# Assignment 2 - ST1002

Intro

This is a report outlining the variables associated with the rise and fall of house prices in the Ames region in Iowa over a period of five years from 2006- 2010. For a relatively small region (62.86 km^2) and with a population of just 58,965 people, the fluctuation of prices is quite surprising but we will investigate the potential causes for these fluctuations.
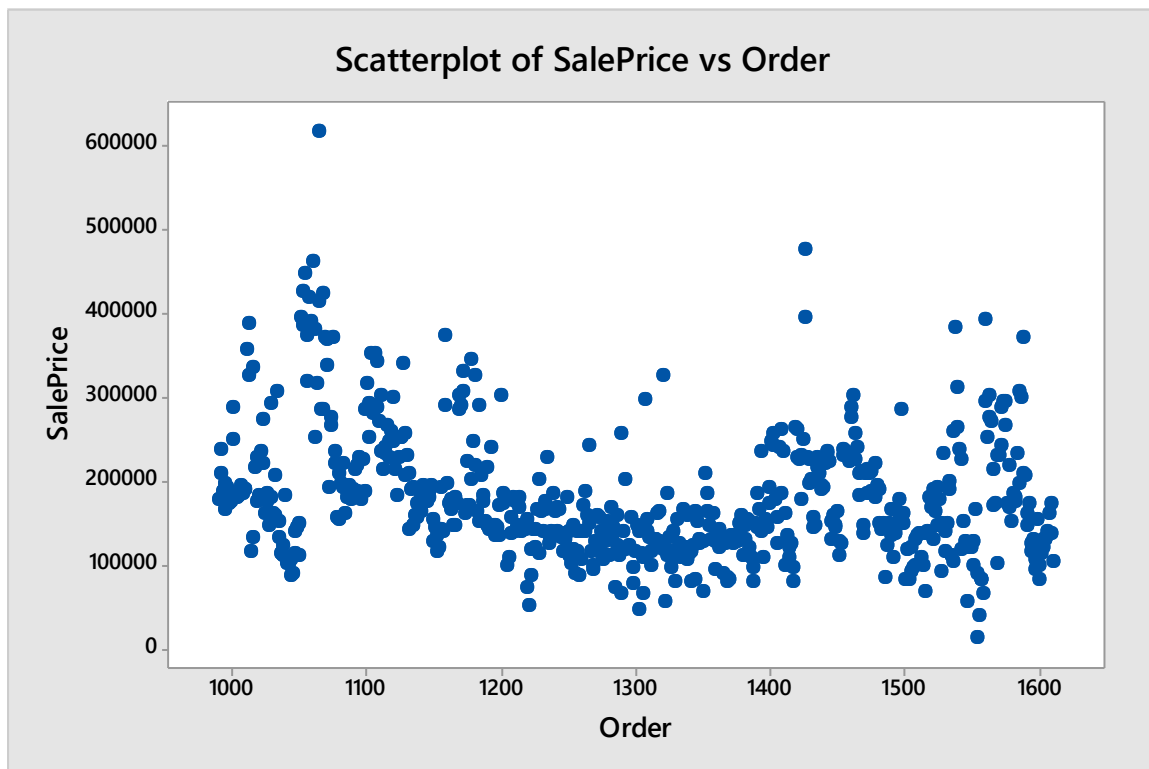
Sale Price

The first aspect that we will inspect is sale price itself and see just how much these prices vary on a year by year basis as well as throughout the five year period.
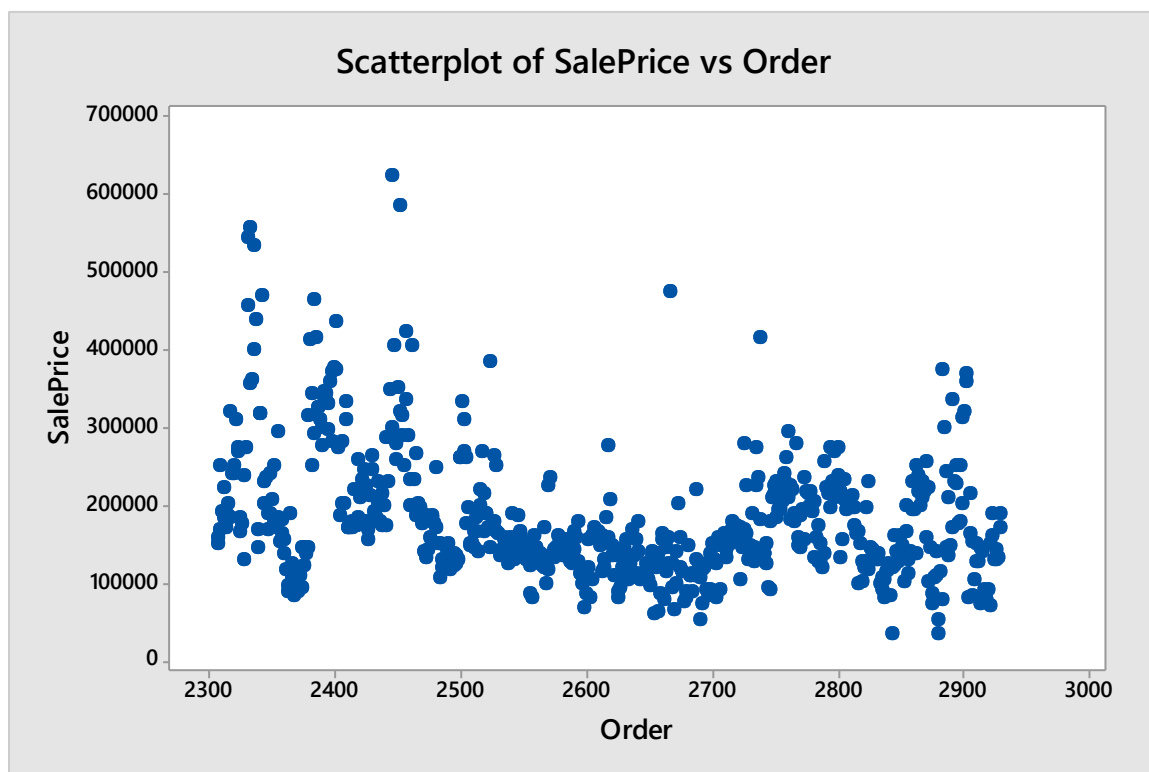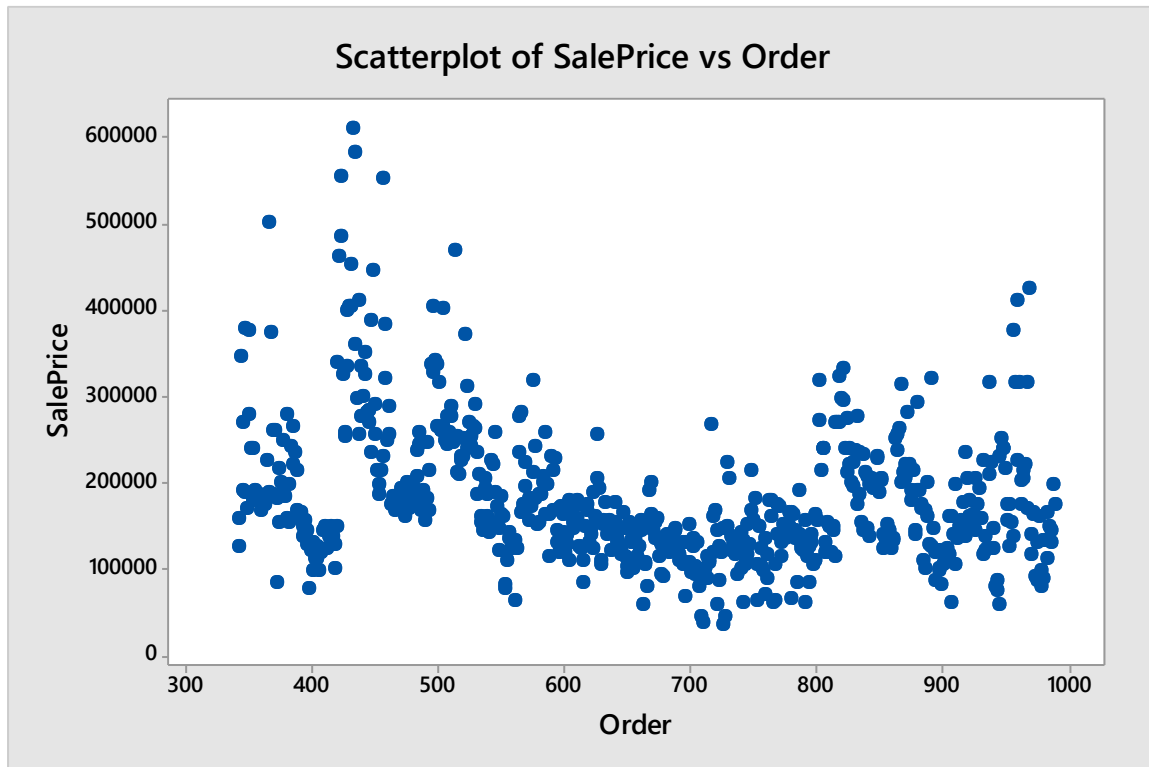

2006. This graph shows the max sale price of approximately $620,000, min sale price of approx. $45,000, and the majority of houses being sold in the $80,000-$300,000 range. From the tallied results there were 625 properties sold this year. The average sale price was $181,762.
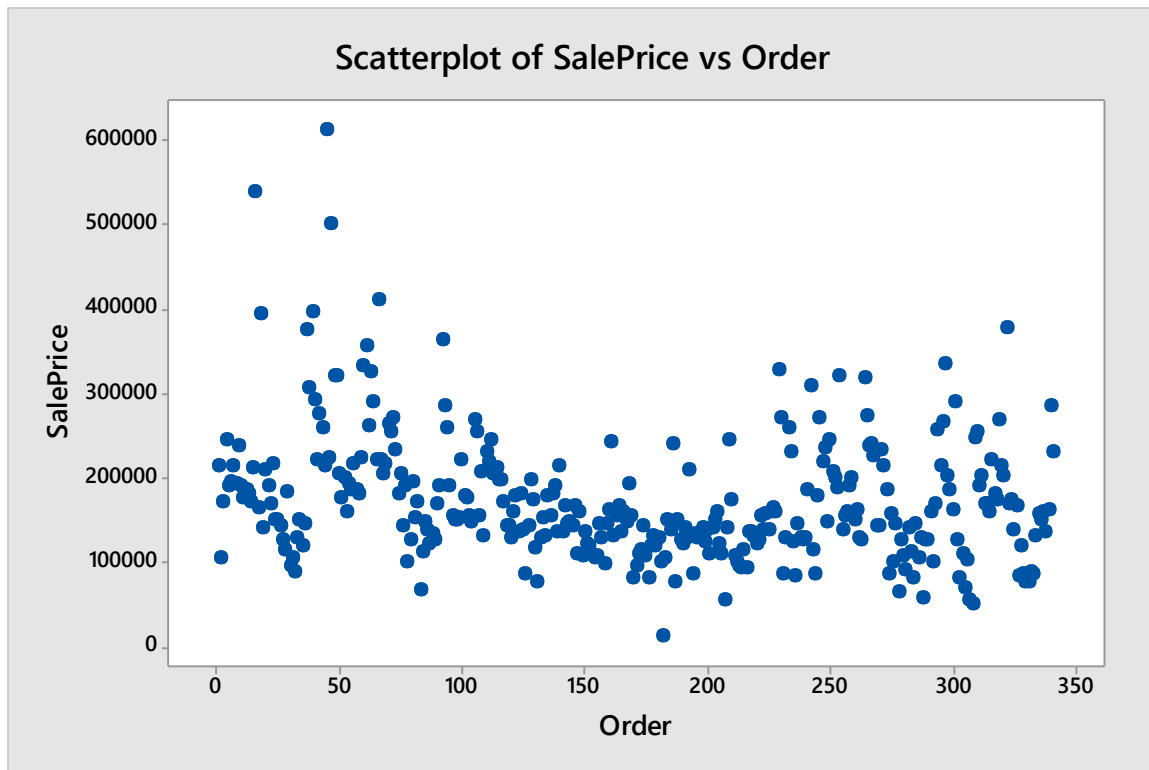
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Scatterplot of SalePrice vs Order
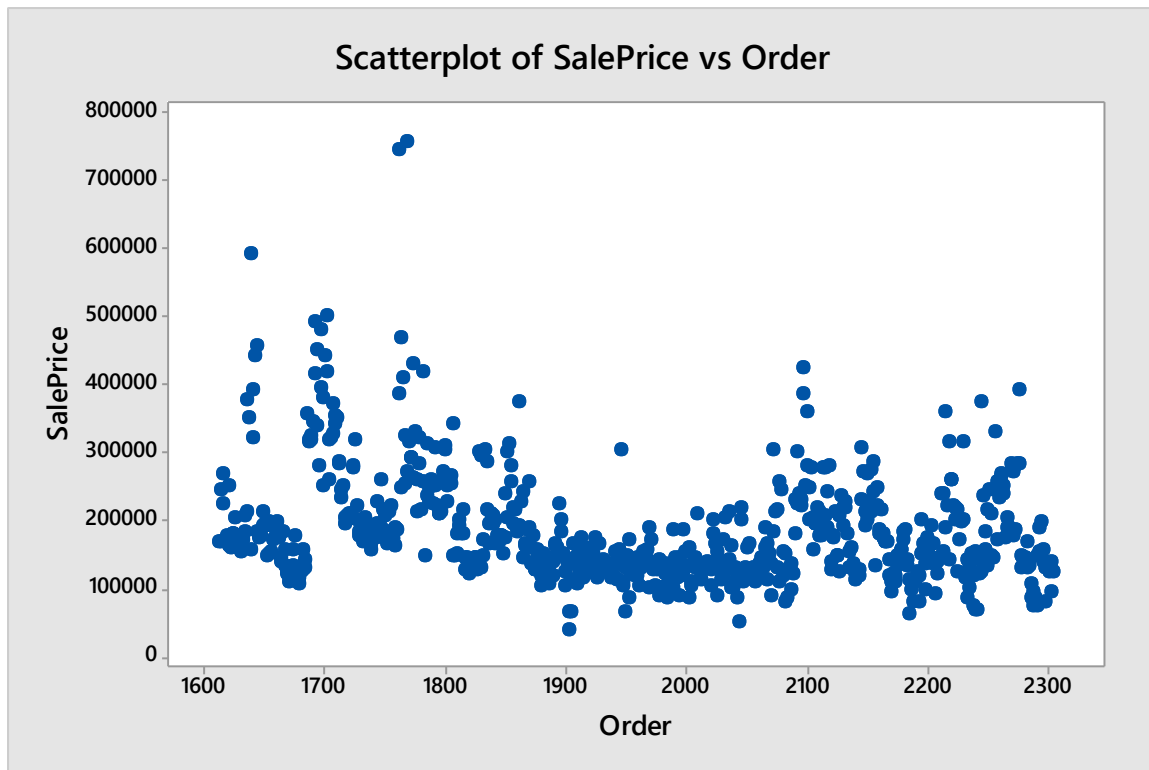
2007. This graph shows the max sale price of approximately $740,000, min sale price of approximately $60,000, and majority of properties sold in the $90,000-$300,000 range. From the tallied results there were 694 properties sold this year. The average sale price was $185,138.

Scatterplot of SalePrice vs Order

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<u>2008</u>. This graph shows max sale price of approx. $615,000, min sale price of approximately $25,000, and majority of properties sold between the $70,000-$250,000 range. From the tallied results there were 622 properties sold this year. The average sale price was $178,842.


<u>2009</u>. This graph shows max sale price of $610,000, min sale price of approximately $40,000. The majority of the properties were sold in the $80,000-$290,000 range. From the tallied results there were 648 properties sold this year. The average sale price was $181,405.

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Scatterplot of SalePrice vs Order

2010. This graph shows a max sale price of $610,000, min sale price of approximately $25,000, and majority of properties sold in the $100,000-$280,000. From the tallied results there were 341 properties sold this year. The average sale price was $172,598.

These results over the course of five years show a relatively steady, well-maintained housing price structure, with the scatterplot below affirming the bulk of the sales followed a consistent pattern. Most of the individual years feature similar shaped graphs due to the consistent sales.

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Scatterplot of SalePrice vs Yr Sold
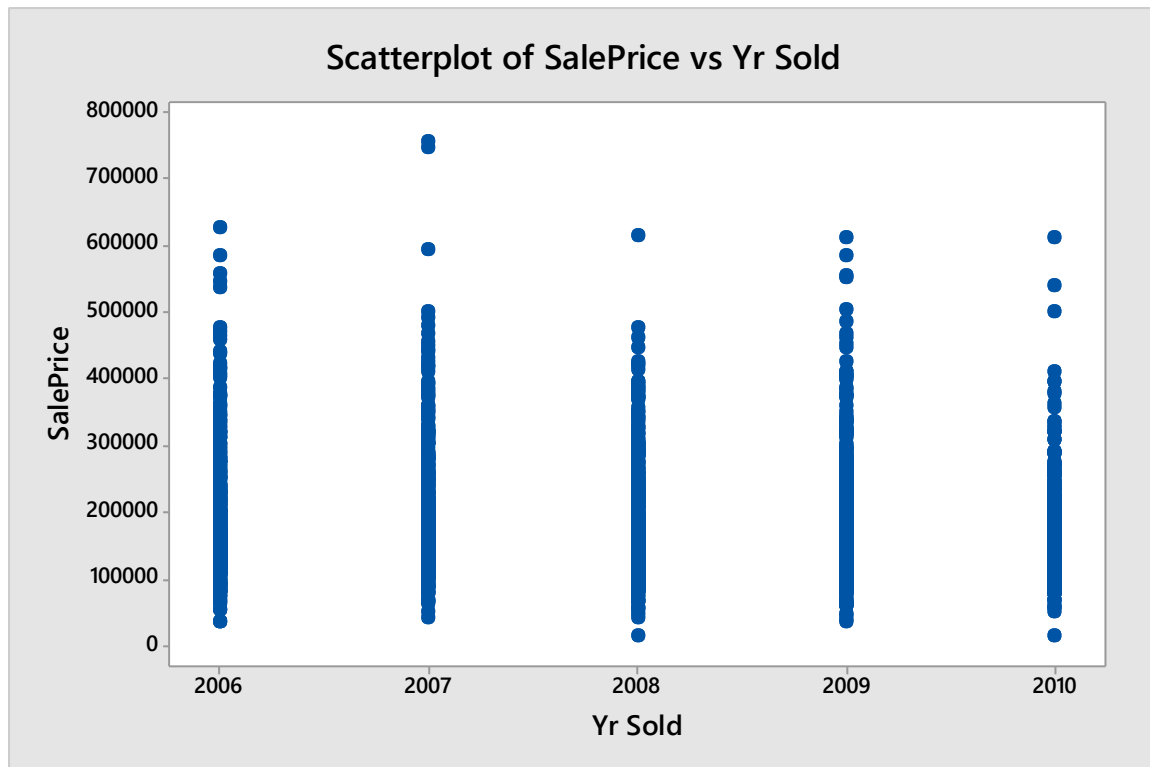
Over the five year period the max sale price recorded was $755,000 in 2007, while the minimum sale price recorded was $12,789 in 2010. There were 2,930 houses sold in total at an average price of $180,796.

Changes made to the data

- I made the decision to add the variable Total Square Feet of the building by adding the previously provided Basement Square Feet, First Floor Square Feet, Second Floor Square Feet and Garage Square Feet. This new variable will allow for a better understanding of the overall size of the building.
- The second variable that I created was the Number of Floors. By creating a number of IF statements I was able to use the previously provided Basement Square Feet, First Floor Square Feet, and Second Floor Square Feet to (if there value was greater than zero) register as individual floors. I would predict that this variable would have a large impact on prospective buyers and the price they would be willing to pay.

Total Square Feet

I created this variable as I believe that it is a figure that buyers immediately look into as a form of comparison between various properties. I would predict that properties with greater total square feet would sell for substantially more than those will less total area.

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Scatterplot of SalePrice vs Total SF
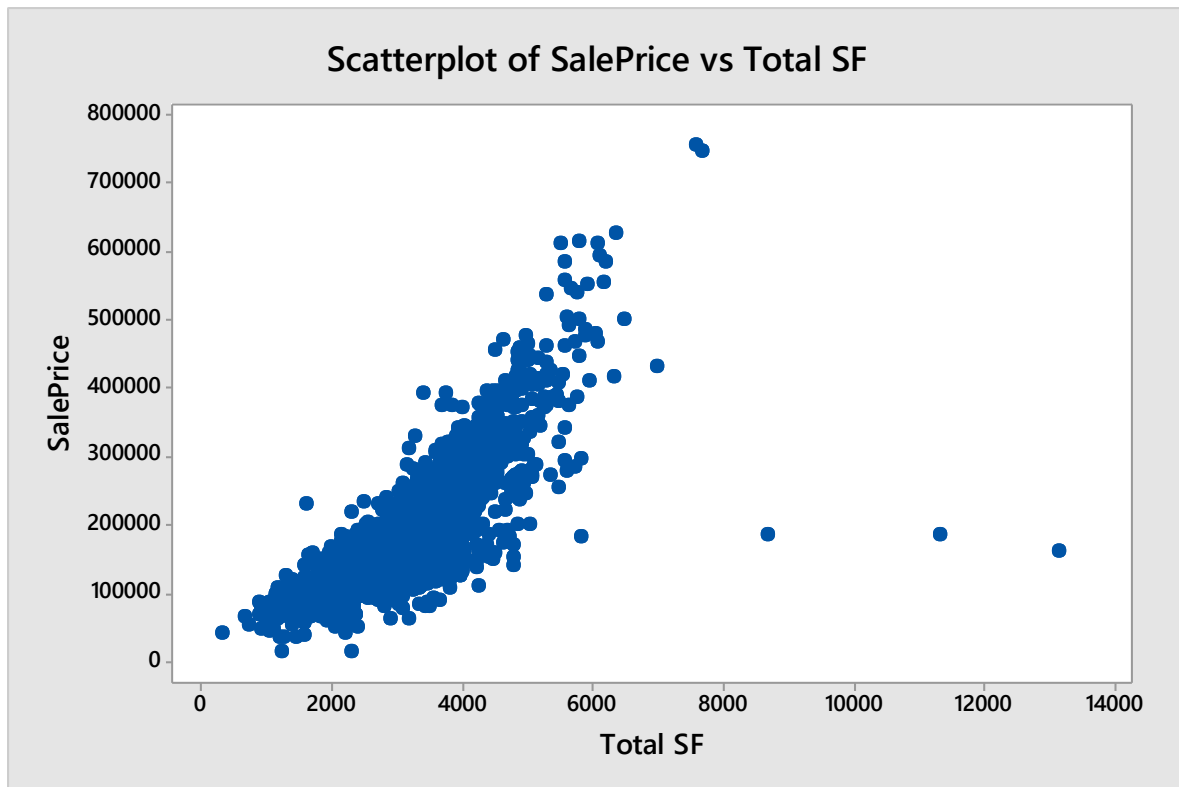
As expected the graph has an upward curve which indicates that as total area increases the sale price will increase. However there are three very obvious exceptions to this trend. The three largest houses appear to have a much lower sale price than expected. Having investigated these sales it is interesting to note that the all three of these sites have "Excellent" ratings on their kitchens and all provide air conditioning however their overall condition of their houses both only rank a 5. This histogram provided below interestingly suggests that 5 is the most common rating for overall condition of houses.

Histogram of Overall Cond

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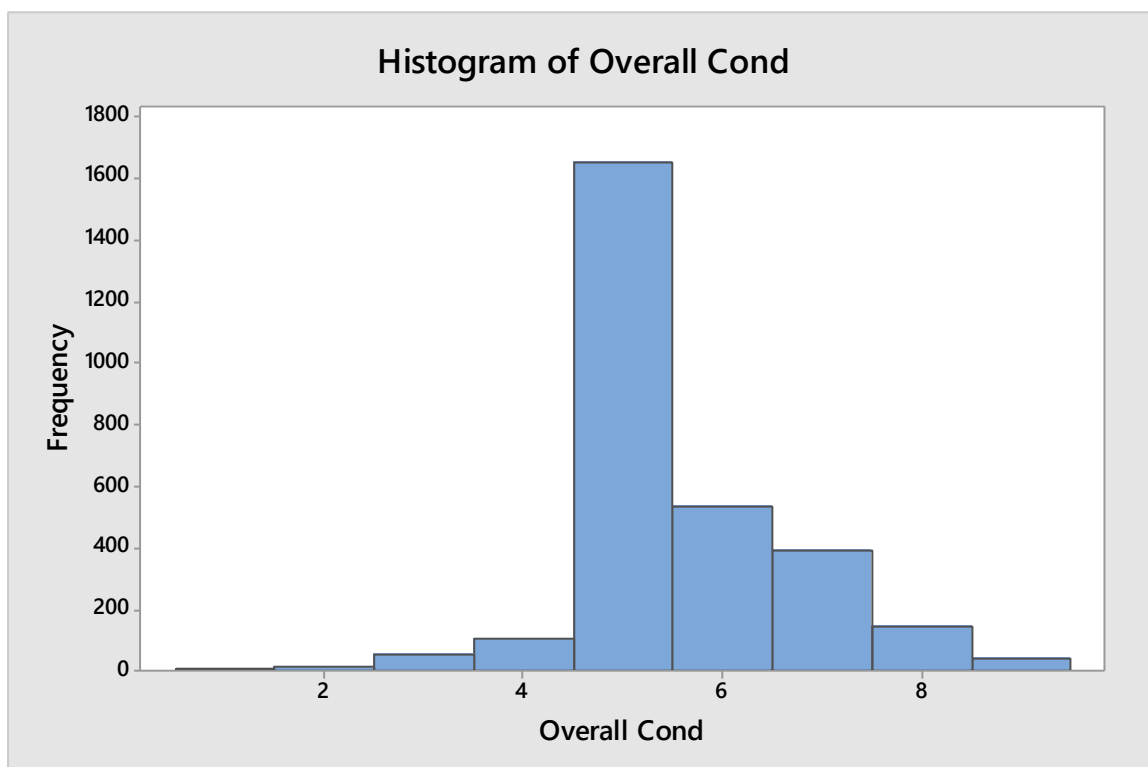
One conclusion which can be drawn is that overall condition imposes a form of cap on the sales price as although the three largest properties are significantly lower than expected they still all sold for prices which far exceeded the average ($180,716).

Number of Floors

The second variable which I created should again provide a similar trend in that the greater the number of floors the greater the sale price.
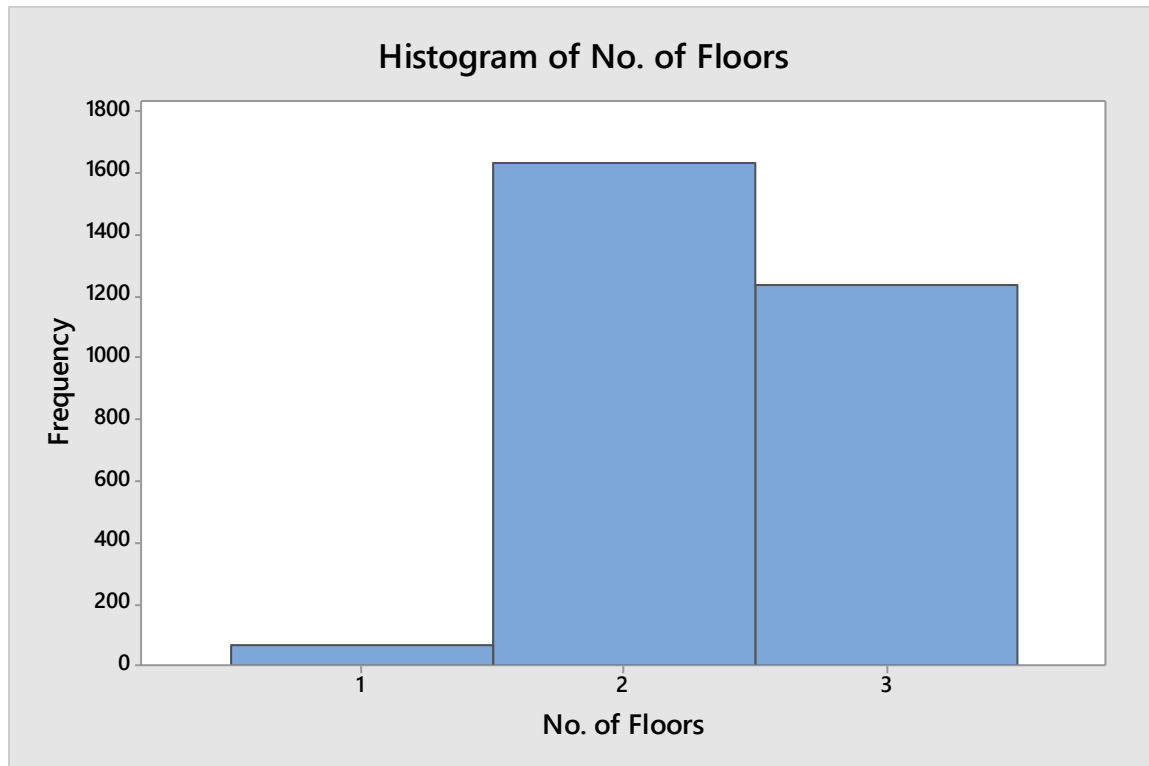

This graph portrays the scarcity of a bungalow to buyers in the Ames area. I found the number of 3-storey homes quite surprising with nearly as many 3-storey houses as 2-storey.

Below the graph shows, as expected, that there is a steady rise in price as the number of floors increases. Interestingly whether the house had 1, 2, or 3 floors they all hit similar minimum prices. This demonstrates that although extra space offers the opportunity for an increase in residential value in does not guarantee it.

Scatterplot of SalePrice vs No. of Floors
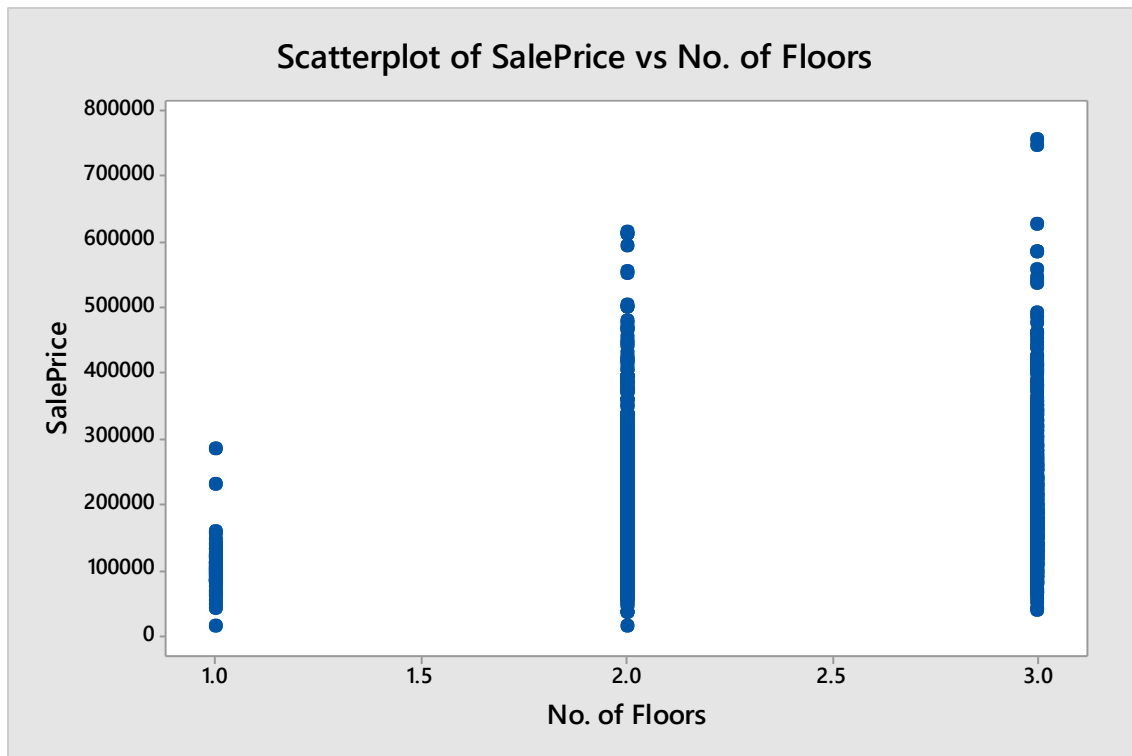
Overall Condition

One aspect that has appeared to have a major sway in the price of houses in the Ames region is the overall condition of the rooms. We saw previously that the large majority of houses scored either a 5 or a 6 in the overall condition ranking which would suggest that those properties with a 7 or higher score should have an inflated price.

Scatterplot of SalePrice vs Overall Cond
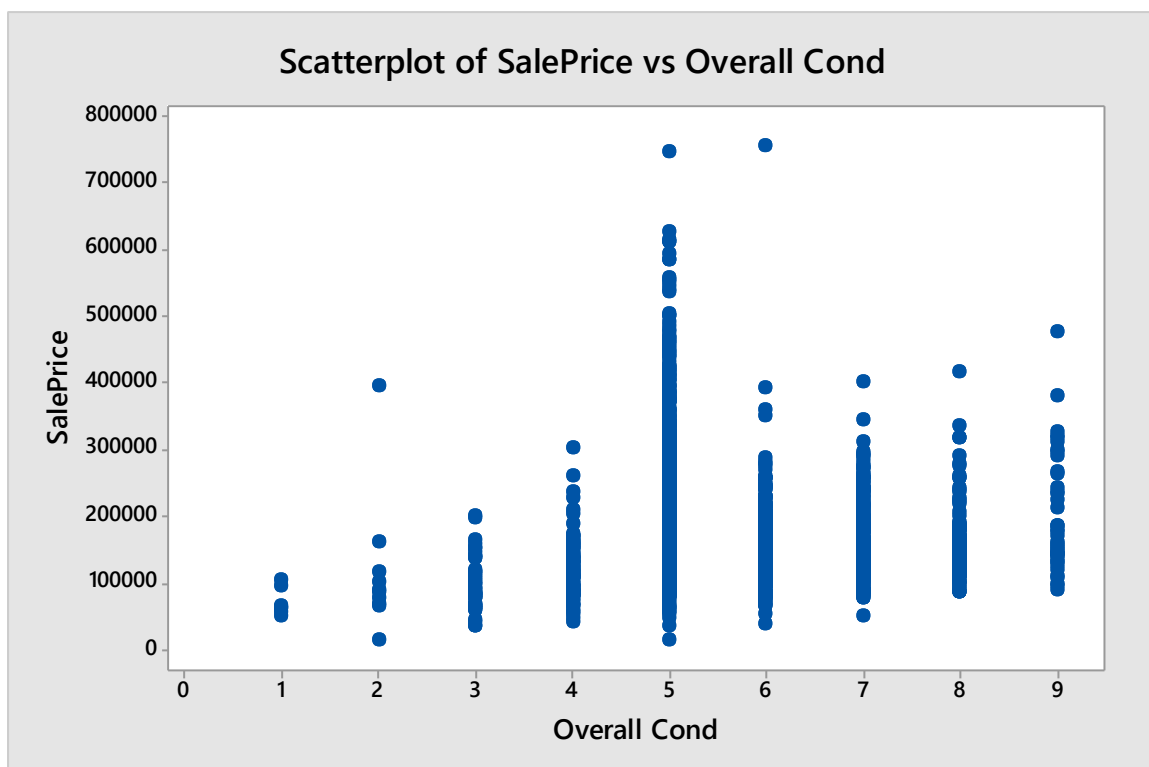
I found this graph to be very surprising. Overall there is a general rise in price across the scores however the gulf in price does not seem that large, with some of the more expensive 1-rated houses costing more than the lower end 9-rated properties. These results are highly surprising. It also interesting to note the vast spread that the score of 5 category contains.

Central Air Conditioning

Iowa experiences summer highs of almost 30°C. This highlights the need for air conditioning in houses. The graphs below demonstrate the number of homes without A.C. and the effect this has on the sale price.
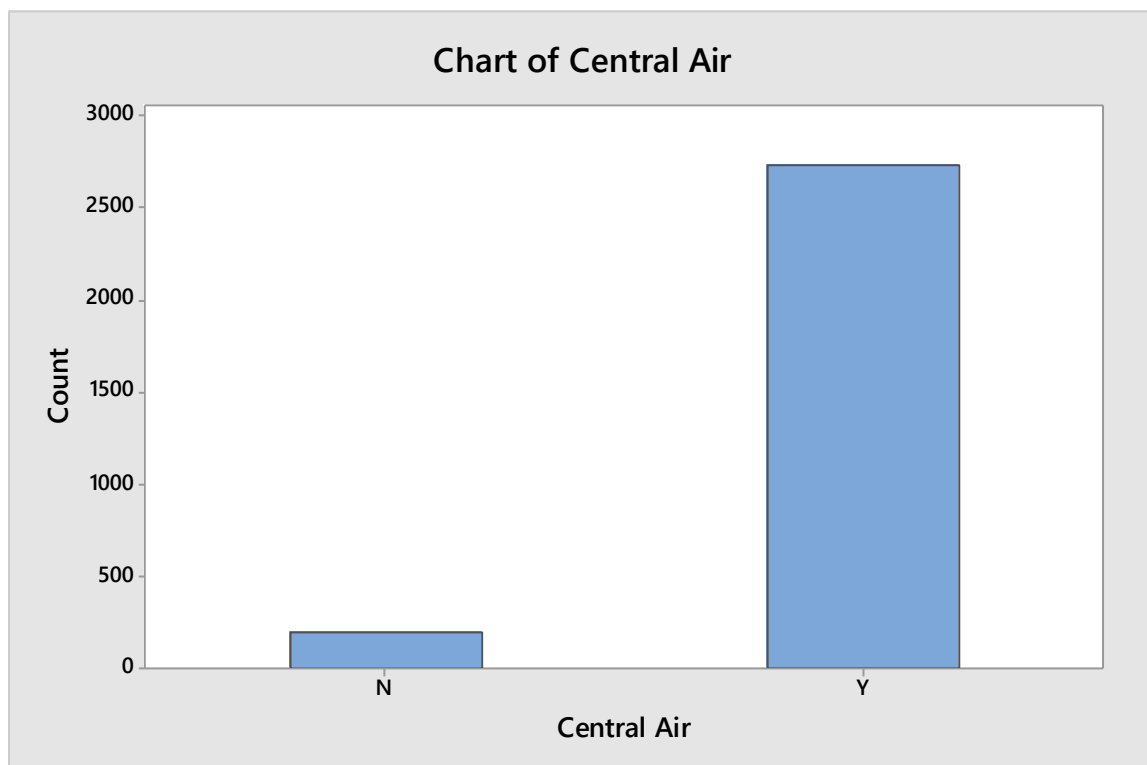
With only 196 homes sold without AC,it's clear that in general it is seen as a necessity.

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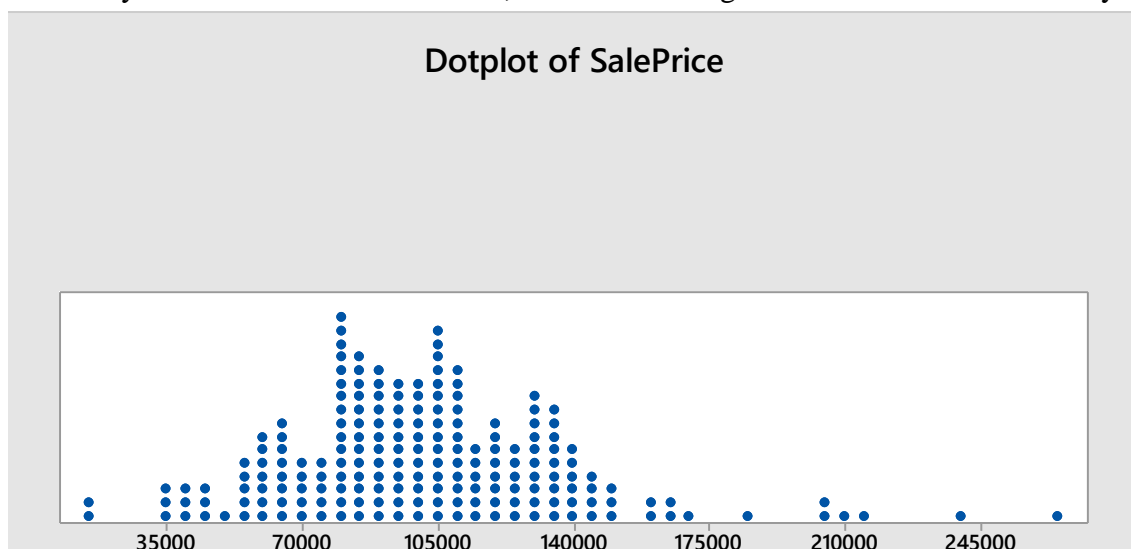
This first dotplot illustrates the sale price of houses with no AC.

Dotplot of SalePrice

Each symbol represents up to 7 observations.
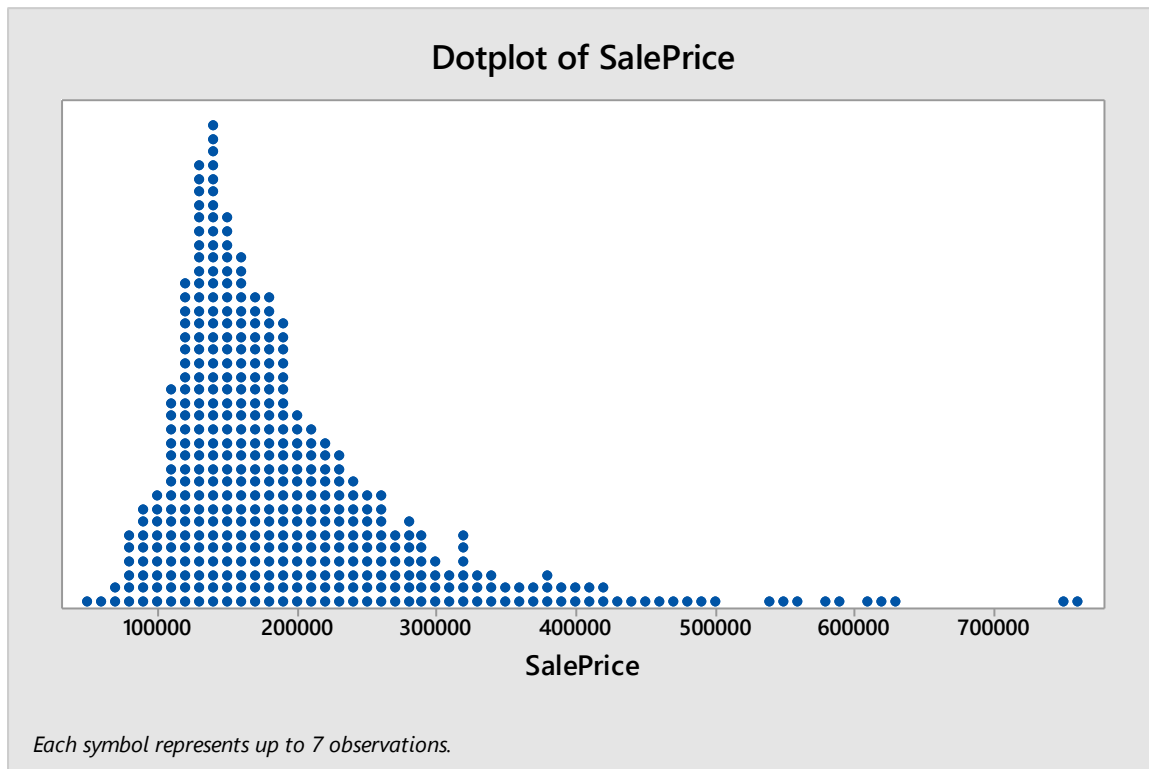
As you can see from this second diagram, prices rise substantially once AC has been installed in the home.

Conclusion

Overall it is clear that the variables mentioned above act as a major force on the sale price of the properties. However the vast range in prices show that there is always an element of luck and chance involved in maximising the sale price of a property. As with most things in life, more is better, and this sentiment certainly holds true in the property retail market.

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