KING COUNTY HOUSING

By Paul Williams

GOAL

- Based off the attributes of certain houses, I wanted to produce a statistical model that will attempt to predict the prices of houses in the King County, Seattle, Washington area.

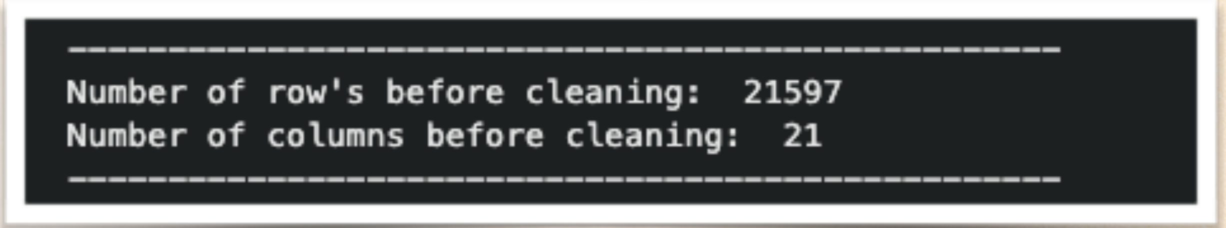
AGENDA

- Present Dataset
- Data Cleaning
- 1 of my EDA questions and the findings
- Regression Model
- Conclusion

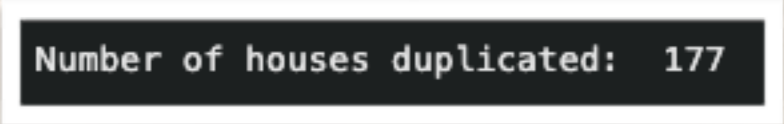
CLEANING

THE DATASET

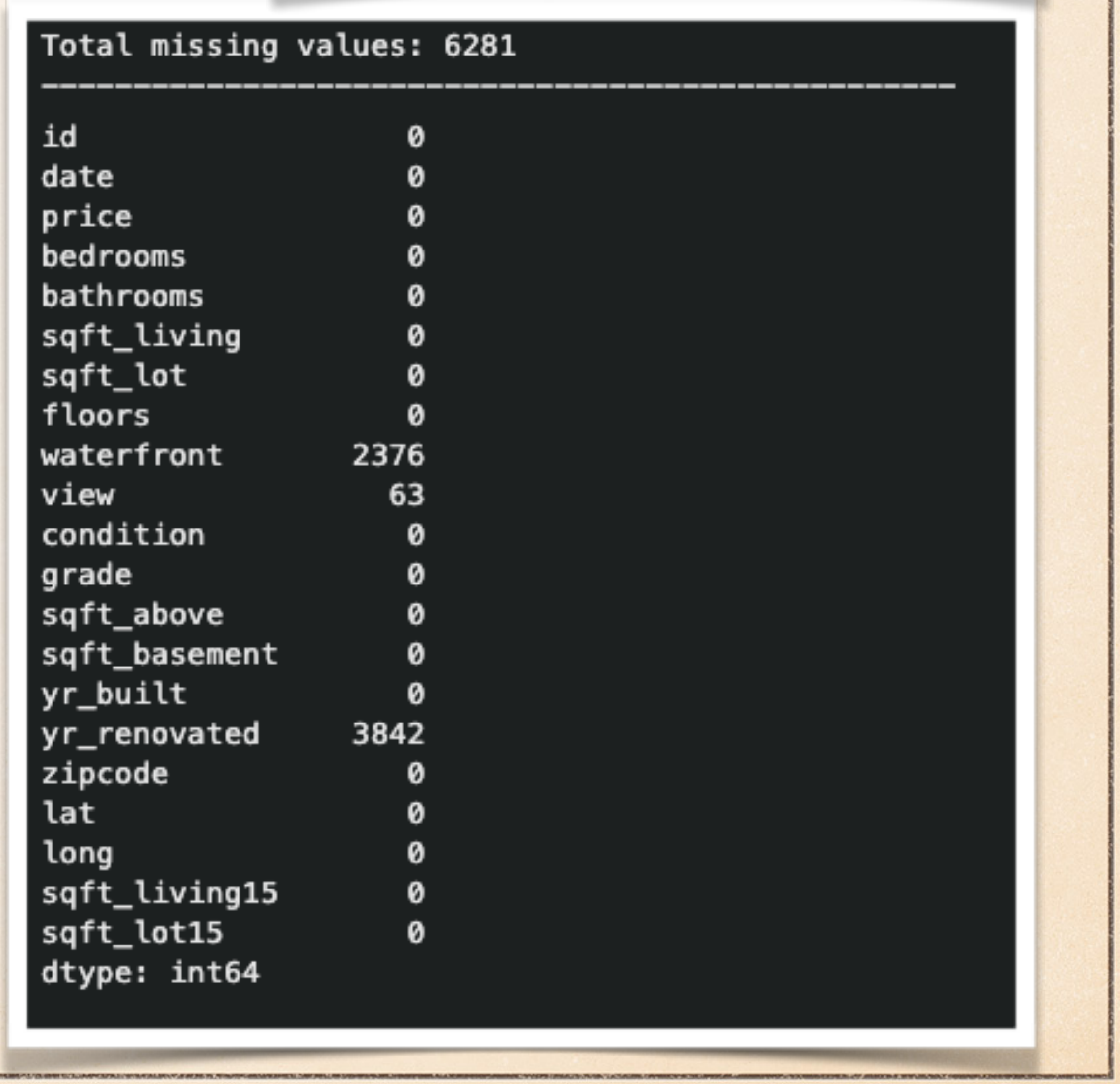
- The data set provided had 21 features and 21,597 homes
- It had missing values and duplicates
- And a few extreme values



```
--------------------------------------------------
Number of row's before cleaning:  21597
Number of columns before cleaning:  21
--------------------------------------------------
```



```
Number of houses duplicated:  177
```

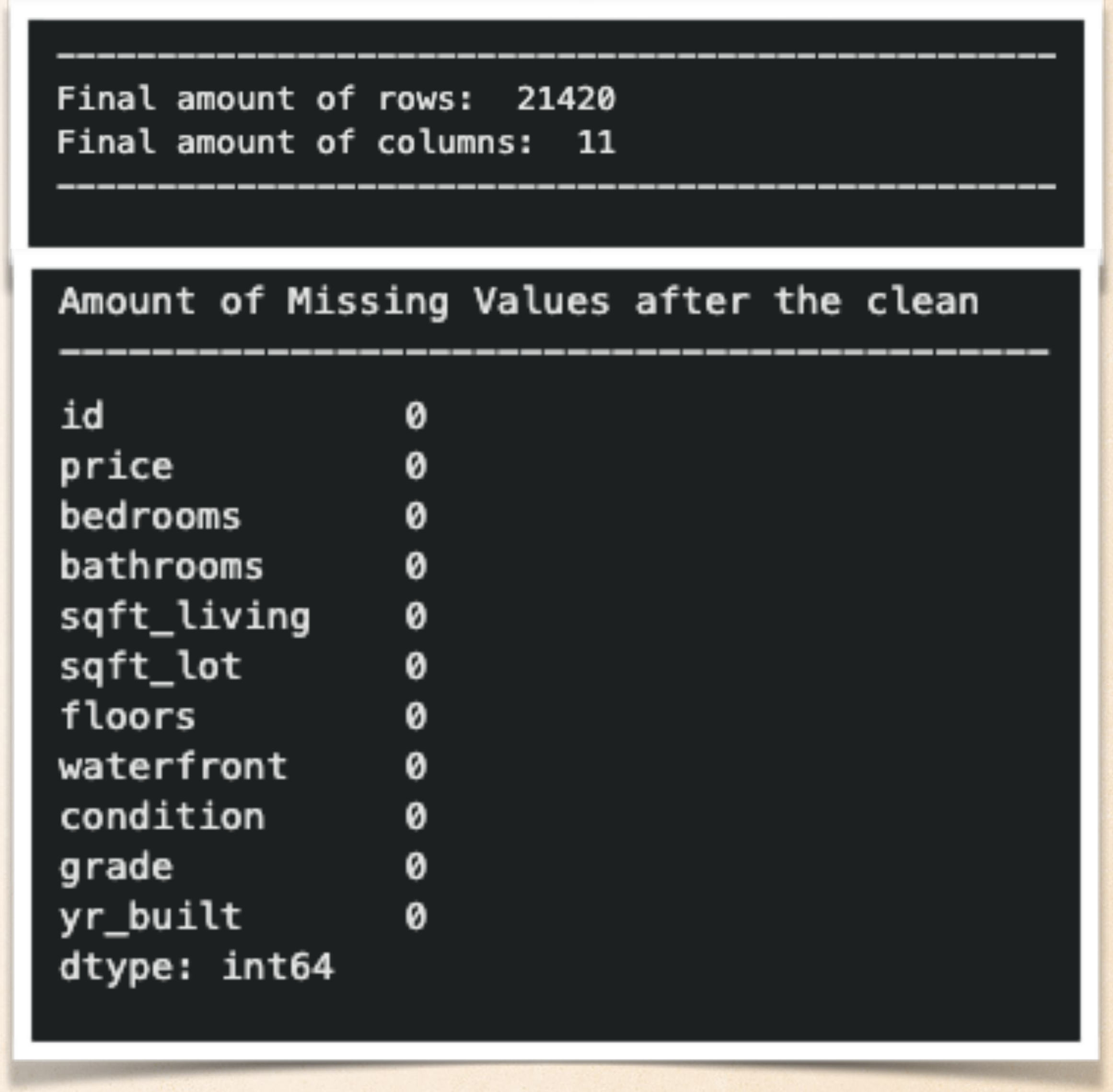


```
Total missing values: 6281
--------------------------------------------------

id                  0
date                0
price               0
bedrooms            0
bathrooms           0
sqft_living         0
sqft_lot            0
floors              0
waterfront       2376
view               63
condition           0
grade               0
sqft_above          0
sqft_basement       0
yr_built            0
yr_renovated     3842
zipcode             0
lat                 0
long                0
sqft_living15       0
sqft_lot15          0
dtype: int64
```

THE DATASET CLEANED

- Median values to replace extremes
- Taking the latest ID and dropping the rest
- Filling waterfront with zero's



```
--------------------------------------------------
Final amount of rows:  21420
Final amount of columns:  11
--------------------------------------------------
```

```
Amount of Missing Values after the clean
-----------------------------------------

id             0
price          0
bedrooms       0
bathrooms      0
sqft_living    0
sqft_lot       0
floors         0
waterfront     0
condition      0
grade          0
yr_built       0
dtype: int64
```

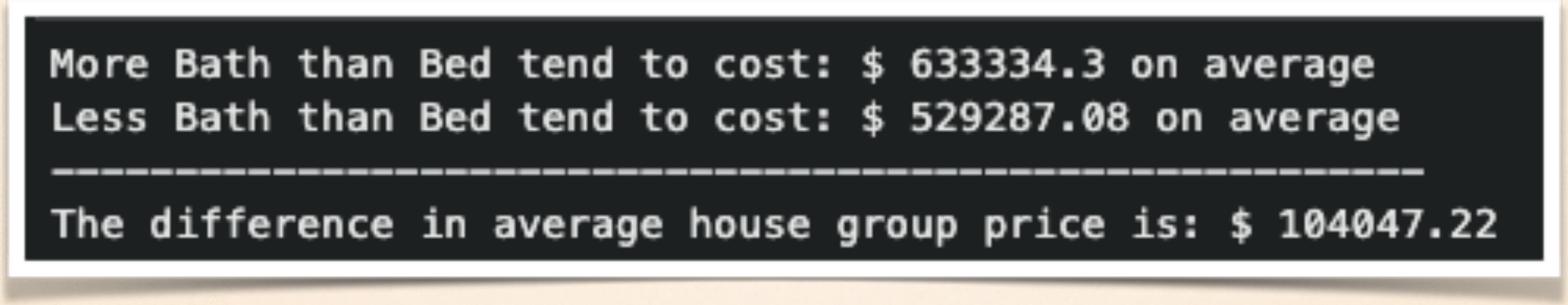
EDA QUESTIONS

QUESTION 1

Does having more bathrooms than bedrooms increase the price of a house?

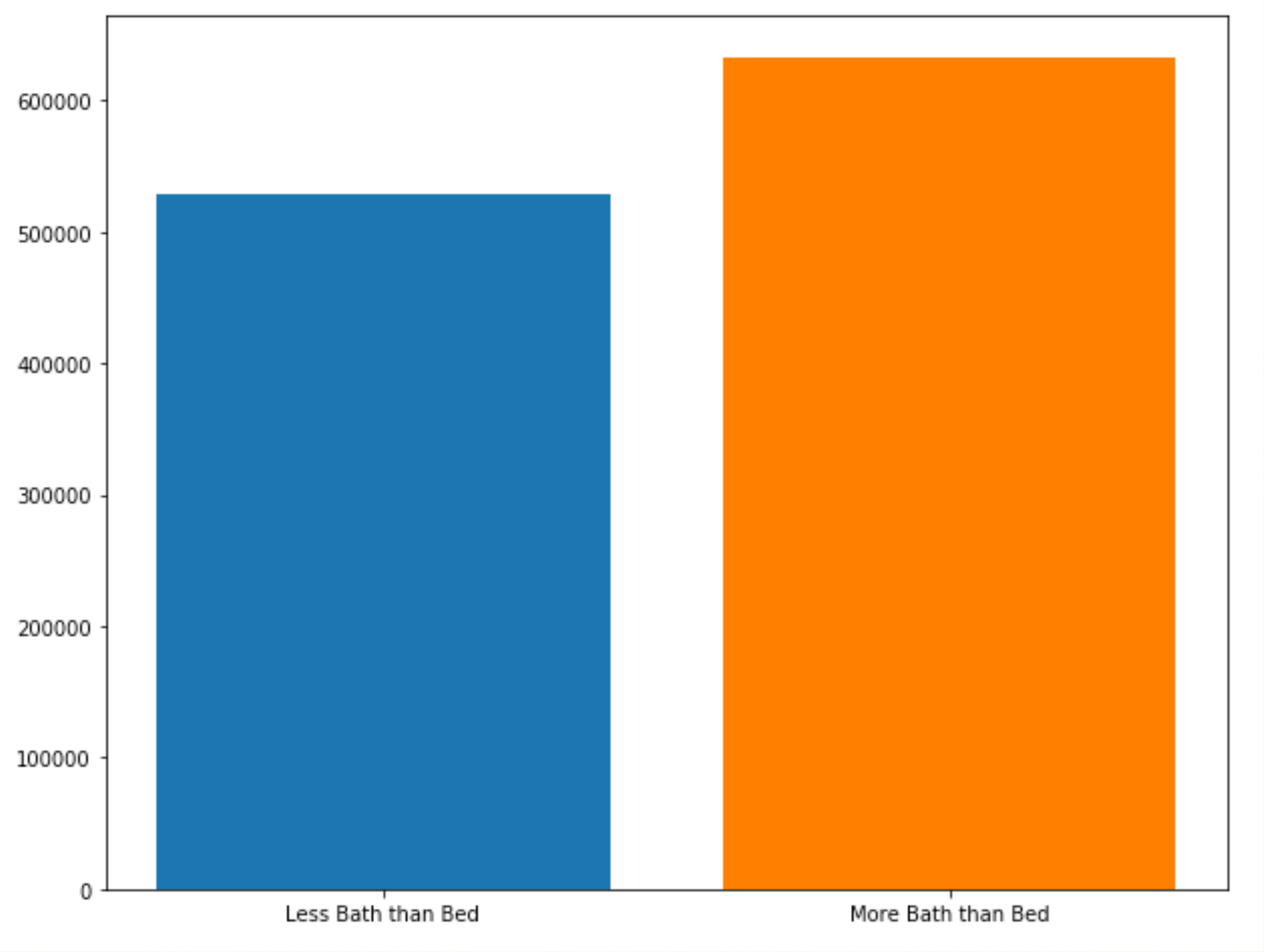
QUESTION 1 RESULT

- I created 2 data frames for this and found that:
- I rounded bathrooms up to symbolise room count
- Result:



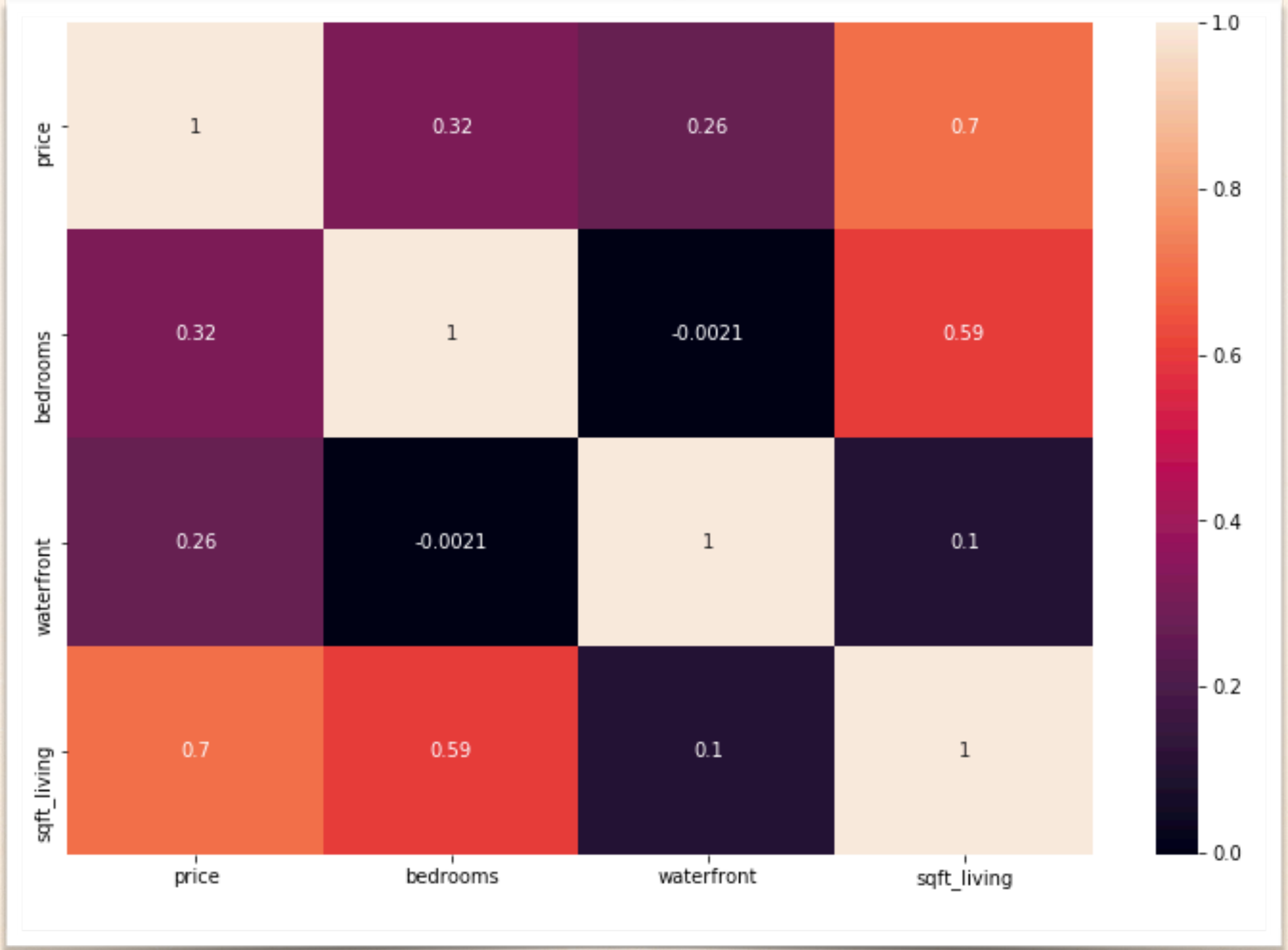
```
More Bath than Bed tend to cost: $ 633334.3 on average
Less Bath than Bed tend to cost: $ 529287.08 on average
--------------------------------------------------------
The difference in average house group price is: $ 104047.22
```

QUESTION 1 VISUAL

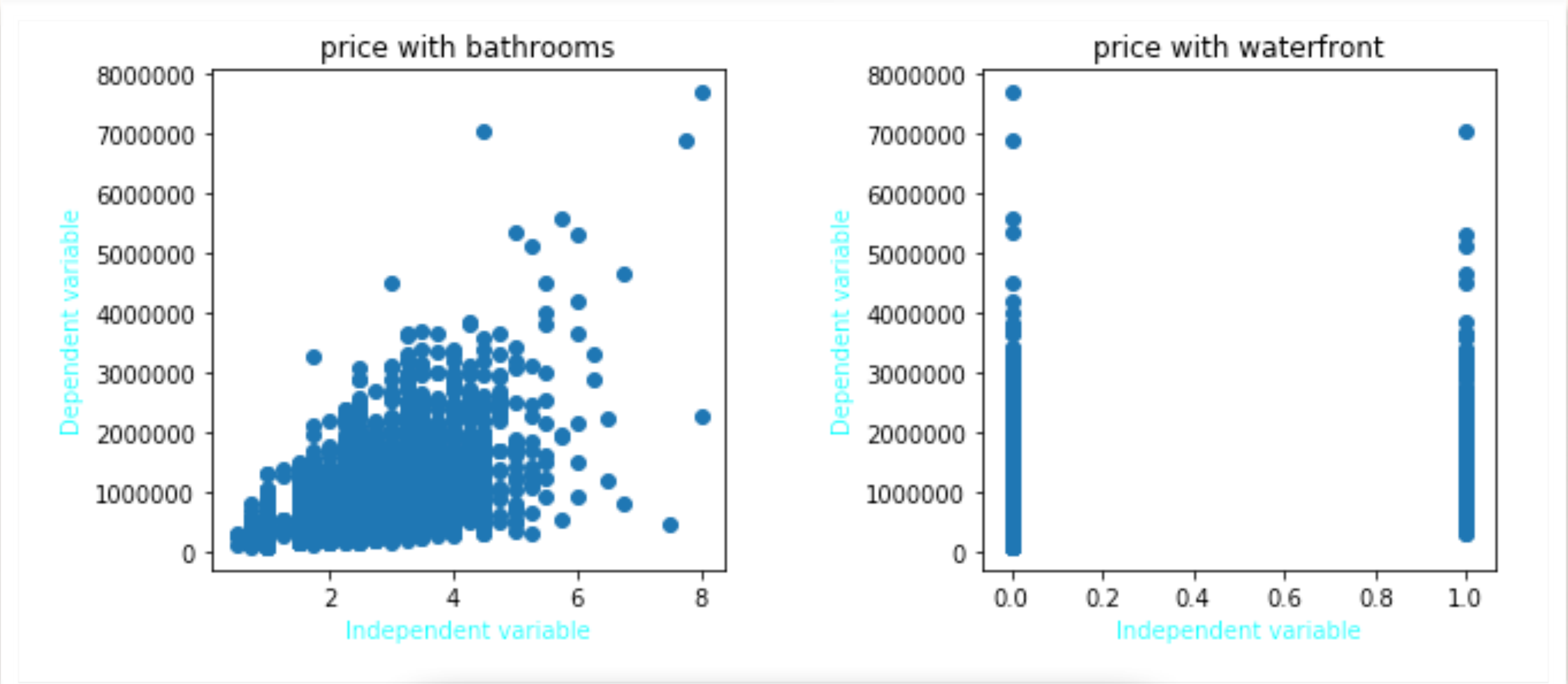


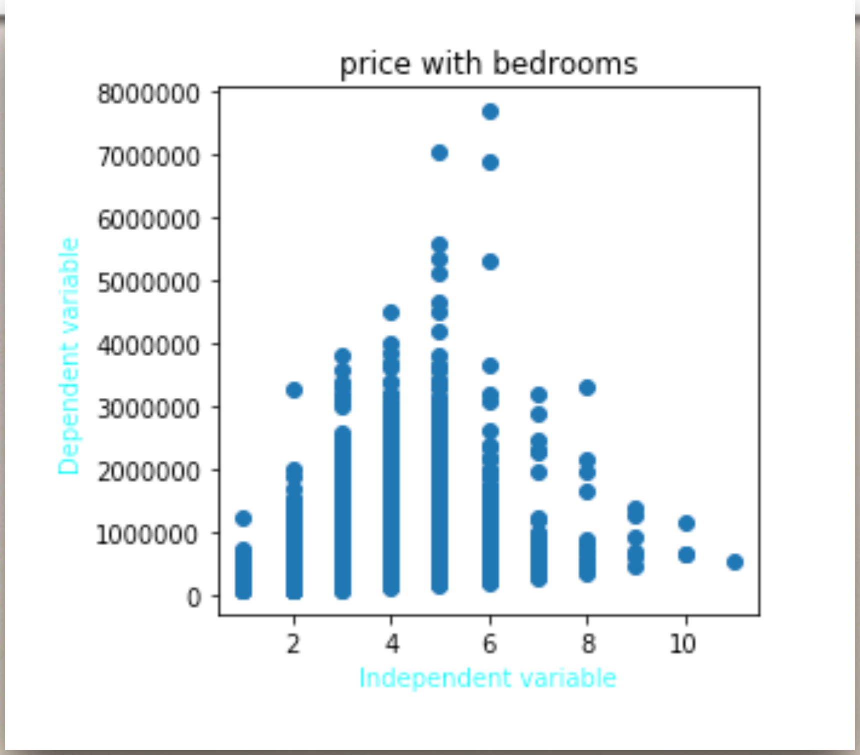
BASELINE REGRESSION MODEL

CORRELATION MATRIX

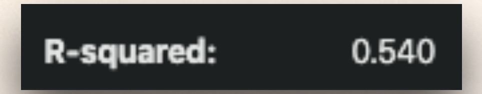


PRICE RELATIONSHIP

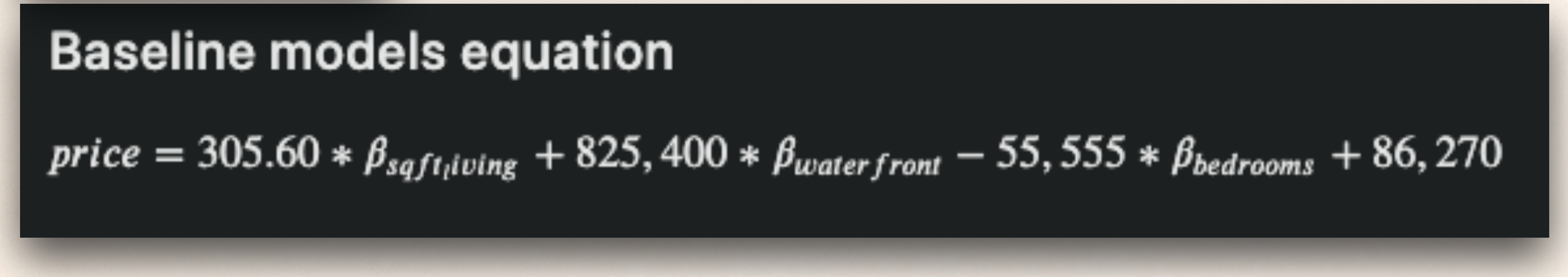




REGRESSION RESULTS

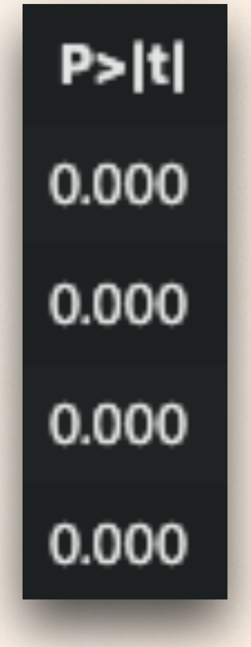


R-squared:	0.540



Baseline models equation

$$price = 305.60 * \beta_{sqft_{l}iving} + 825,400 * \beta_{waterfront} - 55,555 * \beta_{bedrooms} + 86,270$$



P>|t|
0.000
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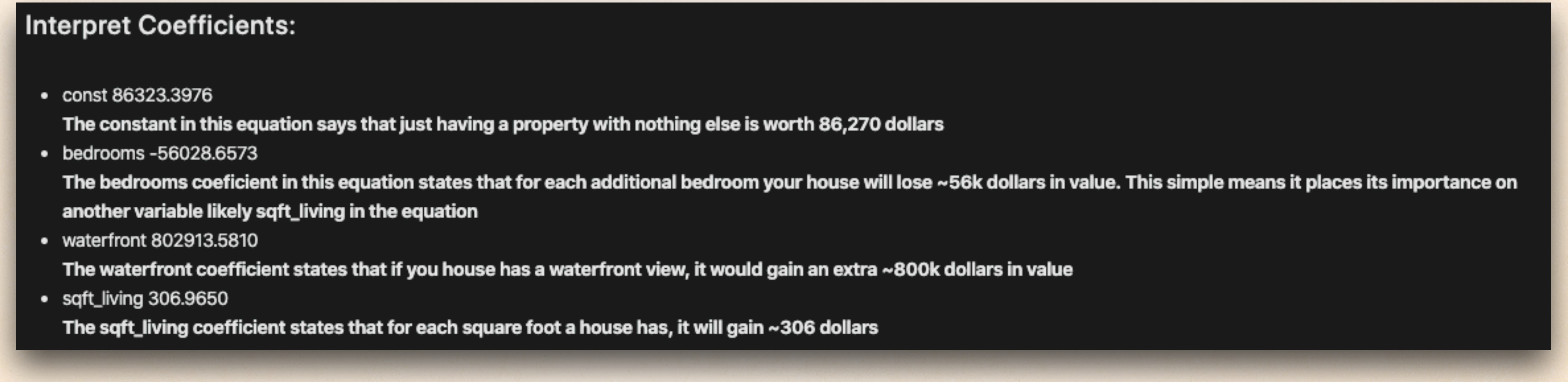
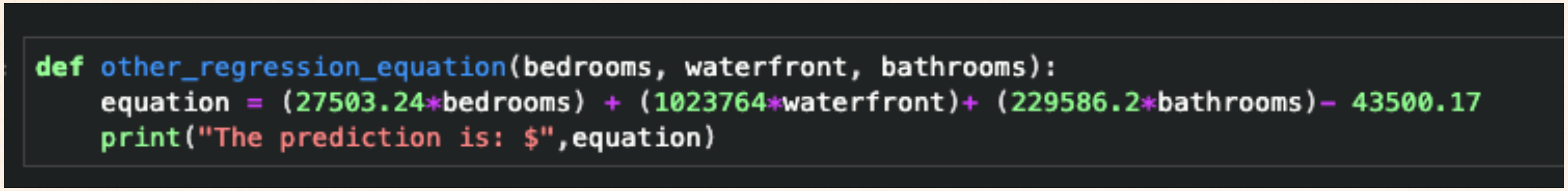


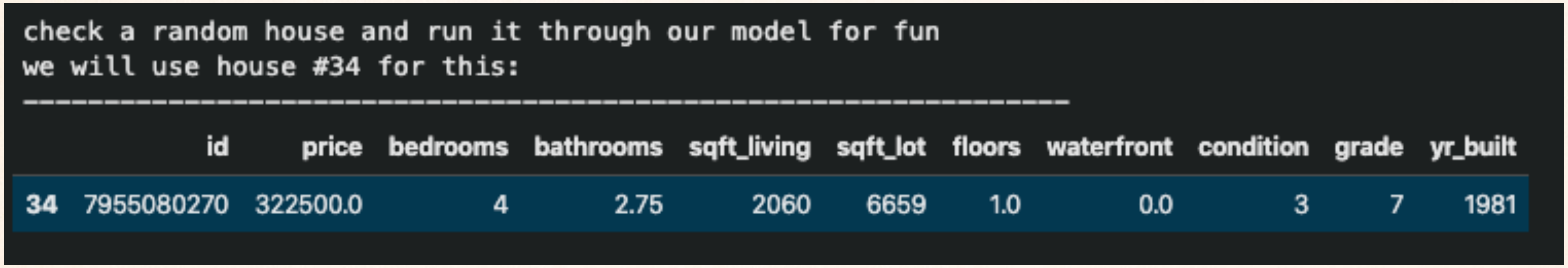
Interpret Coefficients:

- const 86323.3976
  The constant in this equation says that just having a property with nothing else is worth 86,270 dollars
- bedrooms -56028.6573
  The bedrooms coeficient in this equation states that for each additional bedroom your house will lose ~56k dollars in value. This simple means it places its importance on another variable likely sqft_living in the equation
- waterfront 802913.5810
  The waterfront coefficient states that if you house has a waterfront view, it would gain an extra ~800k dollars in value
- sqft_living 306.9650
  The sqft_living coefficient states that for each square foot a house has, it will gain ~306 dollars

MODEL FLAWS

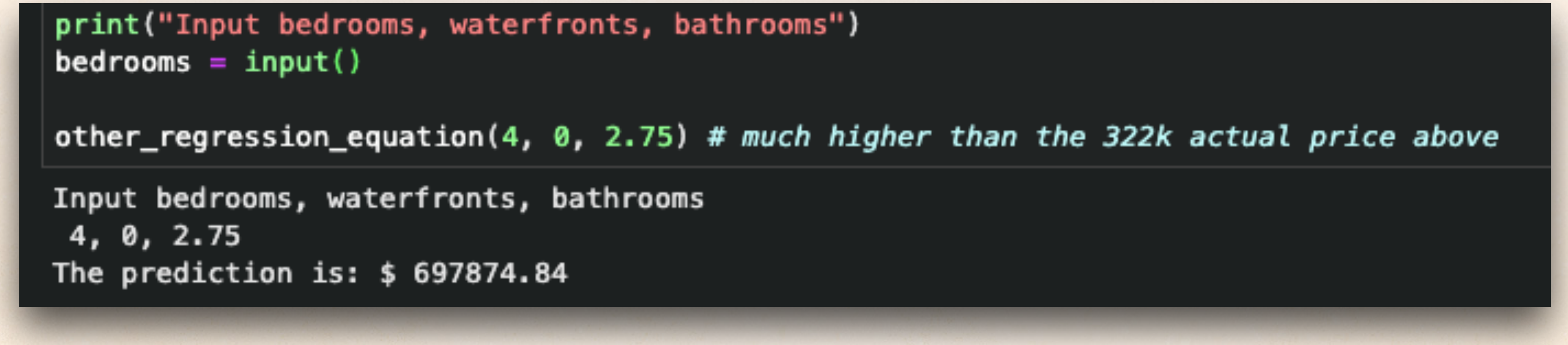


```python
def other_regression_equation(bedrooms, waterfront, bathrooms):
    equation = (27503.24*bedrooms) + (1023764*waterfront)+ (229586.2*bathrooms)- 43500.17
    print("The prediction is: $",equation)
```



```
check a random house and run it through our model for fun
we will use house #34 for this:
-----------------------------------------------------------------
```

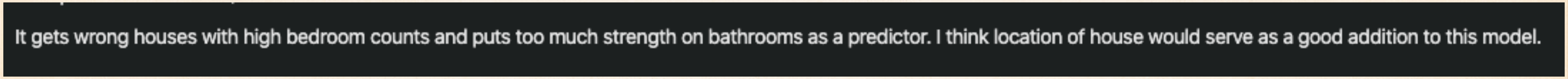
	id	price	bedrooms	bathrooms	sqft_living	sqft_lot	floors	waterfront	condition	grade	yr_built
34	7955080270	322500.0	4	2.75	2060	6659	1.0	0.0	3	7	1981



```python
print("Input bedrooms, waterfronts, bathrooms")
bedrooms = input()

other_regression_equation(4, 0, 2.75) # much higher than the 322k actual price above
```

```
Input bedrooms, waterfronts, bathrooms
 4, 0, 2.75
The prediction is: $ 697874.84
```



It gets wrong houses with high bedroom counts and puts too much strength on bathrooms as a predictor. I think location of house would serve as a good addition to this model.

CONCLUSION