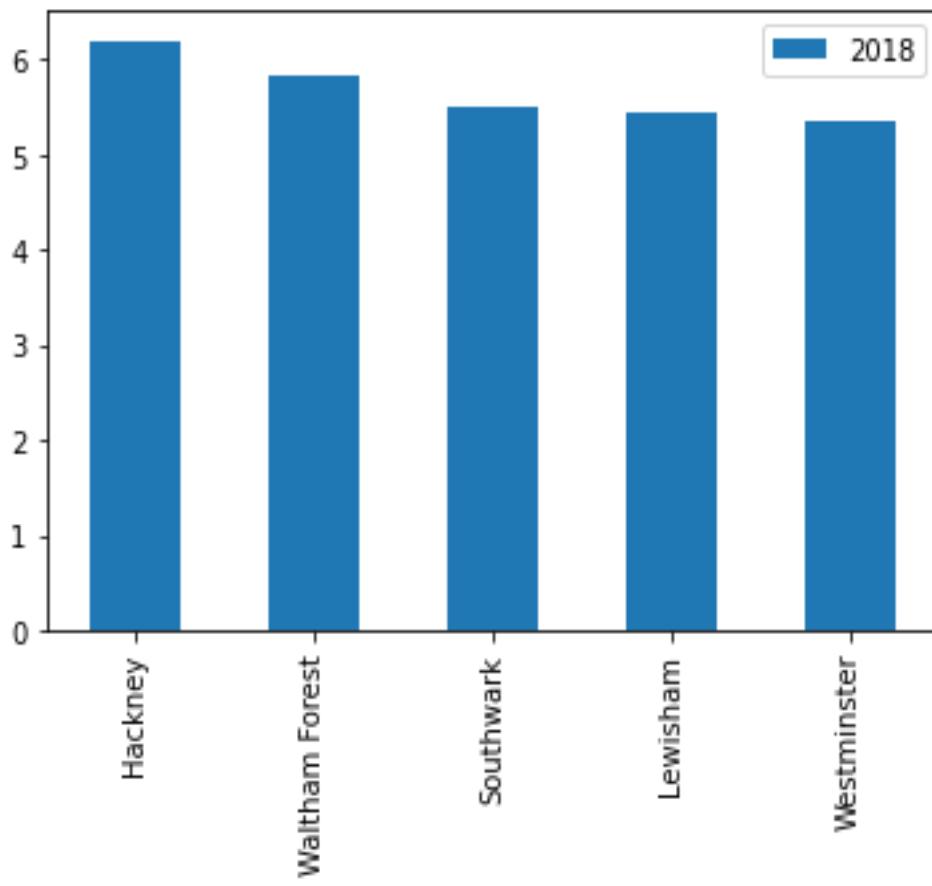
	Borough	2018		
11	Hackney	6.198286	25	Redbridge 4.471182
30	Waltham Forest	5.834756	1	Barnet 4.358196
27	Southwark	5.516485	15	Havering 4.325230
22	Lewisham	5.449221	8	Ealing 4.311451
32	Westminster	5.353565	20	Kingston upon Thames 4.270550
24	Newham	5.305390	9	Enfield 4.263472
6	City of London	5.301620	2	Bexley 4.248977
13	Haringey	5.134625	7	Croydon 4.201100
19	Kensington & Chelsea	5.082465	16	Hillingdon 4.200273
21	Lambeth	4.957751	12	Hammersmith & Fulham 4.137798
5	Camden	4.935353	28	Sutton 4.118523
0	Barking & Dagenham	4.896619	4	Bromley 4.094785
3	Brent	4.894554	14	Harrow 4.059196
18	Islington	4.844048	26	Richmond upon Thames 4.005162
10	Greenwich	4.763036	17	Hounslow 3.976409
31	Wandsworth	4.757709		
23	Merton	4.741273		
29	Tower Hamlets	4.626701		

# MOST EXPENSIVE BOROUGHS



## MOST EXPENSIVE PLACES TO LIVE

## MOST AFFORDABLE PLACES TO LIVE



# CONCLUSION

- After analyzing the all 33 London Boroughs we came to a conclusion that over the last 2 decades from 1998 to 2018 the greatest increase in the housing prices, on average were in the boroughs: '**Hackney**', '**Waltham Forest**', '**Southwark**', '**Lewisham**'.
- The boroughs where there was least increase in housing prices, on average, were: '**Hounslow**', '**Richmond upon Thames**', '**Harrow**' ,'**Bromley**'. Thus these 5 boroughs are best areas to live in due to rising rent prices.