Project: Housing and Property Sales

In this project, we will be doing a complete data analysis on housing and property sales to get useful information about it.

Dataset Features:

- Date of Sale (Datesold)
- Price
- Property type
- Number of bedrooms
- 4-digit postcode
- Year

Study outcome:

At the end of this project, you will learn how to

- Import Python libraries
- Read datasets in a CSV format
- Group the dataset by year, number of bedrooms, and property type.
- Find average house price
- Find how many houses and properties are sold.
- Calculate the average house price.
- Find the highest sales
- Create a histogram that shows the sales dataset, etc.

Import libraries

In [1]:
```
import pandas as pd # for data manipulation
import numpy as np # for numerical computation
import matplotlib.pyplot as plt # for data visualization
```

```
''' magic command that ensures matplotlib plots
are displayed directly inside the Jupyter Notebook cells '''
%matplotlib inline
```

Read the dataset

In [2]:
```
# define a variable called 'sales' to store the dataframe
sales = pd.read_csv('House Sales.csv')
```

In [3]:
```
# displays the dataframe to the console
sales
```

Out[3]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
0	07/02/2007 00:00	2607	525000	house	4	2007
1	27/02/2007 00:00	2906	290000	house	3	2007
2	07/03/2007 00:00	2905	328000	house	3	2007
3	09/03/2007 00:00	2905	380000	house	4	2007
4	21/03/2007 00:00	2906	310000	house	3	2007
...	...	...	...	...	...	...
28190	21/12/2018 00:00	2612	580000	unit	2	2018
28191	22/12/2018 00:00	2602	750000	house	3	2018
28192	24/12/2018 00:00	2914	640000	house	4	2018
28193	24/12/2018 00:00	2602	780000	house	3	2018
28194	24/12/2018 00:00	2603	1410000	house	4	2018

28195 rows × 6 columns

Question 1: Find how many houses and properties are sold?

In [4]:
```
# -----------------------
# each row corresponds to a sale, so we can use
# the count method in finding the number that was sold
# -----------------------

# count the total number of entries (rows) in the 'sales' object and store it in nu
num_sales = sales.count()

# print the result to see how many sales records exist
print(num_sales)
```

```
# Answer: 28195
```

```
Datesold         28195
Postcode         28195
Price            28195
Property Type    28195
Bedrooms         28195
Year             28195
dtype: int64
```

In [ ]:

Question 2: Calculate the average house price

In [5]:

```
# filter only houses
houses = sales[sales['Property Type'] == 'house']

# display the filtered DataFrame containing only houses
houses
```

Out[5]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
0	07/02/2007 00:00	2607	525000	house	4	2007
1	27/02/2007 00:00	2906	290000	house	3	2007
2	07/03/2007 00:00	2905	328000	house	3	2007
3	09/03/2007 00:00	2905	380000	house	4	2007
4	21/03/2007 00:00	2906	310000	house	3	2007
...	...	...	...	...	...	...
28185	21/12/2018 00:00	2602	910000	house	4	2018
28191	22/12/2018 00:00	2602	750000	house	3	2018
28192	24/12/2018 00:00	2914	640000	house	4	2018
28193	24/12/2018 00:00	2602	780000	house	3	2018
28194	24/12/2018 00:00	2603	1410000	house	4	2018

23530 rows × 6 columns

In [6]:

```
# calculate the average house price
average_price = houses['Price'].mean()

#displays the avearge price to the console
print("Average House Price:", average_price)
```

```
Average House Price: 645124.8735231619
```

In [ ]:

Question 3: Find the highest sales

In [7]:
```
# find the maximum value in the 'Price' column of the sales DataFrame
highest_sales = sales['Price'].max()

# displays the highest sales
print(f'Highest sales: {highest_sales}')
```

```
Highest sales: 8000000
```

In [8]:
```
# ---------------------
# finding more information about the house
# the property was sold on 2nd November 2015.
# the property is located in postcode 2611
# a 4-bedroom house—quite standard for a family home
# ---------------------

# returns the row with the highest price in the dataset
sales[sales['Price'].max() == sales['Price']]
```

Out[8]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
15186	02/11/2015 00:00	2611	8000000	house	4	2015

In [ ]:

Question 4: Group the dataset by years, number of bedrooms and property type

In [9]:
```
# Group the sales DataFrame by the 'Year' column
sales_y = sales.groupby('Year')

# Group the sales DataFrame by the 'Bedrooms' column
sales_b = sales.groupby('Bedrooms')

# Group the sales DataFrame by the 'Property Type' column
sales_p = sales.groupby('Property Type')
```

In [10]:
```
sales_y.groups
```

Out[10]:
```
{2007: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20,
21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 4
1, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61,
62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 8
2, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, ...], 2008:
[147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 1
63, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 17
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196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 21
2, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228,
229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 24
5, 246, ...], 2009: [786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 7
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2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 223
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246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259,
2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 227
3, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2
287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300,
2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, ...], 2011: [376
7, 3768, 3769, 3770, 3771, 3772, 3773, 3774, 3775, 3776, 3777, 3778, 3779, 3780, 3
781, 3782, 3783, 3784, 3785, 3786, 3787, 3788, 3789, 3790, 3791, 3792, 3793, 3794,
3795, 3796, 3797, 3798, 3799, 3800, 3801, 3802, 3803, 3804, 3805, 3806, 3807, 380
8, 3809, 3810, 3811, 3812, 3813, 3814, 3815, 3816, 3817, 3818, 3819, 3820, 3821, 3
822, 3823, 3824, 3825, 3826, 3827, 3828, 3829, 3830, 3831, 3832, 3833, 3834, 3835,
3836, 3837, 3838, 3839, 3840, 3841, 3842, 3843, 3844, 3845, 3846, 3847, 3848, 384
9, 3850, 3851, 3852, 3853, 3854, 3855, 3856, 3857, 3858, 3859, 3860, 3861, 3862, 3
863, 3864, 3865, 3866, ...], 2012: [5400, 5401, 5402, 5403, 5404, 5405, 5406, 540
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7259, 7260, 7261, 7262, 7263, 7264, 7265, 7266, 7267, 7268, 7269, 7270, 7271, 727
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327, 7328, 7329, 7330, 7331, 7332, 7333, 7334, 7335, 7336, 7337, 7338, 7339, 7340,
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9, 9440, 9441, 9442, 9443, 9444, 9445, 9446, 9447, 9448, 9449, 9450, 9451, 9452, 9
453, 9454, 9455, 9456, 9457, 9458, 9459, 9460, 9461, 9462, 9463, 9464, 9465, 9466,
9467, 9468, 9469, 9470, 9471, 9472, 9473, 9474, 9475, 9476, ...], 2015: [12240, 12
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276, 12277, 12278, 12279, 12280, 12281, 12282, 12283, 12284, 12285, 12286, 12287,
12288, 12289, 12290, 12291, 12292, 12293, 12294, 12295, 12296, 12297, 12298, 1229
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92, 15893, 15894, 15895, 15896, 15897, 15898, 15899, 15900, 15901, 15902, 15903, 1
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15916, 15917, 15918, 15919, 15920, 15921, 15922, 15923, 15924, 15925, 15926, 1592
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939, 15940, 15941, 15942, 15943, 15944, 15945, 15946, 15947, 15948, 15949, 15950,
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974, 15975, 15976, 15977, 15978, 15979, 15980, 15981, 15982, 15983, 15984, 15985,
15986, 15987, ...], 2017: [19796, 19797, 19798, 19799, 19800, 19801, 19802, 19803,
19804, 19805, 19806, 19807, 19808, 19809, 19810, 19811, 19812, 19813, 19814, 1981
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827, 19828, 19829, 19830, 19831, 19832, 19833, 19834, 19835, 19836, 19837, 19838,
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862, 19863, 19864, 19865, 19866, 19867, 19868, 19869, 19870, 19871, 19872, 19873,
19874, 19875, 19876, 19877, 19878, 19879, 19880, 19881, 19882, 19883, 19884, 1988
5, 19886, 19887, 19888, 19889, 19890, 19891, 19892, 19893, 19894, 19895, ...], 201
8: [24337, 24338, 24339, 24340, 24341, 24342, 24343, 24344, 24345, 24346, 24347, 2
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383, 24384, 24385, 24386, 24387, 24388, 24389, 24390, 24391, 24392, 24393, 24394,
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418, 24419, 24420, 24421, 24422, 24423, 24424, 24425, 24426, 24427, 24428, 24429,
24430, 24431, 24432, 24433, 24434, 24435, 24436, ...]}
```

In [11]:

```
sales_b.groups
```

```
Out[11]: {0: [493, 6581, 7382, 7399, 7627, 7898, 8188, 8316, 8513, 9414, 11994, 12312, 1234
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574, 22974, 26796, 26868], 1: [21, 85, 93, 120, 141, 155, 156, 209, 254, 370, 392,
443, 460, 496, 509, 597, 624, 669, 671, 731, 787, 872, 902, 986, 989, 991, 1014, 1
099, 1110, 1148, 1149, 1229, 1230, 1251, 1280, 1321, 1327, 1342, 1409, 1411, 1445,
1468, 1493, 1512, 1513, 1533, 1551, 1587, 1623, 1639, 1716, 1818, 1832, 1845, 190
1, 1919, 1933, 1947, 2000, 2036, 2060, 2061, 2087, 2128, 2157, 2169, 2174, 2178, 2
199, 2222, 2232, 2260, 2276, 2324, 2429, 2491, 2500, 2539, 2544, 2579, 2604, 2622,
2648, 2730, 2777, 2848, 2869, 2870, 2921, 2959, 2968, 3009, 3049, 3073, 3078, 309
1, 3118, 3140, 3145, 3146, ...], 2: [13, 18, 29, 51, 54, 60, 62, 74, 76, 77, 79, 8
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274, 286, 320, 325, 327, 366, 373, 379, 390, 416, 426, 428, 434, 435, 437, 447, 44
8, 452, 461, 469, 472, 481, 497, 504, 510, 518, 528, 540, 549, 555, 568, 596, 615,
618, 644, 670, 674, 702, 709, 723, 724, 761, 773, 774, 785, 786, 790, 792, 800, 81
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917, 926, 927, 939, 940, 954, ...], 3: [1, 2, 4, 6, 8, 9, 10, 11, 17, 22, 23, 24,
25, 26, 27, 31, 33, 35, 36, 38, 39, 40, 41, 42, 43, 46, 53, 55, 56, 58, 61, 65, 6
7, 68, 78, 80, 81, 86, 87, 91, 92, 98, 102, 103, 108, 109, 110, 112, 113, 117, 11
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148, 160, 162, 163, 164, 165, 166, 167, 168, 173, 183, 185, 189, 190, 194, 195, 19
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...], 4: [0, 3, 5, 7, 12, 14, 15, 20, 28, 30, 32, 34, 44, 45, 48, 49, 50, 52, 57,
59, 63, 64, 66, 70, 71, 72, 73, 75, 82, 83, 89, 90, 94, 96, 99, 100, 105, 107, 11
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158, 159, 161, 169, 170, 171, 172, 175, 177, 180, 182, 184, 187, 188, 191, 193, 19
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245, 248, 249, 251, 252, 255, 257, 262, 263, 264, 267, 270, ...], 5: [16, 19, 37,
47, 69, 88, 95, 97, 101, 124, 174, 176, 179, 181, 200, 203, 205, 221, 226, 250, 26
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712, 745, 752, 809, 852, 875, 899, 953, 960, 977, 982, 983, 985, 1009, 1018, 1060,
1062, 1065, 1096, 1098, 1116, 1144, 1154, 1183, 1193, 1194, 1213, 1277, 1286, 128
7, 1310, 1354, 1367, 1379, 1402, 1452, 1460, 1511, 1524, 1547, 1596, 1606, 1622, 1
650, 1715, 1742, 1747, 1753, 1797, 1814, 1821, 1824, 1844, 1913, 1918, 1924, 1950,
1953, 1978, 2008, 2018, 2042, 2047, ...]}
```

```
In [12]: sales_p.groups
```

```
Out[12]: {'house': [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 20, 21, 2
2, 23, 24, 25, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 40, 41, 42, 43, 44, 45, 46,
47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 61, 63, 64, 65, 66, 67, 69, 7
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96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 1
13, ...], 'unit': [13, 18, 26, 29, 38, 39, 60, 62, 68, 74, 76, 77, 79, 84, 140, 14
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437, 443, 447, 448, 452, 460, 461, 472, 493, 496, 497, 504, 509, 510, 528, 549, 55
5, 565, 596, 597, 624, 644, 669, 670, 671, 724, 725, 731, 761, 773, 784, 785, 786,
787, 790, 792, 797, 810, 835, 848, 854, 864, 865, 871, 872, 877, 886, 887, 891, 89
2, 902, 908, 909, 910, 915, 916, 917, 926, 927, 934, 939, 940, 954, 955, 966, 974,
979, 986, ...]}
```

Question 5: Find the cheapest house sale in 2010

In [13]:
```
# retrieve all rows from the sales DataFrame where 'Property Type' is 'house'
House = sales_p.get_group('house')

# display the filtered DataFrame containing only house records
House
```

Out[13]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
0	07/02/2007 00:00	2607	525000	house	4	2007
1	27/02/2007 00:00	2906	290000	house	3	2007
2	07/03/2007 00:00	2905	328000	house	3	2007
3	09/03/2007 00:00	2905	380000	house	4	2007
4	21/03/2007 00:00	2906	310000	house	3	2007
...	...	...	...	...	...	...
28185	21/12/2018 00:00	2602	910000	house	4	2018
28191	22/12/2018 00:00	2602	750000	house	3	2018
28192	24/12/2018 00:00	2914	640000	house	4	2018
28193	24/12/2018 00:00	2602	780000	house	3	2018
28194	24/12/2018 00:00	2603	1410000	house	4	2018

23530 rows × 6 columns

In [14]:
```
# group the houses by year
House_Year = House.groupby('Year')
```

In [15]:
```
# filters the dataframe for houses sold in 2010
H_2010 = House_Year.get_group(2010)
```

In [16]:
```
# displays the dataframe with houses sold in 2010
H_2010
```

Out[16]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
2212	04/01/2010 00:00	2615	435000	house	3	2010
2213	05/01/2010 00:00	2904	712000	house	4	2010
2214	06/01/2010 00:00	2617	435000	house	4	2010
2215	06/01/2010 00:00	2606	1350000	house	5	2010
2216	07/01/2010 00:00	2905	612500	house	4	2010
...	...	...	...	...	...	...
3760	23/12/2010 00:00	2902	687000	house	4	2010
3761	23/12/2010 00:00	2602	767000	house	4	2010
3762	24/12/2010 00:00	2615	447000	house	4	2010
3763	24/12/2010 00:00	2913	457500	house	3	2010
3764	24/12/2010 00:00	2602	595000	house	3	2010

1374 rows × 6 columns

In [17]:
```
# displays the price of the cheapest house in 2010
H_2010['Price'].min()
```

Out[17]:
```
110000
```

In [18]:
```
# displays the price of the cheapest house in 2010 which is '110000'
# the number of bedrooms, property type, the date sold etc.
H_2010[H_2010['Price'].min() == H_2010['Price']]
```

Out[18]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
3262	21/09/2010 00:00	2606	110000	house	4	2010

In [ ]:

Question 6: Find the most expensive house sale in 2017

In [19]:
```
# filters the dataframe for houses sold in 2017
H_2017 = House_Year.get_group(2017)
```

In [20]:
```
H_2017
```

Out[20]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
19796	01/01/2017 00:00	2602	1095000	house	4	2017
19797	03/01/2017 00:00	2615	426000	house	3	2017
19798	05/01/2017 00:00	2615	410000	house	2	2017
19799	05/01/2017 00:00	2906	645000	house	4	2017
19800	05/01/2017 00:00	2914	745000	house	5	2017
...	...	...	...	...	...	...
24318	22/12/2017 00:00	2904	1000000	house	5	2017
24319	22/12/2017 00:00	2600	1450000	house	5	2017
24332	23/12/2017 00:00	2912	565000	house	3	2017
24334	28/12/2017 00:00	2905	520000	house	3	2017
24336	29/12/2017 00:00	2905	590000	house	3	2017

3630 rows × 6 columns

In [21]:

```
# prints the most expensive house in 2017
H_2017['Price'].max()
```

Out[21]:

```
4700000
```

In [22]:

```
# filter the H_2017 DataFrame to return the row(s) where the 'Price'
# is equal to the minimum price in the 'Price' column
H_2017[H_2017['Price'].min() == H_2017['Price']]
```

Out[22]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
19985	02/02/2017 00:00	2607	190000	house	1	2017

In [ ]:

```

```

Question 7: Find the most expensive house with 5 bedrooms

In [23]:

```
# filters the dataframe for houses with 5 bedrooms
B_5 = sales_b.get_group(5)
B_5
```

Out[23]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
16	02/07/2007 00:00	2914	800000	house	5	2007
19	06/07/2007 00:00	2615	535000	house	5	2007
37	07/08/2007 00:00	2904	815000	house	5	2007
47	21/08/2007 00:00	2902	418000	house	5	2007
69	21/09/2007 00:00	2603	1460000	house	5	2007
...	...	...	...	...	...	...
28097	14/12/2018 00:00	2905	720000	house	5	2018
28099	14/12/2018 00:00	2602	975000	house	5	2018
28112	15/12/2018 00:00	2607	1115000	house	5	2018
28115	16/12/2018 00:00	2611	1000000	house	5	2018
28181	21/12/2018 00:00	2615	820000	house	5	2018

1855 rows × 6 columns

In [24]:
```
# outputs the most expensive house
# with 5 bedrooms
B_5['Price'].max()
```

Out[24]:
```
7300000
```

In [25]:
```
B_5[B_5['Price'].max() == B_5['Price']]
```

Out[25]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
2589	22/04/2010 00:00	2603	7300000	house	5	2010

In [ ]:

Question 8: Find the cheapest unit

In [26]:
```
# retrieve all rows from the sales DataFrame where 'Property Type' is 'unit'
Unit = sales_p.get_group('unit')
Unit
```

Out[26]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
13	27/06/2007 00:00	2606	300000	unit	2	2007
18	05/07/2007 00:00	2611	300000	unit	2	2007
26	19/07/2007 00:00	2607	480000	unit	3	2007
29	20/07/2007 00:00	2604	360000	unit	2	2007
38	07/08/2007 00:00	2617	385000	unit	3	2007
...	...	...	...	...	...	...
28186	21/12/2018 00:00	2615	323000	unit	2	2018
28187	21/12/2018 00:00	2604	475000	unit	2	2018
28188	21/12/2018 00:00	2914	495000	unit	3	2018
28189	21/12/2018 00:00	2602	535000	unit	3	2018
28190	21/12/2018 00:00	2612	580000	unit	2	2018

4665 rows × 6 columns

In [27]:
```
# this returns the cheapest price from the 'Price' column of the DataFrame named Un
Unit['Price'].min()
```

Out[27]:
```
85000
```

In [28]:
```
Unit[Unit['Price'].min() == Unit['Price']]
```

Out[28]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
12179	18/12/2014 00:00	2612	85000	unit	1	2014

In [ ]:

Question 9: Find the cheapest unit in 2008

In [29]:
```
# group the Unit DataFrame by the 'Year' column
unit_year = Unit.groupby('Year')

# display the groupby object,
#which shows that the data is grouped by year
unit_year
```

Out[29]:
```
<pandas.core.groupby.generic.DataFrameGroupBy object at 0x000002309E5EBBB0>
```

In [30]:
```
# retrieve all rows from the Unit DataFrame for the year 2008
U_2008 = unit_year.get_group(2008)
```

```
# display the filtered DataFrame containing only units sold in 2008
U_2008
```

Out[30]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
155	21/01/2008 00:00	2600	315000	unit	1	2008
186	04/03/2008 00:00	2612	400000	unit	2	2008
192	05/04/2008 00:00	2612	438000	unit	2	2008
232	30/05/2008 00:00	2600	329000	unit	2	2008
254	23/06/2008 00:00	2606	289000	unit	1	2008
259	25/06/2008 00:00	2604	347300	unit	2	2008
268	02/07/2008 00:00	2612	350000	unit	2	2008
286	21/07/2008 00:00	2612	385000	unit	2	2008
287	22/07/2008 00:00	2617	415000	unit	3	2008
366	10/09/2008 00:00	2606	367000	unit	2	2008
370	12/09/2008 00:00	2602	270000	unit	1	2008
379	16/09/2008 00:00	2606	257000	unit	2	2008
392	19/09/2008 00:00	2604	420000	unit	1	2008
428	29/09/2008 00:00	2905	295000	unit	2	2008
435	30/09/2008 00:00	2602	312000	unit	2	2008
437	01/10/2008 00:00	2617	340000	unit	2	2008
443	03/10/2008 00:00	2601	325000	unit	1	2008
447	07/10/2008 00:00	2604	351000	unit	2	2008
448	07/10/2008 00:00	2612	415000	unit	2	2008
452	08/10/2008 00:00	2615	280500	unit	2	2008
460	10/10/2008 00:00	2612	330000	unit	1	2008
461	10/10/2008 00:00	2604	358000	unit	2	2008
472	14/10/2008 00:00	2612	395000	unit	2	2008
493	21/10/2008 00:00	2612	90000	unit	0	2008
496	22/10/2008 00:00	2602	231000	unit	1	2008
497	22/10/2008 00:00	2604	373000	unit	2	2008
504	23/10/2008 00:00	2606	313000	unit	2	2008
509	24/10/2008 00:00	2620	140500	unit	1	2008
510	24/10/2008 00:00	2612	432500	unit	2	2008
528	31/10/2008 00:00	2614	220000	unit	2	2008

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
549	07/11/2008 00:00	2602	280000	unit	2	2008
555	10/11/2008 00:00	2607	240000	unit	2	2008
565	14/11/2008 00:00	2604	405000	unit	3	2008
596	21/11/2008 00:00	2913	319950	unit	2	2008
597	21/11/2008 00:00	2612	400000	unit	1	2008
624	27/11/2008 00:00	2602	347000	unit	1	2008
644	01/12/2008 00:00	2912	280000	unit	2	2008
669	04/12/2008 00:00	2602	250000	unit	1	2008
670	04/12/2008 00:00	2602	300000	unit	2	2008
671	04/12/2008 00:00	2601	385000	unit	1	2008
724	15/12/2008 00:00	2606	295000	unit	2	2008
725	15/12/2008 00:00	2612	385000	unit	3	2008
731	16/12/2008 00:00	2601	279000	unit	1	2008
761	22/12/2008 00:00	2603	350000	unit	2	2008
773	23/12/2008 00:00	2606	315000	unit	2	2008
784	24/12/2008 00:00	2606	400000	unit	3	2008
785	24/12/2008 00:00	2612	440000	unit	2	2008

In [31]:
```
# displays the cheapest unit in 2008
U_2008['Price'].min()
```

Out[31]:
```
90000
```

In [32]:
```
# the cheapest unit in 2008 was 90000
# with no bedrooms
U_2008[U_2008['Price'].min() == U_2008['Price']]
```

Out[32]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
493	21/10/2008 00:00	2612	90000	unit	0	2008

In [ ]:
```

```

Question 10: Find the total amount of unit sales in 2016

In [33]:
```
# filters the dataframe for units sold in the year '2016'
U_2016 = unit_year.get_group(2016)
U_2016
```

Out[33]:

	Datesold	Postcode	Price	Property Type	Bedrooms	Year
15888	01/01/2016 00:00	2612	420000	unit	1	2016
15890	04/01/2016 00:00	2612	360000	unit	1	2016
15898	11/01/2016 00:00	2612	335000	unit	1	2016
15899	11/01/2016 00:00	2606	360000	unit	1	2016
15900	11/01/2016 00:00	2617	375000	unit	2	2016
...	...	...	...	...	...	...
19788	23/12/2016 00:00	2617	395000	unit	3	2016
19789	23/12/2016 00:00	2600	408000	unit	1	2016
19790	23/12/2016 00:00	2617	472000	unit	2	2016
19791	23/12/2016 00:00	2604	570000	unit	2	2016
19792	23/12/2016 00:00	2617	615000	unit	3	2016

695 rows × 6 columns

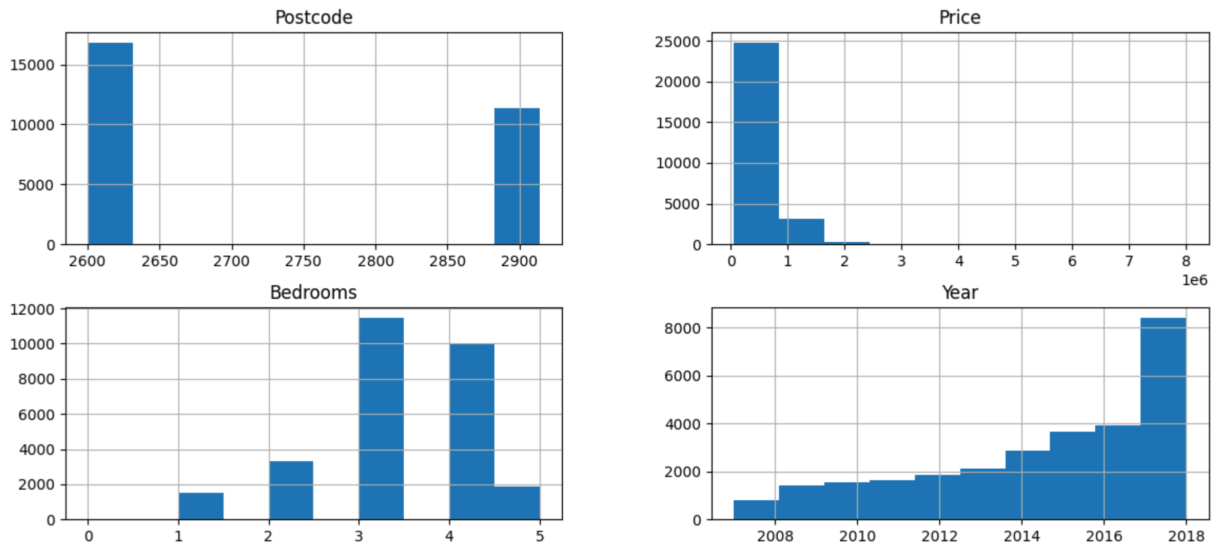
In [34]:
```
# prints the total amount of unit sales in 2016
U_2016['Price'].sum()
```

Out[34]:
```
296981819
```

In [ ]:
```
```

Question 11: Create a histogram that shows the Sales dataset

In [35]:
```
# create a histogram of the sales dataset
Histogram = sales.hist(figsize = (14, 6))
```


Postcode
Price
1e6
Bedrooms
Year