EDA

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## ===== ===== ===== ===== ===== Capstone Project ===== ===== ===== ===== =====

install.packages("e1071",repos = "http://cran.us.r-project.org")

##   
## There is a binary version available but the source version is  
## later:  
## binary source needs\_compilation  
## e1071 1.7-1 1.7-2 TRUE  
##   
## Binaries will be installed  
## package 'e1071' successfully unpacked and MD5 sums checked  
##   
## The downloaded binary packages are in  
## C:\Users\Abdullah\AppData\Local\Temp\RtmpyWSNqR\downloaded\_packages

install.packages("ggplot2",repos = "http://cran.us.r-project.org")

##   
## There is a binary version available but the source version is  
## later:  
## binary source needs\_compilation  
## ggplot2 3.1.1 3.2.0 FALSE

## installing the source package 'ggplot2'

install.packages("corrplot",repos = "http://cran.us.r-project.org")

## package 'corrplot' successfully unpacked and MD5 sums checked  
##   
## The downloaded binary packages are in  
## C:\Users\Abdullah\AppData\Local\Temp\RtmpyWSNqR\downloaded\_packages

install.packages("ggcorrplot",repos = "http://cran.us.r-project.org")

##   
## There is a binary version available but the source version is  
## later:  
## binary source needs\_compilation  
## ggcorrplot 0.1.2 0.1.3 FALSE

## installing the source package 'ggcorrplot'

install.packages("klaR",repos = "http://cran.us.r-project.org")

## package 'klaR' successfully unpacked and MD5 sums checked  
##   
## The downloaded binary packages are in  
## C:\Users\Abdullah\AppData\Local\Temp\RtmpyWSNqR\downloaded\_packages

install.packages("cluster",repos = "http://cran.us.r-project.org")

##   
## There is a binary version available but the source version is  
## later:  
## binary source needs\_compilation  
## cluster 2.0.8 2.1.0 TRUE  
##   
## Binaries will be installed  
## package 'cluster' successfully unpacked and MD5 sums checked  
##   
## The downloaded binary packages are in  
## C:\Users\Abdullah\AppData\Local\Temp\RtmpyWSNqR\downloaded\_packages

install.packages("fpc",repos = "http://cran.us.r-project.org")

##   
## There is a binary version available but the source version is  
## later:  
## binary source needs\_compilation  
## fpc 2.1-11.1 2.2-3 FALSE

## installing the source package 'fpc'

install.packages("class",repos = "http://cran.us.r-project.org")

## package 'class' successfully unpacked and MD5 sums checked  
##   
## The downloaded binary packages are in  
## C:\Users\Abdullah\AppData\Local\Temp\RtmpyWSNqR\downloaded\_packages

install.packages("rpart",repos = "http://cran.us.r-project.org")

## package 'rpart' successfully unpacked and MD5 sums checked  
##   
## The downloaded binary packages are in  
## C:\Users\Abdullah\AppData\Local\Temp\RtmpyWSNqR\downloaded\_packages

library("rpart")

## Warning: package 'rpart' was built under R version 3.4.4

library("class")

## Warning: package 'class' was built under R version 3.4.4

library("fpc")  
library("cluster")

## Warning: package 'cluster' was built under R version 3.4.4

library("plyr")

## Warning: package 'plyr' was built under R version 3.4.4

library("klaR")

## Warning: package 'klaR' was built under R version 3.4.4

## Loading required package: MASS

## Warning: package 'MASS' was built under R version 3.4.4

library("ggplot2")  
library("e1071")

## Warning: package 'e1071' was built under R version 3.4.4

library("corrplot")

## Warning: package 'corrplot' was built under R version 3.4.4

## corrplot 0.84 loaded

library("ggcorrplot")

In this part we shall mostly look to clean our data, which includes: address missing/duplicate values, look for outliers, correct data types , fixing categorical variables, Distribution of variables, Low variance filter.

# 0.0 - Importing data

raw\_data = read.csv2(file='C:\\Users\\Abdullah\\Desktop\\housePrices\\train.csv', header = T, sep = ",", dec = ".",stringsAsFactors = FALSE)  
modified\_data = raw\_data ## To ensure we do not touch original data, we replicate into another df and use that as modified version  
str(raw\_data)

## 'data.frame': 1460 obs. of 81 variables:  
## $ Id : int 1 2 3 4 5 6 7 8 9 10 ...  
## $ MSSubClass : int 60 20 60 70 60 50 20 60 50 190 ...  
## $ MSZoning : chr "RL" "RL" "RL" "RL" ...  
## $ LotFrontage : int 65 80 68 60 84 85 75 NA 51 50 ...  
## $ LotArea : int 8450 9600 11250 9550 14260 14115 10084 10382 6120 7420 ...  
## $ Street : chr "Pave" "Pave" "Pave" "Pave" ...  
## $ Alley : chr NA NA NA NA ...  
## $ LotShape : chr "Reg" "Reg" "IR1" "IR1" ...  
## $ LandContour : chr "Lvl" "Lvl" "Lvl" "Lvl" ...  
## $ Utilities : chr "AllPub" "AllPub" "AllPub" "AllPub" ...  
## $ LotConfig : chr "Inside" "FR2" "Inside" "Corner" ...  
## $ LandSlope : chr "Gtl" "Gtl" "Gtl" "Gtl" ...  
## $ Neighborhood : chr "CollgCr" "Veenker" "CollgCr" "Crawfor" ...  
## $ Condition1 : chr "Norm" "Feedr" "Norm" "Norm" ...  
## $ Condition2 : chr "Norm" "Norm" "Norm" "Norm" ...  
## $ BldgType : chr "1Fam" "1Fam" "1Fam" "1Fam" ...  
## $ HouseStyle : chr "2Story" "1Story" "2Story" "2Story" ...  
## $ OverallQual : int 7 6 7 7 8 5 8 7 7 5 ...  
## $ OverallCond : int 5 8 5 5 5 5 5 6 5 6 ...  
## $ YearBuilt : int 2003 1976 2001 1915 2000 1993 2004 1973 1931 1939 ...  
## $ YearRemodAdd : int 2003 1976 2002 1970 2000 1995 2005 1973 1950 1950 ...  
## $ RoofStyle : chr "Gable" "Gable" "Gable" "Gable" ...  
## $ RoofMatl : chr "CompShg" "CompShg" "CompShg" "CompShg" ...  
## $ Exterior1st : chr "VinylSd" "MetalSd" "VinylSd" "Wd Sdng" ...  
## $ Exterior2nd : chr "VinylSd" "MetalSd" "VinylSd" "Wd Shng" ...  
## $ MasVnrType : chr "BrkFace" "None" "BrkFace" "None" ...  
## $ MasVnrArea : int 196 0 162 0 350 0 186 240 0 0 ...  
## $ ExterQual : chr "Gd" "TA" "Gd" "TA" ...  
## $ ExterCond : chr "TA" "TA" "TA" "TA" ...  
## $ Foundation : chr "PConc" "CBlock" "PConc" "BrkTil" ...  
## $ BsmtQual : chr "Gd" "Gd" "Gd" "TA" ...  
## $ BsmtCond : chr "TA" "TA" "TA" "Gd" ...  
## $ BsmtExposure : chr "No" "Gd" "Mn" "No" ...  
## $ BsmtFinType1 : chr "GLQ" "ALQ" "GLQ" "ALQ" ...  
## $ BsmtFinSF1 : int 706 978 486 216 655 732 1369 859 0 851 ...  
## $ BsmtFinType2 : chr "Unf" "Unf" "Unf" "Unf" ...  
## $ BsmtFinSF2 : int 0 0 0 0 0 0 0 32 0 0 ...  
## $ BsmtUnfSF : int 150 284 434 540 490 64 317 216 952 140 ...  
## $ TotalBsmtSF : int 856 1262 920 756 1145 796 1686 1107 952 991 ...  
## $ Heating : chr "GasA" "GasA" "GasA" "GasA" ...  
## $ HeatingQC : chr "Ex" "Ex" "Ex" "Gd" ...  
## $ CentralAir : chr "Y" "Y" "Y" "Y" ...  
## $ Electrical : chr "SBrkr" "SBrkr" "SBrkr" "SBrkr" ...  
## $ X1stFlrSF : int 856 1262 920 961 1145 796 1694 1107 1022 1077 ...  
## $ X2ndFlrSF : int 854 0 866 756 1053 566 0 983 752 0 ...  
## $ LowQualFinSF : int 0 0 0 0 0 0 0 0 0 0 ...  
## $ GrLivArea : int 1710 1262 1786 1717 2198 1362 1694 2090 1774 1077 ...  
## $ BsmtFullBath : int 1 0 1 1 1 1 1 1 0 1 ...  
## $ BsmtHalfBath : int 0 1 0 0 0 0 0 0 0 0 ...  
## $ FullBath : int 2 2 2 1 2 1 2 2 2 1 ...  
## $ HalfBath : int 1 0 1 0 1 1 0 1 0 0 ...  
## $ BedroomAbvGr : int 3 3 3 3 4 1 3 3 2 2 ...  
## $ KitchenAbvGr : int 1 1 1 1 1 1 1 1 2 2 ...  
## $ KitchenQual : chr "Gd" "TA" "Gd" "Gd" ...  
## $ TotRmsAbvGrd : int 8 6 6 7 9 5 7 7 8 5 ...  
## $ Functional : chr "Typ" "Typ" "Typ" "Typ" ...  
## $ Fireplaces : int 0 1 1 1 1 0 1 2 2 2 ...  
## $ FireplaceQu : chr NA "TA" "TA" "Gd" ...  
## $ GarageType : chr "Attchd" "Attchd" "Attchd" "Detchd" ...  
## $ GarageYrBlt : int 2003 1976 2001 1998 2000 1993 2004 1973 1931 1939 ...  
## $ GarageFinish : chr "RFn" "RFn" "RFn" "Unf" ...  
## $ GarageCars : int 2 2 2 3 3 2 2 2 2 1 ...  
## $ GarageArea : int 548 460 608 642 836 480 636 484 468 205 ...  
## $ GarageQual : chr "TA" "TA" "TA" "TA" ...  
## $ GarageCond : chr "TA" "TA" "TA" "TA" ...  
## $ PavedDrive : chr "Y" "Y" "Y" "Y" ...  
## $ WoodDeckSF : int 0 298 0 0 192 40 255 235 90 0 ...  
## $ OpenPorchSF : int 61 0 42 35 84 30 57 204 0 4 ...  
## $ EnclosedPorch: int 0 0 0 272 0 0 0 228 205 0 ...  
## $ X3SsnPorch : int 0 0 0 0 0 320 0 0 0 0 ...  
## $ ScreenPorch : int 0 0 0 0 0 0 0 0 0 0 ...  
## $ PoolArea : int 0 0 0 0 0 0 0 0 0 0 ...  
## $ PoolQC : chr NA NA NA NA ...  
## $ Fence : chr NA NA NA NA ...  
## $ MiscFeature : chr NA NA NA NA ...  
## $ MiscVal : int 0 0 0 0 0 700 0 350 0 0 ...  
## $ MoSold : int 2 5 9 2 12 10 8 11 4 1 ...  
## $ YrSold : int 2008 2007 2008 2006 2008 2009 2007 2009 2008 2008 ...  
## $ SaleType : chr "WD" "WD" "WD" "WD" ...  
## $ SaleCondition: chr "Normal" "Normal" "Normal" "Abnorml" ...  
## $ SalePrice : int 208500 181500 223500 140000 250000 143000 307000 200000 129900 118000 ...

head(raw\_data)

## Id MSSubClass MSZoning LotFrontage LotArea Street Alley LotShape  
## 1 1 60 RL 65 8450 Pave <NA> Reg  
## 2 2 20 RL 80 9600 Pave <NA> Reg  
## 3 3 60 RL 68 11250 Pave <NA> IR1  
## 4 4 70 RL 60 9550 Pave <NA> IR1  
## 5 5 60 RL 84 14260 Pave <NA> IR1  
## 6 6 50 RL 85 14115 Pave <NA> IR1  
## LandContour Utilities LotConfig LandSlope Neighborhood Condition1  
## 1 Lvl AllPub Inside Gtl CollgCr Norm  
## 2 Lvl AllPub FR2 Gtl Veenker Feedr  
## 3 Lvl AllPub Inside Gtl CollgCr Norm  
## 4 Lvl AllPub Corner Gtl Crawfor Norm  
## 5 Lvl AllPub FR2 Gtl NoRidge Norm  
## 6 Lvl AllPub Inside Gtl Mitchel Norm  
## Condition2 BldgType HouseStyle OverallQual OverallCond YearBuilt  
## 1 Norm 1Fam 2Story 7 5 2003  
## 2 Norm 1Fam 1Story 6 8 1976  
## 3 Norm 1Fam 2Story 7 5 2001  
## 4 Norm 1Fam 2Story 7 5 1915  
## 5 Norm 1Fam 2Story 8 5 2000  
## 6 Norm 1Fam 1.5Fin 5 5 1993  
## YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  
## 1 2003 Gable CompShg VinylSd VinylSd BrkFace  
## 2 1976 Gable CompShg MetalSd MetalSd None  
## 3 2002 Gable CompShg VinylSd VinylSd BrkFace  
## 4 1970 Gable CompShg Wd Sdng Wd Shng None  
## 5 2000 Gable CompShg VinylSd VinylSd BrkFace  
## 6 1995 Gable CompShg VinylSd VinylSd None  
## MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond BsmtExposure  
## 1 196 Gd TA PConc Gd TA No  
## 2 0 TA TA CBlock Gd TA Gd  
## 3 162 Gd TA PConc Gd TA Mn  
## 4 0 TA TA BrkTil TA Gd No  
## 5 350 Gd TA PConc Gd TA Av  
## 6 0 TA TA Wood Gd TA No  
## BsmtFinType1 BsmtFinSF1 BsmtFinType2 BsmtFinSF2 BsmtUnfSF TotalBsmtSF  
## 1 GLQ 706 Unf 0 150 856  
## 2 ALQ 978 Unf 0 284 1262  
## 3 GLQ 486 Unf 0 434 920  
## 4 ALQ 216 Unf 0 540 756  
## 5 GLQ 655 Unf 0 490 1145  
## 6 GLQ 732 Unf 0 64 796  
## Heating HeatingQC CentralAir Electrical X1stFlrSF X2ndFlrSF LowQualFinSF  
## 1 GasA Ex Y SBrkr 856 854 0  
## 2 GasA Ex Y SBrkr 1262 0 0  
## 3 GasA Ex Y SBrkr 920 866 0  
## 4 GasA Gd Y SBrkr 961 756 0  
## 5 GasA Ex Y SBrkr 1145 1053 0  
## 6 GasA Ex Y SBrkr 796 566 0  
## GrLivArea BsmtFullBath BsmtHalfBath FullBath HalfBath BedroomAbvGr  
## 1 1710 1 0 2 1 3  
## 2 1262 0 1 2 0 3  
## 3 1786 1 0 2 1 3  
## 4 1717 1 0 1 0 3  
## 5 2198 1 0 2 1 4  
## 6 1362 1 0 1 1 1  
## KitchenAbvGr KitchenQual TotRmsAbvGrd Functional Fireplaces FireplaceQu  
## 1 1 Gd 8 Typ 0 <NA>  
## 2 1 TA 6 Typ 1 TA  
## 3 1 Gd 6 Typ 1 TA  
## 4 1 Gd 7 Typ 1 Gd  
## 5 1 Gd 9 Typ 1 TA  
## 6 1 TA 5 Typ 0 <NA>  
## GarageType GarageYrBlt GarageFinish GarageCars GarageArea GarageQual  
## 1 Attchd 2003 RFn 2 548 TA  
## 2 Attchd 1976 RFn 2 460 TA  
## 3 Attchd 2001 RFn 2 608 TA  
## 4 Detchd 1998 Unf 3 642 TA  
## 5 Attchd 2000 RFn 3 836 TA  
## 6 Attchd 1993 Unf 2 480 TA  
## GarageCond PavedDrive WoodDeckSF OpenPorchSF EnclosedPorch X3SsnPorch  
## 1 TA Y 0 61 0 0  
## 2 TA Y 298 0 0 0  
## 3 TA Y 0 42 0 0  
## 4 TA Y 0 35 272 0  
## 5 TA Y 192 84 0 0  
## 6 TA Y 40 30 0 320  
## ScreenPorch PoolArea PoolQC Fence MiscFeature MiscVal MoSold YrSold  
## 1 0 0 <NA> <NA> <NA> 0 2 2008  
## 2 0 0 <NA> <NA> <NA> 0 5 2007  
## 3 0 0 <NA> <NA> <NA> 0 9 2008  
## 4 0 0 <NA> <NA> <NA> 0 2 2006  
## 5 0 0 <NA> <NA> <NA> 0 12 2008  
## 6 0 0 <NA> MnPrv Shed 700 10 2009  
## SaleType SaleCondition SalePrice  
## 1 WD Normal 208500  
## 2 WD Normal 181500  
## 3 WD Normal 223500  
## 4 WD Abnorml 140000  
## 5 WD Normal 250000  
## 6 WD Normal 143000

As we can see, we have 81 variables in our data set; 1 ID and 1 salesPrice, 43 categorical and 36 quantitative. Data entries are either int or char data type.

# 1 - Inital Analysis

# 1.1 - Univarient Analysis

# 1.1.1 Looking at our Target variable: Sales Price

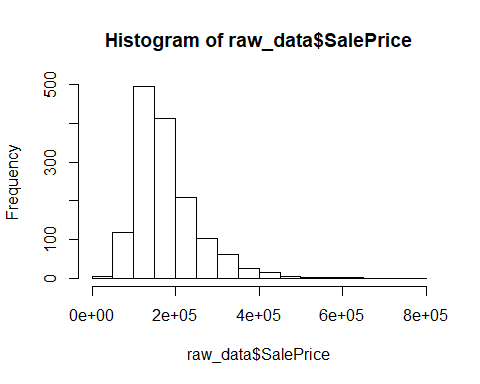
summary(raw\_data$SalePrice)

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 34900 129975 163000 180921 214000 755000

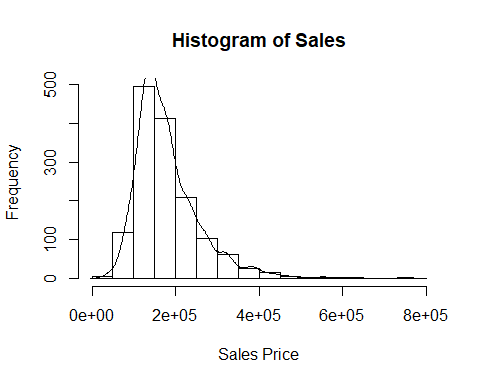
typeof(raw\_data$SalePrice)

## [1] "integer"

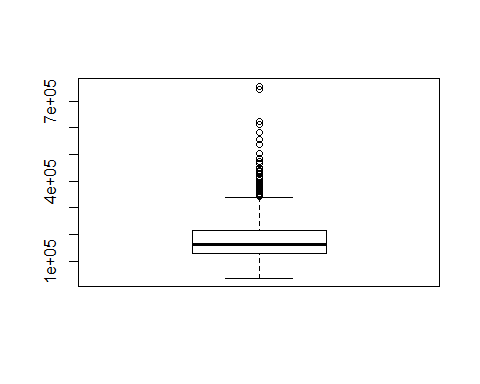
myhist <- hist(raw\_data$SalePrice)



multiplier <- myhist$counts / myhist$density  
mydensity <- density(raw\_data$SalePrice)  
mydensity$y <- mydensity$y \* multiplier[1]  
  
plot(myhist, xlab = "Sales Price", main = "Histogram of Sales")  
lines(mydensity)

 We can see that the average sales price of a house is $181k, the distribution of which is skewed to the right. As we can see from the histogram, the right tail is longer and the mass of the concentration of data is to the left of the graph, suggesting a positive skew value. The peak also looks very sharp, assuming a high kurtosis value.

boxplot(raw\_data$SalePrice)

 We can see that there are many outlier in the SalePrice. In fact, we can measure knowing that outliers are classified as values over 3rd Quartile + 1.5\*(IQR)

count = 0;  
x = 1;  
while (x < 1461) {  
 if (raw\_data$SalePrice[x] > 340000){  
 count = count + 1  
 }  
 x = x + 1   
}  
cat("Number of Sales that lie as outliers are: ", count)

## Number of Sales that lie as outliers are: 61

Now that we’ve seen that there are 61 outliers in the Sale Price, lets look into them.

outlier\_sales <- subset(raw\_data, raw\_data$SalePrice > 340000)  
outlier\_sales

## Id MSSubClass MSZoning LotFrontage LotArea Street Alley LotShape  
## 12 12 60 RL 85 11924 Pave <NA> IR1  
## 54 54 20 RL 68 50271 Pave <NA> IR1  
## 59 59 60 RL 66 13682 Pave <NA> IR2  
## 113 113 60 RL 77 9965 Pave <NA> Reg  
## 152 152 20 RL 107 13891 Pave <NA> Reg  
## 162 162 60 RL 110 13688 Pave <NA> IR1  
## 179 179 20 RL 63 17423 Pave <NA> IR1  
## 186 186 75 RM 90 22950 Pave <NA> IR2  
## 225 225 20 RL 103 13472 Pave <NA> Reg  
## 232 232 60 RL 174 15138 Pave <NA> IR1  
## 279 279 20 RL 107 14450 Pave <NA> Reg  
## 310 310 20 RL 90 12378 Pave <NA> IR1  
## 314 314 20 RL 150 215245 Pave <NA> IR3  
## 321 321 60 RL 111 16259 Pave <NA> Reg  
## 322 322 60 RL 99 12099 Pave <NA> IR1  
## 337 337 20 RL 86 14157 Pave <NA> IR1  
## 350 350 60 RL 56 20431 Pave <NA> IR2  
## 379 379 20 RL 88 11394 Pave <NA> Reg  
## 390 390 60 RL 96 12474 Pave <NA> Reg  
## 441 441 20 RL 105 15431 Pave <NA> Reg  
## 474 474 20 RL 110 14977 Pave <NA> IR1  
## 478 478 60 RL 105 13693 Pave <NA> Reg  
## 482 482 20 RL 72 11846 Pave <NA> IR1  
## 497 497 20 RL NA 12692 Pave <NA> IR1  
## 516 516 20 RL 94 12220 Pave <NA> Reg  
## 528 528 60 RL 67 14948 Pave <NA> IR1  
## 586 586 20 RL 88 11443 Pave <NA> Reg  
## 592 592 60 RL 97 13478 Pave <NA> IR1  
## 609 609 70 RL 78 12168 Pave <NA> Reg  
## 643 643 80 RL 75 13860 Pave <NA> Reg  
## 645 645 20 FV 85 9187 Pave <NA> Reg  
## 655 655 20 RL 91 10437 Pave <NA> IR1  
## 662 662 60 RL 52 46589 Pave <NA> IR2  
## 665 665 20 RL 49 20896 Pave <NA> IR2  
## 679 679 20 RL 80 11844 Pave <NA> IR1  
## 689 689 20 RL 60 8089 Pave <NA> Reg  
## 692 692 60 RL 104 21535 Pave <NA> IR1  
## 703 703 60 RL 82 12438 Pave <NA> IR1  
## 719 719 60 RL 96 10542 Pave <NA> Reg  
## 770 770 60 RL 47 53504 Pave <NA> IR2  
## 775 775 20 RL 110 14226 Pave <NA> Reg  
## 799 799 60 RL 104 13518 Pave <NA> Reg  
## 804 804 60 RL 107 13891 Pave <NA> Reg  
## 826 826 20 RL 114 14803 Pave <NA> Reg  
## 878 878 60 RL 74 8834 Pave <NA> Reg  
## 899 899 20 RL 100 12919 Pave <NA> IR1  
## 988 988 20 RL 83 10159 Pave <NA> IR1  
## 991 991 60 RL 82 9452 Pave <NA> Reg  
## 1047 1047 60 RL 85 16056 Pave <NA> IR1  
## 1143 1143 60 RL 77 9965 Pave <NA> Reg  
## 1170 1170 60 RL 118 35760 Pave <NA> IR1  
## 1182 1182 120 RM 64 5587 Pave <NA> IR1  
## 1183 1183 60 RL 160 15623 Pave <NA> IR1  
## 1229 1229 120 RL 65 8769 Pave <NA> Reg  
## 1244 1244 20 RL 107 13891 Pave <NA> Reg  
## 1268 1268 20 RL 89 13214 Pave <NA> IR1  
## 1269 1269 50 RL NA 14100 Pave <NA> IR1  
## 1354 1354 50 RL 56 14720 Pave <NA> IR1  
## 1374 1374 20 RL NA 11400 Pave <NA> Reg  
## 1389 1389 20 RL 42 14892 Pave <NA> IR1  
## 1438 1438 20 RL 96 12444 Pave <NA> Reg  
## LandContour Utilities LotConfig LandSlope Neighborhood Condition1  
## 12 Lvl AllPub Inside Gtl NridgHt Norm  
## 54 Low AllPub Inside Gtl Veenker Norm  
## 59 HLS AllPub CulDSac Gtl StoneBr Norm  
## 113 Lvl AllPub Inside Gtl CollgCr Norm  
## 152 Lvl AllPub Inside Gtl NridgHt Norm  
## 162 Lvl AllPub Inside Gtl NridgHt Norm  
## 179 Lvl AllPub CulDSac Gtl StoneBr Norm  
## 186 Lvl AllPub Inside Gtl OldTown Artery  
## 225 Lvl AllPub Inside Gtl NridgHt Norm  
## 232 Lvl AllPub Inside Gtl NoRidge Norm  
## 279 Lvl AllPub Inside Gtl NridgHt Norm  
## 310 Lvl AllPub Inside Gtl NridgHt Norm  
## 314 Low AllPub Inside Sev Timber Norm  
## 321 Lvl AllPub Corner Gtl NridgHt Norm  
## 322 Lvl AllPub Inside Gtl NridgHt Norm  
## 337 HLS AllPub Corner Gtl StoneBr Norm  
## 350 Lvl AllPub Inside Gtl NridgHt Norm  
## 379 Lvl AllPub Corner Gtl StoneBr Norm  
## 390 Lvl AllPub Inside Gtl NridgHt Norm  
## 441 Lvl AllPub Inside Gtl NridgHt Norm  
## 474 Lvl AllPub Inside Gtl NridgHt Norm  
## 478 Lvl AllPub Inside Gtl NridgHt Norm  
## 482 HLS AllPub Inside Gtl NridgHt Norm  
## 497 Lvl AllPub Inside Gtl NoRidge Norm  
## 516 Lvl AllPub Inside Gtl NridgHt Norm  
## 528 Lvl AllPub Inside Gtl NridgHt Norm  
## 586 Lvl AllPub Inside Gtl Timber Norm  
## 592 Lvl AllPub Corner Gtl NridgHt Norm  
## 609 HLS AllPub Inside Mod Crawfor Norm  
## 643 Lvl AllPub Inside Gtl NAmes Norm  
## 645 Lvl AllPub Inside Gtl Somerst Norm  
## 655 Lvl AllPub Inside Gtl NoRidge Norm  
## 662 Lvl AllPub CulDSac Gtl NoRidge Norm  
## 665 Lvl AllPub CulDSac Gtl Somerst RRAn  
## 679 Lvl AllPub Inside Gtl StoneBr Norm  
## 689 HLS AllPub Inside Gtl StoneBr Norm  
## 692 Lvl AllPub Corner Gtl NoRidge Norm  
## 703 Lvl AllPub Inside Gtl StoneBr Norm  
## 719 Lvl AllPub Inside Gtl NoRidge Norm  
## 770 HLS AllPub CulDSac Mod StoneBr Norm  
## 775 Lvl AllPub Corner Gtl NridgHt Norm  
## 799 Lvl AllPub Inside Gtl NridgHt Norm  
## 804 Lvl AllPub Inside Gtl NridgHt Norm  
## 826 Lvl AllPub Inside Gtl NridgHt PosN  
## 878 Lvl AllPub Inside Gtl NridgHt Norm  
## 899 Lvl AllPub Inside Gtl NridgHt Norm  
## 988 Lvl AllPub Inside Gtl NridgHt Norm  
## 991 Lvl AllPub Inside Gtl NoRidge Norm  
## 1047 Lvl AllPub Inside Gtl StoneBr Norm  
## 1143 Lvl AllPub Inside Gtl CollgCr Norm  
## 1170 Lvl AllPub CulDSac Gtl NoRidge Norm  
## 1182 HLS AllPub Inside Mod Crawfor Norm  
## 1183 Lvl AllPub Corner Gtl NoRidge Norm  
## 1229 Lvl AllPub Corner Gtl NridgHt Norm  
## 1244 Lvl AllPub Inside Gtl NridgHt Norm  
## 1268 HLS AllPub Inside Gtl Timber Norm  
## 1269 Lvl AllPub Inside Mod Crawfor Norm  
## 1354 Lvl AllPub CulDSac Gtl NoRidge Norm  
## 1374 Lvl AllPub Inside Gtl NoRidge Norm  
## 1389 HLS AllPub CulDSac Gtl Gilbert Norm  
## 1438 Lvl AllPub FR2 Gtl NridgHt Norm  
## Condition2 BldgType HouseStyle OverallQual OverallCond YearBuilt  
## 12 Norm 1Fam 2Story 9 5 2005  
## 54 Norm 1Fam 1Story 9 5 1981  
## 59 Norm 1Fam 2Story 10 5 2006  
## 113 Norm 1Fam 2Story 7 5 2007  
## 152 Norm 1Fam 1Story 8 5 2007  
## 162 Norm 1Fam 2Story 9 5 2003  
## 179 Norm 1Fam 1Story 9 5 2008  
## 186 Norm 1Fam 2.5Fin 10 9 1892  
## 225 Norm 1Fam 1Story 10 5 2003  
## 232 Norm 1Fam 2Story 8 5 1995  
## 279 Norm 1Fam 1Story 9 5 2006  
## 310 Norm 1Fam 1Story 9 5 2003  
## 314 Norm 1Fam 1Story 7 5 1965  
## 321 Norm 1Fam 2Story 9 5 2006  
## 322 Norm 1Fam 2Story 8 5 2004  
## 337 Norm 1Fam 1Story 9 5 2005  
## 350 Norm 1Fam 2Story 9 5 2005  
## 379 Norm 1Fam 1Story 9 2 2010  
## 390 Norm 1Fam 2Story 10 5 2007  
## 441 Norm 1Fam 1Story 10 5 2008  
## 474 Norm 1Fam 1Story 8 5 2006  
## 478 Norm 1Fam 2Story 9 5 2006  
## 482 Norm 1Fam 1Story 9 5 2003  
## 497 Norm 1Fam 1Story 8 5 1992  
## 516 Norm 1Fam 1Story 10 5 2009  
## 528 Norm 1Fam 2Story 9 5 2008  
## 586 Norm 1Fam 1Story 8 5 2005  
## 592 Norm 1Fam 2Story 10 5 2008  
## 609 Norm 1Fam 2Story 8 6 1934  
## 643 Norm 1Fam SLvl 8 7 1972  
## 645 Norm 1Fam 1Story 9 5 2009  
## 655 Norm 1Fam 1Story 8 6 1995  
## 662 Norm 1Fam 2Story 8 7 1994  
## 665 Norm 1Fam 1Story 8 5 2005  
## 679 Norm 1Fam 1Story 8 5 2008  
## 689 Norm 1Fam 1Story 8 6 2007  
## 692 Norm 1Fam 2Story 10 6 1994  
## 703 Norm 1Fam 2Story 8 5 2006  
## 719 Norm 1Fam 2Story 7 5 1993  
## 770 Norm 1Fam 2Story 8 5 2003  
## 775 Norm 1Fam 1Story 8 5 2006  
## 799 Norm 1Fam 2Story 9 5 2008  
## 804 Norm 1Fam 2Story 9 5 2008  
## 826 PosN 1Fam 1Story 10 5 2007  
## 878 Norm 1Fam 2Story 9 5 2004  
## 899 Norm 1Fam 1Story 9 5 2009  
## 988 Norm 1Fam 1Story 9 5 2009  
## 991 Norm 1Fam 2Story 8 5 1997  
## 1047 Norm 1Fam 2Story 9 5 2005  
## 1143 Norm 1Fam 2Story 8 5 2006  
## 1170 Norm 1Fam 2Story 10 5 1995  
## 1182 Norm TwnhsE 1Story 8 5 2008  
## 1183 Norm 1Fam 2Story 10 5 1996  
## 1229 Norm TwnhsE 1Story 9 5 2008  
## 1244 Norm 1Fam 1Story 10 5 2006  
## 1268 Norm 1Fam 1Story 9 5 2008  
## 1269 Norm 1Fam 1.5Fin 8 9 1935  
## 1354 Norm 1Fam 1.5Fin 8 5 1995  
## 1374 Norm 1Fam 1Story 10 5 2001  
## 1389 Norm 1Fam 1Story 9 5 2006  
## 1438 Norm 1Fam 1Story 8 5 2008  
## YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  
## 12 2006 Hip CompShg WdShing Wd Shng Stone  
## 54 1987 Gable WdShngl WdShing Wd Shng None  
## 59 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 113 2007 Gable CompShg VinylSd VinylSd Stone  
## 152 2008 Hip CompShg VinylSd VinylSd Stone  
## 162 2004 Gable CompShg VinylSd VinylSd BrkFace  
## 179 2009 Hip CompShg VinylSd VinylSd Stone  
## 186 1993 Gable WdShngl Wd Sdng Wd Sdng None  
## 225 2003 Hip CompShg VinylSd VinylSd BrkFace  
## 232 1996 Gable CompShg VinylSd VinylSd BrkFace  
## 279 2007 Gable CompShg CemntBd CmentBd BrkFace  
## 310 2004 Gable CompShg VinylSd VinylSd None  
## 314 1965 Hip CompShg BrkFace BrkFace None  
## 321 2006 Gable CompShg VinylSd VinylSd Stone  
## 322 2004 Gable CompShg VinylSd VinylSd BrkFace  
## 337 2006 Hip CompShg VinylSd VinylSd Stone  
## 350 2006 Hip CompShg CemntBd CmentBd BrkFace  
## 379 2010 Hip CompShg VinylSd VinylSd Stone  
## 390 2008 Gable CompShg VinylSd VinylSd Stone  
## 441 2008 Hip CompShg VinylSd VinylSd Stone  
## 474 2007 Gable CompShg VinylSd VinylSd BrkFace  
## 478 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 482 2004 Hip CompShg VinylSd VinylSd BrkFace  
## 497 1993 Hip CompShg BrkFace BrkFace None  
## 516 2009 Hip CompShg CemntBd CmentBd BrkFace  
## 528 2008 Hip CompShg VinylSd VinylSd Stone  
## 586 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 592 2008 Gable CompShg CemntBd CmentBd Stone  
## 609 1998 Gable CompShg BrkFace Wd Sdng None  
## 643 1995 Gable CompShg Plywood Wd Sdng None  
## 645 2009 Gable CompShg CemntBd CmentBd Stone  
## 655 1995 Hip CompShg MetalSd MetalSd BrkFace  
## 662 2005 Hip CompShg VinylSd VinylSd BrkFace  
## 665 2006 Gable CompShg VinylSd VinylSd None  
## 679 2008 Hip CompShg VinylSd VinylSd Stone  
## 689 2007 Gable CompShg MetalSd MetalSd BrkFace  
## 692 1995 Gable WdShngl HdBoard HdBoard BrkFace  
## 703 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 719 1994 Hip CompShg Wd Sdng ImStucc BrkFace  
## 770 2003 Hip CompShg CemntBd Wd Shng BrkFace  
## 775 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 799 2009 Hip CompShg VinylSd VinylSd Stone  
## 804 2009 Hip CompShg VinylSd VinylSd Stone  
## 826 2008 Hip CompShg CemntBd CmentBd BrkFace  
## 878 2005 Hip CompShg VinylSd VinylSd Stone  
## 899 2010 Hip CompShg VinylSd VinylSd Stone  
## 988 2010 Hip CompShg VinylSd VinylSd Stone  
## 991 1998 Gable CompShg VinylSd VinylSd BrkFace  
## 1047 2006 Hip CompShg CemntBd CmentBd Stone  
## 1143 2007 Hip CompShg VinylSd VinylSd Stone  
## 1170 1996 Hip CompShg HdBoard HdBoard BrkFace  
## 1182 2008 Hip CompShg CemntBd CmentBd Stone  
## 1183 1996 Hip CompShg Wd Sdng ImStucc None  
## 1229 2008 Hip CompShg MetalSd MetalSd BrkFace  
## 1244 2006 Gable CompShg VinylSd VinylSd <NA>  
## 1268 2009 Hip CompShg Stucco CmentBd None  
## 1269 1997 Gable CompShg Stucco Stucco BrkFace  
## 1354 1996 Hip CompShg VinylSd VinylSd BrkFace  
## 1374 2002 Hip CompShg VinylSd VinylSd BrkFace  
## 1389 2007 Gable CompShg VinylSd VinylSd Stone  
## 1438 2008 Hip CompShg VinylSd VinylSd Stone  
## MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond  
## 12 286 Ex TA PConc Ex TA  
## 54 0 Gd TA CBlock Ex TA  
## 59 1031 Ex TA PConc Ex TA  
## 113 220 Gd TA PConc Ex TA  
## 152 436 Gd TA PConc Ex TA  
## 162 664 Gd TA PConc Ex TA  
## 179 748 Ex TA PConc Ex TA  
## 186 0 Gd Gd BrkTil TA TA  
## 225 922 Ex TA PConc Ex TA  
## 232 506 Gd TA PConc Gd TA  
## 279 315 Ex TA PConc Ex TA  
## 310 0 Gd TA PConc Ex TA  
## 314 0 TA TA CBlock Gd TA  
## 321 370 TA TA PConc Ex Gd  
## 322 388 Gd TA PConc Ex TA  
## 337 200 Gd TA PConc Ex TA  
## 350 870 Ex TA PConc Ex TA  
## 379 350 Gd TA PConc Ex TA  
## 390 272 Ex TA PConc Ex TA  
## 441 200 Ex TA PConc Ex TA  
## 474 304 Gd TA PConc Ex TA  
## 478 772 Ex TA PConc Gd TA  
## 482 562 Gd TA PConc Ex TA  
## 497 0 Gd TA PConc Gd TA  
## 516 305 Ex TA CBlock Ex TA  
## 528 268 Ex TA PConc Ex TA  
## 586 208 Gd TA PConc Ex TA  
## 592 420 Ex TA PConc Ex TA  
## 609 0 TA TA PConc Gd TA  
## 643 0 Gd TA CBlock Gd TA  
## 645 162 Ex TA PConc Ex TA  
## 655 660 Gd Gd PConc Gd TA  
## 662 528 Gd TA PConc Gd Gd  
## 665 0 Gd TA PConc Ex TA  
## 679 464 Gd TA PConc Ex TA  
## 689 0 Gd TA PConc Gd TA  
## 692 1170 Ex TA PConc Ex TA  
## 703 466 Ex TA PConc Ex Gd  
## 719 651 Gd TA PConc Gd TA  
## 770 603 Ex TA PConc Gd TA  
## 775 375 Gd TA PConc Gd TA  
## 799 860 Ex TA PConc Ex TA  
## 804 424 Ex TA PConc Ex TA  
## 826 816 Ex TA PConc Ex TA  
## 878 216 Gd TA PConc Ex TA  
## 899 760 Ex TA PConc Ex TA  
## 988 450 Ex TA PConc Ex TA  
## 991 423 Gd TA PConc Gd TA  
## 1047 208 Gd TA PConc Ex TA  
## 1143 340 Gd TA PConc Ex TA  
## 1170 1378 Gd Gd PConc Ex TA  
## 1182 186 Ex TA PConc Ex TA  
## 1183 0 Gd TA PConc Ex TA  
## 1229 766 Ex TA PConc Ex TA  
## 1244 NA Ex TA PConc Ex Gd  
## 1268 0 Ex TA PConc Ex TA  
## 1269 632 TA Gd CBlock TA TA  
## 1354 579 Gd TA PConc Gd TA  
## 1374 705 Ex TA PConc Ex TA  
## 1389 160 Ex TA PConc Ex TA  
## 1438 426 Ex TA PConc Ex TA  
## BsmtExposure BsmtFinType1 BsmtFinSF1 BsmtFinType2 BsmtFinSF2  
## 12 No GLQ 998 Unf 0  
## 54 Gd GLQ 1810 Unf 0  
## 59 Gd Unf 0 Unf 0  
## 113 Av GLQ 984 Unf 0  
## 152 Gd GLQ 1400 Unf 0  
## 162 Av GLQ 1016 Unf 0  
## 179 No GLQ 1904 Unf 0  
## 186 Mn Unf 0 Unf 0  
## 225 Gd GLQ 56 Unf 0  
## 232 No GLQ 689 Unf 0  
## 279 Gd Unf 0 Unf 0  
## 310 Gd GLQ 1274 Unf 0  
## 314 Gd ALQ 1236 Rec 820  
## 321 Av Unf 0 Unf 0  
## 322 Av GLQ 970 Unf 0  
## 337 Gd GLQ 1249 Unf 0  
## 350 No GLQ 1410 Unf 0  
## 379 Av GLQ 1445 Unf 0  
## 390 Av GLQ 1280 Unf 0  
## 441 Gd GLQ 1767 ALQ 539  
## 474 Gd GLQ 1350 Unf 0  
## 478 Av Unf 0 Unf 0  
## 482 Gd GLQ 1567 Unf 0  
## 497 No GLQ 1231 Unf 0  
## 516 No GLQ 1436 Unf 0  
## 528 Av GLQ 1330 Unf 0  
## 586 Gd GLQ 1460 Unf 0  
## 592 Gd GLQ 1338 Unf 0  
## 609 Mn BLQ 428 Unf 0  
## 643 Gd GLQ 1410 Unf 0  
## 645 Mn GLQ 1121 Unf 0  
## 655 Gd GLQ 1696 Unf 0  
## 662 No GLQ 1361 Rec 180  
## 665 Mn GLQ 1721 Unf 0  
## 679 Mn Unf 0 Unf 0  
## 689 Av GLQ 945 Unf 0  
## 692 Gd GLQ 1455 Unf 0  
## 703 No Unf 0 Unf 0  
## 719 Gd GLQ 1173 Unf 0  
## 770 Gd ALQ 1416 Unf 0  
## 775 Av Unf 0 Unf 0  
## 799 No Unf 0 Unf 0  
## 804 Gd Unf 0 Unf 0  
## 826 Av GLQ 1636 Unf 0  
## 878 No GLQ 1170 Unf 0  
## 899 Gd GLQ 2188 Unf 0  
## 988 Av GLQ 1646 Unf 0  
## 991 No GLQ 1074 Unf 0  
## 1047 Av GLQ 240 Unf 0  
## 1143 Gd GLQ 1150 Unf 0  
## 1170 Gd GLQ 1387 Unf 0  
## 1182 Gd GLQ 1480 Unf 0  
## 1183 Av GLQ 2096 Unf 0  
## 1229 No GLQ 1540 Unf 0  
## 1244 Gd GLQ 1386 Unf 0  
## 1268 Gd Unf 0 Unf 0  
## 1269 Mn Rec 192 Unf 0  
## 1354 Av GLQ 816 Unf 0  
## 1374 Gd GLQ 1282 Unf 0  
## 1389 Gd GLQ 1320 Unf 0  
## 1438 Av GLQ 1336 Unf 0  
## BsmtUnfSF TotalBsmtSF Heating HeatingQC CentralAir Electrical  
## 12 177 1175 GasA Ex Y SBrkr  
## 54 32 1842 GasA Gd Y SBrkr  
## 59 1410 1410 GasA Ex Y SBrkr  
## 113 280 1264 GasA Ex Y SBrkr  
## 152 310 1710 GasA Ex Y SBrkr  
## 162 556 1572 GasA Ex Y SBrkr  
## 179 312 2216 GasA Ex Y SBrkr  
## 186 1107 1107 GasA Ex Y SBrkr  
## 225 2336 2392 GasA Ex Y SBrkr  
## 232 773 1462 GasA Ex Y SBrkr  
## 279 2121 2121 GasA Ex Y SBrkr  
## 310 622 1896 GasA Ex Y SBrkr  
## 314 80 2136 GasW TA Y SBrkr  
## 321 1249 1249 GasA Ex Y SBrkr  
## 322 166 1136 GasA Ex Y SBrkr  
## 337 673 1922 GasA Ex Y SBrkr  
## 350 438 1848 GasA Ex Y SBrkr  
## 379 411 1856 GasA Ex Y SBrkr  
## 390 402 1682 GasA Ex Y SBrkr  
## 441 788 3094 GasA Ex Y SBrkr  
## 474 626 1976 GasA Ex Y SBrkr  
## 478 2153 2153 GasA Ex Y SBrkr  
## 482 225 1792 GasA Ex Y SBrkr  
## 497 1969 3200 GasA Ex Y SBrkr  
## 516 570 2006 GasA Ex Y SBrkr  
## 528 122 1452 GasA Ex Y SBrkr  
## 586 408 1868 GasA Ex Y SBrkr  
## 592 384 1722 GasA Ex Y SBrkr  
## 609 537 965 GasA TA Y SBrkr  
## 643 542 1952 GasA Gd Y SBrkr  
## 645 645 1766 GasA Ex Y SBrkr  
## 655 413 2109 GasA Ex Y SBrkr  
## 662 88 1629 GasA Ex Y SBrkr  
## 665 356 2077 GasA Ex Y SBrkr  
## 679 2046 2046 GasA Ex Y SBrkr  
## 689 474 1419 GasA Ex Y SBrkr  
## 692 989 2444 GasA Ex Y SBrkr  
## 703 1234 1234 GasA Ex Y SBrkr  
## 719 138 1311 GasA Ex Y SBrkr  
## 770 234 1650 GasA Ex Y SBrkr  
## 775 1935 1935 GasA Gd Y SBrkr  
## 799 1926 1926 GasA Ex Y SBrkr  
## 804 1734 1734 GasA Ex Y SBrkr  
## 826 442 2078 GasA Ex Y SBrkr  
## 878 292 1462 GasA Ex Y SBrkr  
## 899 142 2330 GasA Ex Y SBrkr  
## 988 284 1930 GasA Ex Y SBrkr  
## 991 322 1396 GasA Ex Y SBrkr  
## 1047 1752 1992 GasA Ex Y SBrkr  
## 1143 316 1466 GasA Ex Y SBrkr  
## 1170 543 1930 GasA Ex Y SBrkr  
## 1182 120 1600 GasA Ex Y SBrkr  
## 1183 300 2396 GasA Ex Y SBrkr  
## 1229 162 1702 GasA Ex Y SBrkr  
## 1244 690 2076 GasA Ex Y SBrkr  
## 1268 2002 2002 GasA Ex Y SBrkr  
## 1269 536 728 GasA Ex Y SBrkr  
## 1354 1217 2033 GasA Ex Y SBrkr  
## 1374 1351 2633 GasA Ex Y SBrkr  
## 1389 426 1746 GasA Ex Y SBrkr  
## 1438 596 1932 GasA Ex Y SBrkr  
## X1stFlrSF X2ndFlrSF LowQualFinSF GrLivArea BsmtFullBath BsmtHalfBath  
## 12 1182 1142 0 2324 1 0  
## 54 1842 0 0 1842 2 0  
## 59 1426 1519 0 2945 0 0  
## 113 1282 1414 0 2696 1 0  
## 152 1710 0 0 1710 1 0  
## 162 1572 1096 0 2668 1 0  
## 179 2234 0 0 2234 1 0  
## 186 1518 1518 572 3608 0 0  
## 225 2392 0 0 2392 0 0  
## 232 1490 1304 0 2794 1 0  
## 279 2121 0 0 2121 0 0  
## 310 1944 0 0 1944 1 0  
## 314 2036 0 0 2036 2 0  
## 321 1249 1347 0 2596 0 0  
## 322 1136 1332 0 2468 1 0  
## 337 1922 0 0 1922 1 0  
## 350 1848 880 0 2728 1 0  
## 379 1856 0 0 1856 1 0  
## 390 1742 590 0 2332 1 0  
## 441 2402 0 0 2402 1 0  
## 474 1976 0 0 1976 1 0  
## 478 2069 574 0 2643 0 0  
## 482 1792 0 0 1792 1 0  
## 497 3228 0 0 3228 1 0  
## 516 2020 0 0 2020 1 0  
## 528 1476 1237 0 2713 1 0  
## 586 2028 0 0 2028 1 0  
## 592 1728 568 0 2296 1 0  
## 609 1940 1254 0 3194 0 0  
## 643 2000 704 0 2704 1 0  
## 645 1766 0 0 1766 1 0  
## 655 2113 0 0 2113 1 0  
## 662 1686 762 0 2448 1 0  
## 665 2097 0 0 2097 1 0  
## 679 2046 0 0 2046 0 0  
## 689 1419 0 0 1419 1 0  
## 692 2444 1872 0 4316 0 1  
## 703 1264 1312 0 2576 0 0  
## 719 1325 1093 0 2418 1 0  
## 770 1690 1589 0 3279 1 0  
## 775 1973 0 0 1973 0 0  
## 799 1966 1174 0 3140 0 0  
## 804 1734 1088 0 2822 0 0  
## 826 2084 0 0 2084 1 0  
## 878 1462 762 0 2224 1 0  
## 899 2364 0 0 2364 1 0  
## 988 1940 0 0 1940 1 0  
## 991 1407 985 0 2392 1 0  
## 1047 1992 876 0 2868 0 0  
## 1143 1466 1362 0 2828 1 0  
## 1170 1831 1796 0 3627 1 0  
## 1182 1652 0 0 1652 1 1  
## 1183 2411 2065 0 4476 1 0  
## 1229 1702 0 0 1702 1 0  
## 1244 2076 0 0 2076 1 0  
## 1268 2018 0 0 2018 0 0  
## 1269 1968 1479 0 3447 0 0  
## 1354 2053 1185 0 3238 1 0  
## 1374 2633 0 0 2633 1 0  
## 1389 1746 0 0 1746 1 0  
## 1438 1932 0 0 1932 1 0  
## FullBath HalfBath BedroomAbvGr KitchenAbvGr KitchenQual TotRmsAbvGrd  
## 12 3 0 4 1 Ex 11  
## 54 0 1 0 1 Gd 5  
## 59 3 1 3 1 Gd 10  
## 113 2 1 4 1 Ex 10  
## 152 2 0 2 1 Gd 6  
## 162 2 1 3 1 Ex 10  
## 179 2 0 1 1 Ex 9  
## 186 2 1 4 1 Ex 12  
## 225 2 0 3 1 Ex 8  
## 232 2 1 4 1 Ex 9  
## 279 2 1 3 1 Ex 8  
## 310 2 0 3 1 Ex 8  
## 314 2 0 3 1 TA 8  
## 321 3 1 4 1 Gd 9  
## 322 2 1 4 1 Gd 10  
## 337 2 0 3 1 Gd 8  
## 350 2 1 4 1 Ex 10  
## 379 1 1 1 1 Ex 8  
## 390 2 1 3 1 Ex 9  
## 441 2 0 2 1 Ex 10  
## 474 2 0 2 1 Gd 7  
## 478 2 1 3 1 Ex 9  
## 482 2 0 2 1 Ex 6  
## 497 3 0 4 1 Gd 10  
## 516 2 1 3 1 Ex 9  
## 528 2 1 3 1 Ex 11  
## 586 2 0 2 1 Gd 7  
## 592 2 1 3 1 Ex 10  
## 609 2 1 4 1 TA 10  
## 643 2 1 4 1 Ex 9  
## 645 2 1 2 1 Ex 7  
## 655 2 1 2 1 Gd 7  
## 662 2 1 4 1 Gd 8  
## 665 1 1 1 1 Ex 8  
## 679 2 1 3 1 Gd 7  
## 689 2 0 2 1 Gd 7  
## 692 3 1 4 1 Ex 10  
## 703 2 1 4 1 Ex 10  
## 719 2 1 3 1 Gd 9  
## 770 3 1 4 1 Ex 12  
## 775 2 0 3 1 Gd 9  
## 799 3 1 4 1 Ex 11  
## 804 3 1 4 1 Ex 12  
## 826 2 0 2 1 Ex 7  
## 878 2 1 4 1 Ex 10  
## 899 2 1 2 1 Ex 11  
## 988 2 1 3 1 Ex 8  
## 991 2 1 3 1 Gd 7  
## 1047 3 1 4 1 Ex 11  
## 1143 3 0 4 1 Gd 11  
## 1170 3 1 4 1 Gd 10  
## 1182 2 0 2 1 Gd 5  
## 1183 3 1 4 1 Ex 10  
## 1229 1 1 1 1 Ex 7  
## 1244 2 1 2 1 Ex 7  
## 1268 2 0 3 1 Ex 10  
## 1269 3 1 4 1 Gd 11  
## 1354 2 1 4 1 Gd 9  
## 1374 2 1 2 1 Ex 8  
## 1389 2 0 3 1 Ex 7  
## 1438 2 0 2 1 Ex 7  
## Functional Fireplaces FireplaceQu GarageType GarageYrBlt GarageFinish  
## 12 Typ 2 Gd BuiltIn 2005 Fin  
## 54 Typ 1 Gd Attchd 1981 Fin  
## 59 Typ 1 Gd BuiltIn 2006 Fin  
## 113 Typ 1 Gd BuiltIn 2007 Fin  
## 152 Typ 1 Gd Attchd 2007 RFn  
## 162 Typ 2 Gd BuiltIn 2003 Fin  
## 179 Typ 1 Gd Attchd 2009 Fin  
## 186 Typ 2 TA Detchd 1993 Unf  
## 225 Typ 1 Ex Attchd 2003 Fin  
## 232 Typ 1 TA Attchd 1995 Fin  
## 279 Typ 1 Ex Attchd 2007 Fin  
## 310 Typ 3 Ex Attchd 2003 Fin  
## 314 Typ 2 Gd Attchd 1965 RFn  
## 321 Typ 0 <NA> Attchd 2006 RFn  
## 322 Typ 1 Gd BuiltIn 2004 Fin  
## 337 Typ 1 Gd Attchd 2005 Fin  
## 350 Typ 2 Ex Attchd 2006 Fin  
## 379 Typ 1 Ex Attchd 2010 Fin  
## 390 Typ 1 Ex BuiltIn 2008 Fin  
## 441 Typ 2 Gd Attchd 2008 Fin  
## 474 Typ 1 Ex Attchd 2006 RFn  
## 478 Typ 1 Gd BuiltIn 2006 Fin  
## 482 Typ 1 Gd Attchd 2003 Fin  
## 497 Typ 1 Gd Attchd 1992 RFn  
## 516 Typ 1 Gd Attchd 2009 Fin  
## 528 Typ 1 Gd Attchd 2008 Fin  
## 586 Typ 2 Gd Attchd 2005 RFn  
## 592 Typ 1 Gd BuiltIn 2008 RFn  
## 609 Typ 2 Gd Basment 1934 Unf  
## 643 Typ 3 TA Attchd 1972 Fin  
## 645 Typ 1 Gd Attchd 2009 Fin  
## 655 Typ 1 TA Attchd 1995 Fin  
## 662 Typ 1 TA Attchd 1994 RFn  
## 665 Typ 1 Ex Attchd 2005 Fin  
## 679 Typ 1 Gd Attchd 2008 Fin  
## 689 Typ 1 Gd Attchd 2007 RFn  
## 692 Typ 2 Ex Attchd 1994 Fin  
## 703 Typ 1 Gd BuiltIn 2006 Fin  
## 719 Typ 1 TA Attchd 1993 RFn  
## 770 Mod 1 Gd BuiltIn 2003 Fin  
## 775 Typ 1 Gd Attchd 2006 Fin  
## 799 Typ 2 Gd BuiltIn 2009 Fin  
## 804 Typ 1 Gd BuiltIn 2009 RFn  
## 826 Typ 1 Gd Attchd 2007 Fin  
## 878 Typ 1 Gd Attchd 2004 Fin  
## 899 Typ 2 Gd Attchd 2009 Fin  
## 988 Typ 1 Gd Attchd 2010 Fin  
## 991 Typ 1 TA Attchd 1997 Fin  
## 1047 Typ 1 Gd BuiltIn 2005 Fin  
## 1143 Typ 1 TA BuiltIn 2006 RFn  
## 1170 Typ 1 TA Attchd 1995 Fin  
## 1182 Typ 1 Gd Attchd 2008 Fin  
## 1183 Typ 2 TA Attchd 1996 Fin  
## 1229 Typ 1 Gd Attchd 2008 Fin  
## 1244 Typ 1 Gd Attchd 2006 Fin  
## 1268 Typ 1 Gd Attchd 2009 Fin  
## 1269 Typ 2 Gd BuiltIn 1982 Unf  
## 1354 Typ 1 Ex Attchd 1996 Fin  
## 1374 Typ 2 Gd Attchd 2001 RFn  
## 1389 Typ 2 Gd Attchd 2006 Fin  
## 1438 Typ 1 Gd Attchd 2008 Fin  
## GarageCars GarageArea GarageQual GarageCond PavedDrive WoodDeckSF  
## 12 3 736 TA TA Y 147  
## 54 3 894 TA TA Y 857  
## 59 3 641 TA TA Y 192  
## 113 3 792 TA TA Y 120  
## 152 3 866 TA TA Y 0  
## 162 3 726 TA TA Y 400  
## 179 3 1166 TA TA Y 0  
## 186 3 840 Ex TA Y 0  
## 225 3 968 TA TA Y 248  
## 232 3 810 TA TA Y 0  
## 279 3 732 TA TA Y 124  
## 310 3 708 TA TA Y 208  
## 314 2 513 TA TA Y 0  
## 321 3 840 TA TA Y 240  
## 322 3 872 TA TA Y 184  
## 337 3 676 TA TA Y 178  
## 350 3 706 TA TA Y 0  
## 379 3 834 TA TA Y 113  
## 390 3 846 TA TA Y 196  
## 441 3 672 TA TA Y 0  
## 474 3 908 TA TA Y 250  
## 478 3 694 TA TA Y 414  
## 482 3 874 TA TA Y 206  
## 497 2 546 TA TA Y 264  
## 516 3 900 TA TA Y 156  
## 528 3 858 TA TA Y 126  
## 586 3 880 TA TA Y 326  
## 592 3 842 TA TA Y 382  
## 609 2 380 TA TA Y 0  
## 643 2 538 TA TA Y 269  
## 645 3 478 TA TA Y 195  
## 655 3 839 TA TA Y 236  
## 662 3 711 TA TA Y 517  
## 665 3 1134 TA TA Y 192  
## 679 3 834 TA TA Y 322  
## 689 2 567 TA TA Y 140  
## 692 3 832 TA TA Y 382  
## 703 3 666 TA TA Y 324  
## 719 3 983 TA TA Y 250  
## 770 3 841 TA TA Y 503  
## 775 3 895 TA TA Y 315  
## 799 3 820 TA TA Y 144  
## 804 3 1020 TA TA Y 52  
## 826 3 1220 TA TA Y 188  
## 878 3 738 TA TA Y 184  
## 899 3 820 TA TA Y 0  
## 988 3 606 TA TA Y 168  
## 991 3 870 TA TA Y 0  
## 1047 3 716 TA TA Y 214  
## 1143 3 1052 TA TA Y 125  
## 1170 3 807 TA TA Y 361  
## 1182 2 482 TA TA Y 162  
## 1183 3 813 TA TA Y 171  
## 1229 3 1052 TA TA Y 0  
## 1244 3 850 TA TA Y 216  
## 1268 3 746 TA TA Y 144  
## 1269 3 1014 TA TA Y 314  
## 1354 3 666 TA TA Y 283  
## 1374 3 804 TA TA Y 314  
## 1389 3 758 TA TA Y 201  
## 1438 3 774 TA TA Y 0  
## OpenPorchSF EnclosedPorch X3SsnPorch ScreenPorch PoolArea PoolQC  
## 12 21 0 0 0 0 <NA>  
## 54 72 0 0 0 0 <NA>  
## 59 0 37 0 0 0 <NA>  
## 113 184 0 0 168 0 <NA>  
## 152 102 0 0 0 0 <NA>  
## 162 0 0 0 0 0 <NA>  
## 179 60 0 0 0 0 <NA>  
## 186 260 0 0 410 0 <NA>  
## 225 105 0 0 0 0 <NA>  
## 232 146 202 0 0 0 <NA>  
## 279 98 0 0 142 0 <NA>  
## 310 175 0 0 0 0 <NA>  
## 314 0 0 0 0 0 <NA>  
## 321 154 0 0 0 0 <NA>  
## 322 154 0 0 0 0 <NA>  
## 337 51 0 0 0 0 <NA>  
## 350 0 0 0 0 0 <NA>  
## 379 0 0 0 0 0 <NA>  
## 390 134 0 0 0 0 <NA>  
## 441 72 0 0 170 0 <NA>  
## 474 63 0 0 0 0 <NA>  
## 478 84 0 0 0 0 <NA>  
## 482 49 0 0 0 0 <NA>  
## 497 75 291 0 0 0 <NA>  
## 516 54 0 0 0 0 <NA>  
## 528 66 0 0 0 0 <NA>  
## 586 66 0 0 0 0 <NA>  
## 592 274 0 0 0 0 <NA>  
## 609 0 0 0 0 0 <NA>  
## 643 111 0 0 0 0 <NA>  
## 645 130 0 0 0 0 <NA>  
## 655 46 0 0 0 0 <NA>  
## 662 76 0 0 0 0 <NA>  
## 665 267 0 0 0 0 <NA>  
## 679 82 0 0 0 0 <NA>  
## 689 0 0 0 0 0 <NA>  
## 692 50 0 0 0 0 <NA>  
## 703 100 0 0 0 0 <NA>  
## 719 154 216 0 0 0 <NA>  
## 770 36 0 0 210 0 <NA>  
## 775 45 0 0 0 0 <NA>  
## 799 78 0 0 0 0 <NA>  
## 804 170 0 0 192 0 <NA>  
## 826 45 0 0 0 0 <NA>  
## 878 0 0 0 0 0 <NA>  
## 899 67 0 0 0 0 <NA>  
## 988 95 0 0 0 0 <NA>  
## 991 70 0 0 0 0 <NA>  
## 1047 108 0 0 0 0 <NA>  
## 1143 144 0 0 0 0 <NA>  
## 1170 76 0 0 0 0 <NA>  
## 1182 53 0 153 0 0 <NA>  
## 1183 78 0 0 0 555 Ex  
## 1229 72 0 0 224 0 <NA>  
## 1244 229 0 0 0 0 <NA>  
## 1268 76 0 0 0 0 <NA>  
## 1269 12 0 0 0 0 <NA>  
## 1354 86 0 0 0 0 <NA>  
## 1374 140 0 0 0 0 <NA>  
## 1389 39 0 0 0 0 <NA>  
## 1438 66 0 304 0 0 <NA>  
## Fence MiscFeature MiscVal MoSold YrSold SaleType SaleCondition  
## 12 <NA> <NA> 0 7 2006 New Partial  
## 54 <NA> <NA> 0 11 2006 WD Normal  
## 59 <NA> <NA> 0 10 2006 New Partial  
## 113 <NA> <NA> 0 10 2007 New Partial  
## 152 <NA> <NA> 0 1 2008 New Partial  
## 162 <NA> <NA> 0 3 2008 WD Normal  
## 179 <NA> <NA> 0 7 2009 New Partial  
## 186 GdPrv <NA> 0 6 2006 WD Normal  
## 225 <NA> <NA> 0 6 2009 WD Normal  
## 232 <NA> <NA> 0 7 2009 WD Normal  
## 279 <NA> <NA> 0 5 2007 New Partial  
## 310 <NA> <NA> 0 11 2006 WD Normal  
## 314 <NA> <NA> 0 6 2009 WD Normal  
## 321 <NA> <NA> 0 9 2006 New Partial  
## 322 <NA> <NA> 0 6 2007 WD Normal  
## 337 <NA> <NA> 0 7 2007 WD Normal  
## 350 <NA> <NA> 0 4 2006 New Partial  
## 379 <NA> <NA> 0 6 2010 New Partial  
## 390 <NA> <NA> 0 8 2008 New Partial  
## 441 <NA> <NA> 0 4 2009 WD Normal  
## 474 <NA> <NA> 0 7 2007 New Partial  
## 478 <NA> <NA> 0 3 2007 WD Normal  
## 482 <NA> <NA> 0 8 2006 WD Normal  
## 497 <NA> <NA> 0 5 2007 WD Normal  
## 516 <NA> <NA> 0 9 2009 New Partial  
## 528 <NA> <NA> 0 11 2008 New Partial  
## 586 <NA> <NA> 0 3 2006 New Partial  
## 592 <NA> <NA> 0 6 2009 ConLI Normal  
## 609 <NA> <NA> 0 9 2007 WD Alloca  
## 643 MnPrv <NA> 0 7 2009 WD Normal  
## 645 <NA> <NA> 0 10 2009 New Partial  
## 655 <NA> <NA> 0 8 2008 WD Normal  
## 662 <NA> <NA> 0 7 2009 WD Normal  
## 665 <NA> <NA> 0 1 2006 New Partial  
## 679 <NA> <NA> 0 7 2009 New Partial  
## 689 <NA> <NA> 0 10 2007 New Partial  
## 692 <NA> <NA> 0 1 2007 WD Normal  
## 703 <NA> <NA> 0 7 2006 New Partial  
## 719 <NA> <NA> 0 8 2008 WD Normal  
## 770 <NA> <NA> 0 6 2010 WD Normal  
## 775 <NA> <NA> 0 7 2007 New Partial  
## 799 <NA> <NA> 0 7 2009 New Partial  
## 804 <NA> <NA> 0 1 2009 New Partial  
## 826 <NA> <NA> 0 6 2008 New Partial  
## 878 <NA> <NA> 0 6 2009 WD Normal  
## 899 <NA> <NA> 0 3 2010 New Partial  
## 988 <NA> <NA> 0 4 2010 New Partial  
## 991 <NA> <NA> 0 6 2006 WD Normal  
## 1047 <NA> <NA> 0 7 2006 New Partial  
## 1143 <NA> <NA> 0 4 2007 New Partial  
## 1170 <NA> <NA> 0 7 2006 WD Normal  
## 1182 <NA> <NA> 0 11 2008 New Partial  
## 1183 MnPrv <NA> 0 7 2007 WD Abnorml  
## 1229 <NA> <NA> 0 10 2008 New Partial  
## 1244 <NA> <NA> 0 9 2006 New Partial  
## 1268 <NA> <NA> 0 5 2010 WD Normal  
## 1269 GdWo <NA> 0 5 2008 WD Normal  
## 1354 <NA> <NA> 0 3 2010 WD Normal  
## 1374 <NA> <NA> 0 3 2007 WD Normal  
## 1389 <NA> <NA> 0 10 2009 WD Normal  
## 1438 <NA> <NA> 0 11 2008 New Partial  
## SalePrice  
## 12 345000  
## 54 385000  
## 59 438780  
## 113 383970  
## 152 372402  
## 162 412500  
## 179 501837  
## 186 475000  
## 225 386250  
## 232 403000  
## 279 415298  
## 310 360000  
## 314 375000  
## 321 342643  
## 322 354000  
## 337 377426  
## 350 437154  
## 379 394432  
## 390 426000  
## 441 555000  
## 474 440000  
## 478 380000  
## 482 374000  
## 497 430000  
## 516 402861  
## 528 446261  
## 586 369900  
## 592 451950  
## 609 359100  
## 643 345000  
## 645 370878  
## 655 350000  
## 662 402000  
## 665 423000  
## 679 372500  
## 689 392000  
## 692 755000  
## 703 361919  
## 719 341000  
## 770 538000  
## 775 395000  
## 799 485000  
## 804 582933  
## 826 385000  
## 878 350000  
## 899 611657  
## 988 395192  
## 991 348000  
## 1047 556581  
## 1143 424870  
## 1170 625000  
## 1182 392500  
## 1183 745000  
## 1229 367294  
## 1244 465000  
## 1268 378500  
## 1269 381000  
## 1354 410000  
## 1374 466500  
## 1389 377500  
## 1438 394617

As we can see, there are missing values for many of the entries. Perhaps it is better that we look to address missing values in our other 80 variables.

# 1.1.2 Addressing Nas, missing values in our House Attributes

# Counting number of nulls in each col  
x = 1  
cat("---NULL COUNT---\n")

## ---NULL COUNT---

while (x<81){  
 if(sum(is.na((raw\_data[x]))>0)){  
 cat("Number of nulls in ",(colnames(raw\_data[x])), ": ")  
 cat(sum(is.na(raw\_data[x])), "\n")  
 }  
 x = x + 1   
}

## Number of nulls in LotFrontage : 259   
## Number of nulls in Alley : 1369   
## Number of nulls in MasVnrType : 8   
## Number of nulls in MasVnrArea : 8   
## Number of nulls in BsmtQual : 37   
## Number of nulls in BsmtCond : 37   
## Number of nulls in BsmtExposure : 38   
## Number of nulls in BsmtFinType1 : 37   
## Number of nulls in BsmtFinType2 : 38   
## Number of nulls in Electrical : 1   
## Number of nulls in FireplaceQu : 690   
## Number of nulls in GarageType : 81   
## Number of nulls in GarageYrBlt : 81   
## Number of nulls in GarageFinish : 81   
## Number of nulls in GarageQual : 81   
## Number of nulls in GarageCond : 81   
## Number of nulls in PoolQC : 1453   
## Number of nulls in Fence : 1179   
## Number of nulls in MiscFeature : 1406

There are 19 variables with NA values. It is important to note that this might mean that the observation is missing or perhaps a NA means somthing itself. We must consult the data dictionary.

LotFrontage has 259 NA values. This is integer value repersenting Linear feet of street connected to property. Looking into the dataset, we see that the other observations have a value anywhere from 21-313. We can safetly assume that these 259 entries repersent a house that has 0 linear feet of street being connected to the property. Of course it could be a case of missin value, but it is possible that the homes do not have the property connecting to a steet, we take this assumptions and instead change the NAs to 0. As such, We will not be removing such observations

v = 1  
while (v<1461){  
 if (is.na(modified\_data$LotFrontage[v])){  
 modified\_data$LotFrontage[v] = 0  
 }  
 v = v + 1  
}

Alley has 1369 NAs, this high number suggests that the NAs must mean somthing rather than missing value. The dictionary shows us the NA repersents no alley Access. Rather than Na, lets change that to ‘None’ a bit more repersentative.

v = 1  
while (v<1461){  
 if (is.na(modified\_data$Alley[v])){  
 modified\_data$Alley[v] = "None"  
 }  
 v = v + 1  
}

MasVnrType and MasVnrArea both have 8 missing values. This is very suspeious. Could it be that they are of the same observations and due to another house feature? Let us check. Maybe our data dictionary can help us with this.

MasVnr <- subset(raw\_data, is.na(raw\_data$MasVnrType))  
MasVnr$Area <- subset(raw\_data, is.na(raw\_data$MasVnrArea))  
MasVnr

## Id MSSubClass MSZoning LotFrontage LotArea Street Alley LotShape  
## 235 235 60 RL NA 7851 Pave <NA> Reg  
## 530 530 20 RL NA 32668 Pave <NA> IR1  
## 651 651 60 FV 65 8125 Pave <NA> Reg  
## 937 937 20 RL 67 10083 Pave <NA> Reg  
## 974 974 20 FV 95 11639 Pave <NA> Reg  
## 978 978 120 FV 35 4274 Pave Pave IR1  
## 1244 1244 20 RL 107 13891 Pave <NA> Reg  
## 1279 1279 60 RL 75 9473 Pave <NA> Reg  
## LandContour Utilities LotConfig LandSlope Neighborhood Condition1  
## 235 Lvl AllPub Inside Gtl Gilbert Norm  
## 530 Lvl AllPub CulDSac Gtl Crawfor Norm  
## 651 Lvl AllPub Inside Gtl Somerst Norm  
## 937 Lvl AllPub Inside Gtl SawyerW Norm  
## 974 Lvl AllPub Corner Gtl Somerst Norm  
## 978 Lvl AllPub Inside Gtl Somerst Norm  
## 1244 Lvl AllPub Inside Gtl NridgHt Norm  
## 1279 Lvl AllPub Inside Gtl CollgCr Norm  
## Condition2 BldgType HouseStyle OverallQual OverallCond YearBuilt  
## 235 Norm 1Fam 2Story 6 5 2002  
## 530 Norm 1Fam 1Story 6 3 1957  
## 651 Norm 1Fam 2Story 7 6 2007  
## 937 Norm 1Fam 1Story 7 5 2003  
## 974 Norm 1Fam 1Story 7 5 2007  
## 978 Norm TwnhsE 1Story 7 5 2006  
## 1244 Norm 1Fam 1Story 10 5 2006  
## 1279 Norm 1Fam 2Story 8 5 2002  
## YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  
## 235 2002 Gable CompShg VinylSd VinylSd <NA>  
## 530 1975 Hip CompShg Wd Sdng Stone <NA>  
## 651 2007 Gable CompShg CemntBd CmentBd <NA>  
## 937 2003 Gable CompShg VinylSd VinylSd <NA>  
## 974 2008 Gable CompShg CemntBd CmentBd <NA>  
## 978 2007 Gable CompShg VinylSd VinylSd <NA>  
## 1244 2006 Gable CompShg VinylSd VinylSd <NA>  
## 1279 2002 Gable CompShg VinylSd VinylSd <NA>  
## MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond  
## 235 NA Gd TA PConc Gd TA  
## 530 NA Gd TA PConc TA TA  
## 651 NA Gd TA PConc Gd TA  
## 937 NA Gd TA PConc Gd TA  
## 974 NA Gd TA PConc Gd TA  
## 978 NA Gd TA PConc Gd TA  
## 1244 NA Ex TA PConc Ex Gd  
## 1279 NA Gd TA PConc Gd TA  
## BsmtExposure BsmtFinType1 BsmtFinSF1 BsmtFinType2 BsmtFinSF2  
## 235 No GLQ 625 Unf 0  
## 530 No Rec 1219 Unf 0  
## 651 No Unf 0 Unf 0  
## 937 No GLQ 833 Unf 0  
## 974 No Unf 0 Unf 0  
## 978 No GLQ 1106 Unf 0  
## 1244 Gd GLQ 1386 Unf 0  
## 1279 No GLQ 804 Unf 0  
## BsmtUnfSF TotalBsmtSF Heating HeatingQC CentralAir Electrical  
## 235 235 860 GasA Ex Y SBrkr  
## 530 816 2035 GasA TA Y SBrkr  
## 651 813 813 GasA Ex Y SBrkr  
## 937 343 1176 GasA Ex Y SBrkr  
## 974 1428 1428 GasA Ex Y SBrkr  
## 978 135 1241 GasA Ex Y SBrkr  
## 1244 690 2076 GasA Ex Y SBrkr  
## 1279 324 1128 GasA Ex Y SBrkr  
## X1stFlrSF X2ndFlrSF LowQualFinSF GrLivArea BsmtFullBath BsmtHalfBath  
## 235 860 1100 0 1960 1 0  
## 530 2515 0 0 2515 1 0  
## 651 822 843 0 1665 0 0  
## 937 1200 0 0 1200 1 0  
## 974 1428 0 0 1428 0 0  
## 978 1241 0 0 1241 1 0  
## 1244 2076 0 0 2076 1 0  
## 1279 1128 903 0 2031 1 0  
## FullBath HalfBath BedroomAbvGr KitchenAbvGr KitchenQual TotRmsAbvGrd  
## 235 2 1 4 1 Gd 8  
## 530 3 0 4 2 TA 9  
## 651 2 1 3 1 Gd 7  
## 937 2 0 2 1 Gd 5  
## 974 2 0 3 1 Gd 6  
## 978 1 1 1 1 Gd 4  
## 1244 2 1 2 1 Ex 7  
## 1279 2 1 3 1 Gd 7  
## Functional Fireplaces FireplaceQu GarageType GarageYrBlt GarageFinish  
## 235 Typ 2 TA BuiltIn 2002 Fin  
## 530 Maj1 2 TA Attchd 1975 RFn  
## 651 Typ 0 <NA> Attchd 2007 RFn  
## 937 Typ 0 <NA> Attchd 2003 RFn  
## 974 Typ 0 <NA> Attchd 2007 Fin  
## 978 Typ 0 <NA> Attchd 2007 Fin  
## 1244 Typ 1 Gd Attchd 2006 Fin  
## 1279 Typ 1 Gd Attchd 2002 RFn  
## GarageCars GarageArea GarageQual GarageCond PavedDrive WoodDeckSF  
## 235 2 440 TA TA Y 288  
## 530 2 484 TA TA Y 0  
## 651 2 562 TA TA Y 0  
## 937 2 555 TA TA Y 0  
## 974 2 480 TA TA Y 0  
## 978 2 569 TA TA Y 0  
## 1244 3 850 TA TA Y 216  
## 1279 2 577 TA TA Y 0  
## OpenPorchSF EnclosedPorch X3SsnPorch ScreenPorch PoolArea PoolQC  
## 235 48 0 0 0 0 <NA>  
## 530 0 200 0 0 0 <NA>  
## 651 0 0 0 0 0 <NA>  
## 937 41 0 0 0 0 <NA>  
## 974 120 0 0 0 0 <NA>  
## 978 116 0 0 0 0 <NA>  
## 1244 229 0 0 0 0 <NA>  
## 1279 211 0 0 0 0 <NA>  
## Fence MiscFeature MiscVal MoSold YrSold SaleType SaleCondition  
## 235 <NA> <NA> 0 5 2010 WD Normal  
## 530 <NA> <NA> 0 3 2007 WD Alloca  
## 651 <NA> <NA> 0 5 2008 WD Normal  
## 937 <NA> <NA> 0 8 2009 WD Normal  
## 974 <NA> <NA> 0 12 2008 New Partial  
## 978 <NA> <NA> 0 11 2007 New Partial  
## 1244 <NA> <NA> 0 9 2006 New Partial  
## 1279 <NA> <NA> 0 3 2008 WD Normal  
## SalePrice Area.Id Area.MSSubClass Area.MSZoning Area.LotFrontage  
## 235 216500 235 60 RL NA  
## 530 200624 530 20 RL NA  
## 651 205950 651 60 FV 65  
## 937 184900 937 20 RL 67  
## 974 182000 974 20 FV 95  
## 978 199900 978 120 FV 35  
## 1244 465000 1244 20 RL 107  
## 1279 237000 1279 60 RL 75  
## Area.LotArea Area.Street Area.Alley Area.LotShape Area.LandContour  
## 235 7851 Pave <NA> Reg Lvl  
## 530 32668 Pave <NA> IR1 Lvl  
## 651 8125 Pave <NA> Reg Lvl  
## 937 10083 Pave <NA> Reg Lvl  
## 974 11639 Pave <NA> Reg Lvl  
## 978 4274 Pave Pave IR1 Lvl  
## 1244 13891 Pave <NA> Reg Lvl  
## 1279 9473 Pave <NA> Reg Lvl  
## Area.Utilities Area.LotConfig Area.LandSlope Area.Neighborhood  
## 235 AllPub Inside Gtl Gilbert  
## 530 AllPub CulDSac Gtl Crawfor  
## 651 AllPub Inside Gtl Somerst  
## 937 AllPub Inside Gtl SawyerW  
## 974 AllPub Corner Gtl Somerst  
## 978 AllPub Inside Gtl Somerst  
## 1244 AllPub Inside Gtl NridgHt  
## 1279 AllPub Inside Gtl CollgCr  
## Area.Condition1 Area.Condition2 Area.BldgType Area.HouseStyle  
## 235 Norm Norm 1Fam 2Story  
## 530 Norm Norm 1Fam 1Story  
## 651 Norm Norm 1Fam 2Story  
## 937 Norm Norm 1Fam 1Story  
## 974 Norm Norm 1Fam 1Story  
## 978 Norm Norm TwnhsE 1Story  
## 1244 Norm Norm 1Fam 1Story  
## 1279 Norm Norm 1Fam 2Story  
## Area.OverallQual Area.OverallCond Area.YearBuilt Area.YearRemodAdd  
## 235 6 5 2002 2002  
## 530 6 3 1957 1975  
## 651 7 6 2007 2007  
## 937 7 5 2003 2003  
## 974 7 5 2007 2008  
## 978 7 5 2006 2007  
## 1244 10 5 2006 2006  
## 1279 8 5 2002 2002  
## Area.RoofStyle Area.RoofMatl Area.Exterior1st Area.Exterior2nd  
## 235 Gable CompShg VinylSd VinylSd  
## 530 Hip CompShg Wd Sdng Stone  
## 651 Gable CompShg CemntBd CmentBd  
## 937 Gable CompShg VinylSd VinylSd  
## 974 Gable CompShg CemntBd CmentBd  
## 978 Gable CompShg VinylSd VinylSd  
## 1244 Gable CompShg VinylSd VinylSd  
## 1279 Gable CompShg VinylSd VinylSd  
## Area.MasVnrType Area.MasVnrArea Area.ExterQual Area.ExterCond  
## 235 <NA> NA Gd TA  
## 530 <NA> NA Gd TA  
## 651 <NA> NA Gd TA  
## 937 <NA> NA Gd TA  
## 974 <NA> NA Gd TA  
## 978 <NA> NA Gd TA  
## 1244 <NA> NA Ex TA  
## 1279 <NA> NA Gd TA  
## Area.Foundation Area.BsmtQual Area.BsmtCond Area.BsmtExposure  
## 235 PConc Gd TA No  
## 530 PConc TA TA No  
## 651 PConc Gd TA No  
## 937 PConc Gd TA No  
## 974 PConc Gd TA No  
## 978 PConc Gd TA No  
## 1244 PConc Ex Gd Gd  
## 1279 PConc Gd TA No  
## Area.BsmtFinType1 Area.BsmtFinSF1 Area.BsmtFinType2 Area.BsmtFinSF2  
## 235 GLQ 625 Unf 0  
## 530 Rec 1219 Unf 0  
## 651 Unf 0 Unf 0  
## 937 GLQ 833 Unf 0  
## 974 Unf 0 Unf 0  
## 978 GLQ 1106 Unf 0  
## 1244 GLQ 1386 Unf 0  
## 1279 GLQ 804 Unf 0  
## Area.BsmtUnfSF Area.TotalBsmtSF Area.Heating Area.HeatingQC  
## 235 235 860 GasA Ex  
## 530 816 2035 GasA TA  
## 651 813 813 GasA Ex  
## 937 343 1176 GasA Ex  
## 974 1428 1428 GasA Ex  
## 978 135 1241 GasA Ex  
## 1244 690 2076 GasA Ex  
## 1279 324 1128 GasA Ex  
## Area.CentralAir Area.Electrical Area.X1stFlrSF Area.X2ndFlrSF  
## 235 Y SBrkr 860 1100  
## 530 Y SBrkr 2515 0  
## 651 Y SBrkr 822 843  
## 937 Y SBrkr 1200 0  
## 974 Y SBrkr 1428 0  
## 978 Y SBrkr 1241 0  
## 1244 Y SBrkr 2076 0  
## 1279 Y SBrkr 1128 903  
## Area.LowQualFinSF Area.GrLivArea Area.BsmtFullBath Area.BsmtHalfBath  
## 235 0 1960 1 0  
## 530 0 2515 1 0  
## 651 0 1665 0 0  
## 937 0 1200 1 0  
## 974 0 1428 0 0  
## 978 0 1241 1 0  
## 1244 0 2076 1 0  
## 1279 0 2031 1 0  
## Area.FullBath Area.HalfBath Area.BedroomAbvGr Area.KitchenAbvGr  
## 235 2 1 4 1  
## 530 3 0 4 2  
## 651 2 1 3 1  
## 937 2 0 2 1  
## 974 2 0 3 1  
## 978 1 1 1 1  
## 1244 2 1 2 1  
## 1279 2 1 3 1  
## Area.KitchenQual Area.TotRmsAbvGrd Area.Functional Area.Fireplaces  
## 235 Gd 8 Typ 2  
## 530 TA 9 Maj1 2  
## 651 Gd 7 Typ 0  
## 937 Gd 5 Typ 0  
## 974 Gd 6 Typ 0  
## 978 Gd 4 Typ 0  
## 1244 Ex 7 Typ 1  
## 1279 Gd 7 Typ 1  
## Area.FireplaceQu Area.GarageType Area.GarageYrBlt Area.GarageFinish  
## 235 TA BuiltIn 2002 Fin  
## 530 TA Attchd 1975 RFn  
## 651 <NA> Attchd 2007 RFn  
## 937 <NA> Attchd 2003 RFn  
## 974 <NA> Attchd 2007 Fin  
## 978 <NA> Attchd 2007 Fin  
## 1244 Gd Attchd 2006 Fin  
## 1279 Gd Attchd 2002 RFn  
## Area.GarageCars Area.GarageArea Area.GarageQual Area.GarageCond  
## 235 2 440 TA TA  
## 530 2 484 TA TA  
## 651 2 562 TA TA  
## 937 2 555 TA TA  
## 974 2 480 TA TA  
## 978 2 569 TA TA  
## 1244 3 850 TA TA  
## 1279 2 577 TA TA  
## Area.PavedDrive Area.WoodDeckSF Area.OpenPorchSF Area.EnclosedPorch  
## 235 Y 288 48 0  
## 530 Y 0 0 200  
## 651 Y 0 0 0  
## 937 Y 0 41 0  
## 974 Y 0 120 0  
## 978 Y 0 116 0  
## 1244 Y 216 229 0  
## 1279 Y 0 211 0  
## Area.X3SsnPorch Area.ScreenPorch Area.PoolArea Area.PoolQC Area.Fence  
## 235 0 0 0 <NA> <NA>  
## 530 0 0 0 <NA> <NA>  
## 651 0 0 0 <NA> <NA>  
## 937 0 0 0 <NA> <NA>  
## 974 0 0 0 <NA> <NA>  
## 978 0 0 0 <NA> <NA>  
## 1244 0 0 0 <NA> <NA>  
## 1279 0 0 0 <NA> <NA>  
## Area.MiscFeature Area.MiscVal Area.MoSold Area.YrSold Area.SaleType  
## 235 <NA> 0 5 2010 WD  
## 530 <NA> 0 3 2007 WD  
## 651 <NA> 0 5 2008 WD  
## 937 <NA> 0 8 2009 WD  
## 974 <NA> 0 12 2008 New  
## 978 <NA> 0 11 2007 New  
## 1244 <NA> 0 9 2006 New  
## 1279 <NA> 0 3 2008 WD  
## Area.SaleCondition Area.SalePrice  
## 235 Normal 216500  
## 530 Alloca 200624  
## 651 Normal 205950  
## 937 Normal 184900  
## 974 Partial 182000  
## 978 Partial 199900  
## 1244 Partial 465000  
## 1279 Normal 237000

These both variables are Na in the same observation. What is weird is that MasVnrType has a None category, so that means that it isn’t a case that there was no masonry veneer, rather I would say that the Masonry data was not collected for these 8 observations. This would tell me that it might be good to remove the observations

modified\_data <- subset(modified\_data, !is.na(raw\_data$MasVnrType)) # we only do it for when one attribute isnt na, because the other overlaps.

Next lets look at BsmtQual, BsmtCond, BsmtExposure, BsmtFinType1, BsmtFinType2. All these have 37-38 missing values. Lets see if they are overlapping observations again, and see if we can figure out a pattern.

Bsmt <- subset(raw\_data, is.na(raw\_data$BsmtExposure))  
Bsmt

## Id MSSubClass MSZoning LotFrontage LotArea Street Alley LotShape  
## 18 18 90 RL 72 10791 Pave <NA> Reg  
## 40 40 90 RL 65 6040 Pave <NA> Reg  
## 91 91 20 RL 60 7200 Pave <NA> Reg  
## 103 103 90 RL 64 7018 Pave <NA> Reg  
## 157 157 20 RL 60 7200 Pave <NA> Reg  
## 183 183 20 RL 60 9060 Pave <NA> Reg  
## 260 260 20 RM 70 12702 Pave <NA> Reg  
## 343 343 90 RL NA 8544 Pave <NA> Reg  
## 363 363 85 RL 64 7301 Pave <NA> Reg  
## 372 372 50 RL 80 17120 Pave <NA> Reg  
## 393 393 20 RL NA 8339 Pave <NA> IR1  
## 521 521 190 RL 60 10800 Pave Grvl Reg  
## 533 533 20 RL 60 7200 Pave <NA> Reg  
## 534 534 20 RL 50 5000 Pave <NA> Reg  
## 554 554 20 RL 67 8777 Pave <NA> Reg  
## 647 647 20 RL 60 7200 Pave <NA> Reg  
## 706 706 190 RM 70 5600 Pave <NA> Reg  
## 737 737 90 RL 60 8544 Pave <NA> Reg  
## 750 750 50 RL 50 8405 Pave <NA> Reg  
## 779 779 90 RH 60 8400 Pave <NA> Reg  
## 869 869 60 RL NA 14762 Pave <NA> IR2  
## 895 895 90 RL 64 7018 Pave <NA> Reg  
## 898 898 90 RL 64 7018 Pave <NA> Reg  
## 949 949 60 RL 65 14006 Pave <NA> IR1  
## 985 985 90 RL 75 10125 Pave <NA> Reg  
## 1001 1001 20 RL 74 10206 Pave <NA> Reg  
## 1012 1012 90 RL 75 9825 Pave <NA> Reg  
## 1036 1036 20 RL NA 11500 Pave <NA> IR1  
## 1046 1046 20 RL NA 13680 Pave <NA> IR1  
## 1049 1049 20 RL 100 21750 Pave <NA> Reg  
## 1050 1050 20 RL 60 11100 Pave <NA> Reg  
## 1091 1091 90 RL 60 8544 Pave <NA> Reg  
## 1180 1180 20 RL 77 8335 Pave <NA> Reg  
## 1217 1217 90 RM 68 8930 Pave <NA> Reg  
## 1219 1219 50 RM 52 6240 Pave <NA> Reg  
## 1233 1233 90 RL 70 9842 Pave <NA> Reg  
## 1322 1322 20 RL NA 6627 Pave <NA> IR1  
## 1413 1413 90 RL 60 7200 Pave <NA> Reg  
## LandContour Utilities LotConfig LandSlope Neighborhood Condition1  
## 18 Lvl AllPub Inside Gtl Sawyer Norm  
## 40 Lvl AllPub Inside Gtl Edwards Norm  
## 91 Lvl AllPub Inside Gtl NAmes Norm  
## 103 Bnk AllPub Inside Gtl SawyerW Norm  
## 157 Lvl AllPub Inside Gtl NAmes Norm  
## 183 Lvl AllPub Inside Gtl Edwards Artery  
## 260 Lvl AllPub Inside Gtl OldTown Norm  
## 343 Lvl AllPub Inside Gtl NAmes Norm  
## 363 Lvl AllPub Corner Gtl Edwards Norm  
## 372 Lvl AllPub Inside Gtl ClearCr Feedr  
## 393 Lvl AllPub Inside Gtl NAmes Norm  
## 521 Lvl AllPub Inside Gtl OldTown Norm  
## 533 Lvl AllPub Inside Gtl NAmes Norm  
## 534 Low AllPub Inside Mod BrkSide Norm  
## 554 Lvl AllPub Inside Gtl Edwards Feedr  
## 647 Lvl AllPub Inside Gtl NAmes Norm  
## 706 Lvl AllPub Inside Gtl IDOTRR Norm  
## 737 Lvl AllPub Inside Gtl NAmes Norm  
## 750 Lvl AllPub Inside Gtl Edwards Norm  
## 779 Lvl AllPub Inside Gtl SawyerW Feedr  
## 869 Lvl AllPub Corner Gtl Gilbert Feedr  
## 895 Bnk AllPub Inside Gtl SawyerW Norm  
## 898 Lvl AllPub Inside Gtl SawyerW Feedr  
## 949 Lvl AllPub Inside Gtl CollgCr Norm  
## 985 Lvl AllPub Inside Gtl Mitchel Norm  
## 1001 Lvl AllPub Corner Gtl Edwards Norm  
## 1012 Lvl AllPub Inside Gtl Edwards Norm  
## 1036 Lvl AllPub CulDSac Gtl Edwards Norm  
## 1046 Lvl AllPub CulDSac Gtl Edwards Norm  
## 1049 Lvl AllPub Inside Gtl Mitchel Norm  
## 1050 Low AllPub Inside Gtl Edwards Norm  
## 1091 Lvl AllPub Corner Gtl NAmes Norm  
## 1180 Lvl AllPub Corner Gtl Edwards Norm  
## 1217 Lvl AllPub Inside Gtl Sawyer RRAe  
## 1219 Lvl AllPub Inside Gtl BrkSide Norm  
## 1233 Lvl AllPub FR2 Gtl NAmes Norm  
## 1322 Lvl AllPub Corner Gtl BrkSide Feedr  
## 1413 Lvl AllPub Inside Gtl NAmes Norm  
## Condition2 BldgType HouseStyle OverallQual OverallCond YearBuilt  
## 18 Norm Duplex 1Story 4 5 1967  
## 40 Norm Duplex 1Story 4 5 1955  
## 91 Norm 1Fam 1Story 4 5 1950  
## 103 Norm Duplex 1Story 5 5 1979  
## 157 Norm 1Fam 1Story 5 7 1950  
## 183 Norm 1Fam 1Story 5 6 1957  
## 260 Norm 1Fam 1Story 5 5 1956  
## 343 Norm Duplex 1Story 3 4 1949  
## 363 Norm 1Fam SFoyer 7 5 2003  
## 372 Norm 1Fam 1.5Fin 4 4 1959  
## 393 Norm 1Fam 1Story 5 7 1959  
## 521 Norm 2fmCon 2Story 4 7 1900  
## 533 Norm 1Fam 1Story 5 7 1955  
## 534 Norm 1Fam 1Story 1 3 1946  
## 554 Norm 1Fam 1Story 4 5 1949  
## 647 Norm 1Fam 1Story 5 5 1950  
## 706 Norm 2fmCon 2Story 4 5 1930  
## 737 Norm Duplex 1Story 3 4 1950  
## 750 Norm 1Fam 1.5Fin 4 3 1945  
## 779 Norm Duplex 1Story 5 5 1977  
## 869 Norm 1Fam 2Story 5 6 1948  
## 895 Norm Duplex 1Story 5 5 1979  
## 898 Norm Duplex 2Story 5 5 1979  
## 949 Norm 1Fam 2Story 7 5 2002  
## 985 Norm Duplex 1.5Fin 5 5 1977  
## 1001 Norm 1Fam 1Story 3 3 1952  
## 1012 Norm Duplex 1Story 5 5 1965  
## 1036 Norm 1Fam 1Story 4 3 1957  
## 1046 Norm 1Fam 1Story 3 5 1955  
## 1049 Norm 1Fam 1Story 5 4 1960  
## 1050 Norm 1Fam 1Story 4 7 1946  
## 1091 Norm Duplex 1Story 3 4 1950  
## 1180 Norm 1Fam 1Story 5 5 1954  
## 1217 Norm Duplex 1.5Fin 6 5 1978  
## 1219 Norm 1Fam 1.5Fin 4 5 1947  
## 1233 Norm Duplex 1Story 4 5 1962  
## 1322 Norm 1Fam 1Story 3 6 1949  
## 1413 Norm Duplex 1Story 4 5 1949  
## YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  
## 18 1967 Gable CompShg MetalSd MetalSd None  
## 40 1955 Gable CompShg AsbShng Plywood None  
## 91 1950 Gable CompShg BrkFace Wd Sdng None  
## 103 1979 Gable CompShg HdBoard HdBoard None  
## 157 1950 Hip CompShg Wd Sdng Wd Sdng None  
## 183 2006 Hip CompShg Wd Sdng Wd Sdng BrkFace  
## 260 1956 Gable CompShg BrkFace BrkFace None  
## 343 1950 Gable CompShg Stucco Stucco BrkFace  
## 363 2003 Gable CompShg HdBoard HdBoard BrkFace  
## 372 1959 Gable CompShg WdShing Plywood None  
## 393 1959 Gable CompShg MetalSd MetalSd None  
## 521 2000 Gable CompShg MetalSd MetalSd None  
## 533 2007 Gable CompShg VinylSd VinylSd None  
## 534 1950 Gable CompShg VinylSd VinylSd None  
## 554 2003 Gable CompShg VinylSd VinylSd None  
## 647 1950 Hip CompShg MetalSd MetalSd None  
## 706 1950 Hip CompShg VinylSd Wd Shng None  
## 737 1950 Gable CompShg Stucco Stone None  
## 750 1950 Gable CompShg WdShing Wd Shng None  
## 779 1977 Gable CompShg Plywood Plywood BrkFace  
## 869 1950 Gable CompShg Plywood Plywood None  
## 895 1979 Gable CompShg Plywood Plywood None  
## 898 1979 Gable CompShg Plywood Plywood None  
## 949 2002 Gable CompShg VinylSd VinylSd BrkFace  
## 985 1977 Gable CompShg Plywood Plywood None  
## 1001 1952 Flat Tar&Grv BrkComm Brk Cmn None  
## 1012 1965 Hip CompShg AsphShn AsphShn None  
## 1036 1957 Gable CompShg Wd Sdng Wd Sdng None  
## 1046 1955 Hip CompShg BrkFace Wd Sdng None  
## 1049 2006 Hip CompShg HdBoard HdBoard BrkFace  
## 1050 2006 Gable CompShg MetalSd MetalSd None  
## 1091 1950 Gable CompShg BrkFace BrkFace None  
## 1180 1954 Gable CompShg Wd Sdng Wd Sdng None  
## 1217 1978 Gable CompShg VinylSd VinylSd None  
## 1219 1950 Gable CompShg AsbShng AsbShng None  
## 1233 1962 Gable CompShg HdBoard HdBoard None  
## 1322 1950 Hip CompShg VinylSd VinylSd None  
## 1413 1950 Gable CompShg BrkFace Stone None  
## MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond  
## 18 0 TA TA Slab <NA> <NA>  
## 40 0 TA TA PConc <NA> <NA>  
## 91 0 TA TA Slab <NA> <NA>  
## 103 0 TA Fa Slab <NA> <NA>  
## 157 0 TA TA CBlock <NA> <NA>  
## 183 98 TA TA PConc <NA> <NA>  
## 260 0 TA TA PConc <NA> <NA>  
## 343 340 TA TA Slab <NA> <NA>  
## 363 500 Gd TA Slab <NA> <NA>  
## 372 0 TA TA CBlock <NA> <NA>  
## 393 0 TA TA Slab <NA> <NA>  
## 521 0 TA TA BrkTil <NA> <NA>  
## 533 0 TA TA Slab <NA> <NA>  
## 534 0 Fa Fa Slab <NA> <NA>  
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## 647 0 TA TA CBlock <NA> <NA>  
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## 750 0 TA TA Slab <NA> <NA>  
## 779 320 TA TA Slab <NA> <NA>  
## 869 0 TA TA Slab <NA> <NA>  
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## 949 144 Gd TA PConc Gd TA  
## 985 0 TA TA CBlock <NA> <NA>  
## 1001 0 TA TA Slab <NA> <NA>  
## 1012 0 TA TA CBlock <NA> <NA>  
## 1036 0 TA Gd Slab <NA> <NA>  
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## 1219 0 TA TA Slab <NA> <NA>  
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## 1322 0 TA TA CBlock <NA> <NA>  
## 1413 0 TA TA Slab <NA> <NA>  
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## 18 <NA> <NA> 0 <NA> 0  
## 40 <NA> <NA> 0 <NA> 0  
## 91 <NA> <NA> 0 <NA> 0  
## 103 <NA> <NA> 0 <NA> 0  
## 157 <NA> <NA> 0 <NA> 0  
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## 260 <NA> <NA> 0 <NA> 0  
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## 18 0 0 GasA TA Y SBrkr  
## 40 0 0 GasA TA N FuseP  
## 91 0 0 GasA TA Y FuseA  
## 103 0 0 GasA TA Y SBrkr  
## 157 0 0 GasA TA Y FuseF  
## 183 0 0 GasA Ex Y SBrkr  
## 260 0 0 GasA Gd Y FuseA  
## 343 0 0 Wall Fa N FuseA  
## 363 0 0 GasA Ex Y SBrkr  
## 372 0 0 GasA TA Y SBrkr  
## 393 0 0 GasA TA Y SBrkr  
## 521 0 0 GasA TA N FuseA  
## 533 0 0 GasA Ex Y SBrkr  
## 534 0 0 GasA Fa N FuseF  
## 554 0 0 GasA Ex Y SBrkr  
## 647 0 0 GasA Gd Y SBrkr  
## 706 0 0 GasA Fa N SBrkr  
## 737 0 0 GasA Gd N FuseF  
## 750 0 0 Wall TA N FuseF  
## 779 0 0 GasA TA Y SBrkr  
## 869 0 0 GasA Gd Y SBrkr  
## 895 0 0 GasA TA Y SBrkr  
## 898 0 0 GasA TA Y SBrkr  
## 949 936 936 GasA Ex Y SBrkr  
## 985 0 0 GasA TA Y SBrkr  
## 1001 0 0 GasW Fa N FuseF  
## 1012 0 0 GasA TA N SBrkr  
## 1036 0 0 GasA Ex N SBrkr  
## 1046 0 0 GasA Ex Y FuseA  
## 1049 0 0 GasA TA Y SBrkr  
## 1050 0 0 GasA Ex Y SBrkr  
## 1091 0 0 Wall Fa N FuseA  
## 1180 0 0 GasA Gd Y SBrkr  
## 1217 0 0 GasA TA Y SBrkr  
## 1219 0 0 GasA Gd N SBrkr  
## 1233 0 0 GasA TA Y SBrkr  
## 1322 0 0 Floor TA N SBrkr  
## 1413 0 0 Wall Fa N FuseF  
## X1stFlrSF X2ndFlrSF LowQualFinSF GrLivArea BsmtFullBath BsmtHalfBath  
## 18 1296 0 0 1296 0 0  
## 40 1152 0 0 1152 0 0  
## 91 1040 0 0 1040 0 0  
## 103 1535 0 0 1535 0 0  
## 157 1040 0 0 1040 0 0  
## 183 1340 0 0 1340 0 0  
## 260 882 0 0 882 0 0  
## 343 1040 0 0 1040 0 0  
## 363 495 1427 0 1922 0 0  
## 372 1120 468 0 1588 0 0  
## 393 882 0 0 882 0 0  
## 521 694 600 0 1294 0 0  
## 533 827 0 0 827 0 0  
## 534 334 0 0 334 0 0  
## 554 1126 0 0 1126 0 0  
## 647 1048 0 0 1048 0 0  
## 706 372 720 0 1092 0 0  
## 737 1040 0 0 1040 0 0  
## 750 1088 441 0 1529 0 0  
## 779 2020 0 0 2020 0 0  
## 869 1547 720 53 2320 0 0  
## 895 1535 0 0 1535 0 0  
## 898 1120 1120 0 2240 0 0  
## 949 936 840 0 1776 0 0  
## 985 1302 432 0 1734 0 0  
## 1001 944 0 0 944 0 0  
## 1012 1664 0 0 1664 0 0  
## 1036 845 0 0 845 0 0  
## 1046 1733 0 0 1733 0 0  
## 1049 1771 0 0 1771 0 0  
## 1050 930 0 0 930 0 0  
## 1091 1040 0 0 1040 0 0  
## 1180 1124 0 0 1124 0 0  
## 1217 1318 584 0 1902 0 0  
## 1219 672 240 0 912 0 0  
## 1233 1224 0 0 1224 0 0  
## 1322 720 0 0 720 0 0  
## 1413 1040 0 0 1040 0 0  
## FullBath HalfBath BedroomAbvGr KitchenAbvGr KitchenQual TotRmsAbvGrd  
## 18 2 0 2 2 TA 6  
## 40 2 0 2 2 Fa 6  
## 91 1 0 2 1 TA 4  
## 103 2 0 4 2 TA 8  
## 157 1 0 2 1 TA 5  
## 183 1 0 3 1 TA 7  
## 260 1 0 2 1 TA 4  
## 343 2 0 2 2 TA 6  
## 363 3 0 4 1 Gd 7  
## 372 2 0 4 1 TA 7  
## 393 1 0 3 1 TA 5  
## 521 2 0 3 2 TA 7  
## 533 1 0 2 1 TA 5  
## 534 1 0 1 1 Fa 2  
## 554 2 0 2 1 Gd 5  
## 647 1 0 3 1 TA 7  
## 706 2 0 3 2 Fa 7  
## 737 2 0 2 2 TA 6  
## 750 2 0 4 1 TA 9  
## 779 2 0 4 2 TA 10  
## 869 2 0 2 1 TA 7  
## 895 2 0 4 2 TA 8  
## 898 2 0 6 2 TA 12  
## 949 2 1 3 1 Gd 7  
## 985 2 0 4 2 Gd 8  
## 1001 1 0 2 1 Fa 4  
## 1012 2 0 4 2 TA 8  
## 1036 1 0 3 1 TA 5  
## 1046 2 0 4 1 TA 8  
## 1049 1 0 3 1 TA 9  
## 1050 1 0 2 1 Gd 6  
## 1091 2 0 2 2 TA 6  
## 1180 1 0 3 1 TA 5  
## 1217 2 0 4 2 TA 8  
## 1219 1 0 2 1 TA 3  
## 1233 2 0 2 2 TA 6  
## 1322 1 0 2 1 TA 4  
## 1413 2 0 2 2 TA 6  
## Functional Fireplaces FireplaceQu GarageType GarageYrBlt GarageFinish  
## 18 Typ 0 <NA> CarPort 1967 Unf  
## 40 Typ 0 <NA> <NA> NA <NA>  
## 91 Typ 0 <NA> Detchd 1950 Unf  
## 103 Typ 0 <NA> Attchd 1979 Unf  
## 157 Typ 0 <NA> Detchd 1950 Unf  
## 183 Typ 1 Gd Attchd 1957 RFn  
## 260 Typ 0 <NA> Detchd 1956 Unf  
## 343 Typ 0 <NA> Detchd 1949 Unf  
## 363 Typ 1 Ex BuiltIn 2003 RFn  
## 372 Min2 1 Gd Detchd 1991 Fin  
## 393 Typ 0 <NA> Attchd 1959 RFn  
## 521 Typ 0 <NA> <NA> NA <NA>  
## 533 Mod 1 Po Detchd 1967 Unf  
## 534 Typ 0 <NA> <NA> NA <NA>  
## 554 Typ 0 <NA> Detchd 2002 Fin  
## 647 Min1 0 <NA> Detchd 1950 Unf  
## 706 Mod 0 <NA> <NA> NA <NA>  
## 737 Typ 0 <NA> Detchd 1949 Unf  
## 750 Mod 0 <NA> Detchd 1945 Unf  
## 779 Typ 2 TA Detchd 1977 Unf  
## 869 Typ 1 TA Attchd 1979 Unf  
## 895 Typ 0 <NA> Attchd 1979 Unf  
## 898 Typ 0 <NA> Detchd 1979 Unf  
## 949 Typ 1 TA Attchd 2002 RFn  
## 985 Typ 0 <NA> Attchd 1977 Unf  
## 1001 Min1 0 <NA> Detchd 1956 Unf  
## 1012 Typ 0 <NA> <NA> NA <NA>  
## 1036 Typ 0 <NA> Detchd 1957 Unf  
## 1046 Min2 1 Gd Attchd 1955 Unf  
## 1049 Min1 1 TA Attchd 1960 Unf  
## 1050 Typ 0 <NA> Detchd 1946 Unf  
## 1091 Typ 0 <NA> Detchd 1987 Unf  
## 1180 Min2 1 Gd <NA> NA <NA>  
## 1217 Typ 0 <NA> Attchd 1978 Unf  
## 1219 Typ 0 <NA> <NA> NA <NA>  
## 1233 Typ 0 <NA> CarPort 1962 Unf  
## 1322 Typ 0 <NA> Detchd 1955 Unf  
## 1413 Typ 0 <NA> Detchd 1956 Unf  
## GarageCars GarageArea GarageQual GarageCond PavedDrive WoodDeckSF  
## 18 2 516 TA TA Y 0  
## 40 0 0 <NA> <NA> N 0  
## 91 2 420 TA TA Y 0  
## 103 2 410 TA TA Y 0  
## 157 2 625 TA TA Y 0  
## 183 1 252 TA TA Y 116  
## 260 1 308 TA TA Y 0  
## 343 2 400 TA TA Y 0  
## 363 2 672 TA TA Y 0  
## 372 2 680 TA TA N 0  
## 393 1 294 TA TA Y 0  
## 521 0 0 <NA> <NA> N 220  
## 533 1 392 TA TA Y 0  
## 534 0 0 <NA> <NA> N 0  
## 554 2 520 TA TA N 0  
## 647 2 420 TA TA Y 0  
## 706 0 0 <NA> <NA> N 0  
## 737 2 400 TA TA Y 0  
## 750 1 240 TA TA N 92  
## 779 2 630 TA TA Y 0  
## 869 2 672 TA TA P 120  
## 895 2 400 TA TA Y 0  
## 898 2 528 TA TA Y 154  
## 949 2 474 TA TA Y 144  
## 985 2 539 TA TA Y 0  
## 1001 2 528 TA Fa Y 0  
## 1012 0 0 <NA> <NA> Y 0  
## 1036 1 290 TA TA N 186  
## 1046 2 452 TA TA Y 0  
## 1049 2 336 TA TA Y 0  
## 1050 1 308 TA TA Y 0  
## 1091 2 400 TA TA Y 0  
## 1180 0 0 <NA> <NA> N 0  
## 1217 2 539 TA TA Y 0  
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## 1233 2 462 TA TA Y 0  
## 1322 1 287 TA Fa Y 0  
## 1413 2 420 TA TA Y 0  
## OpenPorchSF EnclosedPorch X3SsnPorch ScreenPorch PoolArea PoolQC  
## 18 0 0 0 0 0 <NA>  
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## 91 29 0 0 0 0 <NA>  
## 103 0 0 0 0 0 <NA>  
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## 183 0 0 180 0 0 <NA>  
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## 372 59 0 0 0 0 <NA>  
## 393 0 0 0 0 0 <NA>  
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## 1217 0 0 0 0 0 <NA>  
## 1219 0 0 0 0 0 <NA>  
## 1233 0 0 0 0 0 <NA>  
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## 1413 0 0 0 0 0 <NA>  
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## 18 <NA> Shed 500 10 2006 WD Normal  
## 40 <NA> <NA> 0 6 2008 WD AdjLand  
## 91 <NA> <NA> 0 7 2006 WD Normal  
## 103 <NA> <NA> 0 6 2009 WD Alloca  
## 157 <NA> <NA> 0 6 2006 WD Normal  
## 183 MnPrv <NA> 0 6 2007 WD Normal  
## 260 <NA> <NA> 0 12 2008 WD Normal  
## 343 <NA> <NA> 0 5 2006 WD Normal  
## 363 <NA> <NA> 0 7 2009 ConLD Normal  
## 372 <NA> <NA> 0 7 2008 WD Normal  
## 393 MnPrv Shed 1200 7 2007 WD Normal  
## 521 <NA> <NA> 0 8 2008 WD Normal  
## 533 <NA> <NA> 0 4 2010 WD Normal  
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## 737 <NA> <NA> 0 7 2006 WD Normal  
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## 1049 GdPrv <NA> 0 11 2009 WD Normal  
## 1050 <NA> <NA> 0 4 2010 WD Abnorml  
## 1091 <NA> <NA> 0 6 2009 WD Normal  
## 1180 <NA> <NA> 0 4 2006 WD Normal  
## 1217 <NA> <NA> 0 4 2010 WD Normal  
## 1219 <NA> <NA> 0 7 2006 WD Normal  
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## 1413 <NA> <NA> 0 6 2009 WD Normal  
## SalePrice  
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## 40 82000  
## 91 109900  
## 103 118964  
## 157 109500  
## 183 120000  
## 260 97000  
## 343 87500  
## 363 198500  
## 372 134432  
## 393 106500  
## 521 106250  
## 533 107500  
## 534 39300  
## 554 108000  
## 647 98300  
## 706 55000  
## 737 93500  
## 750 98000  
## 779 144000  
## 869 169000  
## 895 118858  
## 898 142953  
## 949 192500  
## 985 126000  
## 1001 82000  
## 1012 100000  
## 1036 84000  
## 1046 139600  
## 1049 115000  
## 1050 84900  
## 1091 92900  
## 1180 93000  
## 1217 112000  
## 1219 80500  
## 1233 101800  
## 1322 72500  
## 1413 90000

Here we can see that they all overlap and there is a pattern here. They are all basement, perhaps there is somthing odd about the basement. Looking in the data dictionary confirms our suspicions, NA repersents No basements for all of there variables. These are not missing values, and NA is a very meaningful entry. I don’t like the use of NA, I would rather use a more descriptive categorical name: NoB

v = 1  
while (v<1453){  
 if (is.na(modified\_data$BsmtQual[v])){  
 modified\_data$BsmtQual[v] = "NoB"  
 }  
 if (is.na(modified\_data$BsmtCond[v])){  
 modified\_data$BsmtCond[v] = "NoB"  
 }  
 if (is.na(modified\_data$BsmtExposure[v])){  
 modified\_data$BsmtExposure[v] = "NoB"  
 }  
 if (is.na(modified\_data$BsmtFinType1[v])){  
 modified\_data$BsmtFinType1[v] = "NoB"  
 }  
 if (is.na(modified\_data$BsmtFinType2[v])){  
 modified\_data$BsmtFinType2[v] = "NoB"  
 }  
 v = v + 1  
}  
Bsmt1 <- subset(modified\_data, modified\_data$BsmtExposure == "NoB")  
Bsmt1

## Id MSSubClass MSZoning LotFrontage LotArea Street Alley LotShape  
## 18 18 90 RL 72 10791 Pave None Reg  
## 40 40 90 RL 65 6040 Pave None Reg  
## 91 91 20 RL 60 7200 Pave None Reg  
## 103 103 90 RL 64 7018 Pave None Reg  
## 157 157 20 RL 60 7200 Pave None Reg  
## 183 183 20 RL 60 9060 Pave None Reg  
## 260 260 20 RM 70 12702 Pave None Reg  
## 343 343 90 RL 0 8544 Pave None Reg  
## 363 363 85 RL 64 7301 Pave None Reg  
## 372 372 50 RL 80 17120 Pave None Reg  
## 393 393 20 RL 0 8339 Pave None IR1  
## 521 521 190 RL 60 10800 Pave Grvl Reg  
## 533 533 20 RL 60 7200 Pave None Reg  
## 534 534 20 RL 50 5000 Pave None Reg  
## 554 554 20 RL 67 8777 Pave None Reg  
## 647 647 20 RL 60 7200 Pave None Reg  
## 706 706 190 RM 70 5600 Pave None Reg  
## 737 737 90 RL 60 8544 Pave None Reg  
## 750 750 50 RL 50 8405 Pave None Reg  
## 779 779 90 RH 60 8400 Pave None Reg  
## 869 869 60 RL 0 14762 Pave None IR2  
## 895 895 90 RL 64 7018 Pave None Reg  
## 898 898 90 RL 64 7018 Pave None Reg  
## 949 949 60 RL 65 14006 Pave None IR1  
## 985 985 90 RL 75 10125 Pave None Reg  
## 1001 1001 20 RL 74 10206 Pave None Reg  
## 1012 1012 90 RL 75 9825 Pave None Reg  
## 1036 1036 20 RL 0 11500 Pave None IR1  
## 1046 1046 20 RL 0 13680 Pave None IR1  
## 1049 1049 20 RL 100 21750 Pave None Reg  
## 1050 1050 20 RL 60 11100 Pave None Reg  
## 1091 1091 90 RL 60 8544 Pave None Reg  
## 1180 1180 20 RL 77 8335 Pave None Reg  
## 1217 1217 90 RM 68 8930 Pave None Reg  
## 1219 1219 50 RM 52 6240 Pave None Reg  
## 1233 1233 90 RL 70 9842 Pave None Reg  
## 1322 1322 20 RL 0 6627 Pave None IR1  
## 1413 1413 90 RL 60 7200 Pave None Reg  
## LandContour Utilities LotConfig LandSlope Neighborhood Condition1  
## 18 Lvl AllPub Inside Gtl Sawyer Norm  
## 40 Lvl AllPub Inside Gtl Edwards Norm  
## 91 Lvl AllPub Inside Gtl NAmes Norm  
## 103 Bnk AllPub Inside Gtl SawyerW Norm  
## 157 Lvl AllPub Inside Gtl NAmes Norm  
## 183 Lvl AllPub Inside Gtl Edwards Artery  
## 260 Lvl AllPub Inside Gtl OldTown Norm  
## 343 Lvl AllPub Inside Gtl NAmes Norm  
## 363 Lvl AllPub Corner Gtl Edwards Norm  
## 372 Lvl AllPub Inside Gtl ClearCr Feedr  
## 393 Lvl AllPub Inside Gtl NAmes Norm  
## 521 Lvl AllPub Inside Gtl OldTown Norm  
## 533 Lvl AllPub Inside Gtl NAmes Norm  
## 534 Low AllPub Inside Mod BrkSide Norm  
## 554 Lvl AllPub Inside Gtl Edwards Feedr  
## 647 Lvl AllPub Inside Gtl NAmes Norm  
## 706 Lvl AllPub Inside Gtl IDOTRR Norm  
## 737 Lvl AllPub Inside Gtl NAmes Norm  
## 750 Lvl AllPub Inside Gtl Edwards Norm  
## 779 Lvl AllPub Inside Gtl SawyerW Feedr  
## 869 Lvl AllPub Corner Gtl Gilbert Feedr  
## 895 Bnk AllPub Inside Gtl SawyerW Norm  
## 898 Lvl AllPub Inside Gtl SawyerW Feedr  
## 949 Lvl AllPub Inside Gtl CollgCr Norm  
## 985 Lvl AllPub Inside Gtl Mitchel Norm  
## 1001 Lvl AllPub Corner Gtl Edwards Norm  
## 1012 Lvl AllPub Inside Gtl Edwards Norm  
## 1036 Lvl AllPub CulDSac Gtl Edwards Norm  
## 1046 Lvl AllPub CulDSac Gtl Edwards Norm  
## 1049 Lvl AllPub Inside Gtl Mitchel Norm  
## 1050 Low AllPub Inside Gtl Edwards Norm  
## 1091 Lvl AllPub Corner Gtl NAmes Norm  
## 1180 Lvl AllPub Corner Gtl Edwards Norm  
## 1217 Lvl AllPub Inside Gtl Sawyer RRAe  
## 1219 Lvl AllPub Inside Gtl BrkSide Norm  
## 1233 Lvl AllPub FR2 Gtl NAmes Norm  
## 1322 Lvl AllPub Corner Gtl BrkSide Feedr  
## 1413 Lvl AllPub Inside Gtl NAmes Norm  
## Condition2 BldgType HouseStyle OverallQual OverallCond YearBuilt  
## 18 Norm Duplex 1Story 4 5 1967  
## 40 Norm Duplex 1Story 4 5 1955  
## 91 Norm 1Fam 1Story 4 5 1950  
## 103 Norm Duplex 1Story 5 5 1979  
## 157 Norm 1Fam 1Story 5 7 1950  
## 183 Norm 1Fam 1Story 5 6 1957  
## 260 Norm 1Fam 1Story 5 5 1956  
## 343 Norm Duplex 1Story 3 4 1949  
## 363 Norm 1Fam SFoyer 7 5 2003  
## 372 Norm 1Fam 1.5Fin 4 4 1959  
## 393 Norm 1Fam 1Story 5 7 1959  
## 521 Norm 2fmCon 2Story 4 7 1900  
## 533 Norm 1Fam 1Story 5 7 1955  
## 534 Norm 1Fam 1Story 1 3 1946  
## 554 Norm 1Fam 1Story 4 5 1949  
## 647 Norm 1Fam 1Story 5 5 1950  
## 706 Norm 2fmCon 2Story 4 5 1930  
## 737 Norm Duplex 1Story 3 4 1950  
## 750 Norm 1Fam 1.5Fin 4 3 1945  
## 779 Norm Duplex 1Story 5 5 1977  
## 869 Norm 1Fam 2Story 5 6 1948  
## 895 Norm Duplex 1Story 5 5 1979  
## 898 Norm Duplex 2Story 5 5 1979  
## 949 Norm 1Fam 2Story 7 5 2002  
## 985 Norm Duplex 1.5Fin 5 5 1977  
## 1001 Norm 1Fam 1Story 3 3 1952  
## 1012 Norm Duplex 1Story 5 5 1965  
## 1036 Norm 1Fam 1Story 4 3 1957  
## 1046 Norm 1Fam 1Story 3 5 1955  
## 1049 Norm 1Fam 1Story 5 4 1960  
## 1050 Norm 1Fam 1Story 4 7 1946  
## 1091 Norm Duplex 1Story 3 4 1950  
## 1180 Norm 1Fam 1Story 5 5 1954  
## 1217 Norm Duplex 1.5Fin 6 5 1978  
## 1219 Norm 1Fam 1.5Fin 4 5 1947  
## 1233 Norm Duplex 1Story 4 5 1962  
## 1322 Norm 1Fam 1Story 3 6 1949  
## 1413 Norm Duplex 1Story 4 5 1949  
## YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  
## 18 1967 Gable CompShg MetalSd MetalSd None  
## 40 1955 Gable CompShg AsbShng Plywood None  
## 91 1950 Gable CompShg BrkFace Wd Sdng None  
## 103 1979 Gable CompShg HdBoard HdBoard None  
## 157 1950 Hip CompShg Wd Sdng Wd Sdng None  
## 183 2006 Hip CompShg Wd Sdng Wd Sdng BrkFace  
## 260 1956 Gable CompShg BrkFace BrkFace None  
## 343 1950 Gable CompShg Stucco Stucco BrkFace  
## 363 2003 Gable CompShg HdBoard HdBoard BrkFace  
## 372 1959 Gable CompShg WdShing Plywood None  
## 393 1959 Gable CompShg MetalSd MetalSd None  
## 521 2000 Gable CompShg MetalSd MetalSd None  
## 533 2007 Gable CompShg VinylSd VinylSd None  
## 534 1950 Gable CompShg VinylSd VinylSd None  
## 554 2003 Gable CompShg VinylSd VinylSd None  
## 647 1950 Hip CompShg MetalSd MetalSd None  
## 706 1950 Hip CompShg VinylSd Wd Shng None  
## 737 1950 Gable CompShg Stucco Stone None  
## 750 1950 Gable CompShg WdShing Wd Shng None  
## 779 1977 Gable CompShg Plywood Plywood BrkFace  
## 869 1950 Gable CompShg Plywood Plywood None  
## 895 1979 Gable CompShg Plywood Plywood None  
## 898 1979 Gable CompShg Plywood Plywood None  
## 949 2002 Gable CompShg VinylSd VinylSd BrkFace  
## 985 1977 Gable CompShg Plywood Plywood None  
## 1001 1952 Flat Tar&Grv BrkComm Brk Cmn None  
## 1012 1965 Hip CompShg AsphShn AsphShn None  
## 1036 1957 Gable CompShg Wd Sdng Wd Sdng None  
## 1046 1955 Hip CompShg BrkFace Wd Sdng None  
## 1049 2006 Hip CompShg HdBoard HdBoard BrkFace  
## 1050 2006 Gable CompShg MetalSd MetalSd None  
## 1091 1950 Gable CompShg BrkFace BrkFace None  
## 1180 1954 Gable CompShg Wd Sdng Wd Sdng None  
## 1217 1978 Gable CompShg VinylSd VinylSd None  
## 1219 1950 Gable CompShg AsbShng AsbShng None  
## 1233 1962 Gable CompShg HdBoard HdBoard None  
## 1322 1950 Hip CompShg VinylSd VinylSd None  
## 1413 1950 Gable CompShg BrkFace Stone None  
## MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond  
## 18 0 TA TA Slab NoB NoB  
## 40 0 TA TA PConc NoB NoB  
## 91 0 TA TA Slab NoB NoB  
## 103 0 TA Fa Slab NoB NoB  
## 157 0 TA TA CBlock NoB NoB  
## 183 98 TA TA PConc NoB NoB  
## 260 0 TA TA PConc NoB NoB  
## 343 340 TA TA Slab NoB NoB  
## 363 500 Gd TA Slab NoB NoB  
## 372 0 TA TA CBlock NoB NoB  
## 393 0 TA TA Slab NoB NoB  
## 521 0 TA TA BrkTil NoB NoB  
## 533 0 TA TA Slab NoB NoB  
## 534 0 Fa Fa Slab NoB NoB  
## 554 0 TA TA CBlock NoB NoB  
## 647 0 TA TA CBlock NoB NoB  
## 706 0 Fa Fa Slab NoB NoB  
## 737 0 TA TA CBlock NoB NoB  
## 750 0 TA TA Slab NoB NoB  
## 779 320 TA TA Slab NoB NoB  
## 869 0 TA TA Slab NoB NoB  
## 895 0 TA TA Slab NoB NoB  
## 898 0 TA TA Slab NoB NoB  
## 949 144 Gd TA PConc Gd TA  
## 985 0 TA TA CBlock NoB NoB  
## 1001 0 TA TA Slab NoB NoB  
## 1012 0 TA TA CBlock NoB NoB  
## 1036 0 TA Gd Slab NoB NoB  
## 1046 0 TA TA Slab NoB NoB  
## 1049 75 TA Fa Slab NoB NoB  
## 1050 0 TA TA CBlock NoB NoB  
## 1091 0 TA TA Slab NoB NoB  
## 1180 0 TA TA Slab NoB NoB  
## 1217 0 TA TA Slab NoB NoB  
## 1219 0 TA TA Slab NoB NoB  
## 1233 0 TA TA Slab NoB NoB  
## 1322 0 TA TA CBlock NoB NoB  
## 1413 0 TA TA Slab NoB NoB  
## BsmtExposure BsmtFinType1 BsmtFinSF1 BsmtFinType2 BsmtFinSF2  
## 18 NoB NoB 0 NoB 0  
## 40 NoB NoB 0 NoB 0  
## 91 NoB NoB 0 NoB 0  
## 103 NoB NoB 0 NoB 0  
## 157 NoB NoB 0 NoB 0  
## 183 NoB NoB 0 NoB 0  
## 260 NoB NoB 0 NoB 0  
## 343 NoB NoB 0 NoB 0  
## 363 NoB NoB 0 NoB 0  
## 372 NoB NoB 0 NoB 0  
## 393 NoB NoB 0 NoB 0  
## 521 NoB NoB 0 NoB 0  
## 533 NoB NoB 0 NoB 0  
## 534 NoB NoB 0 NoB 0  
## 554 NoB NoB 0 NoB 0  
## 647 NoB NoB 0 NoB 0  
## 706 NoB NoB 0 NoB 0  
## 737 NoB NoB 0 NoB 0  
## 750 NoB NoB 0 NoB 0  
## 779 NoB NoB 0 NoB 0  
## 869 NoB NoB 0 NoB 0  
## 895 NoB NoB 0 NoB 0  
## 898 NoB NoB 0 NoB 0  
## 949 NoB Unf 0 Unf 0  
## 985 NoB NoB 0 NoB 0  
## 1001 NoB NoB 0 NoB 0  
## 1012 NoB NoB 0 NoB 0  
## 1036 NoB NoB 0 NoB 0  
## 1046 NoB NoB 0 NoB 0  
## 1049 NoB NoB 0 NoB 0  
## 1050 NoB NoB 0 NoB 0  
## 1091 NoB NoB 0 NoB 0  
## 1180 NoB NoB 0 NoB 0  
## 1217 NoB NoB 0 NoB 0  
## 1219 NoB NoB 0 NoB 0  
## 1233 NoB NoB 0 NoB 0  
## 1322 NoB NoB 0 NoB 0  
## 1413 NoB NoB 0 NoB 0  
## BsmtUnfSF TotalBsmtSF Heating HeatingQC CentralAir Electrical  
## 18 0 0 GasA TA Y SBrkr  
## 40 0 0 GasA TA N FuseP  
## 91 0 0 GasA TA Y FuseA  
## 103 0 0 GasA TA Y SBrkr  
## 157 0 0 GasA TA Y FuseF  
## 183 0 0 GasA Ex Y SBrkr  
## 260 0 0 GasA Gd Y FuseA  
## 343 0 0 Wall Fa N FuseA  
## 363 0 0 GasA Ex Y SBrkr  
## 372 0 0 GasA TA Y SBrkr  
## 393 0 0 GasA TA Y SBrkr  
## 521 0 0 GasA TA N FuseA  
## 533 0 0 GasA Ex Y SBrkr  
## 534 0 0 GasA Fa N FuseF  
## 554 0 0 GasA Ex Y SBrkr  
## 647 0 0 GasA Gd Y SBrkr  
## 706 0 0 GasA Fa N SBrkr  
## 737 0 0 GasA Gd N FuseF  
## 750 0 0 Wall TA N FuseF  
## 779 0 0 GasA TA Y SBrkr  
## 869 0 0 GasA Gd Y SBrkr  
## 895 0 0 GasA TA Y SBrkr  
## 898 0 0 GasA TA Y SBrkr  
## 949 936 936 GasA Ex Y SBrkr  
## 985 0 0 GasA TA Y SBrkr  
## 1001 0 0 GasW Fa N FuseF  
## 1012 0 0 GasA TA N SBrkr  
## 1036 0 0 GasA Ex N SBrkr  
## 1046 0 0 GasA Ex Y FuseA  
## 1049 0 0 GasA TA Y SBrkr  
## 1050 0 0 GasA Ex Y SBrkr  
## 1091 0 0 Wall Fa N FuseA  
## 1180 0 0 GasA Gd Y SBrkr  
## 1217 0 0 GasA TA Y SBrkr  
## 1219 0 0 GasA Gd N SBrkr  
## 1233 0 0 GasA TA Y SBrkr  
## 1322 0 0 Floor TA N SBrkr  
## 1413 0 0 Wall Fa N FuseF  
## X1stFlrSF X2ndFlrSF LowQualFinSF GrLivArea BsmtFullBath BsmtHalfBath  
## 18 1296 0 0 1296 0 0  
## 40 1152 0 0 1152 0 0  
## 91 1040 0 0 1040 0 0  
## 103 1535 0 0 1535 0 0  
## 157 1040 0 0 1040 0 0  
## 183 1340 0 0 1340 0 0  
## 260 882 0 0 882 0 0  
## 343 1040 0 0 1040 0 0  
## 363 495 1427 0 1922 0 0  
## 372 1120 468 0 1588 0 0  
## 393 882 0 0 882 0 0  
## 521 694 600 0 1294 0 0  
## 533 827 0 0 827 0 0  
## 534 334 0 0 334 0 0  
## 554 1126 0 0 1126 0 0  
## 647 1048 0 0 1048 0 0  
## 706 372 720 0 1092 0 0  
## 737 1040 0 0 1040 0 0  
## 750 1088 441 0 1529 0 0  
## 779 2020 0 0 2020 0 0  
## 869 1547 720 53 2320 0 0  
## 895 1535 0 0 1535 0 0  
## 898 1120 1120 0 2240 0 0  
## 949 936 840 0 1776 0 0  
## 985 1302 432 0 1734 0 0  
## 1001 944 0 0 944 0 0  
## 1012 1664 0 0 1664 0 0  
## 1036 845 0 0 845 0 0  
## 1046 1733 0 0 1733 0 0  
## 1049 1771 0 0 1771 0 0  
## 1050 930 0 0 930 0 0  
## 1091 1040 0 0 1040 0 0  
## 1180 1124 0 0 1124 0 0  
## 1217 1318 584 0 1902 0 0  
## 1219 672 240 0 912 0 0  
## 1233 1224 0 0 1224 0 0  
## 1322 720 0 0 720 0 0  
## 1413 1040 0 0 1040 0 0  
## FullBath HalfBath BedroomAbvGr KitchenAbvGr KitchenQual TotRmsAbvGrd  
## 18 2 0 2 2 TA 6  
## 40 2 0 2 2 Fa 6  
## 91 1 0 2 1 TA 4  
## 103 2 0 4 2 TA 8  
## 157 1 0 2 1 TA 5  
## 183 1 0 3 1 TA 7  
## 260 1 0 2 1 TA 4  
## 343 2 0 2 2 TA 6  
## 363 3 0 4 1 Gd 7  
## 372 2 0 4 1 TA 7  
## 393 1 0 3 1 TA 5  
## 521 2 0 3 2 TA 7  
## 533 1 0 2 1 TA 5  
## 534 1 0 1 1 Fa 2  
## 554 2 0 2 1 Gd 5  
## 647 1 0 3 1 TA 7  
## 706 2 0 3 2 Fa 7  
## 737 2 0 2 2 TA 6  
## 750 2 0 4 1 TA 9  
## 779 2 0 4 2 TA 10  
## 869 2 0 2 1 TA 7  
## 895 2 0 4 2 TA 8  
## 898 2 0 6 2 TA 12  
## 949 2 1 3 1 Gd 7  
## 985 2 0 4 2 Gd 8  
## 1001 1 0 2 1 Fa 4  
## 1012 2 0 4 2 TA 8  
## 1036 1 0 3 1 TA 5  
## 1046 2 0 4 1 TA 8  
## 1049 1 0 3 1 TA 9  
## 1050 1 0 2 1 Gd 6  
## 1091 2 0 2 2 TA 6  
## 1180 1 0 3 1 TA 5  
## 1217 2 0 4 2 TA 8  
## 1219 1 0 2 1 TA 3  
## 1233 2 0 2 2 TA 6  
## 1322 1 0 2 1 TA 4  
## 1413 2 0 2 2 TA 6  
## Functional Fireplaces FireplaceQu GarageType GarageYrBlt GarageFinish  
## 18 Typ 0 <NA> CarPort 1967 Unf  
## 40 Typ 0 <NA> <NA> NA <NA>  
## 91 Typ 0 <NA> Detchd 1950 Unf  
## 103 Typ 0 <NA> Attchd 1979 Unf  
## 157 Typ 0 <NA> Detchd 1950 Unf  
## 183 Typ 1 Gd Attchd 1957 RFn  
## 260 Typ 0 <NA> Detchd 1956 Unf  
## 343 Typ 0 <NA> Detchd 1949 Unf  
## 363 Typ 1 Ex BuiltIn 2003 RFn  
## 372 Min2 1 Gd Detchd 1991 Fin  
## 393 Typ 0 <NA> Attchd 1959 RFn  
## 521 Typ 0 <NA> <NA> NA <NA>  
## 533 Mod 1 Po Detchd 1967 Unf  
## 534 Typ 0 <NA> <NA> NA <NA>  
## 554 Typ 0 <NA> Detchd 2002 Fin  
## 647 Min1 0 <NA> Detchd 1950 Unf  
## 706 Mod 0 <NA> <NA> NA <NA>  
## 737 Typ 0 <NA> Detchd 1949 Unf  
## 750 Mod 0 <NA> Detchd 1945 Unf  
## 779 Typ 2 TA Detchd 1977 Unf  
## 869 Typ 1 TA Attchd 1979 Unf  
## 895 Typ 0 <NA> Attchd 1979 Unf  
## 898 Typ 0 <NA> Detchd 1979 Unf  
## 949 Typ 1 TA Attchd 2002 RFn  
## 985 Typ 0 <NA> Attchd 1977 Unf  
## 1001 Min1 0 <NA> Detchd 1956 Unf  
## 1012 Typ 0 <NA> <NA> NA <NA>  
## 1036 Typ 0 <NA> Detchd 1957 Unf  
## 1046 Min2 1 Gd Attchd 1955 Unf  
## 1049 Min1 1 TA Attchd 1960 Unf  
## 1050 Typ 0 <NA> Detchd 1946 Unf  
## 1091 Typ 0 <NA> Detchd 1987 Unf  
## 1180 Min2 1 Gd <NA> NA <NA>  
## 1217 Typ 0 <NA> Attchd 1978 Unf  
## 1219 Typ 0 <NA> <NA> NA <NA>  
## 1233 Typ 0 <NA> CarPort 1962 Unf  
## 1322 Typ 0 <NA> Detchd 1955 Unf  
## 1413 Typ 0 <NA> Detchd 1956 Unf  
## GarageCars GarageArea GarageQual GarageCond PavedDrive WoodDeckSF  
## 18 2 516 TA TA Y 0  
## 40 0 0 <NA> <NA> N 0  
## 91 2 420 TA TA Y 0  
## 103 2 410 TA TA Y 0  
## 157 2 625 TA TA Y 0  
## 183 1 252 TA TA Y 116  
## 260 1 308 TA TA Y 0  
## 343 2 400 TA TA Y 0  
## 363 2 672 TA TA Y 0  
## 372 2 680 TA TA N 0  
## 393 1 294 TA TA Y 0  
## 521 0 0 <NA> <NA> N 220  
## 533 1 392 TA TA Y 0  
## 534 0 0 <NA> <NA> N 0  
## 554 2 520 TA TA N 0  
## 647 2 420 TA TA Y 0  
## 706 0 0 <NA> <NA> N 0  
## 737 2 400 TA TA Y 0  
## 750 1 240 TA TA N 92  
## 779 2 630 TA TA Y 0  
## 869 2 672 TA TA P 120  
## 895 2 400 TA TA Y 0  
## 898 2 528 TA TA Y 154  
## 949 2 474 TA TA Y 144  
## 985 2 539 TA TA Y 0  
## 1001 2 528 TA Fa Y 0  
## 1012 0 0 <NA> <NA> Y 0  
## 1036 1 290 TA TA N 186  
## 1046 2 452 TA TA Y 0  
## 1049 2 336 TA TA Y 0  
## 1050 1 308 TA TA Y 0  
## 1091 2 400 TA TA Y 0  
## 1180 0 0 <NA> <NA> N 0  
## 1217 2 539 TA TA Y 0  
## 1219 0 0 <NA> <NA> N 0  
## 1233 2 462 TA TA Y 0  
## 1322 1 287 TA Fa Y 0  
## 1413 2 420 TA TA Y 0  
## OpenPorchSF EnclosedPorch X3SsnPorch ScreenPorch PoolArea PoolQC  
## 18 0 0 0 0 0 <NA>  
## 40 0 0 0 0 0 <NA>  
## 91 29 0 0 0 0 <NA>  
## 103 0 0 0 0 0 <NA>  
## 157 0 0 0 0 0 <NA>  
## 183 0 0 180 0 0 <NA>  
## 260 45 0 0 0 0 <NA>  
## 343 0 0 0 0 0 <NA>  
## 363 0 177 0 0 0 <NA>  
## 372 59 0 0 0 0 <NA>  
## 393 0 0 0 0 0 <NA>  
## 521 114 210 0 0 0 <NA>  
## 533 0 0 0 0 0 <NA>  
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## 554 96 0 0 0 0 <NA>  
## 647 27 0 0 0 0 <NA>  
## 706 0 0 0 0 0 <NA>  
## 737 0 0 0 0 0 <NA>  
## 750 0 185 0 0 0 <NA>  
## 779 0 0 0 0 0 <NA>  
## 869 144 0 0 0 0 <NA>  
## 895 0 0 0 0 0 <NA>  
## 898 0 0 0 0 0 <NA>  
## 949 96 0 0 0 0 <NA>  
## 985 0 0 0 0 0 <NA>  
## 1001 0 0 0 0 0 <NA>  
## 1012 0 0 0 0 0 <NA>  
## 1036 0 0 0 0 0 <NA>  
## 1046 0 0 0 0 0 <NA>  
## 1049 0 0 0 0 0 <NA>  
## 1050 0 0 0 0 0 <NA>  
## 1091 0 0 0 0 0 <NA>  
## 1180 36 190 0 0 0 <NA>  
## 1217 0 0 0 0 0 <NA>  
## 1219 0 0 0 0 0 <NA>  
## 1233 0 0 0 0 0 <NA>  
## 1322 0 0 0 0 0 <NA>  
## 1413 0 0 0 0 0 <NA>  
## Fence MiscFeature MiscVal MoSold YrSold SaleType SaleCondition  
## 18 <NA> Shed 500 10 2006 WD Normal  
## 40 <NA> <NA> 0 6 2008 WD AdjLand  
## 91 <NA> <NA> 0 7 2006 WD Normal  
## 103 <NA> <NA> 0 6 2009 WD Alloca  
## 157 <NA> <NA> 0 6 2006 WD Normal  
## 183 MnPrv <NA> 0 6 2007 WD Normal  
## 260 <NA> <NA> 0 12 2008 WD Normal  
## 343 <NA> <NA> 0 5 2006 WD Normal  
## 363 <NA> <NA> 0 7 2009 ConLD Normal  
## 372 <NA> <NA> 0 7 2008 WD Normal  
## 393 MnPrv Shed 1200 7 2007 WD Normal  
## 521 <NA> <NA> 0 8 2008 WD Normal  
## 533 <NA> <NA> 0 4 2010 WD Normal  
## 534 <NA> <NA> 0 1 2007 WD Normal  
## 554 MnPrv <NA> 0 5 2009 WD Normal  
## 647 <NA> <NA> 0 7 2008 WD Normal  
## 706 <NA> Othr 3500 7 2010 WD Normal  
## 737 <NA> <NA> 0 7 2006 WD Normal  
## 750 <NA> <NA> 0 4 2009 WD Normal  
## 779 <NA> <NA> 0 10 2007 WD Normal  
## 869 <NA> <NA> 0 5 2006 WD Normal  
## 895 <NA> <NA> 0 6 2009 WD Alloca  
## 898 <NA> <NA> 0 6 2009 WD Alloca  
## 949 <NA> <NA> 0 2 2006 WD Normal  
## 985 <NA> <NA> 0 8 2009 COD Normal  
## 1001 <NA> <NA> 0 7 2009 WD Normal  
## 1012 <NA> <NA> 0 5 2010 WD Normal  
## 1036 <NA> <NA> 0 1 2009 WD Normal  
## 1046 <NA> <NA> 0 6 2009 WD Normal  
## 1049 GdPrv <NA> 0 11 2009 WD Normal  
## 1050 <NA> <NA> 0 4 2010 WD Abnorml  
## 1091 <NA> <NA> 0 6 2009 WD Normal  
## 1180 <NA> <NA> 0 4 2006 WD Normal  
## 1217 <NA> <NA> 0 4 2010 WD Normal  
## 1219 <NA> <NA> 0 7 2006 WD Normal  
## 1233 <NA> <NA> 0 3 2007 WD Normal  
## 1322 <NA> <NA> 0 7 2008 WD Normal  
## 1413 <NA> <NA> 0 6 2009 WD Normal  
## SalePrice  
## 18 90000  
## 40 82000  
## 91 109900  
## 103 118964  
## 157 109500  
## 183 120000  
## 260 97000  
## 343 87500  
## 363 198500  
## 372 134432  
## 393 106500  
## 521 106250  
## 533 107500  
## 534 39300  
## 554 108000  
## 647 98300  
## 706 55000  
## 737 93500  
## 750 98000  
## 779 144000  
## 869 169000  
## 895 118858  
## 898 142953  
## 949 192500  
## 985 126000  
## 1001 82000  
## 1012 100000  
## 1036 84000  
## 1046 139600  
## 1049 115000  
## 1050 84900  
## 1091 92900  
## 1180 93000  
## 1217 112000  
## 1219 80500  
## 1233 101800  
## 1322 72500  
## 1413 90000

Bsmt2 <- subset(modified\_data, modified\_data$BsmtFinType2 == "NoB")  
Bsmt2

## Id MSSubClass MSZoning LotFrontage LotArea Street Alley LotShape  
## 18 18 90 RL 72 10791 Pave None Reg  
## 40 40 90 RL 65 6040 Pave None Reg  
## 91 91 20 RL 60 7200 Pave None Reg  
## 103 103 90 RL 64 7018 Pave None Reg  
## 157 157 20 RL 60 7200 Pave None Reg  
## 183 183 20 RL 60 9060 Pave None Reg  
## 260 260 20 RM 70 12702 Pave None Reg  
## 333 333 20 RL 85 10655 Pave None IR1  
## 343 343 90 RL 0 8544 Pave None Reg  
## 363 363 85 RL 64 7301 Pave None Reg  
## 372 372 50 RL 80 17120 Pave None Reg  
## 393 393 20 RL 0 8339 Pave None IR1  
## 521 521 190 RL 60 10800 Pave Grvl Reg  
## 533 533 20 RL 60 7200 Pave None Reg  
## 534 534 20 RL 50 5000 Pave None Reg  
## 554 554 20 RL 67 8777 Pave None Reg  
## 647 647 20 RL 60 7200 Pave None Reg  
## 706 706 190 RM 70 5600 Pave None Reg  
## 737 737 90 RL 60 8544 Pave None Reg  
## 750 750 50 RL 50 8405 Pave None Reg  
## 779 779 90 RH 60 8400 Pave None Reg  
## 869 869 60 RL 0 14762 Pave None IR2  
## 895 895 90 RL 64 7018 Pave None Reg  
## 898 898 90 RL 64 7018 Pave None Reg  
## 985 985 90 RL 75 10125 Pave None Reg  
## 1001 1001 20 RL 74 10206 Pave None Reg  
## 1012 1012 90 RL 75 9825 Pave None Reg  
## 1036 1036 20 RL 0 11500 Pave None IR1  
## 1046 1046 20 RL 0 13680 Pave None IR1  
## 1049 1049 20 RL 100 21750 Pave None Reg  
## 1050 1050 20 RL 60 11100 Pave None Reg  
## 1091 1091 90 RL 60 8544 Pave None Reg  
## 1180 1180 20 RL 77 8335 Pave None Reg  
## 1217 1217 90 RM 68 8930 Pave None Reg  
## 1219 1219 50 RM 52 6240 Pave None Reg  
## 1233 1233 90 RL 70 9842 Pave None Reg  
## 1322 1322 20 RL 0 6627 Pave None IR1  
## 1413 1413 90 RL 60 7200 Pave None Reg  
## LandContour Utilities LotConfig LandSlope Neighborhood Condition1  
## 18 Lvl AllPub Inside Gtl Sawyer Norm  
## 40 Lvl AllPub Inside Gtl Edwards Norm  
## 91 Lvl AllPub Inside Gtl NAmes Norm  
## 103 Bnk AllPub Inside Gtl SawyerW Norm  
## 157 Lvl AllPub Inside Gtl NAmes Norm  
## 183 Lvl AllPub Inside Gtl Edwards Artery  
## 260 Lvl AllPub Inside Gtl OldTown Norm  
## 333 Lvl AllPub Inside Gtl NridgHt Norm  
## 343 Lvl AllPub Inside Gtl NAmes Norm  
## 363 Lvl AllPub Corner Gtl Edwards Norm  
## 372 Lvl AllPub Inside Gtl ClearCr Feedr  
## 393 Lvl AllPub Inside Gtl NAmes Norm  
## 521 Lvl AllPub Inside Gtl OldTown Norm  
## 533 Lvl AllPub Inside Gtl NAmes Norm  
## 534 Low AllPub Inside Mod BrkSide Norm  
## 554 Lvl AllPub Inside Gtl Edwards Feedr  
## 647 Lvl AllPub Inside Gtl NAmes Norm  
## 706 Lvl AllPub Inside Gtl IDOTRR Norm  
## 737 Lvl AllPub Inside Gtl NAmes Norm  
## 750 Lvl AllPub Inside Gtl Edwards Norm  
## 779 Lvl AllPub Inside Gtl SawyerW Feedr  
## 869 Lvl AllPub Corner Gtl Gilbert Feedr  
## 895 Bnk AllPub Inside Gtl SawyerW Norm  
## 898 Lvl AllPub Inside Gtl SawyerW Feedr  
## 985 Lvl AllPub Inside Gtl Mitchel Norm  
## 1001 Lvl AllPub Corner Gtl Edwards Norm  
## 1012 Lvl AllPub Inside Gtl Edwards Norm  
## 1036 Lvl AllPub CulDSac Gtl Edwards Norm  
## 1046 Lvl AllPub CulDSac Gtl Edwards Norm  
## 1049 Lvl AllPub Inside Gtl Mitchel Norm  
## 1050 Low AllPub Inside Gtl Edwards Norm  
## 1091 Lvl AllPub Corner Gtl NAmes Norm  
## 1180 Lvl AllPub Corner Gtl Edwards Norm  
## 1217 Lvl AllPub Inside Gtl Sawyer RRAe  
## 1219 Lvl AllPub Inside Gtl BrkSide Norm  
## 1233 Lvl AllPub FR2 Gtl NAmes Norm  
## 1322 Lvl AllPub Corner Gtl BrkSide Feedr  
## 1413 Lvl AllPub Inside Gtl NAmes Norm  
## Condition2 BldgType HouseStyle OverallQual OverallCond YearBuilt  
## 18 Norm Duplex 1Story 4 5 1967  
## 40 Norm Duplex 1Story 4 5 1955  
## 91 Norm 1Fam 1Story 4 5 1950  
## 103 Norm Duplex 1Story 5 5 1979  
## 157 Norm 1Fam 1Story 5 7 1950  
## 183 Norm 1Fam 1Story 5 6 1957  
## 260 Norm 1Fam 1Story 5 5 1956  
## 333 Norm 1Fam 1Story 8 5 2003  
## 343 Norm Duplex 1Story 3 4 1949  
## 363 Norm 1Fam SFoyer 7 5 2003  
## 372 Norm 1Fam 1.5Fin 4 4 1959  
## 393 Norm 1Fam 1Story 5 7 1959  
## 521 Norm 2fmCon 2Story 4 7 1900  
## 533 Norm 1Fam 1Story 5 7 1955  
## 534 Norm 1Fam 1Story 1 3 1946  
## 554 Norm 1Fam 1Story 4 5 1949  
## 647 Norm 1Fam 1Story 5 5 1950  
## 706 Norm 2fmCon 2Story 4 5 1930  
## 737 Norm Duplex 1Story 3 4 1950  
## 750 Norm 1Fam 1.5Fin 4 3 1945  
## 779 Norm Duplex 1Story 5 5 1977  
## 869 Norm 1Fam 2Story 5 6 1948  
## 895 Norm Duplex 1Story 5 5 1979  
## 898 Norm Duplex 2Story 5 5 1979  
## 985 Norm Duplex 1.5Fin 5 5 1977  
## 1001 Norm 1Fam 1Story 3 3 1952  
## 1012 Norm Duplex 1Story 5 5 1965  
## 1036 Norm 1Fam 1Story 4 3 1957  
## 1046 Norm 1Fam 1Story 3 5 1955  
## 1049 Norm 1Fam 1Story 5 4 1960  
## 1050 Norm 1Fam 1Story 4 7 1946  
## 1091 Norm Duplex 1Story 3 4 1950  
## 1180 Norm 1Fam 1Story 5 5 1954  
## 1217 Norm Duplex 1.5Fin 6 5 1978  
## 1219 Norm 1Fam 1.5Fin 4 5 1947  
## 1233 Norm Duplex 1Story 4 5 1962  
## 1322 Norm 1Fam 1Story 3 6 1949  
## 1413 Norm Duplex 1Story 4 5 1949  
## YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  
## 18 1967 Gable CompShg MetalSd MetalSd None  
## 40 1955 Gable CompShg AsbShng Plywood None  
## 91 1950 Gable CompShg BrkFace Wd Sdng None  
## 103 1979 Gable CompShg HdBoard HdBoard None  
## 157 1950 Hip CompShg Wd Sdng Wd Sdng None  
## 183 2006 Hip CompShg Wd Sdng Wd Sdng BrkFace  
## 260 1956 Gable CompShg BrkFace BrkFace None  
## 333 2004 Gable CompShg VinylSd VinylSd BrkFace  
## 343 1950 Gable CompShg Stucco Stucco BrkFace  
## 363 2003 Gable CompShg HdBoard HdBoard BrkFace  
## 372 1959 Gable CompShg WdShing Plywood None  
## 393 1959 Gable CompShg MetalSd MetalSd None  
## 521 2000 Gable CompShg MetalSd MetalSd None  
## 533 2007 Gable CompShg VinylSd VinylSd None  
## 534 1950 Gable CompShg VinylSd VinylSd None  
## 554 2003 Gable CompShg VinylSd VinylSd None  
## 647 1950 Hip CompShg MetalSd MetalSd None  
## 706 1950 Hip CompShg VinylSd Wd Shng None  
## 737 1950 Gable CompShg Stucco Stone None  
## 750 1950 Gable CompShg WdShing Wd Shng None  
## 779 1977 Gable CompShg Plywood Plywood BrkFace  
## 869 1950 Gable CompShg Plywood Plywood None  
## 895 1979 Gable CompShg Plywood Plywood None  
## 898 1979 Gable CompShg Plywood Plywood None  
## 985 1977 Gable CompShg Plywood Plywood None  
## 1001 1952 Flat Tar&Grv BrkComm Brk Cmn None  
## 1012 1965 Hip CompShg AsphShn AsphShn None  
## 1036 1957 Gable CompShg Wd Sdng Wd Sdng None  
## 1046 1955 Hip CompShg BrkFace Wd Sdng None  
## 1049 2006 Hip CompShg HdBoard HdBoard BrkFace  
## 1050 2006 Gable CompShg MetalSd MetalSd None  
## 1091 1950 Gable CompShg BrkFace BrkFace None  
## 1180 1954 Gable CompShg Wd Sdng Wd Sdng None  
## 1217 1978 Gable CompShg VinylSd VinylSd None  
## 1219 1950 Gable CompShg AsbShng AsbShng None  
## 1233 1962 Gable CompShg HdBoard HdBoard None  
## 1322 1950 Hip CompShg VinylSd VinylSd None  
## 1413 1950 Gable CompShg BrkFace Stone None  
## MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond  
## 18 0 TA TA Slab NoB NoB  
## 40 0 TA TA PConc NoB NoB  
## 91 0 TA TA Slab NoB NoB  
## 103 0 TA Fa Slab NoB NoB  
## 157 0 TA TA CBlock NoB NoB  
## 183 98 TA TA PConc NoB NoB  
## 260 0 TA TA PConc NoB NoB  
## 333 296 Gd TA PConc Gd TA  
## 343 340 TA TA Slab NoB NoB  
## 363 500 Gd TA Slab NoB NoB  
## 372 0 TA TA CBlock NoB NoB  
## 393 0 TA TA Slab NoB NoB  
## 521 0 TA TA BrkTil NoB NoB  
## 533 0 TA TA Slab NoB NoB  
## 534 0 Fa Fa Slab NoB NoB  
## 554 0 TA TA CBlock NoB NoB  
## 647 0 TA TA CBlock NoB NoB  
## 706 0 Fa Fa Slab NoB NoB  
## 737 0 TA TA CBlock NoB NoB  
## 750 0 TA TA Slab NoB NoB  
## 779 320 TA TA Slab NoB NoB  
## 869 0 TA TA Slab NoB NoB  
## 895 0 TA TA Slab NoB NoB  
## 898 0 TA TA Slab NoB NoB  
## 985 0 TA TA CBlock NoB NoB  
## 1001 0 TA TA Slab NoB NoB  
## 1012 0 TA TA CBlock NoB NoB  
## 1036 0 TA Gd Slab NoB NoB  
## 1046 0 TA TA Slab NoB NoB  
## 1049 75 TA Fa Slab NoB NoB  
## 1050 0 TA TA CBlock NoB NoB  
## 1091 0 TA TA Slab NoB NoB  
## 1180 0 TA TA Slab NoB NoB  
## 1217 0 TA TA Slab NoB NoB  
## 1219 0 TA TA Slab NoB NoB  
## 1233 0 TA TA Slab NoB NoB  
## 1322 0 TA TA CBlock NoB NoB  
## 1413 0 TA TA Slab NoB NoB  
## BsmtExposure BsmtFinType1 BsmtFinSF1 BsmtFinType2 BsmtFinSF2  
## 18 NoB NoB 0 NoB 0  
## 40 NoB NoB 0 NoB 0  
## 91 NoB NoB 0 NoB 0  
## 103 NoB NoB 0 NoB 0  
## 157 NoB NoB 0 NoB 0  
## 183 NoB NoB 0 NoB 0  
## 260 NoB NoB 0 NoB 0  
## 333 No GLQ 1124 NoB 479  
## 343 NoB NoB 0 NoB 0  
## 363 NoB NoB 0 NoB 0  
## 372 NoB NoB 0 NoB 0  
## 393 NoB NoB 0 NoB 0  
## 521 NoB NoB 0 NoB 0  
## 533 NoB NoB 0 NoB 0  
## 534 NoB NoB 0 NoB 0  
## 554 NoB NoB 0 NoB 0  
## 647 NoB NoB 0 NoB 0  
## 706 NoB NoB 0 NoB 0  
## 737 NoB NoB 0 NoB 0  
## 750 NoB NoB 0 NoB 0  
## 779 NoB NoB 0 NoB 0  
## 869 NoB NoB 0 NoB 0  
## 895 NoB NoB 0 NoB 0  
## 898 NoB NoB 0 NoB 0  
## 985 NoB NoB 0 NoB 0  
## 1001 NoB NoB 0 NoB 0  
## 1012 NoB NoB 0 NoB 0  
## 1036 NoB NoB 0 NoB 0  
## 1046 NoB NoB 0 NoB 0  
## 1049 NoB NoB 0 NoB 0  
## 1050 NoB NoB 0 NoB 0  
## 1091 NoB NoB 0 NoB 0  
## 1180 NoB NoB 0 NoB 0  
## 1217 NoB NoB 0 NoB 0  
## 1219 NoB NoB 0 NoB 0  
## 1233 NoB NoB 0 NoB 0  
## 1322 NoB NoB 0 NoB 0  
## 1413 NoB NoB 0 NoB 0  
## BsmtUnfSF TotalBsmtSF Heating HeatingQC CentralAir Electrical  
## 18 0 0 GasA TA Y SBrkr  
## 40 0 0 GasA TA N FuseP  
## 91 0 0 GasA TA Y FuseA  
## 103 0 0 GasA TA Y SBrkr  
## 157 0 0 GasA TA Y FuseF  
## 183 0 0 GasA Ex Y SBrkr  
## 260 0 0 GasA Gd Y FuseA  
## 333 1603 3206 GasA Ex Y SBrkr  
## 343 0 0 Wall Fa N FuseA  
## 363 0 0 GasA Ex Y SBrkr  
## 372 0 0 GasA TA Y SBrkr  
## 393 0 0 GasA TA Y SBrkr  
## 521 0 0 GasA TA N FuseA  
## 533 0 0 GasA Ex Y SBrkr  
## 534 0 0 GasA Fa N FuseF  
## 554 0 0 GasA Ex Y SBrkr  
## 647 0 0 GasA Gd Y SBrkr  
## 706 0 0 GasA Fa N SBrkr  
## 737 0 0 GasA Gd N FuseF  
## 750 0 0 Wall TA N FuseF  
## 779 0 0 GasA TA Y SBrkr  
## 869 0 0 GasA Gd Y SBrkr  
## 895 0 0 GasA TA Y SBrkr  
## 898 0 0 GasA TA Y SBrkr  
## 985 0 0 GasA TA Y SBrkr  
## 1001 0 0 GasW Fa N FuseF  
## 1012 0 0 GasA TA N SBrkr  
## 1036 0 0 GasA Ex N SBrkr  
## 1046 0 0 GasA Ex Y FuseA  
## 1049 0 0 GasA TA Y SBrkr  
## 1050 0 0 GasA Ex Y SBrkr  
## 1091 0 0 Wall Fa N FuseA  
## 1180 0 0 GasA Gd Y SBrkr  
## 1217 0 0 GasA TA Y SBrkr  
## 1219 0 0 GasA Gd N SBrkr  
## 1233 0 0 GasA TA Y SBrkr  
## 1322 0 0 Floor TA N SBrkr  
## 1413 0 0 Wall Fa N FuseF  
## X1stFlrSF X2ndFlrSF LowQualFinSF GrLivArea BsmtFullBath BsmtHalfBath  
## 18 1296 0 0 1296 0 0  
## 40 1152 0 0 1152 0 0  
## 91 1040 0 0 1040 0 0  
## 103 1535 0 0 1535 0 0  
## 157 1040 0 0 1040 0 0  
## 183 1340 0 0 1340 0 0  
## 260 882 0 0 882 0 0  
## 333 1629 0 0 1629 1 0  
## 343 1040 0 0 1040 0 0  
## 363 495 1427 0 1922 0 0  
## 372 1120 468 0 1588 0 0  
## 393 882 0 0 882 0 0  
## 521 694 600 0 1294 0 0  
## 533 827 0 0 827 0 0  
## 534 334 0 0 334 0 0  
## 554 1126 0 0 1126 0 0  
## 647 1048 0 0 1048 0 0  
## 706 372 720 0 1092 0 0  
## 737 1040 0 0 1040 0 0  
## 750 1088 441 0 1529 0 0  
## 779 2020 0 0 2020 0 0  
## 869 1547 720 53 2320 0 0  
## 895 1535 0 0 1535 0 0  
## 898 1120 1120 0 2240 0 0  
## 985 1302 432 0 1734 0 0  
## 1001 944 0 0 944 0 0  
## 1012 1664 0 0 1664 0 0  
## 1036 845 0 0 845 0 0  
## 1046 1733 0 0 1733 0 0  
## 1049 1771 0 0 1771 0 0  
## 1050 930 0 0 930 0 0  
## 1091 1040 0 0 1040 0 0  
## 1180 1124 0 0 1124 0 0  
## 1217 1318 584 0 1902 0 0  
## 1219 672 240 0 912 0 0  
## 1233 1224 0 0 1224 0 0  
## 1322 720 0 0 720 0 0  
## 1413 1040 0 0 1040 0 0  
## FullBath HalfBath BedroomAbvGr KitchenAbvGr KitchenQual TotRmsAbvGrd  
## 18 2 0 2 2 TA 6  
## 40 2 0 2 2 Fa 6  
## 91 1 0 2 1 TA 4  
## 103 2 0 4 2 TA 8  
## 157 1 0 2 1 TA 5  
## 183 1 0 3 1 TA 7  
## 260 1 0 2 1 TA 4  
## 333 2 0 3 1 Gd 7  
## 343 2 0 2 2 TA 6  
## 363 3 0 4 1 Gd 7  
## 372 2 0 4 1 TA 7  
## 393 1 0 3 1 TA 5  
## 521 2 0 3 2 TA 7  
## 533 1 0 2 1 TA 5  
## 534 1 0 1 1 Fa 2  
## 554 2 0 2 1 Gd 5  
## 647 1 0 3 1 TA 7  
## 706 2 0 3 2 Fa 7  
## 737 2 0 2 2 TA 6  
## 750 2 0 4 1 TA 9  
## 779 2 0 4 2 TA 10  
## 869 2 0 2 1 TA 7  
## 895 2 0 4 2 TA 8  
## 898 2 0 6 2 TA 12  
## 985 2 0 4 2 Gd 8  
## 1001 1 0 2 1 Fa 4  
## 1012 2 0 4 2 TA 8  
## 1036 1 0 3 1 TA 5  
## 1046 2 0 4 1 TA 8  
## 1049 1 0 3 1 TA 9  
## 1050 1 0 2 1 Gd 6  
## 1091 2 0 2 2 TA 6  
## 1180 1 0 3 1 TA 5  
## 1217 2 0 4 2 TA 8  
## 1219 1 0 2 1 TA 3  
## 1233 2 0 2 2 TA 6  
## 1322 1 0 2 1 TA 4  
## 1413 2 0 2 2 TA 6  
## Functional Fireplaces FireplaceQu GarageType GarageYrBlt GarageFinish  
## 18 Typ 0 <NA> CarPort 1967 Unf  
## 40 Typ 0 <NA> <NA> NA <NA>  
## 91 Typ 0 <NA> Detchd 1950 Unf  
## 103 Typ 0 <NA> Attchd 1979 Unf  
## 157 Typ 0 <NA> Detchd 1950 Unf  
## 183 Typ 1 Gd Attchd 1957 RFn  
## 260 Typ 0 <NA> Detchd 1956 Unf  
## 333 Typ 1 Gd Attchd 2003 RFn  
## 343 Typ 0 <NA> Detchd 1949 Unf  
## 363 Typ 1 Ex BuiltIn 2003 RFn  
## 372 Min2 1 Gd Detchd 1991 Fin  
## 393 Typ 0 <NA> Attchd 1959 RFn  
## 521 Typ 0 <NA> <NA> NA <NA>  
## 533 Mod 1 Po Detchd 1967 Unf  
## 534 Typ 0 <NA> <NA> NA <NA>  
## 554 Typ 0 <NA> Detchd 2002 Fin  
## 647 Min1 0 <NA> Detchd 1950 Unf  
## 706 Mod 0 <NA> <NA> NA <NA>  
## 737 Typ 0 <NA> Detchd 1949 Unf  
## 750 Mod 0 <NA> Detchd 1945 Unf  
## 779 Typ 2 TA Detchd 1977 Unf  
## 869 Typ 1 TA Attchd 1979 Unf  
## 895 Typ 0 <NA> Attchd 1979 Unf  
## 898 Typ 0 <NA> Detchd 1979 Unf  
## 985 Typ 0 <NA> Attchd 1977 Unf  
## 1001 Min1 0 <NA> Detchd 1956 Unf  
## 1012 Typ 0 <NA> <NA> NA <NA>  
## 1036 Typ 0 <NA> Detchd 1957 Unf  
## 1046 Min2 1 Gd Attchd 1955 Unf  
## 1049 Min1 1 TA Attchd 1960 Unf  
## 1050 Typ 0 <NA> Detchd 1946 Unf  
## 1091 Typ 0 <NA> Detchd 1987 Unf  
## 1180 Min2 1 Gd <NA> NA <NA>  
## 1217 Typ 0 <NA> Attchd 1978 Unf  
## 1219 Typ 0 <NA> <NA> NA <NA>  
## 1233 Typ 0 <NA> CarPort 1962 Unf  
## 1322 Typ 0 <NA> Detchd 1955 Unf  
## 1413 Typ 0 <NA> Detchd 1956 Unf  
## GarageCars GarageArea GarageQual GarageCond PavedDrive WoodDeckSF  
## 18 2 516 TA TA Y 0  
## 40 0 0 <NA> <NA> N 0  
## 91 2 420 TA TA Y 0  
## 103 2 410 TA TA Y 0  
## 157 2 625 TA TA Y 0  
## 183 1 252 TA TA Y 116  
## 260 1 308 TA TA Y 0  
## 333 3 880 TA TA Y 0  
## 343 2 400 TA TA Y 0  
## 363 2 672 TA TA Y 0  
## 372 2 680 TA TA N 0  
## 393 1 294 TA TA Y 0  
## 521 0 0 <NA> <NA> N 220  
## 533 1 392 TA TA Y 0  
## 534 0 0 <NA> <NA> N 0  
## 554 2 520 TA TA N 0  
## 647 2 420 TA TA Y 0  
## 706 0 0 <NA> <NA> N 0  
## 737 2 400 TA TA Y 0  
## 750 1 240 TA TA N 92  
## 779 2 630 TA TA Y 0  
## 869 2 672 TA TA P 120  
## 895 2 400 TA TA Y 0  
## 898 2 528 TA TA Y 154  
## 985 2 539 TA TA Y 0  
## 1001 2 528 TA Fa Y 0  
## 1012 0 0 <NA> <NA> Y 0  
## 1036 1 290 TA TA N 186  
## 1046 2 452 TA TA Y 0  
## 1049 2 336 TA TA Y 0  
## 1050 1 308 TA TA Y 0  
## 1091 2 400 TA TA Y 0  
## 1180 0 0 <NA> <NA> N 0  
## 1217 2 539 TA TA Y 0  
## 1219 0 0 <NA> <NA> N 0  
## 1233 2 462 TA TA Y 0  
## 1322 1 287 TA Fa Y 0  
## 1413 2 420 TA TA Y 0  
## OpenPorchSF EnclosedPorch X3SsnPorch ScreenPorch PoolArea PoolQC  
## 18 0 0 0 0 0 <NA>  
## 40 0 0 0 0 0 <NA>  
## 91 29 0 0 0 0 <NA>  
## 103 0 0 0 0 0 <NA>  
## 157 0 0 0 0 0 <NA>  
## 183 0 0 180 0 0 <NA>  
## 260 45 0 0 0 0 <NA>  
## 333 0 0 0 0 0 <NA>  
## 343 0 0 0 0 0 <NA>  
## 363 0 177 0 0 0 <NA>  
## 372 59 0 0 0 0 <NA>  
## 393 0 0 0 0 0 <NA>  
## 521 114 210 0 0 0 <NA>  
## 533 0 0 0 0 0 <NA>  
## 534 0 0 0 0 0 <NA>  
## 554 96 0 0 0 0 <NA>  
## 647 27 0 0 0 0 <NA>  
## 706 0 0 0 0 0 <NA>  
## 737 0 0 0 0 0 <NA>  
## 750 0 185 0 0 0 <NA>  
## 779 0 0 0 0 0 <NA>  
## 869 144 0 0 0 0 <NA>  
## 895 0 0 0 0 0 <NA>  
## 898 0 0 0 0 0 <NA>  
## 985 0 0 0 0 0 <NA>  
## 1001 0 0 0 0 0 <NA>  
## 1012 0 0 0 0 0 <NA>  
## 1036 0 0 0 0 0 <NA>  
## 1046 0 0 0 0 0 <NA>  
## 1049 0 0 0 0 0 <NA>  
## 1050 0 0 0 0 0 <NA>  
## 1091 0 0 0 0 0 <NA>  
## 1180 36 190 0 0 0 <NA>  
## 1217 0 0 0 0 0 <NA>  
## 1219 0 0 0 0 0 <NA>  
## 1233 0 0 0 0 0 <NA>  
## 1322 0 0 0 0 0 <NA>  
## 1413 0 0 0 0 0 <NA>  
## Fence MiscFeature MiscVal MoSold YrSold SaleType SaleCondition  
## 18 <NA> Shed 500 10 2006 WD Normal  
## 40 <NA> <NA> 0 6 2008 WD AdjLand  
## 91 <NA> <NA> 0 7 2006 WD Normal  
## 103 <NA> <NA> 0 6 2009 WD Alloca  
## 157 <NA> <NA> 0 6 2006 WD Normal  
## 183 MnPrv <NA> 0 6 2007 WD Normal  
## 260 <NA> <NA> 0 12 2008 WD Normal  
## 333 <NA> <NA> 0 10 2009 WD Normal  
## 343 <NA> <NA> 0 5 2006 WD Normal  
## 363 <NA> <NA> 0 7 2009 ConLD Normal  
## 372 <NA> <NA> 0 7 2008 WD Normal  
## 393 MnPrv Shed 1200 7 2007 WD Normal  
## 521 <NA> <NA> 0 8 2008 WD Normal  
## 533 <NA> <NA> 0 4 2010 WD Normal  
## 534 <NA> <NA> 0 1 2007 WD Normal  
## 554 MnPrv <NA> 0 5 2009 WD Normal  
## 647 <NA> <NA> 0 7 2008 WD Normal  
## 706 <NA> Othr 3500 7 2010 WD Normal  
## 737 <NA> <NA> 0 7 2006 WD Normal  
## 750 <NA> <NA> 0 4 2009 WD Normal  
## 779 <NA> <NA> 0 10 2007 WD Normal  
## 869 <NA> <NA> 0 5 2006 WD Normal  
## 895 <NA> <NA> 0 6 2009 WD Alloca  
## 898 <NA> <NA> 0 6 2009 WD Alloca  
## 985 <NA> <NA> 0 8 2009 COD Normal  
## 1001 <NA> <NA> 0 7 2009 WD Normal  
## 1012 <NA> <NA> 0 5 2010 WD Normal  
## 1036 <NA> <NA> 0 1 2009 WD Normal  
## 1046 <NA> <NA> 0 6 2009 WD Normal  
## 1049 GdPrv <NA> 0 11 2009 WD Normal  
## 1050 <NA> <NA> 0 4 2010 WD Abnorml  
## 1091 <NA> <NA> 0 6 2009 WD Normal  
## 1180 <NA> <NA> 0 4 2006 WD Normal  
## 1217 <NA> <NA> 0 4 2010 WD Normal  
## 1219 <NA> <NA> 0 7 2006 WD Normal  
## 1233 <NA> <NA> 0 3 2007 WD Normal  
## 1322 <NA> <NA> 0 7 2008 WD Normal  
## 1413 <NA> <NA> 0 6 2009 WD Normal  
## SalePrice  
## 18 90000  
## 40 82000  
## 91 109900  
## 103 118964  
## 157 109500  
## 183 120000  
## 260 97000  
## 333 284000  
## 343 87500  
## 363 198500  
## 372 134432  
## 393 106500  
## 521 106250  
## 533 107500  
## 534 39300  
## 554 108000  
## 647 98300  
## 706 55000  
## 737 93500  
## 750 98000  
## 779 144000  
## 869 169000  
## 895 118858  
## 898 142953  
## 985 126000  
## 1001 82000  
## 1012 100000  
## 1036 84000  
## 1046 139600  
## 1049 115000  
## 1050 84900  
## 1091 92900  
## 1180 93000  
## 1217 112000  
## 1219 80500  
## 1233 101800  
## 1322 72500  
## 1413 90000

It’s important to note that observation 949 has a basement that is unfinished and the Exposure is set to NA. This is a potential missing value, only because we know that the other categorical variables label this observation as UNFINSHED rather than NO BASEMENT. The exposture could have been set at No exposure, but rather was set to a level repersenting no basement. I think it’s safe to remove this data observation.

Also observation 333 has a signular basement with FinType2 as NA. FinType1 does have a value, however, and after looking through other observations, this stikes as very odd. FinType repersents the finishing of the basement, FinType1 repersents the first layer, and FinType2 repersents any additional layers (if there are any), however in the event there is one layer, other entries would have FinType2 as UNF or No Basement. I think it is safe to eliminate this observation.

modified\_data <- modified\_data[-c(949),]  
modified\_data <- modified\_data[-c(333),]

Poof! The two records are gone.

For the misisng electrical data, we will be removing it, because NA has no meaning behind it and there needs to be an option for it.

modified\_data <- subset(modified\_data, !is.na(modified\_data$Electrical))

Poof! It’s gone!

For FireplaceQu, I looked ahead at the data dictionary, and it clearly states all NAs means no Fireplace, so we can attribute this to a better categorical variable: NoF

v = 1  
while (v<1450){  
 if (is.na(modified\_data$FireplaceQu[v])){  
 modified\_data$FireplaceQu[v] = "NoF"  
 }  
 v = v + 1  
}

And now again we have 5 variables that describe the same part of the house, the garage (GarageType, GarageYrBlt, GarageFinish, GarageQual, GarageCond), and they have equal amounts of NA (81). And to no suprise, NA for each of those variables means No garage. We’ll chnage this to NoG instead.

v = 1  
while (v<1450){  
 if (is.na(modified\_data$GarageType[v])){  
 modified\_data$GarageType[v] = "NoG"  
 }  
 if (is.na(modified\_data$GarageYrBlt[v])){  
 modified\_data$GarageYrBlt[v] = "NoG"  
 }  
 if (is.na(modified\_data$GarageFinish[v])){  
 modified\_data$GarageFinish[v] = "NoG"  
 }  
 if (is.na(modified\_data$GarageQual[v])){  
 modified\_data$GarageQual[v] = "NoG"  
 }  
 if (is.na(modified\_data$GarageCond[v])){  
 modified\_data$GarageCond[v] = "NoG"  
 }  
 v = v + 1  
}

I found it that the next three attributes had a lot of NA entires. So I looked into the data dictionary, they all repersent the missing item for the attribute. They are not missing values, so will not be excluded, but given better names. NA for PoolQc will be chnaged to NoP, NA for Fence will be NoF, and NA for MiscFeature will become NoM.

v = 1  
while (v<1450){  
 if (is.na(modified\_data$PoolQC[v])){  
 modified\_data$PoolQC[v] = "NoP"  
 }  
 if (is.na(modified\_data$Fence[v])){  
 modified\_data$Fence[v] = "NoF"  
 }  
 if (is.na(modified\_data$MiscFeature[v])){  
 modified\_data$MiscFeature[v] = "NoM"  
 }  
 v = v + 1  
}

We should be done will addressing missing values, lets check!

x = 1  
cat("---NULL COUNT---\n")

## ---NULL COUNT---

while (x<81){  
 if(sum(is.na((modified\_data[x]))>0)){  
 cat("Number of nulls in ",(colnames(modified\_data[x])), ": ")  
 cat(sum(is.na(modified\_data[x])), "\n")  
 }  
 x = x + 1   
}

outlier\_sales <- subset(modified\_data, modified\_data$SalePrice > 340000)  
outlier\_sales[order(outlier\_sales$SalePrice),]

## Id MSSubClass MSZoning LotFrontage LotArea Street Alley LotShape  
## 719 719 60 RL 96 10542 Pave None Reg  
## 321 321 60 RL 111 16259 Pave None Reg  
## 12 12 60 RL 85 11924 Pave None IR1  
## 643 643 80 RL 75 13860 Pave None Reg  
## 991 991 60 RL 82 9452 Pave None Reg  
## 655 655 20 RL 91 10437 Pave None IR1  
## 878 878 60 RL 74 8834 Pave None Reg  
## 322 322 60 RL 99 12099 Pave None IR1  
## 609 609 70 RL 78 12168 Pave None Reg  
## 310 310 20 RL 90 12378 Pave None IR1  
## 703 703 60 RL 82 12438 Pave None IR1  
## 1229 1229 120 RL 65 8769 Pave None Reg  
## 586 586 20 RL 88 11443 Pave None Reg  
## 645 645 20 FV 85 9187 Pave None Reg  
## 152 152 20 RL 107 13891 Pave None Reg  
## 679 679 20 RL 80 11844 Pave None IR1  
## 482 482 20 RL 72 11846 Pave None IR1  
## 314 314 20 RL 150 215245 Pave None IR3  
## 337 337 20 RL 86 14157 Pave None IR1  
## 1389 1389 20 RL 42 14892 Pave None IR1  
## 1268 1268 20 RL 89 13214 Pave None IR1  
## 478 478 60 RL 105 13693 Pave None Reg  
## 1269 1269 50 RL 0 14100 Pave None IR1  
## 113 113 60 RL 77 9965 Pave None Reg  
## 54 54 20 RL 68 50271 Pave None IR1  
## 826 826 20 RL 114 14803 Pave None Reg  
## 225 225 20 RL 103 13472 Pave None Reg  
## 689 689 20 RL 60 8089 Pave None Reg  
## 1182 1182 120 RM 64 5587 Pave None IR1  
## 379 379 20 RL 88 11394 Pave None Reg  
## 1438 1438 20 RL 96 12444 Pave None Reg  
## 775 775 20 RL 110 14226 Pave None Reg  
## 988 988 20 RL 83 10159 Pave None IR1  
## 662 662 60 RL 52 46589 Pave None IR2  
## 516 516 20 RL 94 12220 Pave None Reg  
## 232 232 60 RL 174 15138 Pave None IR1  
## 1354 1354 50 RL 56 14720 Pave None IR1  
## 162 162 60 RL 110 13688 Pave None IR1  
## 279 279 20 RL 107 14450 Pave None Reg  
## 665 665 20 RL 49 20896 Pave None IR2  
## 1143 1143 60 RL 77 9965 Pave None Reg  
## 390 390 60 RL 96 12474 Pave None Reg  
## 497 497 20 RL 0 12692 Pave None IR1  
## 350 350 60 RL 56 20431 Pave None IR2  
## 59 59 60 RL 66 13682 Pave None IR2  
## 474 474 20 RL 110 14977 Pave None IR1  
## 528 528 60 RL 67 14948 Pave None IR1  
## 592 592 60 RL 97 13478 Pave None IR1  
## 1374 1374 20 RL 0 11400 Pave None Reg  
## 186 186 75 RM 90 22950 Pave None IR2  
## 799 799 60 RL 104 13518 Pave None Reg  
## 179 179 20 RL 63 17423 Pave None IR1  
## 770 770 60 RL 47 53504 Pave None IR2  
## 441 441 20 RL 105 15431 Pave None Reg  
## 1047 1047 60 RL 85 16056 Pave None IR1  
## 804 804 60 RL 107 13891 Pave None Reg  
## 899 899 20 RL 100 12919 Pave None IR1  
## 1170 1170 60 RL 118 35760 Pave None IR1  
## 1183 1183 60 RL 160 15623 Pave None IR1  
## 692 692 60 RL 104 21535 Pave None IR1  
## LandContour Utilities LotConfig LandSlope Neighborhood Condition1  
## 719 Lvl AllPub Inside Gtl NoRidge Norm  
## 321 Lvl AllPub Corner Gtl NridgHt Norm  
## 12 Lvl AllPub Inside Gtl NridgHt Norm  
## 643 Lvl AllPub Inside Gtl NAmes Norm  
## 991 Lvl AllPub Inside Gtl NoRidge Norm  
## 655 Lvl AllPub Inside Gtl NoRidge Norm  
## 878 Lvl AllPub Inside Gtl NridgHt Norm  
## 322 Lvl AllPub Inside Gtl NridgHt Norm  
## 609 HLS AllPub Inside Mod Crawfor Norm  
## 310 Lvl AllPub Inside Gtl NridgHt Norm  
## 703 Lvl AllPub Inside Gtl StoneBr Norm  
## 1229 Lvl AllPub Corner Gtl NridgHt Norm  
## 586 Lvl AllPub Inside Gtl Timber Norm  
## 645 Lvl AllPub Inside Gtl Somerst Norm  
## 152 Lvl AllPub Inside Gtl NridgHt Norm  
## 679 Lvl AllPub Inside Gtl StoneBr Norm  
## 482 HLS AllPub Inside Gtl NridgHt Norm  
## 314 Low AllPub Inside Sev Timber Norm  
## 337 HLS AllPub Corner Gtl StoneBr Norm  
## 1389 HLS AllPub CulDSac Gtl Gilbert Norm  
## 1268 HLS AllPub Inside Gtl Timber Norm  
## 478 Lvl AllPub Inside Gtl NridgHt Norm  
## 1269 Lvl AllPub Inside Mod Crawfor Norm  
## 113 Lvl AllPub Inside Gtl CollgCr Norm  
## 54 Low AllPub Inside Gtl Veenker Norm  
## 826 Lvl AllPub Inside Gtl NridgHt PosN  
## 225 Lvl AllPub Inside Gtl NridgHt Norm  
## 689 HLS AllPub Inside Gtl StoneBr Norm  
## 1182 HLS AllPub Inside Mod Crawfor Norm  
## 379 Lvl AllPub Corner Gtl StoneBr Norm  
## 1438 Lvl AllPub FR2 Gtl NridgHt Norm  
## 775 Lvl AllPub Corner Gtl NridgHt Norm  
## 988 Lvl AllPub Inside Gtl NridgHt Norm  
## 662 Lvl AllPub CulDSac Gtl NoRidge Norm  
## 516 Lvl AllPub Inside Gtl NridgHt Norm  
## 232 Lvl AllPub Inside Gtl NoRidge Norm  
## 1354 Lvl AllPub CulDSac Gtl NoRidge Norm  
## 162 Lvl AllPub Inside Gtl NridgHt Norm  
## 279 Lvl AllPub Inside Gtl NridgHt Norm  
## 665 Lvl AllPub CulDSac Gtl Somerst RRAn  
## 1143 Lvl AllPub Inside Gtl CollgCr Norm  
## 390 Lvl AllPub Inside Gtl NridgHt Norm  
## 497 Lvl AllPub Inside Gtl NoRidge Norm  
## 350 Lvl AllPub Inside Gtl NridgHt Norm  
## 59 HLS AllPub CulDSac Gtl StoneBr Norm  
## 474 Lvl AllPub Inside Gtl NridgHt Norm  
## 528 Lvl AllPub Inside Gtl NridgHt Norm  
## 592 Lvl AllPub Corner Gtl NridgHt Norm  
## 1374 Lvl AllPub Inside Gtl NoRidge Norm  
## 186 Lvl AllPub Inside Gtl OldTown Artery  
## 799 Lvl AllPub Inside Gtl NridgHt Norm  
## 179 Lvl AllPub CulDSac Gtl StoneBr Norm  
## 770 HLS AllPub CulDSac Mod StoneBr Norm  
## 441 Lvl AllPub Inside Gtl NridgHt Norm  
## 1047 Lvl AllPub Inside Gtl StoneBr Norm  
## 804 Lvl AllPub Inside Gtl NridgHt Norm  
## 899 Lvl AllPub Inside Gtl NridgHt Norm  
## 1170 Lvl AllPub CulDSac Gtl NoRidge Norm  
## 1183 Lvl AllPub Corner Gtl NoRidge Norm  
## 692 Lvl AllPub Corner Gtl NoRidge Norm  
## Condition2 BldgType HouseStyle OverallQual OverallCond YearBuilt  
## 719 Norm 1Fam 2Story 7 5 1993  
## 321 Norm 1Fam 2Story 9 5 2006  
## 12 Norm 1Fam 2Story 9 5 2005  
## 643 Norm 1Fam SLvl 8 7 1972  
## 991 Norm 1Fam 2Story 8 5 1997  
## 655 Norm 1Fam 1Story 8 6 1995  
## 878 Norm 1Fam 2Story 9 5 2004  
## 322 Norm 1Fam 2Story 8 5 2004  
## 609 Norm 1Fam 2Story 8 6 1934  
## 310 Norm 1Fam 1Story 9 5 2003  
## 703 Norm 1Fam 2Story 8 5 2006  
## 1229 Norm TwnhsE 1Story 9 5 2008  
## 586 Norm 1Fam 1Story 8 5 2005  
## 645 Norm 1Fam 1Story 9 5 2009  
## 152 Norm 1Fam 1Story 8 5 2007  
## 679 Norm 1Fam 1Story 8 5 2008  
## 482 Norm 1Fam 1Story 9 5 2003  
## 314 Norm 1Fam 1Story 7 5 1965  
## 337 Norm 1Fam 1Story 9 5 2005  
## 1389 Norm 1Fam 1Story 9 5 2006  
## 1268 Norm 1Fam 1Story 9 5 2008  
## 478 Norm 1Fam 2Story 9 5 2006  
## 1269 Norm 1Fam 1.5Fin 8 9 1935  
## 113 Norm 1Fam 2Story 7 5 2007  
## 54 Norm 1Fam 1Story 9 5 1981  
## 826 PosN 1Fam 1Story 10 5 2007  
## 225 Norm 1Fam 1Story 10 5 2003  
## 689 Norm 1Fam 1Story 8 6 2007  
## 1182 Norm TwnhsE 1Story 8 5 2008  
## 379 Norm 1Fam 1Story 9 2 2010  
## 1438 Norm 1Fam 1Story 8 5 2008  
## 775 Norm 1Fam 1Story 8 5 2006  
## 988 Norm 1Fam 1Story 9 5 2009  
## 662 Norm 1Fam 2Story 8 7 1994  
## 516 Norm 1Fam 1Story 10 5 2009  
## 232 Norm 1Fam 2Story 8 5 1995  
## 1354 Norm 1Fam 1.5Fin 8 5 1995  
## 162 Norm 1Fam 2Story 9 5 2003  
## 279 Norm 1Fam 1Story 9 5 2006  
## 665 Norm 1Fam 1Story 8 5 2005  
## 1143 Norm 1Fam 2Story 8 5 2006  
## 390 Norm 1Fam 2Story 10 5 2007  
## 497 Norm 1Fam 1Story 8 5 1992  
## 350 Norm 1Fam 2Story 9 5 2005  
## 59 Norm 1Fam 2Story 10 5 2006  
## 474 Norm 1Fam 1Story 8 5 2006  
## 528 Norm 1Fam 2Story 9 5 2008  
## 592 Norm 1Fam 2Story 10 5 2008  
## 1374 Norm 1Fam 1Story 10 5 2001  
## 186 Norm 1Fam 2.5Fin 10 9 1892  
## 799 Norm 1Fam 2Story 9 5 2008  
## 179 Norm 1Fam 1Story 9 5 2008  
## 770 Norm 1Fam 2Story 8 5 2003  
## 441 Norm 1Fam 1Story 10 5 2008  
## 1047 Norm 1Fam 2Story 9 5 2005  
## 804 Norm 1Fam 2Story 9 5 2008  
## 899 Norm 1Fam 1Story 9 5 2009  
## 1170 Norm 1Fam 2Story 10 5 1995  
## 1183 Norm 1Fam 2Story 10 5 1996  
## 692 Norm 1Fam 2Story 10 6 1994  
## YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  
## 719 1994 Hip CompShg Wd Sdng ImStucc BrkFace  
## 321 2006 Gable CompShg VinylSd VinylSd Stone  
## 12 2006 Hip CompShg WdShing Wd Shng Stone  
## 643 1995 Gable CompShg Plywood Wd Sdng None  
## 991 1998 Gable CompShg VinylSd VinylSd BrkFace  
## 655 1995 Hip CompShg MetalSd MetalSd BrkFace  
## 878 2005 Hip CompShg VinylSd VinylSd Stone  
## 322 2004 Gable CompShg VinylSd VinylSd BrkFace  
## 609 1998 Gable CompShg BrkFace Wd Sdng None  
## 310 2004 Gable CompShg VinylSd VinylSd None  
## 703 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 1229 2008 Hip CompShg MetalSd MetalSd BrkFace  
## 586 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 645 2009 Gable CompShg CemntBd CmentBd Stone  
## 152 2008 Hip CompShg VinylSd VinylSd Stone  
## 679 2008 Hip CompShg VinylSd VinylSd Stone  
## 482 2004 Hip CompShg VinylSd VinylSd BrkFace  
## 314 1965 Hip CompShg BrkFace BrkFace None  
## 337 2006 Hip CompShg VinylSd VinylSd Stone  
## 1389 2007 Gable CompShg VinylSd VinylSd Stone  
## 1268 2009 Hip CompShg Stucco CmentBd None  
## 478 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 1269 1997 Gable CompShg Stucco Stucco BrkFace  
## 113 2007 Gable CompShg VinylSd VinylSd Stone  
## 54 1987 Gable WdShngl WdShing Wd Shng None  
## 826 2008 Hip CompShg CemntBd CmentBd BrkFace  
## 225 2003 Hip CompShg VinylSd VinylSd BrkFace  
## 689 2007 Gable CompShg MetalSd MetalSd BrkFace  
## 1182 2008 Hip CompShg CemntBd CmentBd Stone  
## 379 2010 Hip CompShg VinylSd VinylSd Stone  
## 1438 2008 Hip CompShg VinylSd VinylSd Stone  
## 775 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 988 2010 Hip CompShg VinylSd VinylSd Stone  
## 662 2005 Hip CompShg VinylSd VinylSd BrkFace  
## 516 2009 Hip CompShg CemntBd CmentBd BrkFace  
## 232 1996 Gable CompShg VinylSd VinylSd BrkFace  
## 1354 1996 Hip CompShg VinylSd VinylSd BrkFace  
## 162 2004 Gable CompShg VinylSd VinylSd BrkFace  
## 279 2007 Gable CompShg CemntBd CmentBd BrkFace  
## 665 2006 Gable CompShg VinylSd VinylSd None  
## 1143 2007 Hip CompShg VinylSd VinylSd Stone  
## 390 2008 Gable CompShg VinylSd VinylSd Stone  
## 497 1993 Hip CompShg BrkFace BrkFace None  
## 350 2006 Hip CompShg CemntBd CmentBd BrkFace  
## 59 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 474 2007 Gable CompShg VinylSd VinylSd BrkFace  
## 528 2008 Hip CompShg VinylSd VinylSd Stone  
## 592 2008 Gable CompShg CemntBd CmentBd Stone  
## 1374 2002 Hip CompShg VinylSd VinylSd BrkFace  
## 186 1993 Gable WdShngl Wd Sdng Wd Sdng None  
## 799 2009 Hip CompShg VinylSd VinylSd Stone  
## 179 2009 Hip CompShg VinylSd VinylSd Stone  
## 770 2003 Hip CompShg CemntBd Wd Shng BrkFace  
## 441 2008 Hip CompShg VinylSd VinylSd Stone  
## 1047 2006 Hip CompShg CemntBd CmentBd Stone  
## 804 2009 Hip CompShg VinylSd VinylSd Stone  
## 899 2010 Hip CompShg VinylSd VinylSd Stone  
## 1170 1996 Hip CompShg HdBoard HdBoard BrkFace  
## 1183 1996 Hip CompShg Wd Sdng ImStucc None  
## 692 1995 Gable WdShngl HdBoard HdBoard BrkFace  
## MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond  
## 719 651 Gd TA PConc Gd TA  
## 321 370 TA TA PConc Ex Gd  
## 12 286 Ex TA PConc Ex TA  
## 643 0 Gd TA CBlock Gd TA  
## 991 423 Gd TA PConc Gd TA  
## 655 660 Gd Gd PConc Gd TA  
## 878 216 Gd TA PConc Ex TA  
## 322 388 Gd TA PConc Ex TA  
## 609 0 TA TA PConc Gd TA  
## 310 0 Gd TA PConc Ex TA  
## 703 466 Ex TA PConc Ex Gd  
## 1229 766 Ex TA PConc Ex TA  
## 586 208 Gd TA PConc Ex TA  
## 645 162 Ex TA PConc Ex TA  
## 152 436 Gd TA PConc Ex TA  
## 679 464 Gd TA PConc Ex TA  
## 482 562 Gd TA PConc Ex TA  
## 314 0 TA TA CBlock Gd TA  
## 337 200 Gd TA PConc Ex TA  
## 1389 160 Ex TA PConc Ex TA  
## 1268 0 Ex TA PConc Ex TA  
## 478 772 Ex TA PConc Gd TA  
## 1269 632 TA Gd CBlock TA TA  
## 113 220 Gd TA PConc Ex TA  
## 54 0 Gd TA CBlock Ex TA  
## 826 816 Ex TA PConc Ex TA  
## 225 922 Ex TA PConc Ex TA  
## 689 0 Gd TA PConc Gd TA  
## 1182 186 Ex TA PConc Ex TA  
## 379 350 Gd TA PConc Ex TA  
## 1438 426 Ex TA PConc Ex TA  
## 775 375 Gd TA PConc Gd TA  
## 988 450 Ex TA PConc Ex TA  
## 662 528 Gd TA PConc Gd Gd  
## 516 305 Ex TA CBlock Ex TA  
## 232 506 Gd TA PConc Gd TA  
## 1354 579 Gd TA PConc Gd TA  
## 162 664 Gd TA PConc Ex TA  
## 279 315 Ex TA PConc Ex TA  
## 665 0 Gd TA PConc Ex TA  
## 1143 340 Gd TA PConc Ex TA  
## 390 272 Ex TA PConc Ex TA  
## 497 0 Gd TA PConc Gd TA  
## 350 870 Ex TA PConc Ex TA  
## 59 1031 Ex TA PConc Ex TA  
## 474 304 Gd TA PConc Ex TA  
## 528 268 Ex TA PConc Ex TA  
## 592 420 Ex TA PConc Ex TA  
## 1374 705 Ex TA PConc Ex TA  
## 186 0 Gd Gd BrkTil TA TA  
## 799 860 Ex TA PConc Ex TA  
## 179 748 Ex TA PConc Ex TA  
## 770 603 Ex TA PConc Gd TA  
## 441 200 Ex TA PConc Ex TA  
## 1047 208 Gd TA PConc Ex TA  
## 804 424 Ex TA PConc Ex TA  
## 899 760 Ex TA PConc Ex TA  
## 1170 1378 Gd Gd PConc Ex TA  
## 1183 0 Gd TA PConc Ex TA  
## 692 1170 Ex TA PConc Ex TA  
## BsmtExposure BsmtFinType1 BsmtFinSF1 BsmtFinType2 BsmtFinSF2  
## 719 Gd GLQ 1173 Unf 0  
## 321 Av Unf 0 Unf 0  
## 12 No GLQ 998 Unf 0  
## 643 Gd GLQ 1410 Unf 0  
## 991 No GLQ 1074 Unf 0  
## 655 Gd GLQ 1696 Unf 0  
## 878 No GLQ 1170 Unf 0  
## 322 Av GLQ 970 Unf 0  
## 609 Mn BLQ 428 Unf 0  
## 310 Gd GLQ 1274 Unf 0  
## 703 No Unf 0 Unf 0  
## 1229 No GLQ 1540 Unf 0  
## 586 Gd GLQ 1460 Unf 0  
## 645 Mn GLQ 1121 Unf 0  
## 152 Gd GLQ 1400 Unf 0  
## 679 Mn Unf 0 Unf 0  
## 482 Gd GLQ 1567 Unf 0  
## 314 Gd ALQ 1236 Rec 820  
## 337 Gd GLQ 1249 Unf 0  
## 1389 Gd GLQ 1320 Unf 0  
## 1268 Gd Unf 0 Unf 0  
## 478 Av Unf 0 Unf 0  
## 1269 Mn Rec 192 Unf 0  
## 113 Av GLQ 984 Unf 0  
## 54 Gd GLQ 1810 Unf 0  
## 826 Av GLQ 1636 Unf 0  
## 225 Gd GLQ 56 Unf 0  
## 689 Av GLQ 945 Unf 0  
## 1182 Gd GLQ 1480 Unf 0  
## 379 Av GLQ 1445 Unf 0  
## 1438 Av GLQ 1336 Unf 0  
## 775 Av Unf 0 Unf 0  
## 988 Av GLQ 1646 Unf 0  
## 662 No GLQ 1361 Rec 180  
## 516 No GLQ 1436 Unf 0  
## 232 No GLQ 689 Unf 0  
## 1354 Av GLQ 816 Unf 0  
## 162 Av GLQ 1016 Unf 0  
## 279 Gd Unf 0 Unf 0  
## 665 Mn GLQ 1721 Unf 0  
## 1143 Gd GLQ 1150 Unf 0  
## 390 Av GLQ 1280 Unf 0  
## 497 No GLQ 1231 Unf 0  
## 350 No GLQ 1410 Unf 0  
## 59 Gd Unf 0 Unf 0  
## 474 Gd GLQ 1350 Unf 0  
## 528 Av GLQ 1330 Unf 0  
## 592 Gd GLQ 1338 Unf 0  
## 1374 Gd GLQ 1282 Unf 0  
## 186 Mn Unf 0 Unf 0  
## 799 No Unf 0 Unf 0  
## 179 No GLQ 1904 Unf 0  
## 770 Gd ALQ 1416 Unf 0  
## 441 Gd GLQ 1767 ALQ 539  
## 1047 Av GLQ 240 Unf 0  
## 804 Gd Unf 0 Unf 0  
## 899 Gd GLQ 2188 Unf 0  
## 1170 Gd GLQ 1387 Unf 0  
## 1183 Av GLQ 2096 Unf 0  
## 692 Gd GLQ 1455 Unf 0  
## BsmtUnfSF TotalBsmtSF Heating HeatingQC CentralAir Electrical  
## 719 138 1311 GasA Ex Y SBrkr  
## 321 1249 1249 GasA Ex Y SBrkr  
## 12 177 1175 GasA Ex Y SBrkr  
## 643 542 1952 GasA Gd Y SBrkr  
## 991 322 1396 GasA Ex Y SBrkr  
## 655 413 2109 GasA Ex Y SBrkr  
## 878 292 1462 GasA Ex Y SBrkr  
## 322 166 1136 GasA Ex Y SBrkr  
## 609 537 965 GasA TA Y SBrkr  
## 310 622 1896 GasA Ex Y SBrkr  
## 703 1234 1234 GasA Ex Y SBrkr  
## 1229 162 1702 GasA Ex Y SBrkr  
## 586 408 1868 GasA Ex Y SBrkr  
## 645 645 1766 GasA Ex Y SBrkr  
## 152 310 1710 GasA Ex Y SBrkr  
## 679 2046 2046 GasA Ex Y SBrkr  
## 482 225 1792 GasA Ex Y SBrkr  
## 314 80 2136 GasW TA Y SBrkr  
## 337 673 1922 GasA Ex Y SBrkr  
## 1389 426 1746 GasA Ex Y SBrkr  
## 1268 2002 2002 GasA Ex Y SBrkr  
## 478 2153 2153 GasA Ex Y SBrkr  
## 1269 536 728 GasA Ex Y SBrkr  
## 113 280 1264 GasA Ex Y SBrkr  
## 54 32 1842 GasA Gd Y SBrkr  
## 826 442 2078 GasA Ex Y SBrkr  
## 225 2336 2392 GasA Ex Y SBrkr  
## 689 474 1419 GasA Ex Y SBrkr  
## 1182 120 1600 GasA Ex Y SBrkr  
## 379 411 1856 GasA Ex Y SBrkr  
## 1438 596 1932 GasA Ex Y SBrkr  
## 775 1935 1935 GasA Gd Y SBrkr  
## 988 284 1930 GasA Ex Y SBrkr  
## 662 88 1629 GasA Ex Y SBrkr  
## 516 570 2006 GasA Ex Y SBrkr  
## 232 773 1462 GasA Ex Y SBrkr  
## 1354 1217 2033 GasA Ex Y SBrkr  
## 162 556 1572 GasA Ex Y SBrkr  
## 279 2121 2121 GasA Ex Y SBrkr  
## 665 356 2077 GasA Ex Y SBrkr  
## 1143 316 1466 GasA Ex Y SBrkr  
## 390 402 1682 GasA Ex Y SBrkr  
## 497 1969 3200 GasA Ex Y SBrkr  
## 350 438 1848 GasA Ex Y SBrkr  
## 59 1410 1410 GasA Ex Y SBrkr  
## 474 626 1976 GasA Ex Y SBrkr  
## 528 122 1452 GasA Ex Y SBrkr  
## 592 384 1722 GasA Ex Y SBrkr  
## 1374 1351 2633 GasA Ex Y SBrkr  
## 186 1107 1107 GasA Ex Y SBrkr  
## 799 1926 1926 GasA Ex Y SBrkr  
## 179 312 2216 GasA Ex Y SBrkr  
## 770 234 1650 GasA Ex Y SBrkr  
## 441 788 3094 GasA Ex Y SBrkr  
## 1047 1752 1992 GasA Ex Y SBrkr  
## 804 1734 1734 GasA Ex Y SBrkr  
## 899 142 2330 GasA Ex Y SBrkr  
## 1170 543 1930 GasA Ex Y SBrkr  
## 1183 300 2396 GasA Ex Y SBrkr  
## 692 989 2444 GasA Ex Y SBrkr  
## X1stFlrSF X2ndFlrSF LowQualFinSF GrLivArea BsmtFullBath BsmtHalfBath  
## 719 1325 1093 0 2418 1 0  
## 321 1249 1347 0 2596 0 0  
## 12 1182 1142 0 2324 1 0  
## 643 2000 704 0 2704 1 0  
## 991 1407 985 0 2392 1 0  
## 655 2113 0 0 2113 1 0  
## 878 1462 762 0 2224 1 0  
## 322 1136 1332 0 2468 1 0  
## 609 1940 1254 0 3194 0 0  
## 310 1944 0 0 1944 1 0  
## 703 1264 1312 0 2576 0 0  
## 1229 1702 0 0 1702 1 0  
## 586 2028 0 0 2028 1 0  
## 645 1766 0 0 1766 1 0  
## 152 1710 0 0 1710 1 0  
## 679 2046 0 0 2046 0 0  
## 482 1792 0 0 1792 1 0  
## 314 2036 0 0 2036 2 0  
## 337 1922 0 0 1922 1 0  
## 1389 1746 0 0 1746 1 0  
## 1268 2018 0 0 2018 0 0  
## 478 2069 574 0 2643 0 0  
## 1269 1968 1479 0 3447 0 0  
## 113 1282 1414 0 2696 1 0  
## 54 1842 0 0 1842 2 0  
## 826 2084 0 0 2084 1 0  
## 225 2392 0 0 2392 0 0  
## 689 1419 0 0 1419 1 0  
## 1182 1652 0 0 1652 1 1  
## 379 1856 0 0 1856 1 0  
## 1438 1932 0 0 1932 1 0  
## 775 1973 0 0 1973 0 0  
## 988 1940 0 0 1940 1 0  
## 662 1686 762 0 2448 1 0  
## 516 2020 0 0 2020 1 0  
## 232 1490 1304 0 2794 1 0  
## 1354 2053 1185 0 3238 1 0  
## 162 1572 1096 0 2668 1 0  
## 279 2121 0 0 2121 0 0  
## 665 2097 0 0 2097 1 0  
## 1143 1466 1362 0 2828 1 0  
## 390 1742 590 0 2332 1 0  
## 497 3228 0 0 3228 1 0  
## 350 1848 880 0 2728 1 0  
## 59 1426 1519 0 2945 0 0  
## 474 1976 0 0 1976 1 0  
## 528 1476 1237 0 2713 1 0  
## 592 1728 568 0 2296 1 0  
## 1374 2633 0 0 2633 1 0  
## 186 1518 1518 572 3608 0 0  
## 799 1966 1174 0 3140 0 0  
## 179 2234 0 0 2234 1 0  
## 770 1690 1589 0 3279 1 0  
## 441 2402 0 0 2402 1 0  
## 1047 1992 876 0 2868 0 0  
## 804 1734 1088 0 2822 0 0  
## 899 2364 0 0 2364 1 0  
## 1170 1831 1796 0 3627 1 0  
## 1183 2411 2065 0 4476 1 0  
## 692 2444 1872 0 4316 0 1  
## FullBath HalfBath BedroomAbvGr KitchenAbvGr KitchenQual TotRmsAbvGrd  
## 719 2 1 3 1 Gd 9  
## 321 3 1 4 1 Gd 9  
## 12 3 0 4 1 Ex 11  
## 643 2 1 4 1 Ex 9  
## 991 2 1 3 1 Gd 7  
## 655 2 1 2 1 Gd 7  
## 878 2 1 4 1 Ex 10  
## 322 2 1 4 1 Gd 10  
## 609 2 1 4 1 TA 10  
## 310 2 0 3 1 Ex 8  
## 703 2 1 4 1 Ex 10  
## 1229 1 1 1 1 Ex 7  
## 586 2 0 2 1 Gd 7  
## 645 2 1 2 1 Ex 7  
## 152 2 0 2 1 Gd 6  
## 679 2 1 3 1 Gd 7  
## 482 2 0 2 1 Ex 6  
## 314 2 0 3 1 TA 8  
## 337 2 0 3 1 Gd 8  
## 1389 2 0 3 1 Ex 7  
## 1268 2 0 3 1 Ex 10  
## 478 2 1 3 1 Ex 9  
## 1269 3 1 4 1 Gd 11  
## 113 2 1 4 1 Ex 10  
## 54 0 1 0 1 Gd 5  
## 826 2 0 2 1 Ex 7  
## 225 2 0 3 1 Ex 8  
## 689 2 0 2 1 Gd 7  
## 1182 2 0 2 1 Gd 5  
## 379 1 1 1 1 Ex 8  
## 1438 2 0 2 1 Ex 7  
## 775 2 0 3 1 Gd 9  
## 988 2 1 3 1 Ex 8  
## 662 2 1 4 1 Gd 8  
## 516 2 1 3 1 Ex 9  
## 232 2 1 4 1 Ex 9  
## 1354 2 1 4 1 Gd 9  
## 162 2 1 3 1 Ex 10  
## 279 2 1 3 1 Ex 8  
## 665 1 1 1 1 Ex 8  
## 1143 3 0 4 1 Gd 11  
## 390 2 1 3 1 Ex 9  
## 497 3 0 4 1 Gd 10  
## 350 2 1 4 1 Ex 10  
## 59 3 1 3 1 Gd 10  
## 474 2 0 2 1 Gd 7  
## 528 2 1 3 1 Ex 11  
## 592 2 1 3 1 Ex 10  
## 1374 2 1 2 1 Ex 8  
## 186 2 1 4 1 Ex 12  
## 799 3 1 4 1 Ex 11  
## 179 2 0 1 1 Ex 9  
## 770 3 1 4 1 Ex 12  
## 441 2 0 2 1 Ex 10  
## 1047 3 1 4 1 Ex 11  
## 804 3 1 4 1 Ex 12  
## 899 2 1 2 1 Ex 11  
## 1170 3 1 4 1 Gd 10  
## 1183 3 1 4 1 Ex 10  
## 692 3 1 4 1 Ex 10  
## Functional Fireplaces FireplaceQu GarageType GarageYrBlt GarageFinish  
## 719 Typ 1 TA Attchd 1993 RFn  
## 321 Typ 0 NoF Attchd 2006 RFn  
## 12 Typ 2 Gd BuiltIn 2005 Fin  
## 643 Typ 3 TA Attchd 1972 Fin  
## 991 Typ 1 TA Attchd 1997 Fin  
## 655 Typ 1 TA Attchd 1995 Fin  
## 878 Typ 1 Gd Attchd 2004 Fin  
## 322 Typ 1 Gd BuiltIn 2004 Fin  
## 609 Typ 2 Gd Basment 1934 Unf  
## 310 Typ 3 Ex Attchd 2003 Fin  
## 703 Typ 1 Gd BuiltIn 2006 Fin  
## 1229 Typ 1 Gd Attchd 2008 Fin  
## 586 Typ 2 Gd Attchd 2005 RFn  
## 645 Typ 1 Gd Attchd 2009 Fin  
## 152 Typ 1 Gd Attchd 2007 RFn  
## 679 Typ 1 Gd Attchd 2008 Fin  
## 482 Typ 1 Gd Attchd 2003 Fin  
## 314 Typ 2 Gd Attchd 1965 RFn  
## 337 Typ 1 Gd Attchd 2005 Fin  
## 1389 Typ 2 Gd Attchd 2006 Fin  
## 1268 Typ 1 Gd Attchd 2009 Fin  
## 478 Typ 1 Gd BuiltIn 2006 Fin  
## 1269 Typ 2 Gd BuiltIn 1982 Unf  
## 113 Typ 1 Gd BuiltIn 2007 Fin  
## 54 Typ 1 Gd Attchd 1981 Fin  
## 826 Typ 1 Gd Attchd 2007 Fin  
## 225 Typ 1 Ex Attchd 2003 Fin  
## 689 Typ 1 Gd Attchd 2007 RFn  
## 1182 Typ 1 Gd Attchd 2008 Fin  
## 379 Typ 1 Ex Attchd 2010 Fin  
## 1438 Typ 1 Gd Attchd 2008 Fin  
## 775 Typ 1 Gd Attchd 2006 Fin  
## 988 Typ 1 Gd Attchd 2010 Fin  
## 662 Typ 1 TA Attchd 1994 RFn  
## 516 Typ 1 Gd Attchd 2009 Fin  
## 232 Typ 1 TA Attchd 1995 Fin  
## 1354 Typ 1 Ex Attchd 1996 Fin  
## 162 Typ 2 Gd BuiltIn 2003 Fin  
## 279 Typ 1 Ex Attchd 2007 Fin  
## 665 Typ 1 Ex Attchd 2005 Fin  
## 1143 Typ 1 TA BuiltIn 2006 RFn  
## 390 Typ 1 Ex BuiltIn 2008 Fin  
## 497 Typ 1 Gd Attchd 1992 RFn  
## 350 Typ 2 Ex Attchd 2006 Fin  
## 59 Typ 1 Gd BuiltIn 2006 Fin  
## 474 Typ 1 Ex Attchd 2006 RFn  
## 528 Typ 1 Gd Attchd 2008 Fin  
## 592 Typ 1 Gd BuiltIn 2008 RFn  
## 1374 Typ 2 Gd Attchd 2001 RFn  
## 186 Typ 2 TA Detchd 1993 Unf  
## 799 Typ 2 Gd BuiltIn 2009 Fin  
## 179 Typ 1 Gd Attchd 2009 Fin  
## 770 Mod 1 Gd BuiltIn 2003 Fin  
## 441 Typ 2 Gd Attchd 2008 Fin  
## 1047 Typ 1 Gd BuiltIn 2005 Fin  
## 804 Typ 1 Gd BuiltIn 2009 RFn  
## 899 Typ 2 Gd Attchd 2009 Fin  
## 1170 Typ 1 TA Attchd 1995 Fin  
## 1183 Typ 2 TA Attchd 1996 Fin  
## 692 Typ 2 Ex Attchd 1994 Fin  
## GarageCars GarageArea GarageQual GarageCond PavedDrive WoodDeckSF  
## 719 3 983 TA TA Y 250  
## 321 3 840 TA TA Y 240  
## 12 3 736 TA TA Y 147  
## 643 2 538 TA TA Y 269  
## 991 3 870 TA TA Y 0  
## 655 3 839 TA TA Y 236  
## 878 3 738 TA TA Y 184  
## 322 3 872 TA TA Y 184  
## 609 2 380 TA TA Y 0  
## 310 3 708 TA TA Y 208  
## 703 3 666 TA TA Y 324  
## 1229 3 1052 TA TA Y 0  
## 586 3 880 TA TA Y 326  
## 645 3 478 TA TA Y 195  
## 152 3 866 TA TA Y 0  
## 679 3 834 TA TA Y 322  
## 482 3 874 TA TA Y 206  
## 314 2 513 TA TA Y 0  
## 337 3 676 TA TA Y 178  
## 1389 3 758 TA TA Y 201  
## 1268 3 746 TA TA Y 144  
## 478 3 694 TA TA Y 414  
## 1269 3 1014 TA TA Y 314  
## 113 3 792 TA TA Y 120  
## 54 3 894 TA TA Y 857  
## 826 3 1220 TA TA Y 188  
## 225 3 968 TA TA Y 248  
## 689 2 567 TA TA Y 140  
## 1182 2 482 TA TA Y 162  
## 379 3 834 TA TA Y 113  
## 1438 3 774 TA TA Y 0  
## 775 3 895 TA TA Y 315  
## 988 3 606 TA TA Y 168  
## 662 3 711 TA TA Y 517  
## 516 3 900 TA TA Y 156  
## 232 3 810 TA TA Y 0  
## 1354 3 666 TA TA Y 283  
## 162 3 726 TA TA Y 400  
## 279 3 732 TA TA Y 124  
## 665 3 1134 TA TA Y 192  
## 1143 3 1052 TA TA Y 125  
## 390 3 846 TA TA Y 196  
## 497 2 546 TA TA Y 264  
## 350 3 706 TA TA Y 0  
## 59 3 641 TA TA Y 192  
## 474 3 908 TA TA Y 250  
## 528 3 858 TA TA Y 126  
## 592 3 842 TA TA Y 382  
## 1374 3 804 TA TA Y 314  
## 186 3 840 Ex TA Y 0  
## 799 3 820 TA TA Y 144  
## 179 3 1166 TA TA Y 0  
## 770 3 841 TA TA Y 503  
## 441 3 672 TA TA Y 0  
## 1047 3 716 TA TA Y 214  
## 804 3 1020 TA TA Y 52  
## 899 3 820 TA TA Y 0  
## 1170 3 807 TA TA Y 361  
## 1183 3 813 TA TA Y 171  
## 692 3 832 TA TA Y 382  
## OpenPorchSF EnclosedPorch X3SsnPorch ScreenPorch PoolArea PoolQC  
## 719 154 216 0 0 0 NoP  
## 321 154 0 0 0 0 NoP  
## 12 21 0 0 0 0 NoP  
## 643 111 0 0 0 0 NoP  
## 991 70 0 0 0 0 NoP  
## 655 46 0 0 0 0 NoP  
## 878 0 0 0 0 0 NoP  
## 322 154 0 0 0 0 NoP  
## 609 0 0 0 0 0 NoP  
## 310 175 0 0 0 0 NoP  
## 703 100 0 0 0 0 NoP  
## 1229 72 0 0 224 0 NoP  
## 586 66 0 0 0 0 NoP  
## 645 130 0 0 0 0 NoP  
## 152 102 0 0 0 0 NoP  
## 679 82 0 0 0 0 NoP  
## 482 49 0 0 0 0 NoP  
## 314 0 0 0 0 0 NoP  
## 337 51 0 0 0 0 NoP  
## 1389 39 0 0 0 0 NoP  
## 1268 76 0 0 0 0 NoP  
## 478 84 0 0 0 0 NoP  
## 1269 12 0 0 0 0 NoP  
## 113 184 0 0 168 0 NoP  
## 54 72 0 0 0 0 NoP  
## 826 45 0 0 0 0 NoP  
## 225 105 0 0 0 0 NoP  
## 689 0 0 0 0 0 NoP  
## 1182 53 0 153 0 0 NoP  
## 379 0 0 0 0 0 NoP  
## 1438 66 0 304 0 0 NoP  
## 775 45 0 0 0 0 NoP  
## 988 95 0 0 0 0 NoP  
## 662 76 0 0 0 0 NoP  
## 516 54 0 0 0 0 NoP  
## 232 146 202 0 0 0 NoP  
## 1354 86 0 0 0 0 NoP  
## 162 0 0 0 0 0 NoP  
## 279 98 0 0 142 0 NoP  
## 665 267 0 0 0 0 NoP  
## 1143 144 0 0 0 0 NoP  
## 390 134 0 0 0 0 NoP  
## 497 75 291 0 0 0 NoP  
## 350 0 0 0 0 0 NoP  
## 59 0 37 0 0 0 NoP  
## 474 63 0 0 0 0 NoP  
## 528 66 0 0 0 0 NoP  
## 592 274 0 0 0 0 NoP  
## 1374 140 0 0 0 0 NoP  
## 186 260 0 0 410 0 NoP  
## 799 78 0 0 0 0 NoP  
## 179 60 0 0 0 0 NoP  
## 770 36 0 0 210 0 NoP  
## 441 72 0 0 170 0 NoP  
## 1047 108 0 0 0 0 NoP  
## 804 170 0 0 192 0 NoP  
## 899 67 0 0 0 0 NoP  
## 1170 76 0 0 0 0 NoP  
## 1183 78 0 0 0 555 Ex  
## 692 50 0 0 0 0 NoP  
## Fence MiscFeature MiscVal MoSold YrSold SaleType SaleCondition  
## 719 NoF NoM 0 8 2008 WD Normal  
## 321 NoF NoM 0 9 2006 New Partial  
## 12 NoF NoM 0 7 2006 New Partial  
## 643 MnPrv NoM 0 7 2009 WD Normal  
## 991 NoF NoM 0 6 2006 WD Normal  
## 655 NoF NoM 0 8 2008 WD Normal  
## 878 NoF NoM 0 6 2009 WD Normal  
## 322 NoF NoM 0 6 2007 WD Normal  
## 609 NoF NoM 0 9 2007 WD Alloca  
## 310 NoF NoM 0 11 2006 WD Normal  
## 703 NoF NoM 0 7 2006 New Partial  
## 1229 NoF NoM 0 10 2008 New Partial  
## 586 NoF NoM 0 3 2006 New Partial  
## 645 NoF NoM 0 10 2009 New Partial  
## 152 NoF NoM 0 1 2008 New Partial  
## 679 NoF NoM 0 7 2009 New Partial  
## 482 NoF NoM 0 8 2006 WD Normal  
## 314 NoF NoM 0 6 2009 WD Normal  
## 337 NoF NoM 0 7 2007 WD Normal  
## 1389 NoF NoM 0 10 2009 WD Normal  
## 1268 NoF NoM 0 5 2010 WD Normal  
## 478 NoF NoM 0 3 2007 WD Normal  
## 1269 GdWo NoM 0 5 2008 WD Normal  
## 113 NoF NoM 0 10 2007 New Partial  
## 54 NoF NoM 0 11 2006 WD Normal  
## 826 NoF NoM 0 6 2008 New Partial  
## 225 NoF NoM 0 6 2009 WD Normal  
## 689 NoF NoM 0 10 2007 New Partial  
## 1182 NoF NoM 0 11 2008 New Partial  
## 379 NoF NoM 0 6 2010 New Partial  
## 1438 NoF NoM 0 11 2008 New Partial  
## 775 NoF NoM 0 7 2007 New Partial  
## 988 NoF NoM 0 4 2010 New Partial  
## 662 NoF NoM 0 7 2009 WD Normal  
## 516 NoF NoM 0 9 2009 New Partial  
## 232 NoF NoM 0 7 2009 WD Normal  
## 1354 NoF NoM 0 3 2010 WD Normal  
## 162 NoF NoM 0 3 2008 WD Normal  
## 279 NoF NoM 0 5 2007 New Partial  
## 665 NoF NoM 0 1 2006 New Partial  
## 1143 NoF NoM 0 4 2007 New Partial  
## 390 NoF NoM 0 8 2008 New Partial  
## 497 NoF NoM 0 5 2007 WD Normal  
## 350 NoF NoM 0 4 2006 New Partial  
## 59 NoF NoM 0 10 2006 New Partial  
## 474 NoF NoM 0 7 2007 New Partial  
## 528 NoF NoM 0 11 2008 New Partial  
## 592 NoF NoM 0 6 2009 ConLI Normal  
## 1374 NoF NoM 0 3 2007 WD Normal  
## 186 GdPrv NoM 0 6 2006 WD Normal  
## 799 NoF NoM 0 7 2009 New Partial  
## 179 NoF NoM 0 7 2009 New Partial  
## 770 NoF NoM 0 6 2010 WD Normal  
## 441 NoF NoM 0 4 2009 WD Normal  
## 1047 NoF NoM 0 7 2006 New Partial  
## 804 NoF NoM 0 1 2009 New Partial  
## 899 NoF NoM 0 3 2010 New Partial  
## 1170 NoF NoM 0 7 2006 WD Normal  
## 1183 MnPrv NoM 0 7 2007 WD Abnorml  
## 692 NoF NoM 0 1 2007 WD Normal  
## SalePrice  
## 719 341000  
## 321 342643  
## 12 345000  
## 643 345000  
## 991 348000  
## 655 350000  
## 878 350000  
## 322 354000  
## 609 359100  
## 310 360000  
## 703 361919  
## 1229 367294  
## 586 369900  
## 645 370878  
## 152 372402  
## 679 372500  
## 482 374000  
## 314 375000  
## 337 377426  
## 1389 377500  
## 1268 378500  
## 478 380000  
## 1269 381000  
## 113 383970  
## 54 385000  
## 826 385000  
## 225 386250  
## 689 392000  
## 1182 392500  
## 379 394432  
## 1438 394617  
## 775 395000  
## 988 395192  
## 662 402000  
## 516 402861  
## 232 403000  
## 1354 410000  
## 162 412500  
## 279 415298  
## 665 423000  
## 1143 424870  
## 390 426000  
## 497 430000  
## 350 437154  
## 59 438780  
## 474 440000  
## 528 446261  
## 592 451950  
## 1374 466500  
## 186 475000  
## 799 485000  
## 179 501837  
## 770 538000  
## 441 555000  
## 1047 556581  
## 804 582933  
## 899 611657  
## 1170 625000  
## 1183 745000  
## 692 755000

# 1.1.3 Fixing Data types

modified\_data$MSSubClass <- formatC(modified\_data$MSSubClass)  
modified\_data$BsmtFullBath <- formatC(modified\_data$BsmtFullBath)  
modified\_data$BsmtHalfBath <- formatC(modified\_data$BsmtHalfBath)  
modified\_data$FullBath <- formatC(modified\_data$FullBath)  
modified\_data$HalfBath <- formatC(modified\_data$HalfBath)  
modified\_data$BedroomAbvGr <- formatC(modified\_data$BedroomAbvGr)  
modified\_data$KitchenAbvGr <- formatC(modified\_data$KitchenAbvGr)  
modified\_data$TotRmsAbvGrd <- formatC(modified\_data$TotRmsAbvGrd)  
modified\_data$Fireplaces <- formatC(modified\_data$Fireplaces)  
modified\_data$MoSold <- formatC(modified\_data$MoSold)  
modified\_data$YrSold <- formatC(modified\_data$YrSold)  
#modified\_data$OverallQual <- formatC(modified\_data$OverallQual)  
#modified\_data$OverallCond <- formatC(modified\_data$OverallCond)

# 1.1.4 Reducing the levels on for Categorical attributes and dealing with outlier for Quantitative attributes. Fixing distributions of categorical variables

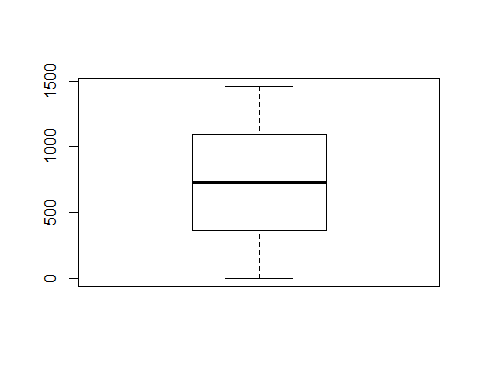
# I will be using temp as an alt to the actual modified dataset until everything is finalized.   
colname <- colnames(modified\_data)  
temp = modified\_data  
#remeber which attributes to remove  
toremove = as.vector(0)  
outers= as.vector(0)  
gg = 0  
attrib = 0  
global = 0

This will be a strainious process, but I will be going thru each variable. we shall see if there is a need to reduce the levels for the categorical ones, and if outliers need to be dealt with for the numerical ones.

attrib = attrib + 1  
colname[attrib]

## [1] "Id"

if (typeof(temp[,attrib]) == 'integer'){  
 graph = boxplot(temp[,attrib])  
 print(length(graph$out))  
 print(graph$out)  
 outlierID = which(temp[,attrib]>graph$stats[5],)  
 temp[outlierID,]  
}



## [1] 0  
## numeric(0)

## [1] Id MSSubClass MSZoning LotFrontage LotArea   
## [6] Street Alley LotShape LandContour Utilities   
## [11] LotConfig LandSlope Neighborhood Condition1 Condition2   
## [16] BldgType HouseStyle OverallQual OverallCond YearBuilt   
## [21] YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd   
## [26] MasVnrType MasVnrArea ExterQual ExterCond Foundation   
## [31] BsmtQual BsmtCond BsmtExposure BsmtFinType1 BsmtFinSF1   
## [36] BsmtFinType2 BsmtFinSF2 BsmtUnfSF TotalBsmtSF Heating   
## [41] HeatingQC CentralAir Electrical X1stFlrSF X2ndFlrSF   
## [46] LowQualFinSF GrLivArea BsmtFullBath BsmtHalfBath FullBath   
## [51] HalfBath BedroomAbvGr KitchenAbvGr KitchenQual TotRmsAbvGrd   
## [56] Functional Fireplaces FireplaceQu GarageType GarageYrBlt   
## [61] GarageFinish GarageCars GarageArea GarageQual GarageCond   
## [66] PavedDrive WoodDeckSF OpenPorchSF EnclosedPorch X3SsnPorch   
## [71] ScreenPorch PoolArea PoolQC Fence MiscFeature   
## [76] MiscVal MoSold YrSold SaleType SaleCondition  
## [81] SalePrice   
## <0 rows> (or 0-length row.names)

if (typeof(temp[,attrib]) == 'character'){  
 print(as.data.frame(table(temp[,attrib])))  
 print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
 # global = global + 1  
 # toremove[global] = attrib  
}

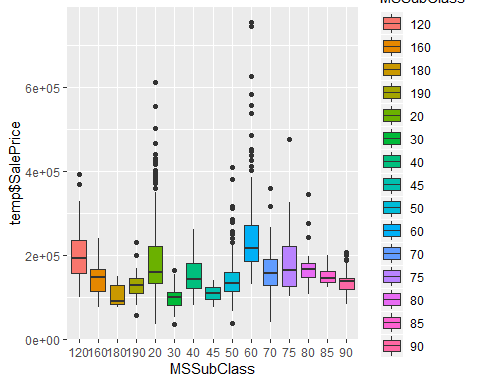
Obviously there is no outlier problem with our ID variables. Nothing to be removed.

attrib = attrib + 1  
colname[attrib]

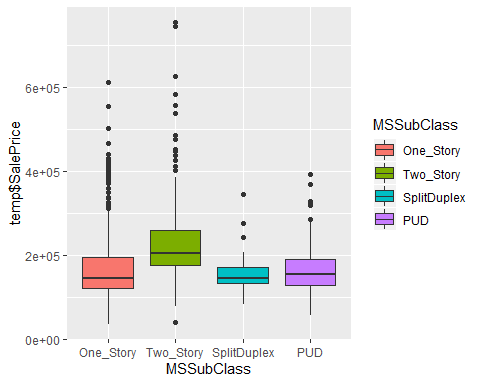
## [1] "MSSubClass"

if (typeof(temp[,attrib]) == 'integer'){  
graph = boxplot(temp[,attrib])  
length(graph$out)  
graph$out  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
# Reassigning levels   
temp$MSSubClass <- factor(temp$MSSubClass)  
levels(temp$MSSubClass) <- list(One\_Story=c("20","30","40","45", "50"), Two\_Story=c("60","70","75"), SplitDuplex=c("80","85","90"), PUD=c("120","160","180","190"))  
  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
# global = global + 1  
# toremove[global] = attrib  
}

## Var1 Freq  
## 1 120 85  
## 2 160 63  
## 3 180 10  
## 4 190 30  
## 5 20 532  
## 6 30 69  
## 7 40 4  
## 8 45 12  
## 9 50 144  
## 10 60 296  
## 11 70 60  
## 12 75 16  
## 13 80 57  
## 14 85 19  
## 15 90 52



## Var1 Freq  
## 1 One\_Story 761  
## 2 Two\_Story 372  
## 3 SplitDuplex 128  
## 4 PUD 188

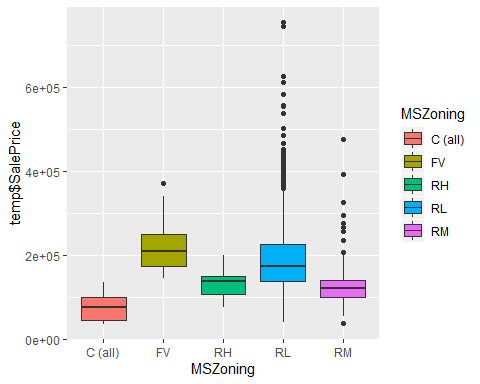
 Reduced the number of factors

attrib = attrib + 1  
colname[attrib]

## [1] "MSZoning"

if (typeof(temp[,attrib]) == 'integer'){  
graph = boxplot(temp[,attrib])  
length(graph$out)  
graph$out  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
global = global + 1  
toremove[global] = attrib  
}

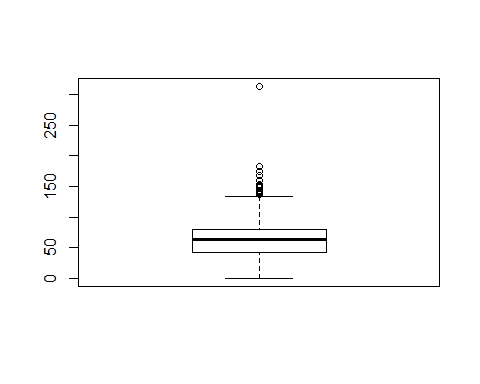
## Var1 Freq  
## 1 C (all) 10  
## 2 FV 62  
## 3 RH 16  
## 4 RL 1144  
## 5 RM 217

 I decided that the number of categorical factors are appropriate, and do not need to reduce. However Judging by the variance, Probably will be looking to remove this one. The distribution is too skewed. Variance looks too little.

attrib = attrib + 1  
colname[attrib]

## [1] "LotFrontage"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1],)  
temp[outlierID,]  
outlier\_lotFrontage = subset(temp, temp[,attrib]>graph$stats[5])  
gg = gg+1  
outers[gg] = attrib  
}



## [1] 16  
## [1] 141 174 174 140 150 137 144 149 313 168 182 138 160 152 313 153

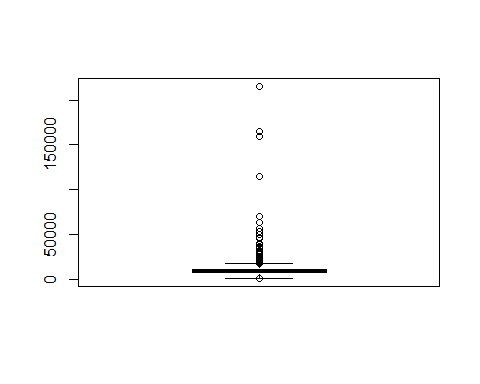
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
# global = global + 1  
# toremove[global] = attrib  
}

I flagged all the potential outliers into the var outlier. WIll not remove yet because i might just be removing this attribute all together.

attrib = attrib + 1  
colname[attrib]

## [1] "LotArea"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1],)  
temp[outlierID,]  
outlier\_lotArea = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



## [1] 67  
## [1] 50271 19900 21000 21453 19378 31770 22950 25419 159000 19296  
## [11] 39104 19138 18386 215245 164660 20431 18800 53107 34650 22420  
## [21] 21750 70761 53227 40094 21872 21780 25095 46589 20896 18450  
## [31] 21535 26178 115149 21695 53504 21384 28698 45600 17920 25286  
## [41] 27650 24090 25000 1300 21286 21750 29959 18000 23257 17755  
## [51] 35760 18030 35133 32463 18890 24682 23595 17871 36500 63887  
## [61] 20781 25339 57200 20544 19690 21930 26142

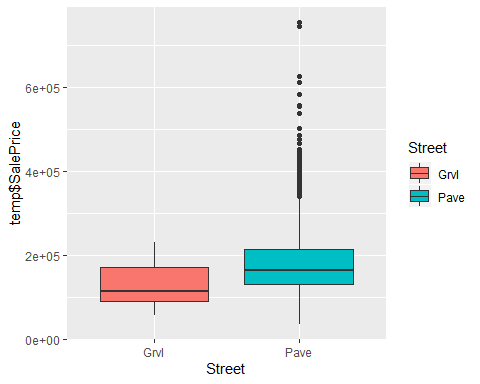
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
# global = global + 1  
# toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "Street"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Grvl 6  
## 2 Pave 1443

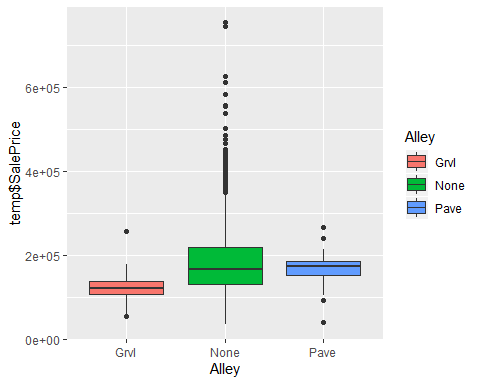
 Probably will be looking to remove this one. The distribution is too skewed. Variance looks too little.

attrib = attrib + 1  
colname[attrib]

## [1] "Alley"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
 global = global + 1  
 toremove[global] = attrib  
}

## Var1 Freq  
## 1 Grvl 50  
## 2 None 1359  
## 3 Pave 40

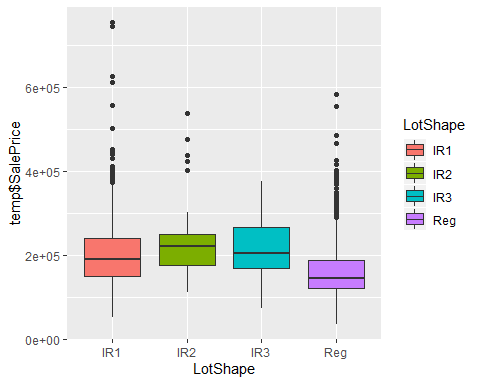
 Probably will be looking to remove this one. The distribution is too skewed. Variance looks too little.

attrib = attrib + 1  
colname[attrib]

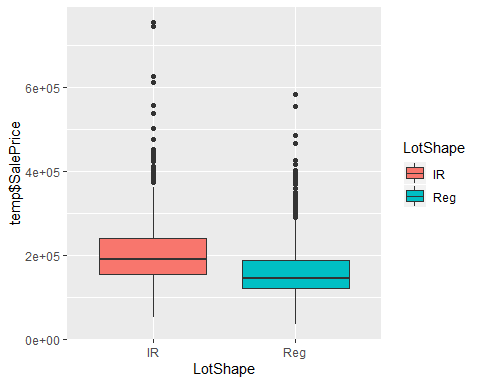
## [1] "LotShape"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
# Reassigning levels   
temp$LotShape <- factor(temp$LotShape)  
levels(temp$LotShape) <- list(IR=c("IR1","IR2","IR3"), Reg="Reg")  
  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
# global = global + 1  
# toremove[global] = attrib  
}

## Var1 Freq  
## 1 IR1 482  
## 2 IR2 41  
## 3 IR3 10  
## 4 Reg 916



## Var1 Freq  
## 1 IR 533  
## 2 Reg 916

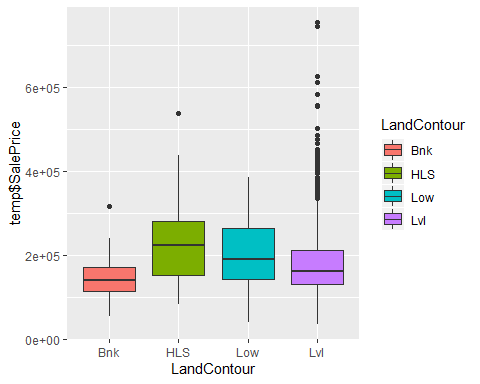
 After looking at the distribution (variances) in each level and how closely related IR1,IR2,IR3 were to each other, I decided to group them. This will level the distribution a bit.

attrib = attrib + 1  
colname[attrib]

## [1] "LandContour"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Bnk 63  
## 2 HLS 50  
## 3 Low 36  
## 4 Lvl 1300

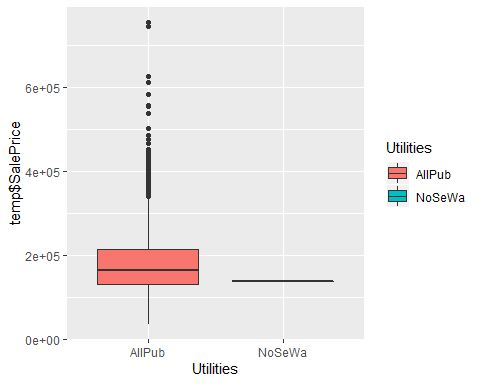
 Will be dropped for sure.

attrib = attrib + 1  
colname[attrib]

## [1] "Utilities"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 AllPub 1448  
## 2 NoSeWa 1

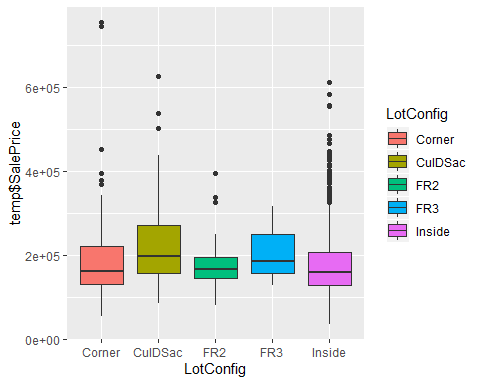
 Will be dropped for sure.

attrib = attrib + 1  
colname[attrib]

## [1] "LotConfig"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Corner 262  
## 2 CulDSac 93  
## 3 FR2 47  
## 4 FR3 3  
## 5 Inside 1044

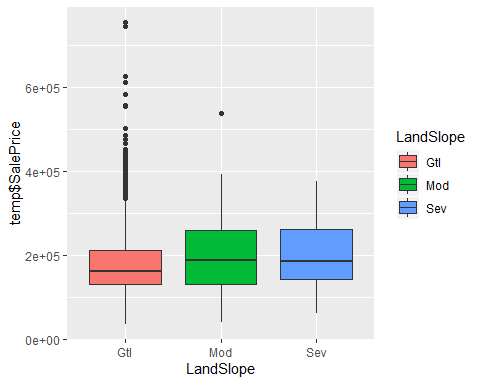
 Will drop.

attrib = attrib + 1  
colname[attrib]

## [1] "LandSlope"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Gtl 1371  
## 2 Mod 65  
## 3 Sev 13

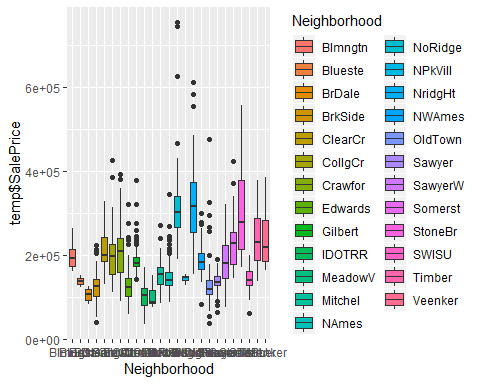
 Will drop

attrib = attrib + 1  
colname[attrib]

## [1] "Neighborhood"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 Blmngtn 17  
## 2 Blueste 2  
## 3 BrDale 16  
## 4 BrkSide 58  
## 5 ClearCr 28  
## 6 CollgCr 148  
## 7 Crawfor 50  
## 8 Edwards 100  
## 9 Gilbert 78  
## 10 IDOTRR 37  
## 11 MeadowV 17  
## 12 Mitchel 49  
## 13 NAmes 225  
## 14 NoRidge 41  
## 15 NPkVill 9  
## 16 NridgHt 75  
## 17 NWAmes 73  
## 18 OldTown 113  
## 19 Sawyer 74  
## 20 SawyerW 58  
## 21 Somerst 83  
## 22 StoneBr 25  
## 23 SWISU 25  
## 24 Timber 37  
## 25 Veenker 11

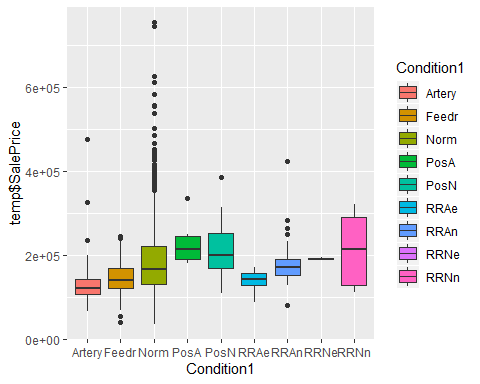
 Will not touch this because i feel it will be very important.

attrib = attrib + 1  
colname[attrib]

## [1] "Condition1"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Artery 48  
## 2 Feedr 81  
## 3 Norm 1249  
## 4 PosA 8  
## 5 PosN 19  
## 6 RRAe 11  
## 7 RRAn 26  
## 8 RRNe 2  
## 9 RRNn 5

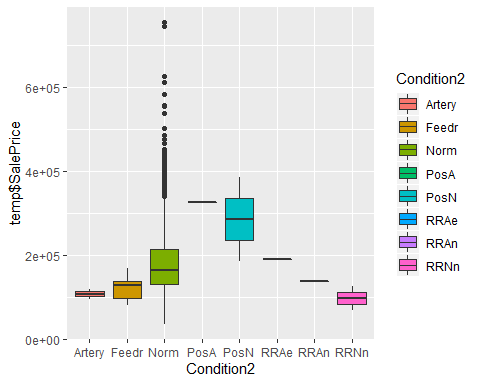
 Distribution is very bad, will drop

attrib = attrib + 1  
colname[attrib]

## [1] "Condition2"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Artery 2  
## 2 Feedr 6  
## 3 Norm 1434  
## 4 PosA 1  
## 5 PosN 2  
## 6 RRAe 1  
## 7 RRAn 1  
## 8 RRNn 2

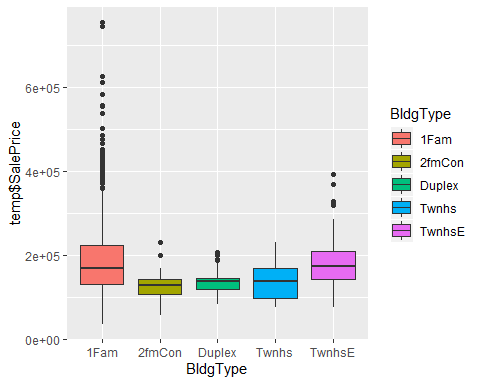
 Even worse vairance, will drop.

attrib = attrib + 1  
colname[attrib]

## [1] "BldgType"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 1Fam 1211  
## 2 2fmCon 31  
## 3 Duplex 52  
## 4 Twnhs 43  
## 5 TwnhsE 112

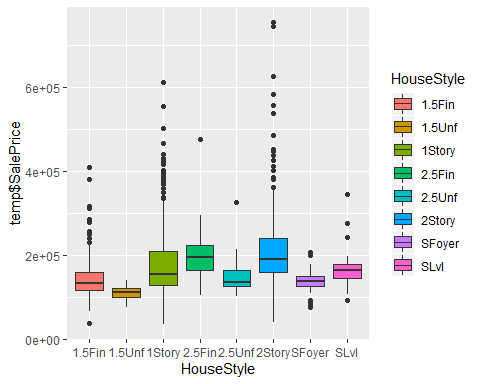
 I like the idea of this attribute, unfortunatly the vaiance is not within my ruleset

attrib = attrib + 1  
colname[attrib]

## [1] "HouseStyle"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 1.5Fin 154  
## 2 1.5Unf 14  
## 3 1Story 720  
## 4 2.5Fin 8  
## 5 2.5Unf 11  
## 6 2Story 442  
## 7 SFoyer 36  
## 8 SLvl 64

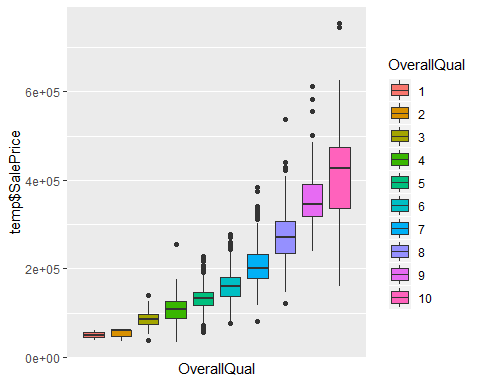
 Although the distribution is not that good, we shall leave it as is because we want to perserve the information it gives. Perhaps later we will remove it.

attrib = attrib + 1  
colname[attrib]

## [1] "OverallQual"

if (colname[attrib] == 'OverallQual'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 1 2  
## 2 2 3  
## 3 3 20  
## 4 4 116  
## 5 5 395  
## 6 6 372  
## 7 7 314  
## 8 8 167  
## 9 9 43  
## 10 10 17



if (typeof(temp[,attrib]) == 'integer' & colname[attrib] != 'OverallQual'){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

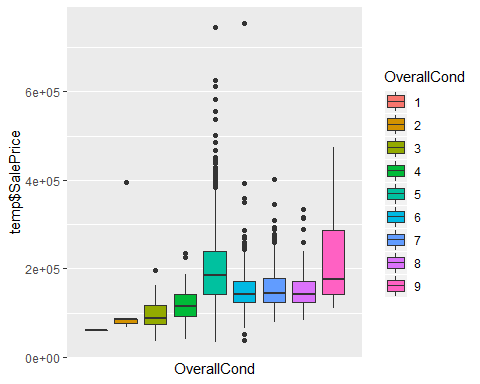
There is no reason for us to be chnaging this. Changing to quality ranges would not help the distribution (ex 1-3, 4-7, 8-10). Will keep as is.

attrib = attrib + 1  
colname[attrib]

## [1] "OverallCond"

if (colname[attrib] == 'OverallCond'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 1 1  
## 2 2 5  
## 3 3 24  
## 4 4 57  
## 5 5 813  
## 6 6 251  
## 7 7 205  
## 8 8 71  
## 9 9 22



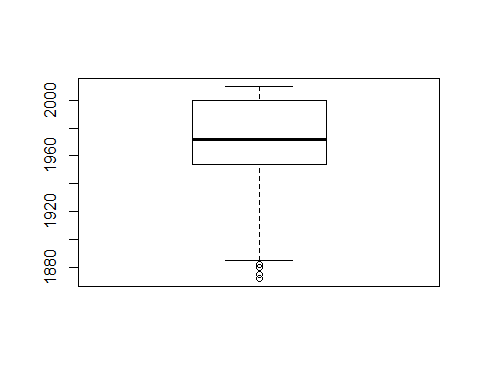
if (typeof(temp[,attrib]) == 'integer' & colname[attrib] != 'OverallCond'){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

Again, the distribution does not look too good towards the extremes, but there is no way to fix this without removing information. Will keep

attrib = attrib + 1  
colname[attrib]

## [1] "YearBuilt"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_yearbuilt = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



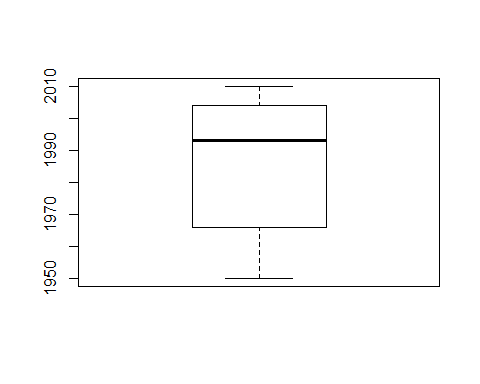
## [1] 7  
## [1] 1880 1880 1880 1882 1880 1875 1872

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "YearRemodAdd"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}



## [1] 0  
## numeric(0)

## [1] Id MSSubClass MSZoning LotFrontage LotArea   
## [6] Street Alley LotShape LandContour Utilities   
## [11] LotConfig LandSlope Neighborhood Condition1 Condition2   
## [16] BldgType HouseStyle OverallQual OverallCond YearBuilt   
## [21] YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd   
## [26] MasVnrType MasVnrArea ExterQual ExterCond Foundation   
## [31] BsmtQual BsmtCond BsmtExposure BsmtFinType1 BsmtFinSF1   
## [36] BsmtFinType2 BsmtFinSF2 BsmtUnfSF TotalBsmtSF Heating   
## [41] HeatingQC CentralAir Electrical X1stFlrSF X2ndFlrSF   
## [46] LowQualFinSF GrLivArea BsmtFullBath BsmtHalfBath FullBath   
## [51] HalfBath BedroomAbvGr KitchenAbvGr KitchenQual TotRmsAbvGrd   
## [56] Functional Fireplaces FireplaceQu GarageType GarageYrBlt   
## [61] GarageFinish GarageCars GarageArea GarageQual GarageCond   
## [66] PavedDrive WoodDeckSF OpenPorchSF EnclosedPorch X3SsnPorch   
## [71] ScreenPorch PoolArea PoolQC Fence MiscFeature   
## [76] MiscVal MoSold YrSold SaleType SaleCondition  
## [81] SalePrice   
## <0 rows> (or 0-length row.names)

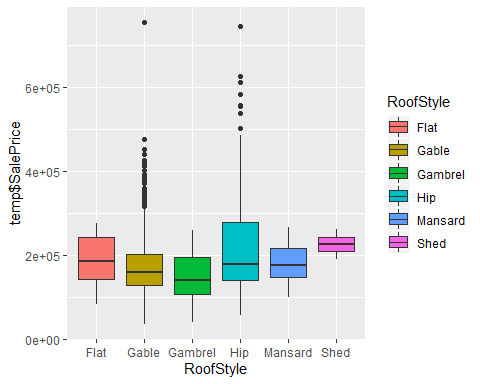
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "RoofStyle"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 Flat 13  
## 2 Gable 1131  
## 3 Gambrel 11  
## 4 Hip 285  
## 5 Mansard 7  
## 6 Shed 2

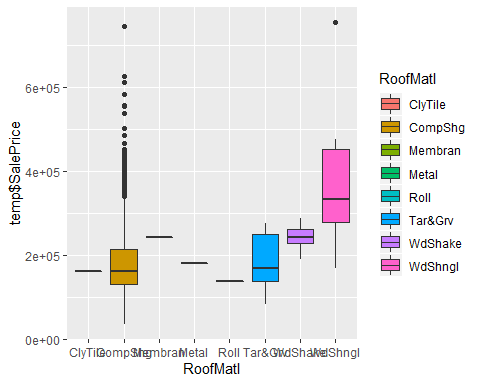


attrib = attrib + 1  
colname[attrib]

## [1] "RoofMatl"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 ClyTile 1  
## 2 CompShg 1423  
## 3 Membran 1  
## 4 Metal 1  
## 5 Roll 1  
## 6 Tar&Grv 11  
## 7 WdShake 5  
## 8 WdShngl 6

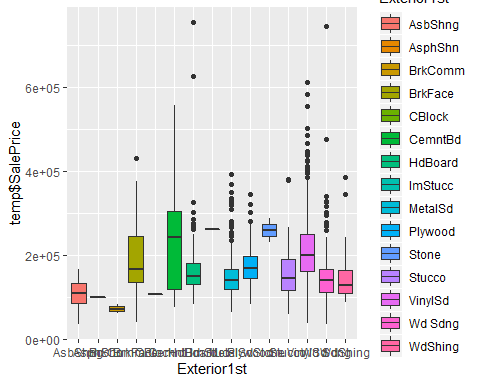
 will remove this this attrib

attrib = attrib + 1  
colname[attrib]

## [1] "Exterior1st"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 AsbShng 20  
## 2 AsphShn 1  
## 3 BrkComm 2  
## 4 BrkFace 50  
## 5 CBlock 1  
## 6 CemntBd 59  
## 7 HdBoard 222  
## 8 ImStucc 1  
## 9 MetalSd 220  
## 10 Plywood 108  
## 11 Stone 2  
## 12 Stucco 25  
## 13 VinylSd 508  
## 14 Wd Sdng 205  
## 15 WdShing 25

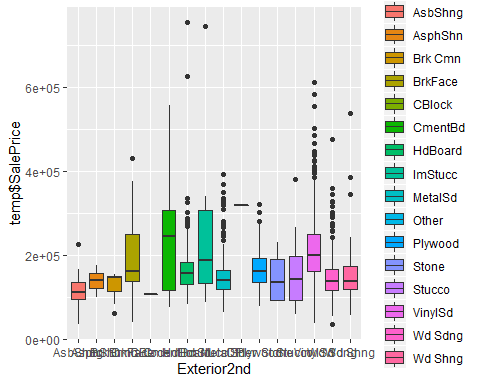


attrib = attrib + 1  
colname[attrib]

## [1] "Exterior2nd"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 AsbShng 20  
## 2 AsphShn 3  
## 3 Brk Cmn 7  
## 4 BrkFace 25  
## 5 CBlock 1  
## 6 CmentBd 58  
## 7 HdBoard 206  
## 8 ImStucc 10  
## 9 MetalSd 214  
## 10 Other 1  
## 11 Plywood 142  
## 12 Stone 4  
## 13 Stucco 26  
## 14 VinylSd 497  
## 15 Wd Sdng 197  
## 16 Wd Shng 38

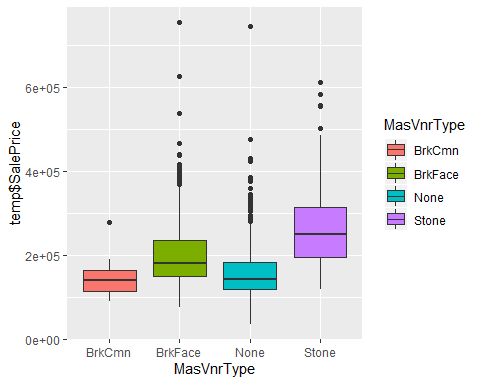


attrib = attrib + 1  
colname[attrib]

## [1] "MasVnrType"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

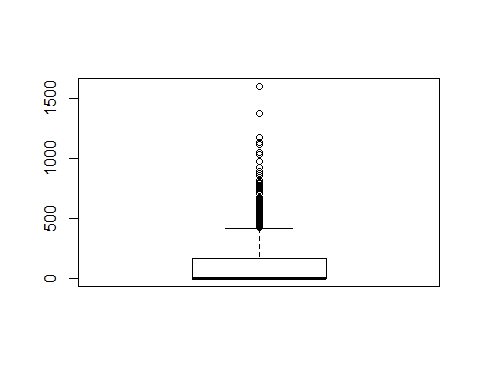
## Var1 Freq  
## 1 BrkCmn 15  
## 2 BrkFace 445  
## 3 None 862  
## 4 Stone 127



attrib = attrib + 1  
colname[attrib]

## [1] "MasVnrArea"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_masVnrArea = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



## [1] 96  
## [1] 640 650 456 1031 573 1115 576 443 468 600 768 480 1129 436  
## [15] 456 664 653 491 748 456 922 506 604 472 481 1600 616 870  
## [29] 530 500 510 650 432 473 772 435 562 921 762 594 479 584  
## [43] 420 459 452 513 472 660 528 464 1170 630 466 651 442 894  
## [57] 513 673 603 860 424 1047 442 816 760 541 423 424 975 450  
## [71] 423 571 480 425 660 1378 456 425 420 766 554 632 567 451  
## [85] 621 788 796 428 564 579 705 731 420 448 426 438

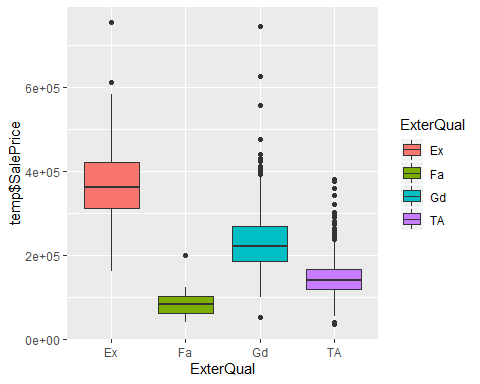
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "ExterQual"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 Ex 51  
## 2 Fa 14  
## 3 Gd 480  
## 4 TA 904

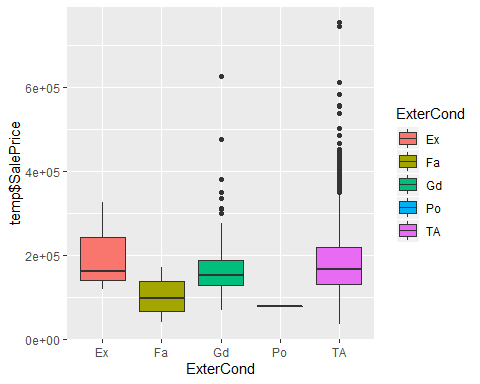


attrib = attrib + 1  
colname[attrib]

## [1] "ExterCond"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 Ex 3  
## 2 Fa 28  
## 3 Gd 145  
## 4 Po 1  
## 5 TA 1272

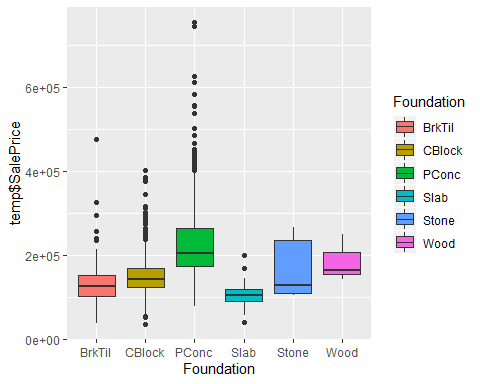


attrib = attrib + 1  
colname[attrib]

## [1] "Foundation"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 BrkTil 146  
## 2 CBlock 633  
## 3 PConc 637  
## 4 Slab 24  
## 5 Stone 6  
## 6 Wood 3

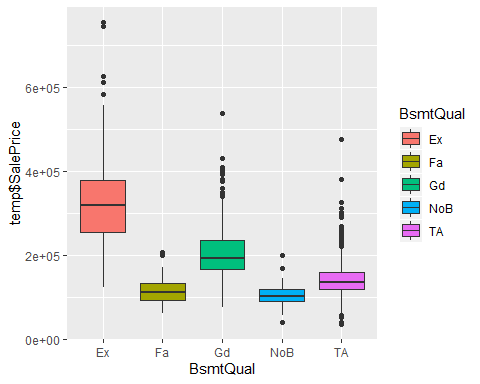


attrib = attrib + 1  
colname[attrib]

## [1] "BsmtQual"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 Ex 120  
## 2 Fa 35  
## 3 Gd 609  
## 4 NoB 37  
## 5 TA 648

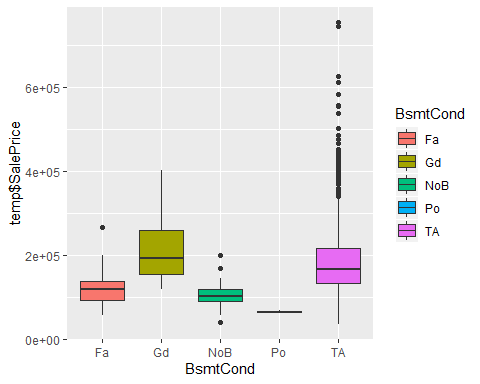


attrib = attrib + 1  
colname[attrib]

## [1] "BsmtCond"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Fa 45  
## 2 Gd 64  
## 3 NoB 37  
## 4 Po 2  
## 5 TA 1301

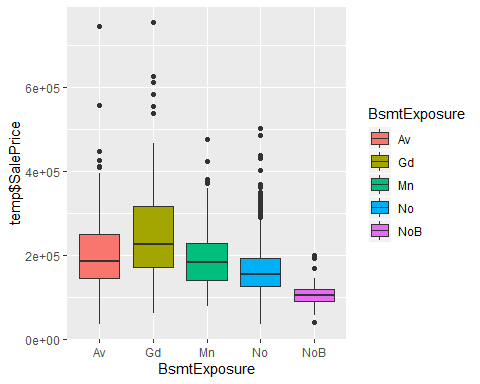
 Might drop too

attrib = attrib + 1  
colname[attrib]

## [1] "BsmtExposure"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 Av 219  
## 2 Gd 133  
## 3 Mn 114  
## 4 No 945  
## 5 NoB 38

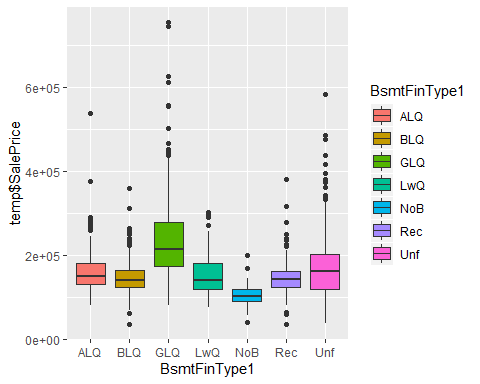


attrib = attrib + 1  
colname[attrib]

## [1] "BsmtFinType1"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

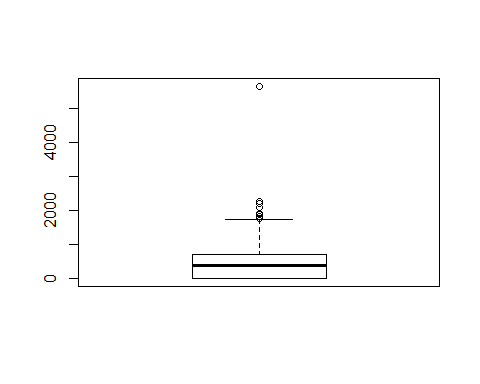
## Var1 Freq  
## 1 ALQ 220  
## 2 BLQ 148  
## 3 GLQ 411  
## 4 LwQ 74  
## 5 NoB 37  
## 6 Rec 132  
## 7 Unf 427



attrib = attrib + 1  
colname[attrib]

## [1] "BsmtFinSF1"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_bsmtFinSF1 = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



## [1] 8  
## [1] 1810 1880 1904 1767 2260 2188 2096 5644

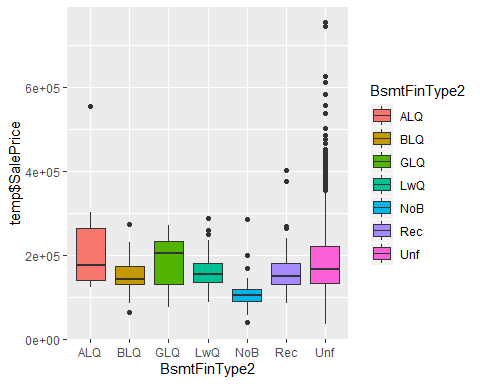
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "BsmtFinType2"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

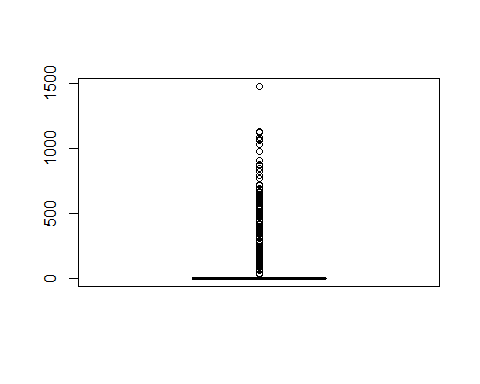
## Var1 Freq  
## 1 ALQ 19  
## 2 BLQ 33  
## 3 GLQ 14  
## 4 LwQ 46  
## 5 NoB 38  
## 6 Rec 54  
## 7 Unf 1245



attrib = attrib + 1  
colname[attrib]

## [1] "BsmtFinSF2"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_bsmtFinSF2 = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



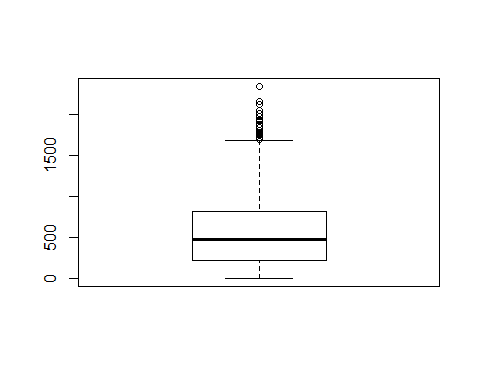
## [1] 167  
## [1] 32 668 486 93 491 506 712 362 41 169 869 150 670 28  
## [15] 1080 181 768 215 374 208 441 184 279 306 180 712 580 690  
## [29] 692 228 125 1063 620 175 820 1474 264 479 147 232 380 544  
## [43] 294 258 121 180 391 531 344 539 713 210 311 1120 165 532  
## [57] 279 96 495 180 174 1127 139 202 645 123 551 219 606 147  
## [71] 612 480 182 132 336 468 287 35 499 180 180 723 119 182  
## [85] 40 551 117 239 80 472 64 1057 127 630 480 128 377 764  
## [99] 345 539 1085 435 823 500 290 324 634 411 841 1061 93 466  
## [113] 396 354 294 149 193 117 273 465 400 468 41 682 64 557  
## [127] 230 106 791 240 287 547 391 469 177 108 374 600 492 211  
## [141] 168 96 1031 438 375 144 81 906 608 276 661 68 173 972  
## [155] 105 420 469 546 334 352 872 374 110 627 163 1029 290

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "BsmtUnfSF"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_bsmtUnfSF = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



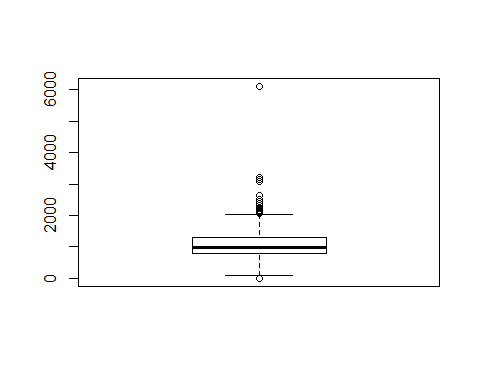
## [1] 29  
## [1] 1777 1768 1907 1686 2336 1694 2121 1869 2153 1969 1709 2042 1774 2046  
## [15] 1836 1935 1926 1734 1800 1753 1905 1800 1710 1752 1694 1689 2002 1753  
## [29] 1795

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "TotalBsmtSF"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_totalBsmtSF = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



## [1] 60  
## [1] 0 0 2223 0 0 0 2216 0 2392 0 2121 2136 3206 0  
## [15] 0 0 0 3094 2153 3200 0 3138 0 0 0 0 2109 2077  
## [29] 2444 0 0 0 0 2078 0 2217 0 0 2330 0 0 0  
## [43] 0 2524 0 0 0 0 0 2396 2158 0 0 2136 0 2110  
## [57] 6110 0 2633 0

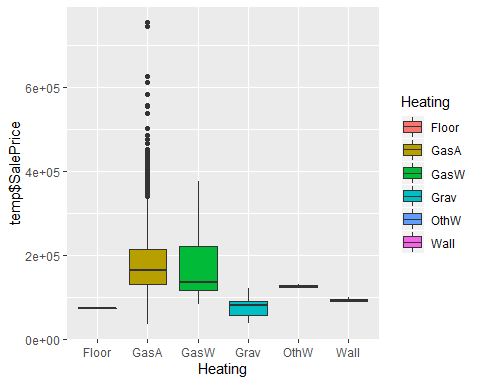
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "Heating"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Floor 1  
## 2 GasA 1417  
## 3 GasW 18  
## 4 Grav 7  
## 5 OthW 2  
## 6 Wall 4

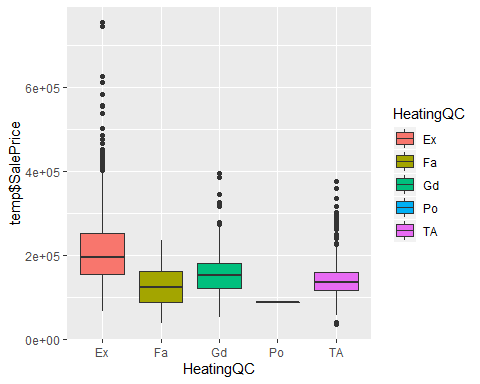


attrib = attrib + 1  
colname[attrib]

## [1] "HeatingQC"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 Ex 733  
## 2 Fa 49  
## 3 Gd 239  
## 4 Po 1  
## 5 TA 427

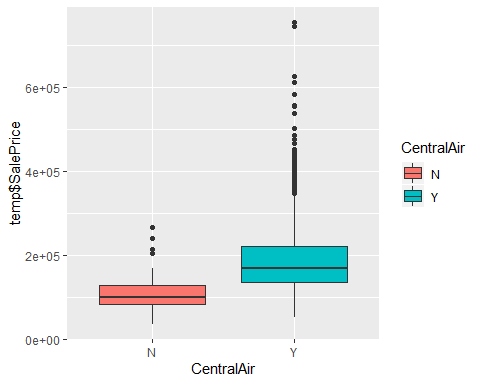


attrib = attrib + 1  
colname[attrib]

## [1] "CentralAir"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 N 95  
## 2 Y 1354

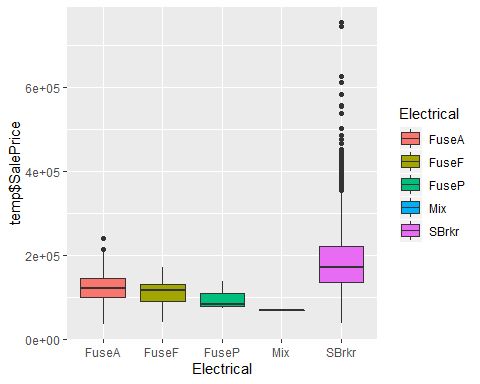


attrib = attrib + 1  
colname[attrib]

## [1] "Electrical"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

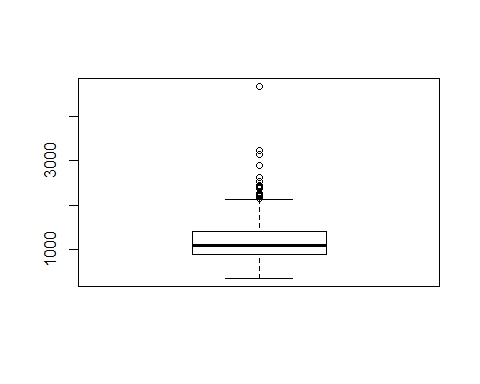
## Var1 Freq  
## 1 FuseA 94  
## 2 FuseF 27  
## 3 FuseP 3  
## 4 Mix 1  
## 5 SBrkr 1324



attrib = attrib + 1  
colname[attrib]

## [1] "X1stFlrSF"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_x1stFlrSF = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



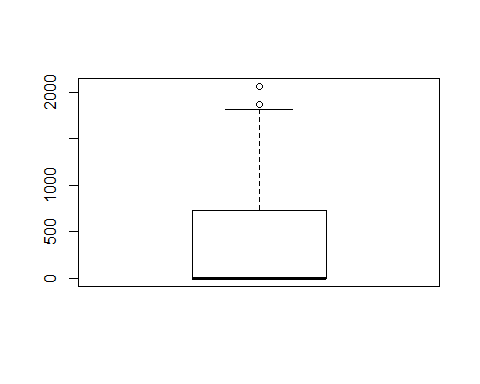
## [1] 19  
## [1] 2207 2223 2259 2158 2234 2392 2402 3228 3138 2444 2217 2364 2898 2524  
## [15] 2411 2196 4692 2156 2633

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "X2ndFlrSF"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_x2stFlrSF = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



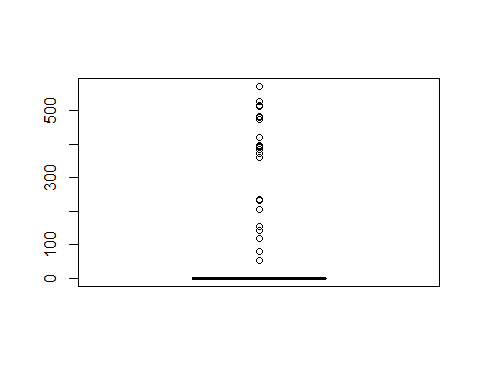
## [1] 2  
## [1] 1872 2065

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "LowQualFinSF"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_lowQualFinSF = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



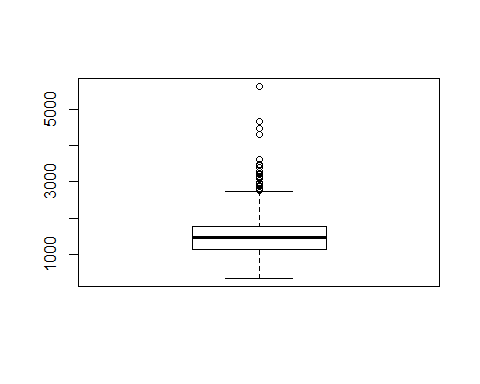
## [1] 26  
## [1] 360 513 234 528 572 144 392 371 390 420 473 156 515 360 80 80 53  
## [18] 232 481 120 514 397 479 205 80 384

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "GrLivArea"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_grLivArea = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



## [1] 31  
## [1] 2945 3222 3608 3112 2794 3493 2978 3228 4676 2775 3194 3395 4316 3279  
## [15] 3140 2822 2872 2898 3082 2868 2828 3627 3086 2872 4476 3447 5642 2810  
## [29] 2792 3238 2784

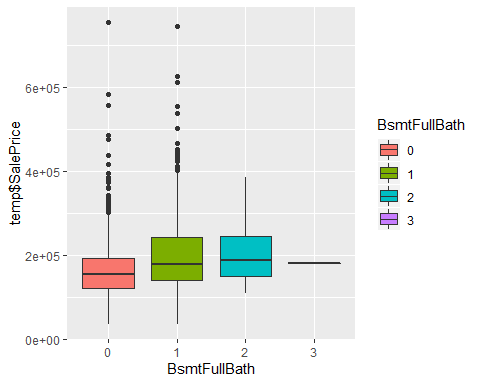
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "BsmtFullBath"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 0 852  
## 2 1 581  
## 3 2 15  
## 4 3 1

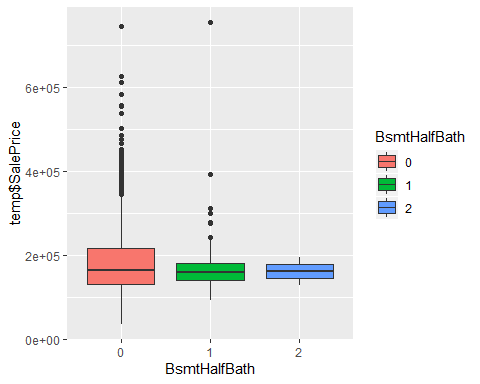


attrib = attrib + 1  
colname[attrib]

## [1] "BsmtHalfBath"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 0 1368  
## 2 1 79  
## 3 2 2

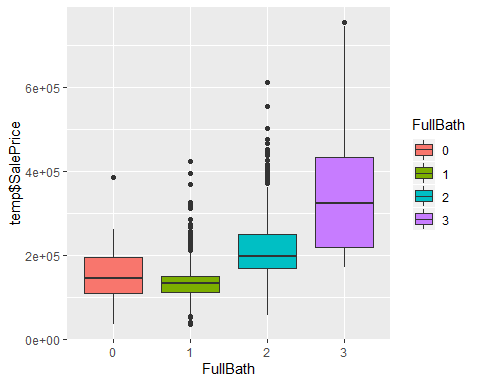


attrib = attrib + 1  
colname[attrib]

## [1] "FullBath"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 0 9  
## 2 1 648  
## 3 2 760  
## 4 3 32

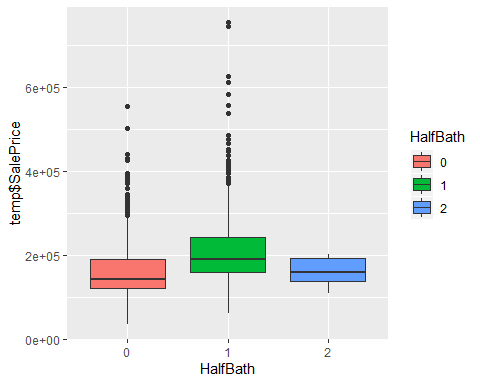


attrib = attrib + 1  
colname[attrib]

## [1] "HalfBath"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 0 908  
## 2 1 529  
## 3 2 12

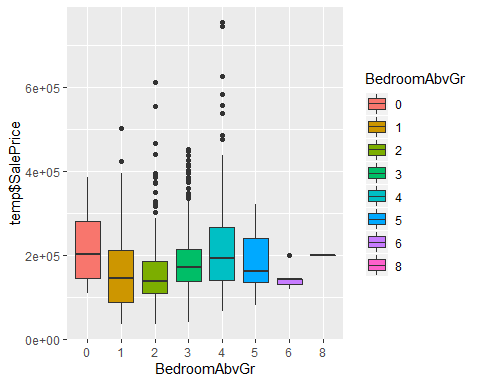


attrib = attrib + 1  
colname[attrib]

## [1] "BedroomAbvGr"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 0 6  
## 2 1 49  
## 3 2 354  
## 4 3 800  
## 5 4 211  
## 6 5 21  
## 7 6 7  
## 8 8 1

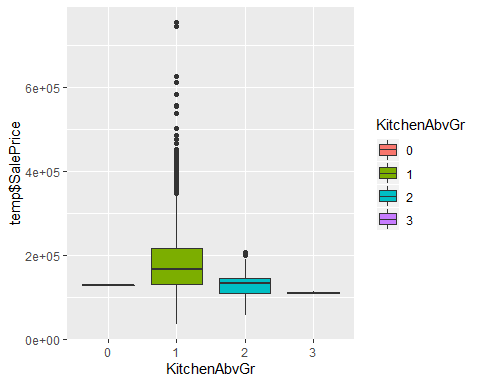


attrib = attrib + 1  
colname[attrib]

## [1] "KitchenAbvGr"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 0 1  
## 2 1 1382  
## 3 2 64  
## 4 3 2

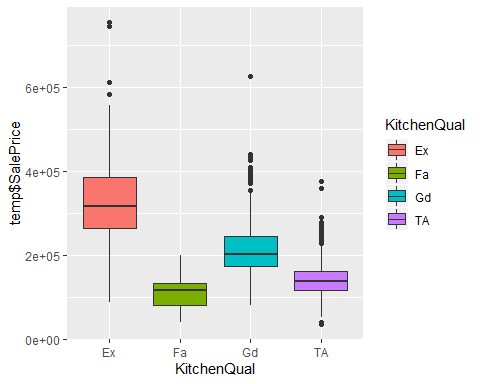


attrib = attrib + 1  
colname[attrib]

## [1] "KitchenQual"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_bedroomAbvGr = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 Ex 99  
## 2 Fa 39  
## 3 Gd 578  
## 4 TA 733

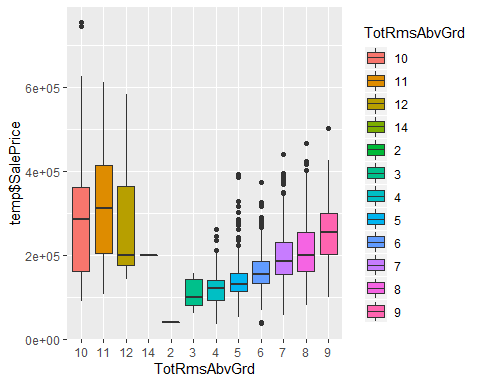


attrib = attrib + 1  
colname[attrib]

## [1] "TotRmsAbvGrd"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 10 47  
## 2 11 18  
## 3 12 11  
## 4 14 1  
## 5 2 1  
## 6 3 17  
## 7 4 96  
## 8 5 273  
## 9 6 400  
## 10 7 325  
## 11 8 186  
## 12 9 74

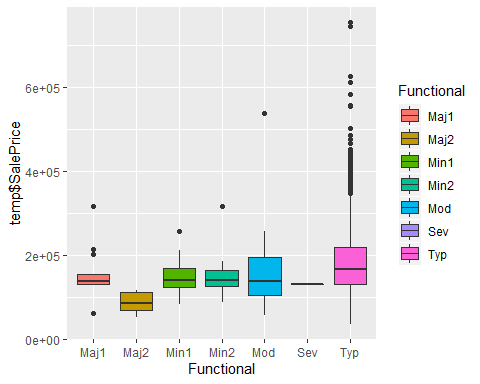


attrib = attrib + 1  
colname[attrib]

## [1] "Functional"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Maj1 13  
## 2 Maj2 5  
## 3 Min1 31  
## 4 Min2 34  
## 5 Mod 15  
## 6 Sev 1  
## 7 Typ 1350

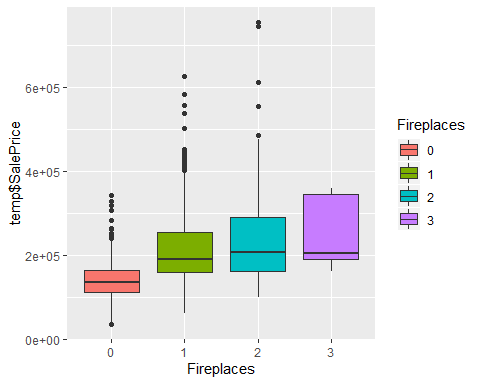


attrib = attrib + 1  
colname[attrib]

## [1] "Fireplaces"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 0 684  
## 2 1 647  
## 3 2 113  
## 4 3 5

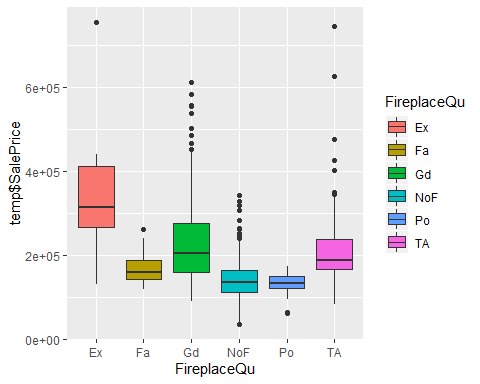


attrib = attrib + 1  
colname[attrib]

## [1] "FireplaceQu"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 Ex 24  
## 2 Fa 33  
## 3 Gd 377  
## 4 NoF 684  
## 5 Po 20  
## 6 TA 311

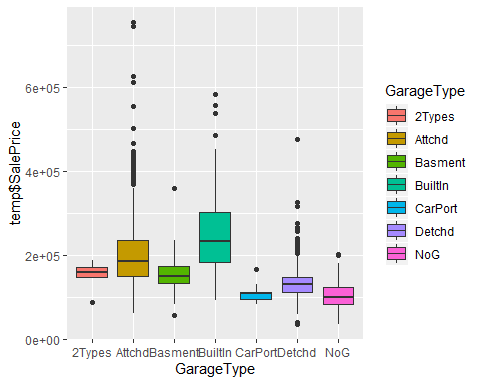


attrib = attrib + 1  
colname[attrib]

## [1] "GarageType"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 2Types 6  
## 2 Attchd 862  
## 3 Basment 19  
## 4 BuiltIn 86  
## 5 CarPort 9  
## 6 Detchd 386  
## 7 NoG 81

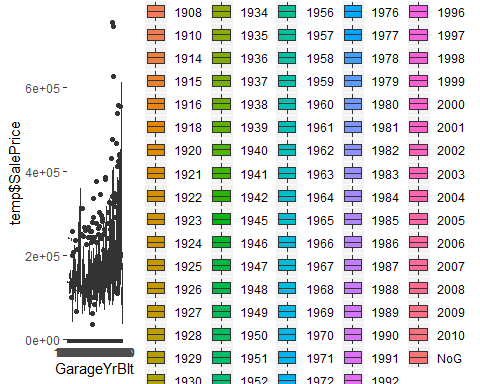


attrib = attrib + 1  
colname[attrib]

## [1] "GarageYrBlt"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 1900 1  
## 2 1906 1  
## 3 1908 1  
## 4 1910 3  
## 5 1914 2  
## 6 1915 2  
## 7 1916 5  
## 8 1918 2  
## 9 1920 14  
## 10 1921 3  
## 11 1922 5  
## 12 1923 3  
## 13 1924 3  
## 14 1925 10  
## 15 1926 6  
## 16 1927 1  
## 17 1928 4  
## 18 1929 2  
## 19 1930 8  
## 20 1931 4  
## 21 1932 3  
## 22 1933 1  
## 23 1934 2  
## 24 1935 4  
## 25 1936 5  
## 26 1937 2  
## 27 1938 3  
## 28 1939 9  
## 29 1940 14  
## 30 1941 10  
## 31 1942 2  
## 32 1945 4  
## 33 1946 4  
## 34 1947 2  
## 35 1948 11  
## 36 1949 8  
## 37 1950 24  
## 38 1951 6  
## 39 1952 3  
## 40 1953 12  
## 41 1954 19  
## 42 1955 13  
## 43 1956 16  
## 44 1957 20  
## 45 1958 21  
## 46 1959 17  
## 47 1960 19  
## 48 1961 13  
## 49 1962 21  
## 50 1963 16  
## 51 1964 18  
## 52 1965 21  
## 53 1966 21  
## 54 1967 15  
## 55 1968 26  
## 56 1969 15  
## 57 1970 20  
## 58 1971 13  
## 59 1972 14  
## 60 1973 14  
## 61 1974 17  
## 62 1975 8  
## 63 1976 29  
## 64 1977 35  
## 65 1978 19  
## 66 1979 15  
## 67 1980 15  
## 68 1981 10  
## 69 1982 4  
## 70 1983 7  
## 71 1984 8  
## 72 1985 10  
## 73 1986 6  
## 74 1987 11  
## 75 1988 14  
## 76 1989 10  
## 77 1990 16  
## 78 1991 9  
## 79 1992 13  
## 80 1993 22  
## 81 1994 18  
## 82 1995 18  
## 83 1996 20  
## 84 1997 19  
## 85 1998 31  
## 86 1999 30  
## 87 2000 27  
## 88 2001 20  
## 89 2002 24  
## 90 2003 49  
## 91 2004 52  
## 92 2005 65  
## 93 2006 58  
## 94 2007 45  
## 95 2008 29  
## 96 2009 21  
## 97 2010 3  
## 98 NoG 81

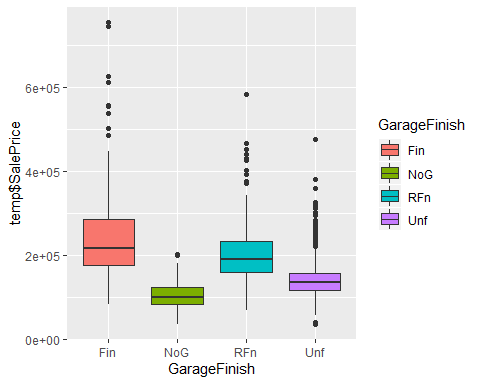
 I will not remove this because it shows a pattern.

attrib = attrib + 1  
colname[attrib]

## [1] "GarageFinish"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

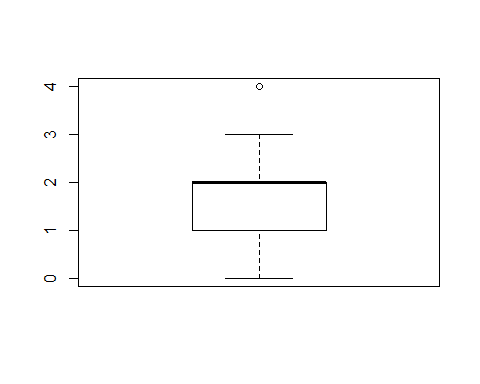
## Var1 Freq  
## 1 Fin 346  
## 2 NoG 81  
## 3 RFn 417  
## 4 Unf 605



attrib = attrib + 1  
colname[attrib]

## [1] "GarageCars"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_garagecars = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



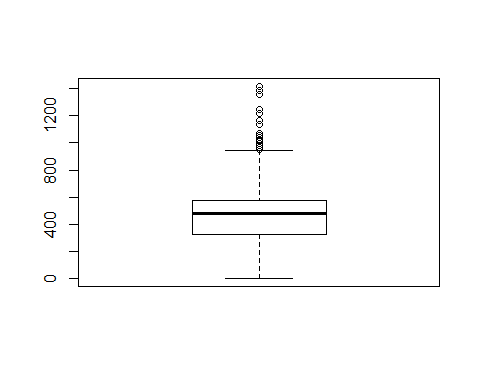
## [1] 5  
## [1] 4 4 4 4 4

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "GarageArea"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_garageArea = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



## [1] 20  
## [1] 1166 968 1053 1025 1390 1134 983 1020 1220 1248 1043 1052 995 1356  
## [15] 1052 954 1014 1418 968 1069

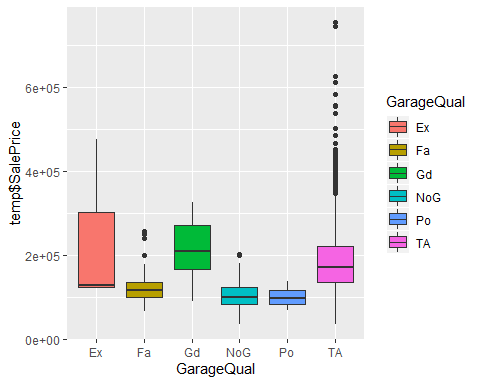
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "GarageQual"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Ex 3  
## 2 Fa 48  
## 3 Gd 14  
## 4 NoG 81  
## 5 Po 3  
## 6 TA 1300

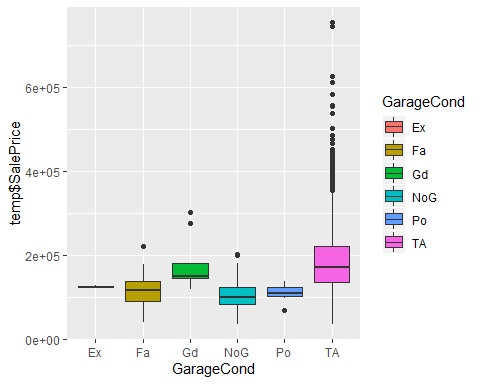


attrib = attrib + 1  
colname[attrib]

## [1] "GarageCond"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Ex 2  
## 2 Fa 35  
## 3 Gd 9  
## 4 NoG 81  
## 5 Po 7  
## 6 TA 1315

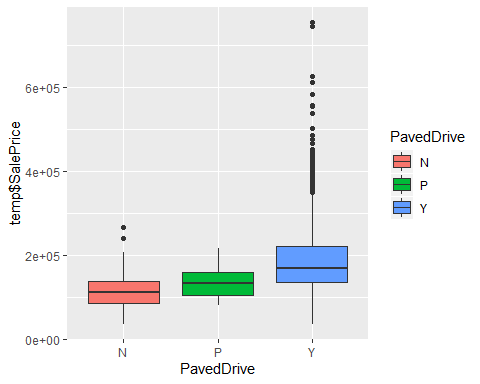


attrib = attrib + 1  
colname[attrib]

## [1] "PavedDrive"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

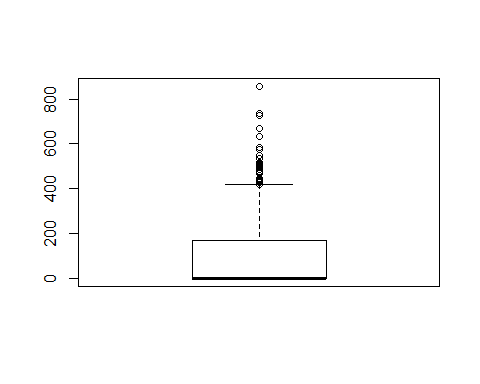
## Var1 Freq  
## 1 N 90  
## 2 P 30  
## 3 Y 1329



attrib = attrib + 1  
colname[attrib]

## [1] "WoodDeckSF"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_woodDeck = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



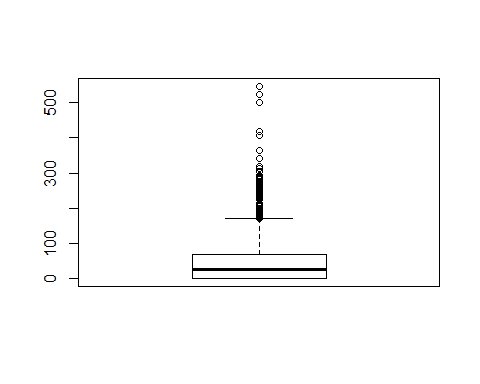
## [1] 32  
## [1] 857 576 476 574 441 468 670 495 536 519 466 517 426 503 486 486 511  
## [18] 421 550 509 474 728 436 431 448 439 635 500 668 586 431 736

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "OpenPorchSF"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_openPorch = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



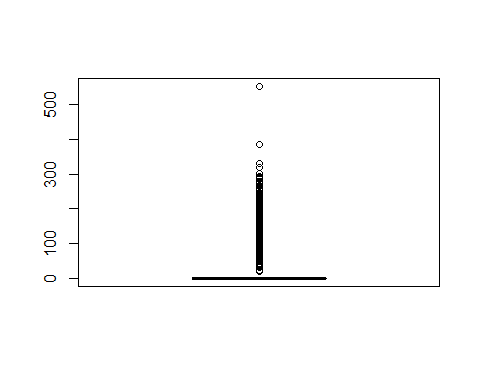
## [1] 75  
## [1] 204 213 258 199 234 184 205 228 238 260 198 172 208 228 184 250 175  
## [18] 195 214 231 192 187 176 523 285 406 182 502 274 172 243 235 312 267  
## [35] 265 288 341 204 174 247 291 312 418 240 364 188 207 234 192 191 252  
## [52] 189 282 224 319 244 185 200 180 263 304 234 240 192 198 287 292 207  
## [69] 241 547 211 184 262 210 236

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "EnclosedPorch"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}



## [1] 207  
## [1] 272 228 205 176 205 87 172 102 37 144 64 114 202 128 156 44 77  
## [18] 144 192 144 140 180 228 128 183 39 184 40 552 30 126 96 60 150  
## [35] 120 202 77 112 252 52 224 234 144 244 268 137 24 108 294 177 218  
## [52] 242 91 112 160 130 184 126 169 105 34 96 248 236 120 32 80 115  
## [69] 291 184 116 158 112 210 36 156 144 84 148 116 120 136 102 240 54  
## [86] 112 39 100 36 189 293 164 40 216 239 112 252 240 180 67 90 120  
## [103] 56 112 129 40 98 143 216 234 112 112 70 386 154 185 156 156 134  
## [120] 196 264 185 275 96 120 112 116 230 254 68 194 192 34 150 164 112  
## [137] 224 32 318 244 48 94 138 108 112 226 192 174 228 19 170 220 128  
## [154] 80 115 137 192 252 112 96 176 216 176 214 280 96 116 102 190 236  
## [171] 192 84 330 208 145 259 126 264 81 164 42 123 162 100 286 190 168  
## [188] 20 301 198 96 221 112 212 50 150 168 112 160 114 216 154 99 158  
## [205] 216 252 112

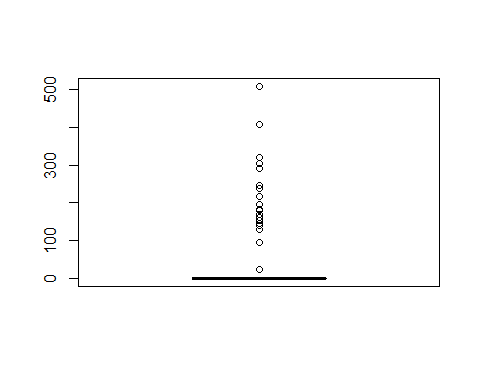
## Id MSSubClass MSZoning LotFrontage LotArea Street Alley LotShape  
## 4 4 Two\_Story RL 60 9550 Pave None IR  
## 8 8 Two\_Story RL 0 10382 Pave None IR  
## 9 9 One\_Story RM 51 6120 Pave None Reg  
## 15 15 One\_Story RL 0 10920 Pave None IR  
## 22 22 One\_Story RM 57 7449 Pave Grvl Reg  
## 30 30 One\_Story RM 60 6324 Pave None IR  
## 31 31 Two\_Story C (all) 50 8500 Pave Pave Reg  
## 49 49 PUD RM 33 4456 Pave None Reg  
## 59 59 Two\_Story RL 66 13682 Pave None IR  
## 62 62 Two\_Story RM 60 7200 Pave None Reg  
## 64 64 Two\_Story RM 50 10300 Pave None IR  
## 70 70 One\_Story RL 81 15593 Pave None Reg  
## 75 75 One\_Story RM 60 5790 Pave None Reg  
## 80 80 One\_Story RM 60 10440 Pave Grvl Reg  
## 89 89 One\_Story C (all) 105 8470 Pave None IR  
## 93 93 One\_Story RL 80 13360 Pave Grvl IR  
## 99 99 One\_Story RL 85 10625 Pave None Reg  
## 109 109 One\_Story RM 85 8500 Pave None Reg  
## 114 114 One\_Story RL 0 21000 Pave None Reg  
## 117 117 One\_Story RL 0 11616 Pave None Reg  
## 122 122 One\_Story RM 50 6060 Pave None Reg  
## 135 135 One\_Story RL 78 10335 Pave None IR  
## 155 155 One\_Story RM 84 11340 Pave None Reg  
## 156 156 One\_Story RL 60 9600 Pave None Reg  
## 165 165 One\_Story RM 40 5400 Pave Pave Reg  
## 176 176 One\_Story RL 84 12615 Pave None Reg  
## 180 180 One\_Story RM 60 8520 Pave None Reg  
## 182 182 Two\_Story RL 54 7588 Pave None Reg  
## 198 198 Two\_Story RL 174 25419 Pave None Reg  
## 199 199 Two\_Story RM 92 5520 Pave None Reg  
## 203 203 One\_Story RL 50 7000 Pave None Reg  
## 211 211 One\_Story RL 67 5604 Pave None Reg  
## 218 218 Two\_Story RM 57 9906 Pave Grvl Reg  
## 219 219 One\_Story RL 0 15660 Pave None IR  
## 231 231 One\_Story RL 73 8760 Pave None Reg  
## 232 232 Two\_Story RL 174 15138 Pave None IR  
## 243 243 One\_Story RM 63 5000 Pave None Reg  
## 247 247 PUD RM 69 9142 Pave Grvl Reg  
## 261 261 SplitDuplex RL 120 19296 Pave None Reg  
## 285 285 PUD RL 50 8012 Pave None Reg  
## 307 307 Two\_Story RL 116 13474 Pave None Reg  
## 315 315 Two\_Story RM 60 9600 Pave Grvl Reg  
## 319 319 Two\_Story RL 90 9900 Pave None Reg  
## 326 326 One\_Story RM 50 5000 Pave None Reg  
## 329 329 Two\_Story RL 0 11888 Pave Pave IR  
## 330 330 Two\_Story RM 60 6402 Pave None Reg  
## 342 342 One\_Story RH 60 8400 Pave None Reg  
## 355 355 One\_Story RL 60 8400 Pave None Reg  
## 359 359 SplitDuplex RL 92 6930 Pave None IR  
## 363 363 SplitDuplex RL 64 7301 Pave None Reg  
## 366 366 Two\_Story RM 59 10690 Pave None Reg  
## 381 381 One\_Story RL 50 5000 Pave Pave Reg  
## 384 384 One\_Story RH 60 9000 Pave None Reg  
## 391 391 One\_Story RL 50 8405 Pave Grvl Reg  
## 408 408 Two\_Story RL 63 15576 Pave None Reg  
## 414 414 One\_Story RM 56 8960 Pave Grvl Reg  
## 420 420 One\_Story RL 65 8450 Pave None Reg  
## 426 426 Two\_Story RM 60 3378 Pave Grvl Reg  
## 430 430 One\_Story RL 130 11457 Pave None IR  
## 438 438 One\_Story RM 50 6000 Pave None Reg  
## 439 439 One\_Story RL 40 4280 Pave None Reg  
## 457 457 Two\_Story RM 34 4571 Pave Grvl Reg  
## 460 460 One\_Story RL 0 7015 Pave None IR  
## 463 463 One\_Story RL 60 8281 Pave None IR  
## 486 486 One\_Story RL 80 9600 Pave None Reg  
## 492 492 One\_Story RL 79 9490 Pave None Reg  
## 495 495 One\_Story RM 50 5784 Pave None Reg  
## 496 496 One\_Story C (all) 60 7879 Pave None Reg  
## 497 497 One\_Story RL 0 12692 Pave None IR  
## 503 503 One\_Story RL 70 9170 Pave None Reg  
## 509 509 Two\_Story RM 60 9600 Pave None Reg  
## 514 514 One\_Story RL 71 9187 Pave None Reg  
## 515 515 One\_Story RL 55 10594 Pave None Reg  
## 521 521 PUD RL 60 10800 Pave Grvl Reg  
## 523 523 One\_Story RM 50 5000 Pave None Reg  
## 527 527 One\_Story RL 70 13300 Pave None Reg  
## 529 529 One\_Story RL 58 9098 Pave None IR  
## 532 532 Two\_Story RM 60 6155 Pave None IR  
## 536 536 PUD RL 70 7000 Pave None Reg  
## 556 556 One\_Story RM 58 6380 Pave None Reg  
## 558 558 One\_Story C (all) 60 11040 Pave None Reg  
## 566 566 Two\_Story RL 66 6858 Pave None Reg  
## 576 576 One\_Story RL 80 8480 Pave None Reg  
## 578 578 SplitDuplex RL 96 11777 Pave None IR  
## 585 585 One\_Story RM 51 6120 Pave None Reg  
## 587 587 One\_Story RL 55 10267 Pave None Reg  
## 610 610 One\_Story RL 61 7943 Pave None Reg  
## 621 621 One\_Story RL 45 8248 Pave Grvl Reg  
## 627 627 One\_Story RL 0 12342 Pave None IR  
## 628 628 SplitDuplex RL 80 9600 Pave None Reg  
## 631 631 Two\_Story RM 50 9000 Pave Grvl Reg  
## 639 639 One\_Story RL 67 8777 Pave None Reg  
## 646 646 One\_Story RL 0 10530 Pave None IR  
## 649 649 Two\_Story RL 70 7700 Pave None Reg  
## 654 654 One\_Story RM 60 10320 Pave Grvl Reg  
## 658 658 Two\_Story RL 60 7200 Pave None Reg  
## 661 661 Two\_Story RL 0 12384 Pave None Reg  
## 663 663 One\_Story RL 120 13560 Pave None Reg  
## 664 664 SplitDuplex RL 90 10012 Pave None Reg  
## 670 670 One\_Story RL 80 11600 Pave None Reg  
## 677 677 Two\_Story RM 60 9600 Pave Grvl Reg  
## 678 678 One\_Story RL 52 9022 Pave None Reg  
## 682 682 One\_Story RH 55 4500 Pave Pave IR  
## 694 694 One\_Story RL 60 5400 Pave None Reg  
## 697 697 One\_Story RM 50 6000 Pave None Reg  
## 704 704 PUD RM 76 7630 Pave None Reg  
## 712 712 One\_Story C (all) 66 8712 Pave Pave Reg  
## 717 717 Two\_Story RM 60 10800 Pave Grvl Reg  
## 719 719 Two\_Story RL 96 10542 Pave None Reg  
## 721 721 PUD RL 0 6563 Pave None IR  
## 730 730 One\_Story RM 52 6240 Pave Grvl Reg  
## 741 741 Two\_Story RM 60 9600 Pave Grvl Reg  
## 745 745 PUD RL 41 5395 Pave None IR  
## 748 748 Two\_Story RM 65 11700 Pave Pave IR  
## 749 749 One\_Story RL 59 10593 Pave None IR  
## 750 750 One\_Story RL 50 8405 Pave None Reg  
## 767 767 Two\_Story RL 80 10421 Pave None Reg  
## 768 768 One\_Story RL 75 12508 Pave None IR  
## 785 785 Two\_Story RM 35 6300 Pave Grvl Reg  
## 787 787 One\_Story RM 60 10800 Pave None Reg  
## 800 800 One\_Story RL 60 7200 Pave None Reg  
## 801 801 Two\_Story RL 79 12798 Pave None IR  
## 814 814 One\_Story RL 75 9750 Pave None Reg  
## 815 815 One\_Story RL 45 8248 Pave Grvl Reg  
## 817 817 One\_Story RL 0 11425 Pave None IR  
## 822 822 One\_Story RM 60 6000 Pave Pave Reg  
## 827 827 One\_Story RM 50 6130 Pave None Reg  
## 837 837 One\_Story RM 90 8100 Pave Pave Reg  
## 841 841 Two\_Story RH 0 12155 Pave None IR  
## 842 842 Two\_Story RM 60 10440 Pave Grvl Reg  
## 845 845 One\_Story RM 100 12665 Pave Grvl IR  
## 847 847 Two\_Story RL 75 9317 Pave None Reg  
## 857 857 SplitDuplex RL 0 10970 Pave None IR  
## 873 873 One\_Story RL 74 8892 Pave None Reg  
## 906 906 One\_Story RL 80 9920 Pave None Reg  
## 913 913 One\_Story RM 51 6120 Pave None Reg  
## 919 919 Two\_Story RL 103 13125 Pave None IR  
## 936 936 One\_Story RL 52 5825 Pave None IR  
## 940 940 Two\_Story RL 0 24090 Pave None Reg  
## 946 946 One\_Story RM 98 8820 Pave None Reg  
## 999 999 One\_Story RM 60 9786 Pave None Reg  
## 1002 1002 One\_Story RL 60 5400 Pave None Reg  
## 1010 1010 One\_Story RL 60 6000 Pave None Reg  
## 1011 1011 One\_Story RL 115 21286 Pave None Reg  
## 1013 1013 Two\_Story RL 55 10592 Pave None Reg  
## 1014 1014 One\_Story RM 60 7200 Pave None Reg  
## 1023 1023 One\_Story RM 52 9439 Pave None Reg  
## 1025 1025 One\_Story RL 0 15498 Pave None IR  
## 1031 1031 PUD RH 0 7082 Pave None Reg  
## 1060 1060 One\_Story RL 0 11275 Pave None IR  
## 1061 1061 PUD RL 41 4920 Pave None Reg  
## 1082 1082 One\_Story RL 75 7500 Pave None Reg  
## 1093 1093 One\_Story RL 60 8400 Pave None Reg  
## 1095 1095 One\_Story RL 74 5868 Pave None Reg  
## 1097 1097 Two\_Story RM 60 6882 Pave None Reg  
## 1098 1098 PUD RL 0 3696 Pave None Reg  
## 1104 1104 One\_Story RL 79 8910 Pave None Reg  
## 1120 1120 One\_Story RL 70 7560 Pave None Reg  
## 1121 1121 One\_Story RM 59 8263 Pave None Reg  
## 1137 1137 One\_Story RL 80 9600 Pave None Reg  
## 1138 1138 One\_Story RL 54 6342 Pave None Reg  
## 1140 1140 One\_Story RL 98 8731 Pave None IR  
## 1149 1149 One\_Story RM 0 5700 Pave None Reg  
## 1151 1151 One\_Story RL 57 8280 Pave None IR  
## 1153 1153 One\_Story RL 90 14115 Pave None IR  
## 1154 1154 One\_Story RM 0 5890 Pave None Reg  
## 1178 1178 One\_Story RM 0 3950 Pave Grvl Reg  
## 1179 1179 One\_Story RL 54 7681 Pave None IR  
## 1180 1180 One\_Story RL 77 8335 Pave None Reg  
## 1186 1186 One\_Story RL 60 9738 Pave None Reg  
## 1188 1188 One\_Story RL 89 12461 Pave None Reg  
## 1193 1193 One\_Story RM 60 9600 Pave Grvl Reg  
## 1198 1198 Two\_Story RM 65 8850 Pave None IR  
## 1203 1203 One\_Story RM 50 6000 Pave None Reg  
## 1231 1231 SplitDuplex RL 0 18890 Pave None IR  
## 1249 1249 Two\_Story RM 60 9600 Pave Grvl Reg  
## 1264 1264 Two\_Story RL 60 13515 Pave Pave Reg  
## 1267 1267 PUD RM 60 10120 Pave None IR  
## 1275 1275 One\_Story RL 53 5362 Pave None Reg  
## 1280 1280 One\_Story C (all) 60 7500 Pave None Reg  
## 1285 1285 One\_Story RL 50 9638 Pave None Reg  
## 1297 1297 One\_Story RL 80 8700 Pave None Reg  
## 1311 1311 One\_Story RL 100 17500 Pave None Reg  
## 1326 1326 One\_Story RM 40 3636 Pave None Reg  
## 1327 1327 One\_Story RH 70 4270 Pave None Reg  
## 1334 1334 One\_Story RM 60 7200 Pave None Reg  
## 1346 1346 One\_Story RM 50 6000 Pave None Reg  
## 1350 1350 Two\_Story RM 50 5250 Pave Pave Reg  
## 1361 1361 Two\_Story RL 51 9842 Pave None Reg  
## 1371 1371 One\_Story RL 90 5400 Pave None Reg  
## 1381 1381 One\_Story RL 45 8212 Pave Grvl Reg  
## 1383 1383 Two\_Story RM 60 7200 Pave None Reg  
## 1384 1384 One\_Story RL 0 25339 Pave None Reg  
## 1394 1394 PUD RM 60 10800 Pave Pave Reg  
## 1397 1397 One\_Story RL 0 57200 Pave None IR  
## 1398 1398 Two\_Story RM 51 6120 Pave None Reg  
## 1399 1399 One\_Story RL 60 7200 Pave None Reg  
## 1401 1401 One\_Story RM 50 6000 Pave None Reg  
## 1405 1405 One\_Story RL 60 10410 Pave Grvl Reg  
## 1417 1417 PUD RM 60 11340 Pave None Reg  
## 1420 1420 One\_Story RL 0 16381 Pave None IR  
## 1429 1429 One\_Story RM 60 7200 Pave None Reg  
## 1430 1430 One\_Story RL 0 12546 Pave None IR  
## 1439 1439 One\_Story RM 90 7407 Pave None Reg  
## 1440 1440 Two\_Story RL 80 11584 Pave None Reg  
## 1446 1446 SplitDuplex RL 70 8400 Pave None Reg  
## 1459 1459 One\_Story RL 68 9717 Pave None Reg  
## LandContour Utilities LotConfig LandSlope Neighborhood Condition1  
## 4 Lvl AllPub Corner Gtl Crawfor Norm  
## 8 Lvl AllPub Corner Gtl NWAmes PosN  
## 9 Lvl AllPub Inside Gtl OldTown Artery  
## 15 Lvl AllPub Corner Gtl NAmes Norm  
## 22 Bnk AllPub Inside Gtl IDOTRR Norm  
## 30 Lvl AllPub Inside Gtl BrkSide Feedr  
## 31 Lvl AllPub Inside Gtl IDOTRR Feedr  
## 49 Lvl AllPub Inside Gtl OldTown Norm  
## 59 HLS AllPub CulDSac Gtl StoneBr Norm  
## 62 Lvl AllPub Inside Gtl IDOTRR Norm  
## 64 Bnk AllPub Inside Gtl OldTown RRAn  
## 70 Lvl AllPub Corner Gtl ClearCr Norm  
## 75 Lvl AllPub Corner Gtl OldTown Norm  
## 80 Lvl AllPub Corner Gtl OldTown Norm  
## 89 Lvl AllPub Corner Gtl IDOTRR Feedr  
## 93 HLS AllPub Inside Gtl Crawfor Norm  
## 99 Lvl AllPub Corner Gtl Edwards Norm  
## 109 Lvl AllPub Corner Gtl IDOTRR Artery  
## 114 Bnk AllPub Corner Gtl Crawfor Norm  
## 117 Lvl AllPub Inside Gtl Sawyer Norm  
## 122 Lvl AllPub Inside Gtl IDOTRR Norm  
## 135 Lvl AllPub Inside Gtl Sawyer Norm  
## 155 Lvl AllPub Corner Gtl OldTown Norm  
## 156 Lvl AllPub Corner Gtl Edwards Artery  
## 165 Lvl AllPub Corner Gtl OldTown Norm  
## 176 Lvl AllPub Corner Gtl Edwards Norm  
## 180 Lvl AllPub Inside Gtl OldTown Norm  
## 182 Lvl AllPub Inside Gtl Crawfor Norm  
## 198 Lvl AllPub Corner Gtl NAmes Artery  
## 199 Lvl AllPub Corner Gtl OldTown Norm  
## 203 Lvl AllPub Corner Gtl OldTown Artery  
## 211 Lvl AllPub Inside Gtl Edwards Norm  
## 218 Lvl AllPub Inside Gtl OldTown Norm  
## 219 Lvl AllPub Corner Gtl Crawfor Norm  
## 231 Lvl AllPub Inside Gtl NAmes Norm  
## 232 Lvl AllPub Inside Gtl NoRidge Norm  
## 243 Lvl AllPub Corner Gtl OldTown Norm  
## 247 Lvl AllPub Inside Gtl OldTown Norm  
## 261 Lvl AllPub Corner Gtl NAmes Artery  
## 285 Lvl AllPub Inside Gtl SawyerW Norm  
## 307 Lvl AllPub Inside Gtl SawyerW Feedr  
## 315 Lvl AllPub Inside Gtl OldTown Norm  
## 319 Low AllPub Inside Mod NoRidge Norm  
## 326 Lvl AllPub Inside Gtl IDOTRR RRAe  
## 329 Bnk AllPub Inside Gtl BrkSide PosN  
## 330 Lvl AllPub Corner Gtl IDOTRR Norm  
## 342 Lvl AllPub Inside Gtl SawyerW Feedr  
## 355 Bnk AllPub Inside Gtl SWISU Norm  
## 359 Lvl AllPub Inside Gtl ClearCr Norm  
## 363 Lvl AllPub Corner Gtl Edwards Norm  
## 366 Lvl AllPub Inside Gtl IDOTRR Norm  
## 381 Lvl AllPub Inside Gtl SWISU Norm  
## 384 Lvl AllPub Corner Gtl SawyerW Norm  
## 391 Lvl AllPub Inside Gtl Edwards Norm  
## 408 Lvl AllPub Inside Gtl Crawfor Norm  
## 414 Lvl AllPub Inside Gtl OldTown Artery  
## 420 Lvl AllPub Inside Gtl NAmes Norm  
## 426 HLS AllPub Inside Gtl OldTown Norm  
## 430 Lvl AllPub Corner Gtl Timber Norm  
## 438 Lvl AllPub Inside Gtl BrkSide Norm  
## 439 Lvl AllPub Inside Gtl Crawfor Norm  
## 457 Lvl AllPub Inside Gtl OldTown Norm  
## 460 Bnk AllPub Corner Gtl BrkSide Norm  
## 463 Lvl AllPub Inside Gtl Sawyer Norm  
## 486 Lvl AllPub Inside Gtl NAmes Norm  
## 492 Lvl AllPub Inside Gtl NAmes Artery  
## 495 Lvl AllPub Inside Gtl OldTown Artery  
## 496 Lvl AllPub Inside Gtl IDOTRR Norm  
## 497 Lvl AllPub Inside Gtl NoRidge Norm  
## 503 Lvl AllPub Corner Gtl Edwards Feedr  
## 509 Lvl AllPub Inside Gtl OldTown Norm  
## 514 Bnk AllPub Corner Gtl Mitchel Norm  
## 515 Lvl AllPub Inside Gtl Crawfor Norm  
## 521 Lvl AllPub Inside Gtl OldTown Norm  
## 523 Lvl AllPub Corner Gtl BrkSide Feedr  
## 527 Lvl AllPub Inside Gtl NAmes Norm  
## 529 Lvl AllPub Inside Gtl Edwards Norm  
## 532 Lvl AllPub FR3 Gtl BrkSide RRNn  
## 536 Lvl AllPub Inside Gtl Edwards Norm  
## 556 Lvl AllPub Inside Gtl BrkSide Norm  
## 558 Low AllPub Inside Mod IDOTRR Norm  
## 566 Bnk AllPub Corner Gtl SWISU Norm  
## 576 Lvl AllPub Inside Gtl NAmes Norm  
## 578 Lvl AllPub Inside Gtl Sawyer Norm  
## 585 Lvl AllPub Inside Gtl BrkSide Norm  
## 587 Lvl AllPub Inside Gtl BrkSide RRAn  
## 610 Lvl AllPub Inside Gtl Sawyer Feedr  
## 621 Lvl AllPub Inside Gtl Edwards Norm  
## 627 Lvl AllPub Inside Gtl NAmes Norm  
## 628 Lvl AllPub Inside Gtl NAmes Norm  
## 631 Lvl AllPub Corner Gtl OldTown Artery  
## 639 Lvl AllPub Inside Gtl Edwards Feedr  
## 646 Lvl AllPub Corner Gtl NAmes Norm  
## 649 Lvl AllPub Inside Gtl NAmes PosN  
## 654 Lvl AllPub Inside Gtl IDOTRR Norm  
## 658 HLS AllPub Inside Mod Crawfor Norm  
## 661 Lvl AllPub CulDSac Gtl NWAmes Norm  
## 663 Lvl AllPub Corner Gtl NAmes Norm  
## 664 Lvl AllPub Inside Gtl Edwards Norm  
## 670 Lvl AllPub Inside Gtl Crawfor Norm  
## 677 Lvl AllPub Inside Gtl OldTown Norm  
## 678 Lvl AllPub Inside Gtl OldTown Norm  
## 682 Bnk AllPub Inside Gtl SWISU Norm  
## 694 Lvl AllPub Corner Sev OldTown Norm  
## 697 Lvl AllPub Inside Gtl BrkSide Norm  
## 704 Lvl AllPub Inside Gtl OldTown Feedr  
## 712 HLS AllPub Inside Mod IDOTRR Norm  
## 717 Bnk AllPub Inside Gtl OldTown Norm  
## 719 Lvl AllPub Inside Gtl NoRidge Norm  
## 721 Low AllPub CulDSac Mod StoneBr Norm  
## 730 Lvl AllPub Inside Gtl IDOTRR Norm  
## 741 Lvl AllPub Inside Gtl OldTown Norm  
## 745 HLS AllPub Inside Gtl StoneBr Norm  
## 748 Lvl AllPub Corner Gtl OldTown Norm  
## 749 Lvl AllPub Inside Gtl NoRidge Norm  
## 750 Lvl AllPub Inside Gtl Edwards Norm  
## 767 Lvl AllPub Inside Gtl NWAmes Norm  
## 768 Lvl AllPub Inside Gtl Mitchel Norm  
## 785 Lvl AllPub Inside Gtl OldTown Norm  
## 787 Lvl AllPub Inside Gtl OldTown Artery  
## 800 Lvl AllPub Corner Gtl SWISU Feedr  
## 801 HLS AllPub Inside Mod ClearCr Feedr  
## 814 Lvl AllPub Inside Gtl NAmes Norm  
## 815 Lvl AllPub Inside Gtl Edwards Norm  
## 817 Lvl AllPub Corner Gtl NAmes Norm  
## 822 Bnk AllPub Inside Mod OldTown Norm  
## 827 Lvl AllPub Inside Gtl BrkSide Norm  
## 837 Lvl AllPub Inside Gtl OldTown Norm  
## 841 Lvl AllPub Inside Gtl SWISU Norm  
## 842 Lvl AllPub Inside Gtl OldTown Norm  
## 845 Lvl AllPub Inside Gtl OldTown Artery  
## 847 Lvl AllPub Inside Gtl SawyerW Norm  
## 857 Low AllPub Inside Mod CollgCr Norm  
## 873 Lvl AllPub Corner Gtl NAmes Norm  
## 906 Lvl AllPub Inside Gtl NAmes Norm  
## 913 Lvl AllPub Inside Gtl BrkSide Norm  
## 919 Lvl AllPub Corner Gtl SawyerW Norm  
## 936 Lvl AllPub Inside Gtl BrkSide Norm  
## 940 Lvl AllPub Inside Gtl ClearCr Norm  
## 946 Lvl AllPub Corner Gtl OldTown Norm  
## 999 Lvl AllPub Inside Gtl IDOTRR Norm  
## 1002 Lvl AllPub Corner Gtl OldTown Norm  
## 1010 Lvl AllPub Inside Gtl SWISU Norm  
## 1011 Lvl AllPub Inside Gtl Sawyer Norm  
## 1013 Lvl AllPub Inside Gtl Crawfor Norm  
## 1014 Lvl AllPub Inside Gtl OldTown Norm  
## 1023 Lvl AllPub Inside Gtl OldTown Norm  
## 1025 Lvl AllPub Corner Gtl Timber Norm  
## 1031 Lvl AllPub Inside Gtl SWISU Norm  
## 1060 HLS AllPub Corner Mod Crawfor Norm  
## 1061 Lvl AllPub Inside Gtl StoneBr Norm  
## 1082 Lvl AllPub Corner Gtl Sawyer Feedr  
## 1093 Bnk AllPub Inside Gtl SWISU Norm  
## 1095 Lvl AllPub Inside Gtl NAmes Norm  
## 1097 Lvl AllPub Inside Gtl IDOTRR Norm  
## 1098 Lvl AllPub Inside Gtl StoneBr Norm  
## 1104 Lvl AllPub Corner Gtl NAmes Norm  
## 1120 Lvl AllPub Inside Gtl NAmes Norm  
## 1121 Bnk AllPub Inside Mod IDOTRR Norm  
## 1137 Lvl AllPub Inside Gtl NAmes Norm  
## 1138 Lvl AllPub Inside Gtl Sawyer Feedr  
## 1140 Lvl AllPub Inside Gtl BrkSide Norm  
## 1149 Lvl AllPub Inside Gtl OldTown Norm  
## 1151 Lvl AllPub Inside Gtl NAmes Norm  
## 1153 Lvl AllPub Inside Gtl Crawfor Norm  
## 1154 Lvl AllPub Corner Gtl IDOTRR Norm  
## 1178 Bnk AllPub Inside Gtl OldTown Artery  
## 1179 Lvl AllPub FR2 Gtl Crawfor Norm  
## 1180 Lvl AllPub Corner Gtl Edwards Norm  
## 1186 Lvl AllPub Inside Gtl Edwards Norm  
## 1188 Lvl AllPub Corner Gtl NoRidge Norm  
## 1193 Lvl AllPub Inside Gtl OldTown Norm  
## 1198 Bnk AllPub Corner Gtl OldTown Norm  
## 1203 Lvl AllPub Corner Gtl BrkSide Norm  
## 1231 Lvl AllPub Inside Gtl Sawyer Feedr  
## 1249 Lvl AllPub Inside Gtl OldTown Norm  
## 1264 Lvl AllPub Inside Gtl BrkSide Norm  
## 1267 Bnk AllPub Inside Gtl OldTown Feedr  
## 1275 Lvl AllPub Corner Gtl Crawfor Norm  
## 1280 Lvl AllPub Inside Gtl IDOTRR Norm  
## 1285 Lvl AllPub Inside Gtl SWISU Feedr  
## 1297 Lvl AllPub Inside Gtl NAmes Norm  
## 1311 Lvl AllPub Inside Gtl Crawfor PosA  
## 1326 Lvl AllPub Inside Gtl IDOTRR Norm  
## 1327 Bnk AllPub Inside Mod Edwards Norm  
## 1334 Lvl AllPub Corner Gtl IDOTRR Norm  
## 1346 Lvl AllPub Inside Gtl OldTown Norm  
## 1350 Lvl AllPub Inside Gtl OldTown Norm  
## 1361 Lvl AllPub Inside Gtl SWISU Feedr  
## 1371 Lvl AllPub Corner Gtl OldTown Artery  
## 1381 Lvl AllPub Inside Gtl Edwards Norm  
## 1383 Lvl AllPub Corner Gtl OldTown Norm  
## 1384 Lvl AllPub Inside Gtl Sawyer Norm  
## 1394 Lvl AllPub Inside Gtl OldTown Norm  
## 1397 Bnk AllPub Inside Sev Timber Norm  
## 1398 Lvl AllPub Inside Gtl BrkSide Norm  
## 1399 Lvl AllPub Inside Gtl NAmes Norm  
## 1401 Lvl AllPub Corner Gtl BrkSide Norm  
## 1405 Lvl AllPub Corner Gtl OldTown Artery  
## 1417 Lvl AllPub Inside Gtl OldTown Norm  
## 1420 Lvl AllPub Inside Gtl Crawfor Norm  
## 1429 Lvl AllPub Corner Gtl OldTown Norm  
## 1430 Lvl AllPub Corner Gtl NWAmes Norm  
## 1439 Lvl AllPub Inside Gtl OldTown Artery  
## 1440 Lvl AllPub Inside Gtl NWAmes Norm  
## 1446 Lvl AllPub Inside Gtl Sawyer Norm  
## 1459 Lvl AllPub Inside Gtl NAmes Norm  
## Condition2 BldgType HouseStyle OverallQual OverallCond YearBuilt  
## 4 Norm 1Fam 2Story 7 5 1915  
## 8 Norm 1Fam 2Story 7 6 1973  
## 9 Norm 1Fam 1.5Fin 7 5 1931  
## 15 Norm 1Fam 1Story 6 5 1960  
## 22 Norm 1Fam 1.5Unf 7 7 1930  
## 30 RRNn 1Fam 1Story 4 6 1927  
## 31 Norm 1Fam 2Story 4 4 1920  
## 49 Norm 2fmCon 2Story 4 5 1920  
## 59 Norm 1Fam 2Story 10 5 2006  
## 62 Norm 1Fam 2.5Unf 5 7 1920  
## 64 Feedr 1Fam 2Story 7 6 1921  
## 70 Norm 1Fam 1.5Fin 7 4 1953  
## 75 Norm 1Fam 2Story 3 6 1915  
## 80 Norm 1Fam 2Story 5 6 1910  
## 89 Feedr 1Fam 1.5Fin 3 2 1915  
## 93 Norm 1Fam 1Story 5 7 1921  
## 99 Norm 1Fam 1Story 5 5 1920  
## 109 Norm 1Fam 1.5Fin 5 7 1919  
## 114 Norm 1Fam 1Story 6 5 1953  
## 117 Norm 1Fam 1Story 5 5 1962  
## 122 Norm 1Fam 1.5Fin 4 5 1939  
## 135 Norm 1Fam 1Story 5 6 1968  
## 155 Norm 1Fam 1Story 6 5 1923  
## 156 Norm 1Fam 1.5Fin 6 5 1924  
## 165 Norm 1Fam 1Story 6 7 1926  
## 176 Norm 1Fam 1Story 6 7 1950  
## 180 Norm 1Fam 1Story 5 6 1923  
## 182 Norm 1Fam 2Story 7 6 1920  
## 198 Norm 1Fam 2Story 8 4 1918  
## 199 Norm 1Fam 2.5Fin 6 6 1912  
## 203 Norm 1Fam 1.5Fin 6 6 1924  
## 211 Norm 1Fam 1Story 5 6 1925  
## 218 Norm 1Fam 2Story 4 4 1925  
## 219 Norm 1Fam 1.5Fin 7 9 1939  
## 231 Norm 1Fam 1Story 6 6 1959  
## 232 Norm 1Fam 2Story 8 5 1995  
## 243 Norm 1Fam 1.5Fin 5 4 1900  
## 247 Norm 2fmCon 2Story 6 8 1910  
## 261 Norm 1Fam SLvl 6 5 1962  
## 285 Norm TwnhsE 1Story 6 5 1992  
## 307 Norm 1Fam 2Story 7 5 1990  
## 315 Norm 1Fam 2Story 7 7 1925  
## 319 Norm 1Fam 2Story 7 5 1993  
## 326 Norm 1Fam 1.5Unf 5 6 1941  
## 329 Norm 1Fam 2.5Unf 6 6 1916  
## 330 Norm 1Fam 2Story 5 5 1920  
## 342 Norm 1Fam 1Story 4 4 1950  
## 355 Norm 1Fam 1.5Fin 6 5 1940  
## 359 Norm 1Fam SLvl 5 4 1958  
## 363 Norm 1Fam SFoyer 7 5 2003  
## 366 Norm 1Fam 2Story 5 7 1920  
## 381 Norm 1Fam 1.5Fin 5 6 1924  
## 384 Norm 1Fam 1.5Unf 6 3 1928  
## 391 Norm 1Fam 1.5Fin 5 8 1900  
## 408 Norm 1Fam 2Story 6 7 1915  
## 414 Norm 1Fam 1Story 5 6 1927  
## 420 Norm 1Fam 1Story 5 6 1968  
## 426 Norm 1Fam 2Story 7 8 1946  
## 430 Norm 1Fam 1Story 6 5 1988  
## 438 Norm 1Fam 1.5Unf 6 7 1926  
## 439 Norm 1Fam 1Story 5 6 1913  
## 457 Norm 1Fam 2Story 5 5 1916  
## 460 Norm 1Fam 1.5Fin 5 4 1950  
## 463 Norm 1Fam 1Story 5 5 1965  
## 486 Norm 1Fam 1Story 5 7 1950  
## 492 Norm 1Fam 1.5Fin 6 7 1941  
## 495 Norm 1Fam 1Story 5 8 1938  
## 496 Norm 1Fam 1Story 4 5 1920  
## 497 Norm 1Fam 1Story 8 5 1992  
## 503 Norm 1Fam 1Story 5 7 1965  
## 509 Norm 1Fam 2Story 7 9 1928  
## 514 Norm 1Fam 1Story 6 5 1983  
## 515 Norm 1Fam 1.5Unf 5 5 1926  
## 521 Norm 2fmCon 2Story 4 7 1900  
## 523 Norm 1Fam 1.5Fin 6 7 1947  
## 527 Norm 1Fam 1Story 5 7 1956  
## 529 Norm 1Fam 1Story 4 7 1920  
## 532 Feedr 1Fam 2Story 6 8 1920  
## 536 Norm 2fmCon 2Story 5 7 1910  
## 556 Norm 1Fam 1.5Unf 5 6 1922  
## 558 Norm 1Fam 1.5Fin 4 6 1920  
## 566 Norm 1Fam 2Story 6 4 1915  
## 576 Norm 1Fam 1.5Fin 5 5 1947  
## 578 Norm 1Fam SLvl 5 6 1966  
## 585 Norm 1Fam 1.5Fin 4 7 1935  
## 587 Norm 1Fam 1Story 6 7 1918  
## 610 Norm 1Fam 1Story 4 5 1961  
## 621 Norm 1Fam 1Story 3 3 1914  
## 627 Norm 1Fam 1Story 5 5 1960  
## 628 Norm 1Fam SLvl 6 6 1955  
## 631 Norm 1Fam 2Story 5 6 1880  
## 639 Norm 1Fam 1Story 5 7 1910  
## 646 Norm 1Fam 1Story 6 5 1971  
## 649 Norm 1Fam 2Story 6 5 1966  
## 654 Norm 1Fam 1.5Fin 6 7 1906  
## 658 Norm 1Fam 2Story 7 6 1931  
## 661 Norm 1Fam 2Story 7 7 1976  
## 663 Norm 1Fam 1Story 6 3 1968  
## 664 Norm 1Fam SFoyer 4 5 1972  
## 670 Norm 1Fam 1Story 4 5 1922  
## 677 Norm 1Fam 2Story 4 2 1900  
## 678 Norm 1Fam 1Story 5 8 1924  
## 682 Norm 1Fam 1.5Fin 5 5 1932  
## 694 Norm 1Fam 1Story 5 6 1921  
## 697 Norm 1Fam 1Story 5 7 1921  
## 704 Norm 2fmCon 2Story 5 9 1900  
## 712 Norm 1Fam 1.5Fin 4 7 1900  
## 717 Norm 1Fam 2Story 7 8 1890  
## 719 Norm 1Fam 2Story 7 5 1993  
## 721 Norm 1Fam 1Story 8 5 1985  
## 730 Norm 1Fam 1.5Fin 4 5 1925  
## 741 Norm 1Fam 2Story 5 7 1910  
## 745 Norm TwnhsE 1Story 8 5 1993  
## 748 Norm 1Fam 2Story 7 7 1880  
## 749 Norm 1Fam 1Story 7 5 1996  
## 750 Norm 1Fam 1.5Fin 4 3 1945  
## 767 Norm 1Fam 2Story 7 5 1988  
## 768 Norm 1Fam 1.5Fin 6 7 1940  
## 785 Norm 1Fam 2.5Unf 6 6 1914  
## 787 Norm 1Fam 1.5Fin 5 6 1915  
## 800 Norm 1Fam 1.5Fin 5 7 1937  
## 801 Norm 1Fam 2Story 6 5 1997  
## 814 Norm 1Fam 1Story 6 6 1958  
## 815 Norm 1Fam 1.5Fin 5 7 1918  
## 817 Norm 1Fam 1Story 5 6 1954  
## 822 Norm 2fmCon 1Story 4 4 1953  
## 827 Norm 1Fam 1.5Unf 5 6 1924  
## 837 Norm 1Fam 1Story 5 6 1948  
## 841 Norm 1Fam 2Story 6 8 1925  
## 842 Norm 1Fam 2Story 5 8 1904  
## 845 Norm 1Fam 1.5Fin 5 8 1915  
## 847 Norm 1Fam 2Story 7 5 1993  
## 857 Norm 1Fam SLvl 6 6 1978  
## 873 Norm 1Fam 1Story 5 7 1953  
## 906 Norm 1Fam 1Story 5 5 1954  
## 913 Norm 1Fam 1Story 5 7 1925  
## 919 Norm 1Fam 2Story 7 5 1991  
## 936 Norm 1Fam 1Story 4 5 1926  
## 940 Norm 1Fam 2Story 7 7 1940  
## 946 Norm 1Fam 1.5Fin 5 6 1890  
## 999 Norm 1Fam 1Story 3 4 1922  
## 1002 Norm 1Fam 1Story 5 6 1920  
## 1010 Norm 1Fam 1.5Fin 5 5 1926  
## 1011 Norm 1Fam 1.5Fin 5 5 1948  
## 1013 Norm 1Fam 2Story 6 7 1923  
## 1014 Norm 1Fam 1Story 5 4 1910  
## 1023 Norm 1Fam 1.5Fin 5 5 1930  
## 1025 Norm 1Fam 1Story 8 6 1976  
## 1031 Norm 2fmCon 2Story 5 8 1916  
## 1060 Norm 1Fam 1.5Fin 6 7 1932  
## 1061 Norm TwnhsE 1Story 8 5 2001  
## 1082 Norm 1Fam 1Story 5 5 1963  
## 1093 Norm 1Fam 1.5Fin 6 5 1925  
## 1095 Norm 1Fam 1Story 5 7 1956  
## 1097 Norm 1Fam 2Story 6 7 1914  
## 1098 Norm TwnhsE 1Story 8 5 1986  
## 1104 Norm 1Fam 1Story 6 6 1959  
## 1120 Norm 1Fam 1Story 5 5 1959  
## 1121 Norm 1Fam 1Story 6 5 1920  
## 1137 Norm 1Fam 1.5Fin 6 5 1950  
## 1138 Norm 1Fam 1.5Fin 5 8 1875  
## 1140 Norm 1Fam 1Story 5 5 1920  
## 1149 Norm 1Fam 1.5Fin 7 7 1926  
## 1151 Norm 1Fam 1Story 6 5 1950  
## 1153 Norm 1Fam 1Story 6 7 1956  
## 1154 Norm 1Fam 1Story 6 8 1930  
## 1178 Norm 1Fam 1.5Fin 6 8 1926  
## 1179 Norm 1Fam 1.5Fin 5 6 1921  
## 1180 Norm 1Fam 1Story 5 5 1954  
## 1186 Norm 1Fam 1.5Fin 5 7 1924  
## 1188 Norm 1Fam 1Story 8 5 1994  
## 1193 Norm 1Fam 1.5Fin 5 8 1925  
## 1198 Norm 1Fam 2.5Unf 7 6 1916  
## 1203 Norm 1Fam 1.5Fin 5 8 1925  
## 1231 RRAe Duplex 1.5Fin 5 5 1977  
## 1249 Norm 1Fam 2.5Unf 6 5 1917  
## 1264 Norm 1Fam 2Story 6 6 1919  
## 1267 Norm 2fmCon 2.5Unf 7 4 1910  
## 1275 Norm 1Fam 1.5Fin 5 6 1910  
## 1280 Norm 1Fam 1.5Fin 4 4 1920  
## 1285 Norm 1Fam 1.5Fin 6 7 1919  
## 1297 Norm 1Fam 1Story 5 6 1963  
## 1311 Norm 1Fam 1Story 7 8 1959  
## 1326 Norm 1Fam 1Story 4 4 1922  
## 1327 Norm 1Fam 1Story 3 6 1931  
## 1334 Norm 1Fam 1.5Fin 5 6 1938  
## 1346 Norm 1Fam 1Story 4 4 1920  
## 1350 Norm 1Fam 2Story 8 5 1872  
## 1361 Norm 1Fam 2Story 5 6 1921  
## 1371 Norm 1Fam 1.5Fin 4 6 1920  
## 1381 Norm 1Fam 1Story 3 3 1914  
## 1383 Norm 1Fam 2Story 7 7 1920  
## 1384 Norm 1Fam 1Story 5 7 1918  
## 1394 Norm 2fmCon 1.5Fin 6 7 1905  
## 1397 Norm 1Fam 1Story 5 5 1948  
## 1398 Norm 1Fam 2Story 5 8 1920  
## 1399 Norm 1Fam 1.5Fin 5 4 1950  
## 1401 Norm 1Fam 1.5Fin 6 7 1929  
## 1405 Norm 1Fam 1.5Fin 3 4 1915  
## 1417 Norm 2fmCon 2Story 4 6 1885  
## 1420 Norm 1Fam 1Story 6 5 1969  
## 1429 Norm 1Fam 1Story 5 7 1940  
## 1430 Norm 1Fam 1Story 6 7 1981  
## 1439 Norm 1Fam 1Story 6 7 1957  
## 1440 Norm 1Fam SLvl 7 6 1979  
## 1446 Norm 1Fam SFoyer 6 5 1966  
## 1459 Norm 1Fam 1Story 5 6 1950  
## YearRemodAdd RoofStyle RoofMatl Exterior1st Exterior2nd MasVnrType  
## 4 1970 Gable CompShg Wd Sdng Wd Shng None  
## 8 1973 Gable CompShg HdBoard HdBoard Stone  
## 9 1950 Gable CompShg BrkFace Wd Shng None  
## 15 1960 Hip CompShg MetalSd MetalSd BrkFace  
## 22 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 30 1950 Gable CompShg MetalSd MetalSd None  
## 31 1950 Gambrel CompShg BrkFace BrkFace None  
## 49 2008 Gable CompShg MetalSd MetalSd None  
## 59 2006 Hip CompShg VinylSd VinylSd BrkFace  
## 62 1996 Gable CompShg MetalSd MetalSd None  
## 64 1950 Gable CompShg Stucco Stucco None  
## 70 1953 Gable CompShg BrkFace AsbShng None  
## 75 1950 Gambrel CompShg VinylSd VinylSd None  
## 80 1981 Gable CompShg Wd Sdng Wd Sdng None  
## 89 1982 Hip CompShg Plywood Plywood None  
## 93 2006 Gable CompShg Wd Sdng Wd Sdng None  
## 99 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 109 2005 Gable CompShg CemntBd CmentBd None  
## 114 1953 Hip CompShg Wd Sdng Wd Sdng BrkFace  
## 117 1962 Gable CompShg Wd Sdng Wd Sdng BrkFace  
## 122 1950 Gable CompShg AsbShng AsbShng None  
## 135 1993 Gable CompShg Plywood Plywood None  
## 155 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 156 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 165 2004 Gable CompShg MetalSd MetalSd None  
## 176 2001 Gable CompShg WdShing Wd Shng None  
## 180 2006 Gable CompShg Wd Sdng Wd Sdng None  
## 182 1950 Gable CompShg Stucco Stucco None  
## 198 1990 Gable CompShg Stucco Stucco None  
## 199 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 203 1950 Gable CompShg MetalSd MetalSd None  
## 211 1950 Gable CompShg Stucco Stucco None  
## 218 1950 Gable CompShg MetalSd MetalSd None  
## 219 2006 Gable CompShg VinylSd VinylSd BrkFace  
## 231 1959 Hip CompShg MetalSd MetalSd BrkFace  
## 232 1996 Gable CompShg VinylSd VinylSd BrkFace  
## 243 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 247 1950 Gable CompShg AsbShng AsbShng None  
## 261 1962 Gable CompShg Wd Sdng Wd Sdng BrkFace  
## 285 1992 Gable CompShg Plywood ImStucc None  
## 307 1991 Gable CompShg HdBoard Plywood BrkFace  
## 315 1990 Gable CompShg Wd Sdng Wd Sdng None  
## 319 1993 Gable CompShg HdBoard HdBoard BrkFace  
## 326 1950 Gable CompShg MetalSd MetalSd None  
## 329 1994 Gable CompShg Wd Sdng Wd Shng None  
## 330 1950 Gable CompShg Wd Sdng Wd Shng None  
## 342 1950 Gable CompShg Wd Sdng AsbShng None  
## 355 2000 Gable CompShg Wd Sdng MetalSd None  
## 359 1958 Hip CompShg Wd Sdng ImStucc BrkFace  
## 363 2003 Gable CompShg HdBoard HdBoard BrkFace  
## 366 1997 Hip CompShg VinylSd VinylSd None  
## 381 1950 Gable CompShg BrkFace Wd Sdng None  
## 384 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 391 1950 Gable CompShg MetalSd MetalSd None  
## 408 1976 Gable CompShg Wd Sdng Plywood None  
## 414 1950 Gable CompShg WdShing Wd Shng None  
## 420 1968 Gable CompShg VinylSd VinylSd None  
## 426 1992 Gable CompShg HdBoard HdBoard None  
## 430 1988 Gable CompShg HdBoard HdBoard None  
## 438 2004 Gable CompShg Wd Sdng Wd Sdng None  
## 439 2002 Gable CompShg WdShing Stucco None  
## 457 1950 Gable CompShg AsbShng AsbShng None  
## 460 1950 Gable CompShg MetalSd MetalSd BrkCmn  
## 463 1965 Gable CompShg MetalSd MetalSd None  
## 486 2007 Gable CompShg MetalSd MetalSd None  
## 492 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 495 1996 Gable CompShg MetalSd MetalSd None  
## 496 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 497 1993 Hip CompShg BrkFace BrkFace None  
## 503 1965 Hip CompShg MetalSd MetalSd None  
## 509 2005 Gambrel CompShg MetalSd MetalSd None  
## 514 1983 Gable CompShg VinylSd VinylSd None  
## 515 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 521 2000 Gable CompShg MetalSd MetalSd None  
## 523 1950 Gable CompShg CemntBd CmentBd None  
## 527 2000 Hip CompShg Wd Sdng Wd Sdng None  
## 529 2002 Gable CompShg Wd Sdng Wd Sdng None  
## 532 1999 Gable CompShg Wd Sdng Wd Sdng None  
## 536 1991 Gable CompShg MetalSd MetalSd None  
## 556 1950 Gable CompShg MetalSd MetalSd None  
## 558 1950 Gable CompShg MetalSd MetalSd None  
## 566 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 576 1950 Gable CompShg MetalSd MetalSd None  
## 578 1966 Gable CompShg VinylSd VinylSd BrkFace  
## 585 1995 Gable CompShg AsbShng AsbShng None  
## 587 2000 Gable CompShg Stucco Wd Shng None  
## 610 1961 Gable CompShg VinylSd VinylSd BrkCmn  
## 621 1950 Gable CompShg Stucco Stucco None  
## 627 1978 Hip CompShg Wd Sdng Wd Sdng None  
## 628 1972 Gable CompShg AsbShng AsbShng BrkFace  
## 631 1991 Gable CompShg VinylSd VinylSd None  
## 639 1950 Gable CompShg MetalSd Wd Sdng None  
## 646 1971 Hip CompShg Plywood Plywood None  
## 649 1966 Gable CompShg MetalSd MetalSd BrkFace  
## 654 1995 Gable CompShg MetalSd MetalSd None  
## 658 2000 Gable CompShg Stucco Wd Shng None  
## 661 1976 Gable CompShg Plywood Plywood BrkFace  
## 663 1968 Hip CompShg Wd Sdng Wd Sdng BrkFace  
## 664 1972 Gable CompShg Plywood Plywood None  
## 670 1950 Gable CompShg MetalSd MetalSd None  
## 677 1950 Gable CompShg AsbShng Stucco None  
## 678 2006 Gable CompShg VinylSd VinylSd None  
## 682 2000 Gable CompShg VinylSd Stucco None  
## 694 1968 Gable CompShg MetalSd MetalSd None  
## 697 1950 Gable CompShg Wd Sdng Wd Shng None  
## 704 1996 Gable CompShg Wd Sdng Wd Sdng None  
## 712 1950 Gable CompShg MetalSd MetalSd None  
## 717 1998 Gable CompShg Wd Sdng VinylSd None  
## 719 1994 Hip CompShg Wd Sdng ImStucc BrkFace  
## 721 1985 Gable CompShg HdBoard HdBoard None  
## 730 1950 Gable CompShg MetalSd MetalSd None  
## 741 2002 Gable CompShg Wd Sdng Wd Shng None  
## 745 1993 Gable CompShg HdBoard HdBoard None  
## 748 2003 Mansard CompShg Stucco Stucco None  
## 749 1996 Hip CompShg VinylSd VinylSd BrkFace  
## 750 1950 Gable CompShg WdShing Wd Shng None  
## 767 1988 Gable CompShg HdBoard HdBoard BrkFace  
## 768 1985 Gable CompShg VinylSd VinylSd None  
## 785 2001 Gable CompShg Wd Sdng Wd Shng None  
## 787 1950 Gable CompShg MetalSd MetalSd None  
## 800 1950 Gable CompShg Wd Sdng Wd Sdng BrkFace  
## 801 1997 Gable CompShg VinylSd VinylSd None  
## 814 1958 Gable CompShg MetalSd MetalSd BrkFace  
## 815 1950 Gable CompShg Stucco Stucco None  
## 817 1954 Gable CompShg BrkFace BrkFace None  
## 822 1953 Gable CompShg MetalSd MetalSd None  
## 827 1950 Gable CompShg MetalSd MetalSd None  
## 837 1973 Gable CompShg VinylSd VinylSd None  
## 841 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 842 2002 Gable CompShg MetalSd MetalSd None  
## 845 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 847 1993 Gable CompShg HdBoard HdBoard BrkFace  
## 857 1978 Gable CompShg Plywood HdBoard None  
## 873 1996 Gable CompShg WdShing Wd Shng None  
## 906 1954 Gable CompShg HdBoard HdBoard Stone  
## 913 1950 Gable CompShg MetalSd MetalSd None  
## 919 1991 Gable CompShg HdBoard HdBoard None  
## 936 1953 Gable CompShg MetalSd MetalSd BrkFace  
## 940 1950 Gable CompShg MetalSd MetalSd None  
## 946 1996 Hip CompShg VinylSd VinylSd None  
## 999 1950 Hip CompShg Wd Sdng Wd Sdng None  
## 1002 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 1010 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 1011 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 1013 1996 Hip CompShg Wd Sdng Wd Sdng None  
## 1014 2006 Hip CompShg MetalSd Stucco None  
## 1023 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 1025 1976 Hip WdShake Stone HdBoard None  
## 1031 1995 Gable CompShg VinylSd VinylSd None  
## 1060 1950 Gable CompShg MetalSd MetalSd BrkFace  
## 1061 2001 Gable CompShg CemntBd CmentBd None  
## 1082 1963 Gable CompShg HdBoard HdBoard None  
## 1093 1950 Gable CompShg MetalSd MetalSd None  
## 1095 2000 Gable CompShg MetalSd MetalSd None  
## 1097 2006 Gable CompShg Wd Sdng Wd Sdng None  
## 1098 1986 Gable CompShg HdBoard HdBoard None  
## 1104 1959 Hip CompShg BrkFace BrkFace None  
## 1120 1959 Gable CompShg BrkFace Wd Sdng None  
## 1121 1950 Gable CompShg BrkFace BrkFace None  
## 1137 1950 Gable CompShg VinylSd VinylSd None  
## 1138 1996 Gable CompShg VinylSd VinylSd None  
## 1140 1950 Gable CompShg Stucco Stucco None  
## 1149 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 1151 1950 Gable CompShg BrkFace BrkFace None  
## 1153 2004 Gable CompShg Stone Stone None  
## 1154 2007 Gable CompShg Wd Sdng Wd Sdng None  
## 1178 2004 Gable CompShg MetalSd MetalSd None  
## 1179 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 1180 1954 Gable CompShg Wd Sdng Wd Sdng None  
## 1186 1950 Gable CompShg AsbShng AsbShng None  
## 1188 1995 Gable CompShg ImStucc ImStucc None  
## 1193 1994 Gambrel CompShg VinylSd VinylSd None  
## 1198 1950 Gable CompShg MetalSd MetalSd None  
## 1203 1997 Gable CompShg Wd Sdng Wd Sdng None  
## 1231 1977 Shed CompShg Plywood Plywood None  
## 1249 1950 Gable CompShg AsbShng AsbShng None  
## 1264 1950 Gambrel CompShg Wd Sdng Wd Sdng None  
## 1267 1950 Hip CompShg Wd Sdng Wd Sdng None  
## 1275 2003 Gable CompShg Wd Sdng Wd Shng None  
## 1280 1950 Gable CompShg MetalSd MetalSd None  
## 1285 1990 Gable CompShg Wd Sdng Wd Shng None  
## 1297 1963 Hip CompShg MetalSd MetalSd BrkFace  
## 1311 2002 Gable CompShg BrkFace HdBoard None  
## 1326 1950 Gable CompShg AsbShng AsbShng None  
## 1327 2006 Gable CompShg MetalSd MetalSd None  
## 1334 1995 Gable CompShg Wd Sdng Wd Sdng None  
## 1346 1950 Hip CompShg MetalSd MetalSd None  
## 1350 1987 Gable CompShg MetalSd MetalSd None  
## 1361 1998 Gable CompShg MetalSd Wd Sdng None  
## 1371 1950 Gable CompShg CBlock CBlock None  
## 1381 1950 Gable CompShg Stucco Stucco None  
## 1383 1950 Hip CompShg Wd Sdng Wd Sdng None  
## 1384 2007 Gable CompShg Wd Sdng Wd Sdng None  
## 1394 2000 Gable CompShg Wd Sdng Wd Sdng None  
## 1397 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 1398 2004 Gable CompShg MetalSd MetalSd None  
## 1399 1982 Gable CompShg VinylSd Wd Sdng None  
## 1401 1950 Gable CompShg WdShing Wd Shng None  
## 1405 1950 Gable CompShg Wd Sdng Wd Sdng None  
## 1417 1950 Gable CompShg VinylSd AsbShng None  
## 1420 1969 Gable CompShg Plywood Plywood BrkFace  
## 1429 1992 Gable CompShg MetalSd MetalSd Stone  
## 1430 1981 Gable CompShg MetalSd MetalSd BrkFace  
## 1439 1996 Gable CompShg MetalSd MetalSd None  
## 1440 1979 Hip CompShg HdBoard HdBoard BrkFace  
## 1446 1966 Gable CompShg VinylSd VinylSd None  
## 1459 1996 Hip CompShg MetalSd MetalSd None  
## MasVnrArea ExterQual ExterCond Foundation BsmtQual BsmtCond  
## 4 0 TA TA BrkTil TA Gd  
## 8 240 TA TA CBlock Gd TA  
## 9 0 TA TA BrkTil TA TA  
## 15 212 TA TA CBlock TA TA  
## 22 0 TA TA PConc TA TA  
## 30 0 TA TA BrkTil TA TA  
## 31 0 TA Fa BrkTil TA TA  
## 49 0 TA TA BrkTil TA TA  
## 59 1031 Ex TA PConc Ex TA  
## 62 0 TA TA BrkTil TA Fa  
## 64 0 TA TA BrkTil TA TA  
## 70 0 Gd TA CBlock TA TA  
## 75 0 Gd Gd CBlock Fa TA  
## 80 0 TA TA PConc TA TA  
## 89 0 Fa Fa CBlock TA Fa  
## 93 0 TA Gd BrkTil Gd TA  
## 99 0 TA TA BrkTil TA TA  
## 109 0 TA TA CBlock TA TA  
## 114 184 TA Gd CBlock Gd TA  
## 117 116 TA TA CBlock TA TA  
## 122 0 TA TA PConc TA TA  
## 135 0 TA TA CBlock TA TA  
## 155 0 TA TA BrkTil TA TA  
## 156 0 TA TA BrkTil TA TA  
## 165 0 TA Gd BrkTil TA TA  
## 176 0 TA TA CBlock TA Gd  
## 180 0 Gd TA CBlock TA TA  
## 182 0 TA TA BrkTil Fa TA  
## 198 0 Gd Gd PConc TA TA  
## 199 0 TA TA CBlock TA TA  
## 203 0 TA Gd BrkTil Fa TA  
## 211 0 TA TA CBlock TA TA  
## 218 0 TA TA CBlock TA TA  
## 219 312 Gd Gd CBlock TA TA  
## 231 220 TA TA CBlock TA TA  
## 232 506 Gd TA PConc Gd TA  
## 243 0 TA TA BrkTil TA TA  
## 247 0 TA Fa Stone Fa TA  
## 261 399 TA TA CBlock TA TA  
## 285 0 Gd TA PConc Gd TA  
## 307 246 Gd TA CBlock Gd TA  
## 315 0 TA TA BrkTil TA Gd  
## 319 256 Gd TA PConc Gd TA  
## 326 0 TA TA CBlock TA TA  
## 329 0 TA TA BrkTil TA TA  
## 330 0 TA TA PConc TA TA  
## 342 0 Fa Fa CBlock TA Fa  
## 355 0 TA TA CBlock TA TA  
## 359 120 TA TA CBlock TA TA  
## 363 500 Gd TA Slab NoB NoB  
## 366 0 TA Gd CBlock TA Fa  
## 381 0 TA TA BrkTil TA TA  
## 384 0 TA TA BrkTil Fa Fa  
## 391 0 TA TA BrkTil TA Gd  
## 408 0 TA TA BrkTil Gd TA  
## 414 0 TA TA CBlock TA TA  
## 420 0 TA TA CBlock TA TA  
## 426 0 TA Gd CBlock TA TA  
## 430 0 TA TA CBlock Gd TA  
## 438 0 Gd TA PConc TA TA  
## 439 0 TA TA PConc TA TA  
## 457 0 TA TA BrkTil TA TA  
## 460 161 TA TA CBlock TA TA  
## 463 0 TA TA CBlock TA TA  
## 486 0 Gd TA CBlock TA TA  
## 492 0 TA TA CBlock TA TA  
## 495 0 TA TA BrkTil Fa TA  
## 496 0 TA TA CBlock TA TA  
## 497 0 Gd TA PConc Gd TA  
## 503 0 TA TA CBlock TA TA  
## 509 0 TA Ex BrkTil TA TA  
## 514 0 TA Gd PConc TA TA  
## 515 0 TA TA BrkTil TA TA  
## 521 0 TA TA BrkTil NoB NoB  
## 523 0 TA Gd CBlock TA TA  
## 527 0 TA TA CBlock Gd TA  
## 529 0 TA TA BrkTil TA TA  
## 532 0 TA TA BrkTil Fa Fa  
## 536 0 TA TA CBlock Gd TA  
## 556 0 TA TA BrkTil TA Fa  
## 558 0 TA TA CBlock TA TA  
## 566 0 TA TA PConc Gd TA  
## 576 0 TA TA CBlock TA TA  
## 578 97 TA TA CBlock TA TA  
## 585 0 TA TA BrkTil TA TA  
## 587 0 TA Gd BrkTil TA Gd  
## 610 192 TA Fa CBlock TA TA  
## 621 0 TA TA BrkTil TA TA  
## 627 0 TA TA CBlock TA TA  
## 628 164 TA TA CBlock TA TA  
## 631 0 TA TA BrkTil Fa Fa  
## 639 0 TA TA CBlock Fa TA  
## 646 0 TA TA CBlock TA TA  
## 649 351 TA TA CBlock TA TA  
## 654 0 TA TA CBlock TA TA  
## 658 0 TA Fa BrkTil Gd TA  
## 661 233 TA TA CBlock Gd TA  
## 663 216 TA TA CBlock Fa Fa  
## 664 0 TA TA CBlock Gd TA  
## 670 0 TA TA BrkTil Fa TA  
## 677 0 TA TA BrkTil TA Fa  
## 678 0 Gd TA BrkTil TA TA  
## 682 0 TA TA BrkTil TA TA  
## 694 0 TA TA BrkTil TA TA  
## 697 0 TA TA CBlock TA TA  
## 704 0 TA Gd BrkTil Gd TA  
## 712 0 TA TA Stone TA TA  
## 717 0 TA Gd BrkTil TA TA  
## 719 651 Gd TA PConc Gd TA  
## 721 0 Gd TA PConc Gd TA  
## 730 0 TA TA CBlock TA TA  
## 741 0 TA Gd BrkTil Fa Fa  
## 745 0 Gd TA PConc Gd TA  
## 748 0 Gd TA Stone TA Fa  
## 749 338 Gd TA PConc Gd TA  
## 750 0 TA TA Slab NoB NoB  
## 767 42 TA TA CBlock Gd TA  
## 768 0 TA TA CBlock Gd TA  
## 785 0 TA TA CBlock TA TA  
## 787 0 TA Gd PConc Fa TA  
## 800 252 TA TA BrkTil Gd TA  
## 801 0 TA TA PConc Gd TA  
## 814 243 TA TA CBlock TA TA  
## 815 0 TA TA BrkTil TA TA  
## 817 0 TA TA CBlock TA TA  
## 822 0 Fa TA CBlock Fa TA  
## 827 0 TA TA BrkTil TA TA  
## 837 0 TA TA BrkTil TA TA  
## 841 0 TA TA BrkTil TA TA  
## 842 0 TA TA PConc TA TA  
## 845 0 TA TA BrkTil TA TA  
## 847 137 Gd TA PConc Gd TA  
## 857 0 TA TA CBlock Gd Gd  
## 873 0 Gd TA Stone TA TA  
## 906 110 TA TA CBlock TA TA  
## 913 0 TA TA BrkTil TA TA  
## 919 0 Gd TA PConc Ex TA  
## 936 108 TA Gd PConc Fa TA  
## 940 0 TA Gd CBlock TA TA  
## 946 0 TA TA BrkTil TA TA  
## 999 0 TA TA BrkTil TA Fa  
## 1002 0 TA TA BrkTil Fa TA  
## 1010 0 TA Fa BrkTil TA TA  
## 1011 0 TA TA CBlock TA TA  
## 1013 0 TA Gd PConc TA Fa  
## 1014 0 TA TA BrkTil TA TA  
## 1023 0 TA TA CBlock TA TA  
## 1025 0 Gd TA CBlock Gd TA  
## 1031 0 TA TA PConc TA TA  
## 1060 480 TA TA CBlock TA TA  
## 1061 0 Gd TA PConc Gd TA  
## 1082 0 TA TA CBlock TA TA  
## 1093 0 TA TA PConc TA TA  
## 1095 0 TA TA CBlock TA TA  
## 1097 0 TA TA PConc TA TA  
## 1098 0 Gd TA CBlock Gd TA  
## 1104 0 TA TA CBlock TA TA  
## 1120 0 TA TA CBlock TA TA  
## 1121 0 TA TA BrkTil TA TA  
## 1137 0 TA TA CBlock TA TA  
## 1138 0 TA Gd CBlock TA TA  
## 1140 0 TA Fa BrkTil TA TA  
## 1149 0 TA TA PConc TA TA  
## 1151 0 TA TA CBlock TA TA  
## 1153 0 TA TA PConc TA TA  
## 1154 0 Gd Gd BrkTil TA TA  
## 1178 0 TA TA CBlock TA TA  
## 1179 0 TA TA BrkTil TA TA  
## 1180 0 TA TA Slab NoB NoB  
## 1186 0 TA Gd BrkTil TA TA  
## 1188 0 Gd TA PConc Gd TA  
## 1193 0 TA TA PConc TA TA  
## 1198 0 TA TA BrkTil TA TA  
## 1203 0 TA TA BrkTil TA TA  
## 1231 1 TA TA CBlock Gd TA  
## 1249 0 TA TA BrkTil Gd TA  
## 1264 0 TA TA PConc TA TA  
## 1267 0 Fa TA CBlock TA TA  
## 1275 0 TA TA PConc TA TA  
## 1280 0 TA Gd CBlock TA TA  
## 1285 0 TA TA PConc TA TA  
## 1297 148 TA Gd CBlock TA TA  
## 1311 0 Gd Gd PConc Gd TA  
## 1326 0 TA TA BrkTil TA Fa  
## 1327 0 TA TA BrkTil TA TA  
## 1334 0 TA TA CBlock TA TA  
## 1346 0 TA TA PConc TA TA  
## 1350 0 TA Gd BrkTil TA Fa  
## 1361 0 TA TA BrkTil TA Fa  
## 1371 0 Fa TA PConc TA TA  
## 1381 0 TA Fa BrkTil TA Fa  
## 1383 0 TA TA BrkTil Fa TA  
## 1384 0 TA Gd BrkTil TA TA  
## 1394 0 TA TA BrkTil Fa TA  
## 1397 0 TA TA CBlock TA TA  
## 1398 0 TA TA BrkTil TA TA  
## 1399 0 TA TA CBlock TA TA  
## 1401 0 TA TA BrkTil TA TA  
## 1405 0 TA TA PConc TA TA  
## 1417 0 TA TA PConc TA TA  
## 1420 312 Gd Gd CBlock TA TA  
## 1429 294 TA Gd CBlock TA TA  
## 1430 310 Gd Gd CBlock Gd TA  
## 1439 0 TA TA CBlock TA TA  
## 1440 96 TA TA CBlock TA TA  
## 1446 0 TA TA CBlock TA TA  
## 1459 0 TA TA CBlock TA TA  
## BsmtExposure BsmtFinType1 BsmtFinSF1 BsmtFinType2 BsmtFinSF2  
## 4 No ALQ 216 Unf 0  
## 8 Mn ALQ 859 BLQ 32  
## 9 No Unf 0 Unf 0  
## 15 No BLQ 733 Unf 0  
## 22 No Unf 0 Unf 0  
## 30 No Unf 0 Unf 0  
## 31 No Unf 0 Unf 0  
## 49 No Unf 0 Unf 0  
## 59 Gd Unf 0 Unf 0  
## 62 No Unf 0 Unf 0  
## 64 No Unf 0 Unf 0  
## 70 No BLQ 603 Unf 0  
## 75 No Unf 0 Unf 0  
## 80 No Unf 0 Unf 0  
## 89 No Unf 0 Unf 0  
## 93 No ALQ 713 Unf 0  
## 99 No ALQ 108 Unf 0  
## 109 No Unf 0 Unf 0  
## 114 Mn ALQ 35 Rec 869  
## 117 No LwQ 170 BLQ 670  
## 122 No Unf 0 Unf 0  
## 135 No Rec 570 Unf 0  
## 155 No Unf 0 Unf 0  
## 156 No Unf 0 Unf 0  
## 165 Mn LwQ 370 Unf 0  
## 176 Av ALQ 477 Unf 0  
## 180 No Unf 0 Unf 0  
## 182 No LwQ 352 Unf 0  
## 198 No GLQ 1036 LwQ 184  
## 199 No Unf 0 Unf 0  
## 203 No LwQ 617 Unf 0  
## 211 No Rec 468 Unf 0  
## 218 No Unf 0 Unf 0  
## 219 No BLQ 341 Unf 0  
## 231 No Unf 0 Unf 0  
## 232 No GLQ 689 Unf 0  
## 243 No Unf 0 Unf 0  
## 247 No Unf 0 Unf 0  
## 261 Gd Rec 672 ALQ 690  
## 285 No GLQ 430 Unf 0  
## 307 No ALQ 700 Unf 0  
## 315 No LwQ 16 Unf 0  
## 319 Gd GLQ 987 Unf 0  
## 326 Av BLQ 116 Unf 0  
## 329 No Unf 0 Unf 0  
## 330 Mn Unf 0 Unf 0  
## 342 No Unf 0 Unf 0  
## 355 No LwQ 388 Unf 0  
## 359 Av BLQ 300 Rec 294  
## 363 NoB NoB 0 NoB 0  
## 366 No Rec 456 Unf 0  
## 381 No LwQ 218 Unf 0  
## 384 No Unf 0 Unf 0  
## 391 No Rec 241 BLQ 391  
## 408 No Unf 0 Unf 0  
## 414 No Unf 0 Unf 0  
## 420 No BLQ 775 Unf 0  
## 426 No Unf 0 Unf 0  
## 430 Mn GLQ 1005 Unf 0  
## 438 No Unf 0 Unf 0  
## 439 No LwQ 365 Unf 0  
## 457 No Unf 0 Unf 0  
## 460 No LwQ 185 Unf 0  
## 463 No Rec 553 BLQ 311  
## 486 No ALQ 607 Unf 0  
## 492 No BLQ 403 Rec 165  
## 495 No Unf 0 Unf 0  
## 496 No Rec 495 Unf 0  
## 497 No GLQ 1231 Unf 0  
## 503 No ALQ 698 GLQ 96  
## 509 No Rec 141 Unf 0  
## 514 No ALQ 336 Unf 0  
## 515 No Unf 0 Unf 0  
## 521 NoB NoB 0 NoB 0  
## 523 No ALQ 399 Unf 0  
## 527 No Rec 377 Unf 0  
## 529 Mn ALQ 348 Unf 0  
## 532 Mn Unf 0 Unf 0  
## 536 Gd GLQ 969 Unf 0  
## 556 No Unf 0 Unf 0  
## 558 No Rec 637 Unf 0  
## 566 No Unf 0 Unf 0  
## 576 No Rec 442 Unf 0  
## 578 Av LwQ 328 ALQ 551  
## 585 No Unf 0 Unf 0  
## 587 Mn Rec 210 ALQ 606  
## 610 Mn Rec 903 Unf 0  
## 621 No BLQ 41 Unf 0  
## 627 No Unf 0 Unf 0  
## 628 Av BLQ 674 LwQ 132  
## 631 No Unf 0 Unf 0  
## 639 No Unf 0 Unf 0  
## 646 No ALQ 282 LwQ 35  
## 649 No Unf 0 Unf 0  
## 654 No Unf 0 Unf 0  
## 658 No Unf 0 Unf 0  
## 661 No Unf 0 Unf 0  
## 663 No Unf 0 Unf 0  
## 664 Av BLQ 920 Rec 180  
## 670 No Unf 0 Unf 0  
## 677 No Unf 0 Unf 0  
## 678 No Unf 0 Unf 0  
## 682 No Rec 182 Unf 0  
## 694 No Unf 0 Unf 0  
## 697 No LwQ 616 Unf 0  
## 704 No Unf 0 Unf 0  
## 712 Mn Unf 0 Unf 0  
## 717 No Unf 0 Unf 0  
## 719 Gd GLQ 1173 Unf 0  
## 721 Gd GLQ 1148 Unf 0  
## 730 No BLQ 152 Unf 0  
## 741 No Unf 0 Unf 0  
## 745 No GLQ 733 Unf 0  
## 748 No Unf 0 Unf 0  
## 749 No GLQ 919 Unf 0  
## 750 NoB NoB 0 NoB 0  
## 767 No GLQ 394 Unf 0  
## 768 Mn ALQ 660 Unf 0  
## 785 No Unf 0 Unf 0  
## 787 No LwQ 686 Unf 0  
## 800 No ALQ 569 Unf 0  
## 801 Gd GLQ 462 Unf 0  
## 814 No Rec 608 Unf 0  
## 815 No Unf 0 Unf 0  
## 817 No BLQ 486 Unf 0  
## 822 No Unf 0 Unf 0  
## 827 No ALQ 784 Unf 0  
## 837 No Rec 338 Unf 0  
## 841 No BLQ 156 Unf 0  
## 842 No Unf 0 Unf 0  
## 845 Mn Unf 0 Unf 0  
## 847 No ALQ 513 Unf 0  
## 857 Gd GLQ 505 LwQ 435  
## 873 Av Unf 0 Unf 0  
## 906 No Rec 354 LwQ 290  
## 913 No Rec 489 Unf 0  
## 919 Mn BLQ 48 GLQ 634  
## 936 Mn Unf 0 Unf 0  
## 940 Mn Unf 0 Unf 0  
## 946 No LwQ 1088 Unf 0  
## 999 No Unf 0 Unf 0  
## 1002 No Unf 0 Unf 0  
## 1010 No Unf 0 Unf 0  
## 1011 No Unf 0 Unf 0  
## 1013 No Unf 0 Unf 0  
## 1014 No ALQ 247 Rec 465  
## 1023 No LwQ 324 Unf 0  
## 1025 Av ALQ 1165 LwQ 400  
## 1031 Mn Unf 0 Unf 0  
## 1060 Mn Rec 297 LwQ 557  
## 1061 Mn GLQ 616 Unf 0  
## 1082 No ALQ 824 Unf 0  
## 1093 No Rec 423 Unf 0  
## 1095 No BLQ 248 Rec 240  
## 1097 No Unf 0 Unf 0  
## 1098 No Unf 0 Unf 0  
## 1104 Mn ALQ 655 Unf 0  
## 1120 No LwQ 369 Unf 0  
## 1121 No Unf 0 Unf 0  
## 1137 No BLQ 280 Unf 0  
## 1138 No Unf 0 Unf 0  
## 1140 No BLQ 645 Unf 0  
## 1149 No Unf 0 Unf 0  
## 1151 No Unf 0 Unf 0  
## 1153 No ALQ 296 GLQ 547  
## 1154 Av ALQ 538 Unf 0  
## 1178 No Rec 468 Unf 0  
## 1179 No Unf 0 Unf 0  
## 1180 NoB NoB 0 NoB 0  
## 1186 No BLQ 392 Unf 0  
## 1188 No GLQ 1456 Unf 0  
## 1193 Mn Unf 0 Unf 0  
## 1198 No Unf 0 Unf 0  
## 1203 No Unf 0 Unf 0  
## 1231 No GLQ 498 Rec 211  
## 1249 No Rec 319 Unf 0  
## 1264 No Unf 0 Unf 0  
## 1267 No Unf 0 Unf 0  
## 1275 No Unf 0 Unf 0  
## 1280 No Unf 0 Unf 0  
## 1285 No Unf 0 Unf 0  
## 1297 Mn ALQ 776 Unf 0  
## 1311 Av GLQ 1406 Unf 0  
## 1326 No Unf 0 Unf 0  
## 1327 No Rec 544 Unf 0  
## 1334 No Unf 0 Unf 0  
## 1346 No ALQ 250 Unf 0  
## 1350 No LwQ 259 Unf 0  
## 1361 No Unf 0 Unf 0  
## 1371 No ALQ 315 Rec 105  
## 1381 No Rec 203 Unf 0  
## 1383 No Unf 0 Unf 0  
## 1384 No Unf 0 Unf 0  
## 1394 No Unf 0 Unf 0  
## 1397 Av BLQ 353 Rec 334  
## 1398 Mn Unf 0 Unf 0  
## 1399 No Rec 180 BLQ 352  
## 1401 No Unf 0 Unf 0  
## 1405 No Unf 0 Unf 0  
## 1417 No Unf 0 Unf 0  
## 1420 Av Rec 1110 Unf 0  
## 1429 No BLQ 510 Unf 0  
## 1430 No BLQ 678 Unf 0  
## 1439 No GLQ 600 Unf 0  
## 1440 No GLQ 315 Rec 110  
## 1446 Gd LwQ 187 Rec 627  
## 1459 Mn GLQ 49 Rec 1029  
## BsmtUnfSF TotalBsmtSF Heating HeatingQC CentralAir Electrical  
## 4 540 756 GasA Gd Y SBrkr  
## 8 216 1107 GasA Ex Y SBrkr  
## 9 952 952 GasA Gd Y FuseF  
## 15 520 1253 GasA TA Y SBrkr  
## 22 637 637 GasA Ex Y FuseF  
## 30 520 520 GasA Fa N SBrkr  
## 31 649 649 GasA TA N SBrkr  
## 49 736 736 GasA Gd Y SBrkr  
## 59 1410 1410 GasA Ex Y SBrkr  
## 62 530 530 GasA TA N SBrkr  
## 64 576 576 GasA Gd Y SBrkr  
## 70 701 1304 GasW TA Y SBrkr  
## 75 840 840 GasA Gd N SBrkr  
## 80 440 440 GasA Gd Y SBrkr  
## 89 1013 1013 GasA TA N SBrkr  
## 93 163 876 GasA Ex Y SBrkr  
## 99 350 458 GasA Fa N SBrkr  
## 109 793 793 GasW TA N FuseF  
## 114 905 1809 GasA TA Y SBrkr  
## 117 252 1092 GasA TA Y SBrkr  
## 122 732 732 GasA Gd Y SBrkr  
## 135 891 1461 GasA Gd Y SBrkr  
## 155 1200 1200 GasA TA Y FuseA  
## 156 572 572 Grav Fa N FuseF  
## 165 779 1149 GasA Gd Y FuseA  
## 176 725 1202 GasA TA Y SBrkr  
## 180 968 968 GasA TA Y SBrkr  
## 182 441 793 GasA Gd Y SBrkr  
## 198 140 1360 GasA Gd Y SBrkr  
## 199 755 755 GasA Ex Y SBrkr  
## 203 0 617 GasA Gd Y SBrkr  
## 211 396 864 GasA TA N FuseA  
## 218 686 686 GasA Fa N SBrkr  
## 219 457 798 GasA Ex Y SBrkr  
## 231 1194 1194 GasA TA Y SBrkr  
## 232 773 1462 GasA Ex Y SBrkr  
## 243 540 540 GasA Gd N FuseA  
## 247 1020 1020 GasA Gd N FuseP  
## 261 0 1362 GasA TA Y SBrkr  
## 285 1145 1575 GasA Gd Y SBrkr  
## 307 0 700 GasA Gd Y SBrkr  
## 315 712 728 GasA Ex Y SBrkr  
## 319 360 1347 GasA Ex Y SBrkr  
## 326 604 720 GasA Po N FuseF  
## 329 844 844 GasA Gd N FuseA  
## 330 596 596 GasA TA N SBrkr  
## 342 721 721 GasA Gd Y SBrkr  
## 355 552 940 GasA Ex Y SBrkr  
## 359 468 1062 GasA Ex Y FuseF  
## 363 0 0 GasA Ex Y SBrkr  
## 366 216 672 GasA Gd Y FuseA  
## 381 808 1026 GasA TA Y SBrkr  
## 384 784 784 GasA TA N FuseA  
## 391 229 861 GasA Ex Y SBrkr  
## 408 840 840 GasA Ex Y SBrkr  
## 414 1008 1008 GasA Gd Y FuseA  
## 420 281 1056 GasA Ex Y SBrkr  
## 426 651 651 GasA Gd Y SBrkr  
## 430 387 1392 GasA TA Y SBrkr  
## 438 884 884 GasA Gd Y SBrkr  
## 439 75 440 GasA TA N SBrkr  
## 457 624 624 GasA Fa N SBrkr  
## 460 524 709 GasA TA Y SBrkr  
## 463 0 864 GasA Gd Y SBrkr  
## 486 506 1113 GasA Gd Y SBrkr  
## 492 238 806 GasA TA Y FuseA  
## 495 190 190 GasA Gd Y FuseA  
## 496 225 720 GasA TA N FuseA  
## 497 1969 3200 GasA Ex Y SBrkr  
## 503 420 1214 GasA Ex Y SBrkr  
## 509 548 689 GasA Ex Y SBrkr  
## 514 748 1084 GasA TA Y SBrkr  
## 515 768 768 Grav Fa N SBrkr  
## 521 0 0 GasA TA N FuseA  
## 523 605 1004 GasA Ex Y SBrkr  
## 527 551 928 GasA TA Y SBrkr  
## 529 180 528 GasA Ex Y SBrkr  
## 532 611 611 GasA Ex Y SBrkr  
## 536 148 1117 GasA TA Y SBrkr  
## 556 993 993 GasA TA Y FuseA  
## 558 0 637 GasA Gd Y SBrkr  
## 566 806 806 GasA TA N FuseF  
## 576 390 832 GasA TA Y SBrkr  
## 578 285 1164 GasA Ex Y SBrkr  
## 585 884 884 GasA Ex Y SBrkr  
## 587 0 816 GasA Ex Y SBrkr  
## 610 126 1029 GasA Gd Y SBrkr  
## 621 823 864 GasA TA N FuseF  
## 627 978 978 GasA TA Y SBrkr  
## 628 350 1156 GasA Ex Y SBrkr  
## 631 636 636 GasA TA Y FuseA  
## 639 796 796 GasA Gd Y FuseA  
## 646 664 981 GasA TA Y SBrkr  
## 649 756 756 GasA TA Y SBrkr  
## 654 756 756 GasA Ex Y SBrkr  
## 658 776 776 GasA TA Y SBrkr  
## 661 793 793 GasA TA Y SBrkr  
## 663 1392 1392 GasA Gd Y SBrkr  
## 664 38 1138 GasA TA Y SBrkr  
## 670 700 700 GasA Ex Y SBrkr  
## 677 1095 1095 GasW Fa N SBrkr  
## 678 768 768 GasA Ex Y SBrkr  
## 682 611 793 GasA Ex Y SBrkr  
## 694 1073 1073 GasA Ex Y SBrkr  
## 697 0 616 GasA Gd Y SBrkr  
## 704 360 360 GasA Gd Y SBrkr  
## 712 859 859 GasA Gd Y SBrkr  
## 717 718 718 GasA Ex Y SBrkr  
## 719 138 1311 GasA Ex Y SBrkr  
## 721 594 1742 GasA TA Y SBrkr  
## 730 628 780 GasA TA Y FuseA  
## 741 264 264 GasA Ex Y SBrkr  
## 745 604 1337 GasA Gd Y SBrkr  
## 748 1240 1240 GasW TA N SBrkr  
## 749 801 1720 GasA Ex Y SBrkr  
## 750 0 0 Wall TA N FuseF  
## 767 586 980 GasA TA Y SBrkr  
## 768 323 983 GasA Ex Y SBrkr  
## 785 742 742 GasA Ex Y SBrkr  
## 787 0 686 GasA TA Y SBrkr  
## 800 162 731 GasA Ex Y SBrkr  
## 801 154 616 GasA Gd Y SBrkr  
## 814 834 1442 GasA Gd Y SBrkr  
## 815 686 686 GasW Gd Y SBrkr  
## 817 522 1008 GasA Gd Y SBrkr  
## 822 936 936 GasA TA N SBrkr  
## 827 0 784 GasA Gd Y SBrkr  
## 837 1221 1559 GasA Gd Y SBrkr  
## 841 516 672 GasA TA N SBrkr  
## 842 650 650 GasA Gd Y SBrkr  
## 845 876 876 GasA Gd Y SBrkr  
## 847 227 740 GasA Ex Y SBrkr  
## 857 0 940 GasA TA Y SBrkr  
## 873 105 105 GasA Gd Y SBrkr  
## 906 412 1056 GasA TA Y SBrkr  
## 913 279 768 GasA TA N SBrkr  
## 919 422 1104 GasA Ex Y SBrkr  
## 936 600 600 GasA Gd Y SBrkr  
## 940 1032 1032 GasA Ex Y SBrkr  
## 946 0 1088 GasA TA Y SBrkr  
## 999 1007 1007 GasA Fa N SBrkr  
## 1002 691 691 GasA Ex Y FuseA  
## 1010 1008 1008 GasA Ex Y SBrkr  
## 1011 720 720 GasA TA Y SBrkr  
## 1013 602 602 GasA TA Y SBrkr  
## 1014 310 1022 GasW TA N SBrkr  
## 1023 588 912 GasA Gd Y FuseA  
## 1025 0 1565 GasA TA Y SBrkr  
## 1031 686 686 GasA Gd Y SBrkr  
## 1060 0 854 GasA TA Y SBrkr  
## 1061 722 1338 GasA Ex Y SBrkr  
## 1082 216 1040 GasA Fa Y SBrkr  
## 1093 758 1181 GasA Fa Y SBrkr  
## 1095 448 936 GasA Ex Y SBrkr  
## 1097 684 684 GasA TA Y SBrkr  
## 1098 1074 1074 GasA Ex Y SBrkr  
## 1104 0 655 GasA Ex Y SBrkr  
## 1120 671 1040 GasA TA Y FuseA  
## 1121 1012 1012 GasA TA Y FuseA  
## 1137 752 1032 GasA TA Y FuseA  
## 1138 780 780 GasA Gd N SBrkr  
## 1140 270 915 GasA TA Y SBrkr  
## 1149 572 572 GasA TA Y SBrkr  
## 1151 932 932 GasA Ex Y FuseA  
## 1153 230 1073 GasA Ex Y SBrkr  
## 1154 278 816 GasA Ex Y SBrkr  
## 1178 350 818 GasA TA Y SBrkr  
## 1179 731 731 GasA Ex Y SBrkr  
## 1180 0 0 GasA Gd Y SBrkr  
## 1186 392 784 GasA Gd Y SBrkr  
## 1188 168 1624 GasA Ex Y SBrkr  
## 1193 702 702 GasA Gd Y SBrkr  
## 1198 815 815 GasA Ex Y SBrkr  
## 1203 884 884 GasA Ex Y SBrkr  
## 1231 652 1361 GasA Ex Y SBrkr  
## 1249 416 735 OthW Fa N SBrkr  
## 1264 764 764 GasA Ex Y FuseA  
## 1267 925 925 GasA TA N FuseF  
## 1275 661 661 GasA Ex Y SBrkr  
## 1280 698 698 GasA TA Y FuseA  
## 1285 804 804 GasA Ex Y SBrkr  
## 1297 344 1120 GasA Gd Y SBrkr  
## 1311 496 1902 GasA TA Y SBrkr  
## 1326 796 796 GasA Fa N SBrkr  
## 1327 0 544 GasA Ex Y SBrkr  
## 1334 803 803 GasA Ex Y SBrkr  
## 1346 710 960 GasA Gd Y FuseA  
## 1350 425 684 OthW Fa N SBrkr  
## 1361 612 612 GasA Ex Y SBrkr  
## 1371 420 840 GasA Ex Y SBrkr  
## 1381 661 864 GasA TA N FuseF  
## 1383 596 596 GasA Ex Y SBrkr  
## 1384 816 816 GasA Ex Y SBrkr  
## 1394 482 482 GasA Ex N SBrkr  
## 1397 60 747 GasA TA Y SBrkr  
## 1398 939 939 GasA Ex Y SBrkr  
## 1399 676 1208 GasA Gd Y FuseA  
## 1401 862 862 GasA TA Y SBrkr  
## 1405 672 672 GasA TA Y SBrkr  
## 1417 777 777 GasA Gd Y SBrkr  
## 1420 734 1844 GasA Gd Y SBrkr  
## 1429 278 788 GasA TA Y SBrkr  
## 1430 762 1440 GasA Ex Y SBrkr  
## 1439 312 912 GasA TA Y FuseA  
## 1440 114 539 GasA TA Y SBrkr  
## 1446 0 814 GasA Gd Y SBrkr  
## 1459 0 1078 GasA Gd Y FuseA  
## X1stFlrSF X2ndFlrSF LowQualFinSF GrLivArea BsmtFullBath BsmtHalfBath  
## 4 961 756 0 1717 1 0  
## 8 1107 983 0 2090 1 0  
## 9 1022 752 0 1774 0 0  
## 15 1253 0 0 1253 1 0  
## 22 1108 0 0 1108 0 0  
## 30 520 0 0 520 0 0  
## 31 649 668 0 1317 0 0  
## 49 736 716 0 1452 0 0  
## 59 1426 1519 0 2945 0 0  
## 62 581 530 0 1111 0 0  
## 64 902 808 0 1710 0 0  
## 70 1304 983 0 2287 0 0  
## 75 840 765 0 1605 0 0  
## 80 682 548 0 1230 0 0  
## 89 1013 0 513 1526 0 0  
## 93 964 0 0 964 1 0  
## 99 835 0 0 835 0 0  
## 109 997 520 0 1517 0 0  
## 114 2259 0 0 2259 1 0  
## 117 1092 0 0 1092 0 1  
## 122 772 351 0 1123 0 0  
## 135 1721 0 0 1721 0 0  
## 155 1200 0 0 1200 0 0  
## 156 572 524 0 1096 0 0  
## 165 1149 467 0 1616 0 0  
## 176 2158 0 0 2158 1 0  
## 180 968 0 0 968 0 0  
## 182 901 901 0 1802 0 0  
## 198 1360 1360 392 3112 1 1  
## 199 929 929 371 2229 0 0  
## 203 865 445 0 1310 0 0  
## 211 864 0 0 864 1 0  
## 218 810 518 0 1328 0 0  
## 219 1137 817 0 1954 0 1  
## 231 1194 0 0 1194 1 0  
## 232 1490 1304 0 2794 1 0  
## 243 889 551 0 1440 0 0  
## 247 908 1020 0 1928 0 0  
## 261 1382 0 0 1382 1 0  
## 285 1575 0 0 1575 1 0  
## 307 1122 1121 0 2243 1 0  
## 315 832 809 0 1641 0 1  
## 319 1372 1274 0 2646 1 0  
## 326 803 0 0 803 0 0  
## 329 1445 689 0 2134 0 0  
## 330 596 596 0 1192 0 0  
## 342 841 0 0 841 0 0  
## 355 1192 403 0 1595 0 0  
## 359 1352 0 0 1352 0 1  
## 363 495 1427 0 1922 0 0  
## 366 672 672 0 1344 0 0  
## 381 1026 665 0 1691 0 0  
## 384 784 0 0 784 0 0  
## 391 961 406 0 1367 1 0  
## 408 840 840 0 1680 0 0  
## 414 1028 0 0 1028 0 0  
## 420 1056 0 0 1056 1 0  
## 426 707 682 0 1389 0 0  
## 430 1412 0 0 1412 1 0  
## 438 904 0 0 904 0 0  
## 439 694 0 0 694 0 0  
## 457 624 720 0 1344 0 0  
## 460 979 224 0 1203 1 0  
## 463 864 0 0 864 0 0  
## 486 1113 0 0 1113 0 0  
## 492 958 620 0 1578 1 0  
## 495 886 0 0 886 0 0  
## 496 720 0 0 720 0 0  
## 497 3228 0 0 3228 1 0  
## 503 1214 0 0 1214 1 0  
## 509 689 689 0 1378 0 0  
## 514 1080 0 0 1080 0 0  
## 515 789 0 0 789 0 0  
## 521 694 600 0 1294 0 0  
## 523 1004 660 0 1664 0 0  
## 527 928 0 0 928 0 0  
## 529 605 0 0 605 1 0  
## 532 751 611 0 1362 0 0  
## 536 820 527 0 1347 1 0  
## 556 1048 0 0 1048 0 0  
## 558 897 439 0 1336 0 0  
## 566 841 806 0 1647 1 0  
## 576 832 384 0 1216 0 0  
## 578 1320 0 0 1320 1 0  
## 585 989 584 0 1573 0 0  
## 587 838 0 0 838 1 0  
## 610 1029 0 0 1029 1 0  
## 621 864 0 0 864 1 0  
## 627 1422 0 0 1422 0 0  
## 628 1520 0 0 1520 1 0  
## 631 1089 661 0 1750 0 0  
## 639 796 0 0 796 0 0  
## 646 981 0 0 981 1 0  
## 649 1051 788 0 1839 0 0  
## 654 756 713 0 1469 0 0  
## 658 851 651 0 1502 0 0  
## 661 1142 793 0 1935 0 0  
## 663 1392 0 0 1392 1 0  
## 664 1181 0 0 1181 1 0  
## 670 1180 0 0 1180 0 0  
## 677 1095 679 0 1774 1 0  
## 678 792 0 0 792 0 0  
## 682 848 672 0 1520 0 0  
## 694 1073 0 0 1073 0 0  
## 697 616 0 0 616 0 0  
## 704 1032 780 0 1812 0 0  
## 712 859 319 0 1178 0 0  
## 717 1576 978 0 2554 0 0  
## 719 1325 1093 0 2418 1 0  
## 721 1742 0 0 1742 1 0  
## 730 848 0 360 1208 0 0  
## 741 768 664 0 1432 0 0  
## 745 1337 0 0 1337 1 0  
## 748 1320 1320 0 2640 0 0  
## 749 1720 0 0 1720 1 0  
## 750 1088 441 0 1529 0 0  
## 767 980 734 0 1714 0 0  
## 768 983 767 0 1750 1 0  
## 785 742 742 0 1484 0 0  
## 787 966 686 0 1652 1 0  
## 800 981 787 0 1768 1 0  
## 801 616 1072 0 1688 1 0  
## 814 1442 0 0 1442 0 0  
## 815 686 564 0 1250 0 1  
## 817 1008 0 0 1008 0 0  
## 822 936 0 0 936 0 0  
## 827 784 0 0 784 1 0  
## 837 1559 0 0 1559 1 0  
## 841 810 672 0 1482 0 0  
## 842 958 581 0 1539 0 0  
## 845 876 540 0 1416 0 0  
## 847 1006 769 0 1775 1 0  
## 857 1026 0 0 1026 1 0  
## 873 910 0 0 910 0 0  
## 906 1063 0 0 1063 1 0  
## 913 1015 0 0 1015 0 0  
## 919 912 1215 0 2127 1 0  
## 936 747 0 0 747 0 0  
## 940 1207 1196 0 2403 0 0  
## 946 1188 561 120 1869 0 0  
## 999 1077 0 0 1077 0 0  
## 1002 691 0 0 691 0 0  
## 1010 1008 0 514 1522 0 0  
## 1011 720 551 0 1271 0 0  
## 1013 900 602 0 1502 0 0  
## 1014 1022 0 0 1022 1 0  
## 1023 912 336 0 1248 0 0  
## 1025 2898 0 0 2898 1 0  
## 1031 948 980 0 1928 0 0  
## 1060 1096 895 0 1991 0 0  
## 1061 1338 0 0 1338 1 0  
## 1082 1040 0 0 1040 1 0  
## 1093 1390 304 0 1694 0 0  
## 1095 936 0 0 936 1 0  
## 1097 773 582 0 1355 0 0  
## 1098 1088 0 0 1088 0 0  
## 1104 1194 0 0 1194 0 1  
## 1120 1040 0 0 1040 0 0  
## 1121 1012 0 0 1012 0 0  
## 1137 1032 220 0 1252 0 0  
## 1138 780 240 0 1020 0 0  
## 1140 1167 0 0 1167 0 0  
## 1149 572 539 0 1111 0 0  
## 1151 932 0 0 932 0 0  
## 1153 1811 0 0 1811 0 0  
## 1154 816 0 0 816 0 0  
## 1178 818 406 0 1224 0 0  
## 1179 820 523 0 1343 0 0  
## 1180 1124 0 0 1124 0 0  
## 1186 949 272 0 1221 1 0  
## 1188 1624 0 0 1624 1 0  
## 1193 842 630 0 1472 0 0  
## 1198 815 875 0 1690 0 0  
## 1203 884 464 0 1348 1 0  
## 1231 1361 1259 0 2620 0 0  
## 1249 1134 924 0 2058 0 0  
## 1264 1060 764 0 1824 0 0  
## 1267 964 925 0 1889 0 0  
## 1275 661 589 0 1250 0 0  
## 1280 698 430 0 1128 0 0  
## 1285 1699 748 0 2447 0 0  
## 1297 1128 0 0 1128 1 0  
## 1311 1902 0 0 1902 1 0  
## 1326 796 0 0 796 0 0  
## 1327 774 0 0 774 0 0  
## 1334 803 557 0 1360 0 0  
## 1346 960 0 0 960 0 0  
## 1350 938 1215 205 2358 0 0  
## 1361 990 1611 0 2601 0 0  
## 1371 840 534 0 1374 0 0  
## 1381 864 0 0 864 1 0  
## 1383 998 764 0 1762 1 0  
## 1384 1416 0 0 1416 0 0  
## 1394 1221 691 0 1912 0 0  
## 1397 1687 0 0 1687 1 0  
## 1398 939 574 0 1513 0 0  
## 1399 1136 768 0 1904 1 0  
## 1401 950 208 0 1158 0 0  
## 1405 694 520 0 1214 0 0  
## 1417 1246 1044 0 2290 0 0  
## 1420 1844 0 0 1844 1 0  
## 1429 804 0 0 804 1 0  
## 1430 1440 0 0 1440 0 0  
## 1439 1236 0 0 1236 1 0  
## 1440 1040 685 0 1725 0 0  
## 1446 913 0 0 913 1 0  
## 1459 1078 0 0 1078 1 0  
## FullBath HalfBath BedroomAbvGr KitchenAbvGr KitchenQual TotRmsAbvGrd  
## 4 1 0 3 1 Gd 7  
## 8 2 1 3 1 TA 7  
## 9 2 0 2 2 TA 8  
## 15 1 1 2 1 TA 5  
## 22 1 0 3 1 Gd 6  
## 30 1 0 1 1 Fa 4  
## 31 1 0 3 1 TA 6  
## 49 2 0 2 3 TA 8  
## 59 3 1 3 1 Gd 10  
## 62 1 0 3 1 Fa 6  
## 64 2 0 3 1 TA 9  
## 70 2 0 3 1 TA 7  
## 75 2 0 3 2 TA 8  
## 80 1 1 2 1 TA 5  
## 89 1 0 2 1 Fa 6  
## 93 1 0 2 1 TA 5  
## 99 1 0 2 1 TA 5  
## 109 2 0 3 1 Fa 7  
## 114 2 0 3 1 Gd 7  
## 117 1 0 3 1 TA 6  
## 122 1 0 3 1 TA 4  
## 135 2 1 3 1 TA 7  
## 155 1 0 4 1 TA 7  
## 156 1 0 2 1 TA 5  
## 165 2 0 3 1 Gd 5  
## 176 2 0 4 1 Gd 7  
## 180 1 0 2 1 TA 5  
## 182 1 1 4 1 TA 9  
## 198 2 0 4 1 Gd 8  
## 199 1 0 5 1 TA 8  
## 203 2 0 2 1 TA 6  
## 211 1 0 2 1 TA 5  
## 218 1 0 3 1 TA 8  
## 219 1 1 3 1 Gd 8  
## 231 1 0 3 1 TA 6  
## 232 2 1 4 1 Ex 9  
## 243 1 0 3 1 TA 6  
## 247 2 0 4 2 Fa 9  
## 261 1 0 3 1 TA 6  
## 285 2 0 2 1 Gd 5  
## 307 2 1 4 1 Gd 8  
## 315 1 1 3 1 Ex 6  
## 319 2 1 4 1 Gd 9  
## 326 1 0 2 1 TA 5  
## 329 2 0 5 1 Gd 10  
## 330 1 0 3 1 TA 6  
## 342 1 0 2 1 TA 4  
## 355 1 0 2 1 TA 6  
## 359 1 0 3 1 Gd 6  
## 363 3 0 4 1 Gd 7  
## 366 1 0 3 1 TA 6  
## 381 2 0 3 1 Gd 6  
## 384 1 0 2 1 TA 5  
## 391 1 0 4 1 TA 7  
## 408 2 0 4 1 TA 8  
## 414 1 0 2 1 TA 5  
## 420 1 0 3 1 TA 6  
## 426 1 1 3 1 TA 6  
## 430 2 0 3 1 Gd 6  
## 438 1 0 2 1 TA 4  
## 439 1 0 2 1 Gd 4  
## 457 1 0 4 1 TA 7  
## 460 1 0 3 1 Gd 5  
## 463 1 0 3 1 TA 5  
## 486 1 0 3 1 Gd 5  
## 492 1 0 3 1 Fa 5  
## 495 1 0 2 1 TA 4  
## 496 1 0 2 1 TA 4  
## 497 3 0 4 1 Gd 10  
## 503 1 0 2 1 TA 6  
## 509 2 0 3 1 Gd 7  
## 514 1 1 3 1 TA 5  
## 515 1 0 2 1 TA 5  
## 521 2 0 3 2 TA 7  
## 523 2 0 3 1 TA 7  
## 527 1 0 2 1 TA 4  
## 529 1 0 2 1 TA 5  
## 532 2 0 3 1 TA 6  
## 536 1 0 3 1 TA 5  
## 556 1 0 2 1 TA 5  
## 558 1 1 3 1 TA 7  
## 566 1 1 4 1 Fa 6  
## 576 1 0 2 1 TA 6  
## 578 1 0 3 1 TA 6  
## 585 1 0 3 1 Gd 6  
## 587 1 0 2 1 Fa 5  
## 610 1 0 3 1 TA 5  
## 621 1 0 2 1 TA 5  
## 627 1 0 3 1 TA 6  
## 628 1 0 3 1 TA 7  
## 631 1 0 3 1 Ex 8  
## 639 1 0 2 1 TA 4  
## 646 1 1 3 1 TA 5  
## 649 1 1 4 1 TA 7  
## 654 1 0 3 1 TA 7  
## 658 1 1 3 1 TA 6  
## 661 2 1 3 1 TA 7  
## 663 1 0 2 1 TA 5  
## 664 2 0 3 1 TA 6  
## 670 1 0 2 1 Fa 5  
## 677 2 0 4 2 TA 8  
## 678 1 0 2 1 Gd 5  
## 682 1 0 3 1 TA 6  
## 694 1 0 2 1 TA 4  
## 697 1 0 2 1 TA 4  
## 704 2 0 4 2 Gd 8  
## 712 1 0 2 1 TA 7  
## 717 1 1 3 1 TA 8  
## 719 2 1 3 1 Gd 9  
## 721 2 0 2 1 Gd 5  
## 730 1 0 2 1 TA 5  
## 741 2 0 2 1 TA 7  
## 745 2 0 2 1 Gd 5  
## 748 1 1 4 1 Gd 8  
## 749 2 0 3 1 Gd 7  
## 750 2 0 4 1 TA 9  
## 767 2 1 3 1 TA 7  
## 768 2 0 4 1 TA 7  
## 785 2 0 3 1 TA 9  
## 787 2 0 4 1 TA 7  
## 800 1 1 3 1 Gd 7  
## 801 2 1 4 1 Gd 8  
## 814 1 1 4 1 TA 7  
## 815 1 1 3 1 Fa 7  
## 817 1 0 2 1 TA 4  
## 822 1 0 2 1 TA 4  
## 827 1 0 2 1 Gd 5  
## 837 1 0 2 1 TA 5  
## 841 2 0 4 1 Fa 7  
## 842 2 0 3 1 Gd 8  
## 845 1 1 4 1 TA 7  
## 847 2 1 3 1 Gd 7  
## 857 1 0 3 1 TA 5  
## 873 1 0 3 1 Gd 5  
## 906 1 0 3 1 TA 6  
## 913 1 0 3 1 TA 6  
## 919 2 1 4 1 Gd 8  
## 936 1 0 1 1 TA 5  
## 940 2 0 4 1 TA 10  
## 946 1 0 2 1 TA 7  
## 999 1 0 3 1 TA 6  
## 1002 1 0 2 1 Ex 4  
## 1010 2 0 4 1 TA 7  
## 1011 2 0 4 1 TA 7  
## 1013 1 1 3 1 Gd 7  
## 1014 1 0 2 1 TA 4  
## 1023 1 0 2 1 TA 6  
## 1025 2 0 2 1 Gd 10  
## 1031 2 0 5 2 TA 10  
## 1060 1 1 3 1 TA 7  
## 1061 2 0 2 1 Gd 6  
## 1082 1 1 3 1 TA 5  
## 1093 2 0 4 1 TA 7  
## 1095 1 0 2 1 TA 4  
## 1097 1 1 3 1 Gd 7  
## 1098 1 1 2 1 Gd 5  
## 1104 1 0 3 1 TA 6  
## 1120 1 0 3 1 TA 6  
## 1121 1 0 2 1 TA 6  
## 1137 1 0 3 1 TA 6  
## 1138 1 0 2 1 TA 6  
## 1140 1 0 3 1 TA 6  
## 1149 1 0 2 1 TA 5  
## 1151 1 0 2 1 Gd 4  
## 1153 1 0 2 1 Ex 6  
## 1154 1 0 2 1 TA 5  
## 1178 1 0 3 1 TA 5  
## 1179 1 1 3 1 TA 7  
## 1180 1 0 3 1 TA 5  
## 1186 1 0 4 1 TA 7  
## 1188 2 0 2 1 Gd 5  
## 1193 1 0 3 1 Gd 6  
## 1198 1 0 3 1 TA 7  
## 1203 1 0 3 1 TA 5  
## 1231 2 2 4 2 TA 12  
## 1249 1 1 3 1 TA 8  
## 1264 1 0 3 1 TA 8  
## 1267 1 1 4 2 TA 9  
## 1275 2 0 3 1 TA 8  
## 1280 1 0 2 1 TA 6  
## 1285 2 0 4 1 Gd 10  
## 1297 2 0 3 1 TA 6  
## 1311 2 0 3 1 Ex 7  
## 1326 1 0 2 1 TA 5  
## 1327 1 0 3 1 Gd 6  
## 1334 1 1 2 1 Gd 6  
## 1346 1 0 2 1 Fa 5  
## 1350 2 0 4 1 TA 8  
## 1361 3 1 4 1 TA 8  
## 1371 1 0 2 1 TA 6  
## 1381 1 0 2 1 TA 5  
## 1383 1 1 4 1 Gd 8  
## 1384 2 0 3 1 Gd 7  
## 1394 2 0 3 2 TA 7  
## 1397 1 0 3 1 TA 7  
## 1398 1 1 4 1 TA 8  
## 1399 1 1 3 1 TA 7  
## 1401 1 0 3 1 TA 5  
## 1405 1 0 3 1 TA 6  
## 1417 2 0 4 2 TA 11  
## 1420 2 0 3 1 Gd 7  
## 1429 1 0 2 1 Gd 4  
## 1430 2 0 3 1 Gd 7  
## 1439 1 0 2 1 TA 6  
## 1440 2 1 3 1 TA 6  
## 1446 1 0 3 1 TA 6  
## 1459 1 0 2 1 Gd 5  
## Functional Fireplaces FireplaceQu GarageType GarageYrBlt GarageFinish  
## 4 Typ 1 Gd Detchd 1998 Unf  
## 8 Typ 2 TA Attchd 1973 RFn  
## 9 Min1 2 TA Detchd 1931 Unf  
## 15 Typ 1 Fa Attchd 1960 RFn  
## 22 Typ 1 Gd Attchd 1930 Unf  
## 30 Typ 0 NoF Detchd 1920 Unf  
## 31 Typ 0 NoF Detchd 1920 Unf  
## 49 Typ 0 NoF NoG NoG NoG  
## 59 Typ 1 Gd BuiltIn 2006 Fin  
## 62 Typ 0 NoF Detchd 1935 Unf  
## 64 Typ 0 NoF Detchd 1990 Unf  
## 70 Typ 1 TA Attchd 1953 Fin  
## 75 Typ 0 NoF Detchd 1915 Unf  
## 80 Typ 0 NoF Detchd 1966 Unf  
## 89 Typ 0 NoF NoG NoG NoG  
## 93 Typ 0 NoF Detchd 1921 Unf  
## 99 Typ 0 NoF Basment 1920 Unf  
## 109 Typ 0 NoF NoG NoG NoG  
## 114 Typ 2 Gd Basment 1953 Unf  
## 117 Typ 1 Po Attchd 1962 Unf  
## 122 Typ 0 NoF Detchd 1979 Unf  
## 135 Min1 1 TA Attchd 1968 RFn  
## 155 Typ 0 NoF Detchd 1923 Unf  
## 156 Typ 0 NoF NoG NoG NoG  
## 165 Typ 0 NoF Detchd 1926 Unf  
## 176 Typ 1 Gd Attchd 1950 Unf  
## 180 Typ 0 NoF Detchd 1935 Unf  
## 182 Typ 1 Gd Detchd 1920 Unf  
## 198 Typ 1 Ex Detchd 1918 Unf  
## 199 Typ 0 NoF NoG NoG NoG  
## 203 Min1 0 NoF Attchd 1924 Unf  
## 211 Typ 0 NoF NoG NoG NoG  
## 218 Typ 0 NoF Detchd 1940 Unf  
## 219 Typ 2 TA Attchd 1939 Unf  
## 231 Typ 0 NoF Attchd 1959 RFn  
## 232 Typ 1 TA Attchd 1995 Fin  
## 243 Typ 0 NoF Attchd 1940 Unf  
## 247 Typ 0 NoF Detchd 1910 Unf  
## 261 Typ 1 TA Attchd 1991 Unf  
## 285 Typ 0 NoF Attchd 1992 RFn  
## 307 Typ 1 TA Attchd 1990 RFn  
## 315 Typ 1 Gd Detchd 1925 Unf  
## 319 Typ 1 TA Attchd 1993 RFn  
## 326 Typ 0 NoF Detchd 1941 Unf  
## 329 Typ 0 NoF Detchd 1930 Unf  
## 330 Typ 0 NoF Detchd 1920 Unf  
## 342 Typ 0 NoF CarPort 1950 Unf  
## 355 Typ 2 Gd Attchd 1940 Unf  
## 359 Min2 0 NoF BuiltIn 1958 Unf  
## 363 Typ 1 Ex BuiltIn 2003 RFn  
## 366 Typ 0 NoF Detchd 1964 Unf  
## 381 Typ 1 Gd Detchd 1924 Unf  
## 384 Typ 0 NoF Detchd 1950 Unf  
## 391 Typ 0 NoF Detchd 1978 Unf  
## 408 Typ 0 NoF Attchd 1960 Unf  
## 414 Typ 1 Gd Detchd 1927 Unf  
## 420 Typ 1 Fa Attchd 1968 Unf  
## 426 Typ 2 Gd Detchd 1947 Unf  
## 430 Typ 1 TA Attchd 1988 Unf  
## 438 Typ 0 NoF Detchd 1926 Unf  
## 439 Typ 1 Gd Detchd 1990 Unf  
## 457 Typ 0 NoF Detchd 1916 Unf  
## 460 Typ 1 TA Detchd 1950 Unf  
## 463 Typ 1 Po Detchd 1965 Unf  
## 486 Typ 1 Gd Attchd 1950 Unf  
## 492 Typ 2 TA Attchd 1941 Unf  
## 495 Typ 0 NoF Attchd 1938 Unf  
## 496 Typ 0 NoF NoG NoG NoG  
## 497 Typ 1 Gd Attchd 1992 RFn  
## 503 Typ 0 NoF Detchd 1965 Unf  
## 509 Typ 1 Gd Detchd 1928 Unf  
## 514 Typ 0 NoF Attchd 1983 Unf  
## 515 Typ 0 NoF Detchd 1926 Unf  
## 521 Typ 0 NoF NoG NoG NoG  
## 523 Typ 2 Gd Detchd 1950 Unf  
## 527 Typ 0 NoF Attchd 1956 Unf  
## 529 Typ 0 NoF NoG NoG NoG  
## 532 Typ 0 NoF Detchd 1920 Fin  
## 536 Typ 0 NoF NoG NoG NoG  
## 556 Typ 1 Gd Detchd 1922 Unf  
## 558 Typ 0 NoF CarPort 1994 Unf  
## 566 Typ 0 NoF Detchd 1920 Unf  
## 576 Typ 0 NoF Detchd 1947 Unf  
## 578 Typ 2 Fa Attchd 1966 RFn  
## 585 Typ 0 NoF Detchd 1935 Unf  
## 587 Typ 0 NoF Detchd 1961 Fin  
## 610 Typ 0 NoF Attchd 1961 Unf  
## 621 Typ 0 NoF NoG NoG NoG  
## 627 Min1 1 TA Attchd 1960 RFn  
## 628 Typ 2 Gd Basment 1955 RFn  
## 631 Typ 0 NoF Detchd 1937 Unf  
## 639 Typ 0 NoF NoG NoG NoG  
## 646 Typ 0 NoF Detchd 1979 Unf  
## 649 Typ 1 TA Attchd 1966 Unf  
## 654 Typ 0 NoF Detchd 1906 Unf  
## 658 Typ 1 Gd Attchd 1931 RFn  
## 661 Typ 1 TA Attchd 1976 RFn  
## 663 Maj2 2 TA Attchd 1968 RFn  
## 664 Typ 0 NoF Detchd 1974 RFn  
## 670 Typ 1 Gd Detchd 1922 Unf  
## 677 Min2 0 NoF 2Types 1920 Unf  
## 678 Typ 0 NoF Detchd 1924 Unf  
## 682 Typ 0 NoF Detchd 1968 Unf  
## 694 Typ 0 NoF Detchd 1968 Unf  
## 697 Typ 0 NoF Detchd 1921 Unf  
## 704 Typ 1 Po Detchd 1999 Unf  
## 712 Typ 0 NoF Detchd 1964 RFn  
## 717 Typ 0 NoF Detchd 1996 Unf  
## 719 Typ 1 TA Attchd 1993 RFn  
## 721 Typ 1 TA Attchd 1985 RFn  
## 730 Typ 0 NoF Detchd 1962 Unf  
## 741 Typ 0 NoF Detchd 1910 Unf  
## 745 Typ 1 TA Attchd 1993 RFn  
## 748 Typ 1 Gd Detchd 1950 Unf  
## 749 Typ 1 TA Attchd 1996 Fin  
## 750 Mod 0 NoF Detchd 1945 Unf  
## 767 Typ 1 TA Attchd 1988 Unf  
## 768 Mod 0 NoF Attchd 1989 Unf  
## 785 Typ 1 Gd NoG NoG NoG  
## 787 Typ 0 NoF Detchd 1961 Unf  
## 800 Typ 2 TA Detchd 1939 Unf  
## 801 Typ 0 NoF Attchd 1997 RFn  
## 814 Typ 0 NoF Attchd 1958 RFn  
## 815 Typ 0 NoF Detchd 1955 Unf  
## 817 Typ 1 Gd Attchd 1954 RFn  
## 822 Min2 0 NoF Detchd 1974 Unf  
## 827 Typ 0 NoF NoG NoG NoG  
## 837 Min2 0 NoF Detchd 1948 Unf  
## 841 Typ 0 NoF Detchd 1934 Unf  
## 842 Typ 1 Po Detchd 1983 Unf  
## 845 Typ 1 Gd Detchd 1949 Unf  
## 847 Typ 1 TA Attchd 1993 Unf  
## 857 Typ 0 NoF Detchd 1981 Unf  
## 873 Typ 0 NoF Attchd 1953 Unf  
## 906 Typ 0 NoF Attchd 1954 RFn  
## 913 Min1 0 NoF Detchd 1925 Unf  
## 919 Typ 1 TA Attchd 1991 RFn  
## 936 Typ 0 NoF Detchd 1953 Unf  
## 940 Typ 2 TA Attchd 1940 Unf  
## 946 Typ 0 NoF Detchd 1963 Unf  
## 999 Typ 1 Gd Detchd 1922 Unf  
## 1002 Typ 0 NoF Detchd 1920 Unf  
## 1010 Typ 0 NoF NoG NoG NoG  
## 1011 Typ 1 Gd Attchd 1948 Unf  
## 1013 Typ 2 TA Detchd 1923 Unf  
## 1014 Maj2 0 NoF Detchd 1956 Unf  
## 1023 Typ 0 NoF Detchd 1957 Unf  
## 1025 Typ 1 Gd Attchd 1976 Fin  
## 1031 Typ 0 NoF NoG NoG NoG  
## 1060 Typ 1 Gd Detchd 1977 Unf  
## 1061 Typ 0 NoF Attchd 2001 Fin  
## 1082 Typ 0 NoF Attchd 1963 Fin  
## 1093 Typ 1 Gd Detchd 1925 Unf  
## 1095 Typ 0 NoF Attchd 1956 Fin  
## 1097 Typ 0 NoF NoG NoG NoG  
## 1098 Typ 0 NoF Attchd 1987 RFn  
## 1104 Typ 1 Fa BuiltIn 1954 Fin  
## 1120 Typ 0 NoF Attchd 1959 RFn  
## 1121 Typ 1 Gd Detchd 1920 Unf  
## 1137 Typ 0 NoF Attchd 1950 Unf  
## 1138 Typ 0 NoF NoG NoG NoG  
## 1140 Maj1 1 Gd Detchd 1972 Unf  
## 1149 Typ 1 Gd Detchd 1982 Unf  
## 1151 Typ 1 Gd Attchd 1950 Unf  
## 1153 Typ 1 Gd Attchd 1956 Fin  
## 1154 Typ 0 NoF Detchd 2002 Unf  
## 1178 Typ 0 NoF Detchd 1926 Unf  
## 1179 Typ 1 Gd Detchd 1921 Unf  
## 1180 Min2 1 Gd NoG NoG NoG  
## 1186 Typ 0 NoF Attchd 1965 Unf  
## 1188 Typ 1 Fa Attchd 1994 RFn  
## 1193 Typ 0 NoF Detchd 1925 Unf  
## 1198 Typ 1 Gd Detchd 1916 Unf  
## 1203 Typ 1 Fa Detchd 1960 Unf  
## 1231 Typ 1 TA BuiltIn 1977 RFn  
## 1249 Typ 1 Gd Detchd 1950 Unf  
## 1264 Typ 1 Gd Detchd 1940 Unf  
## 1267 Typ 1 Gd Detchd 1960 Unf  
## 1275 Typ 1 Gd Detchd 1985 Unf  
## 1280 Typ 0 NoF Detchd 1980 RFn  
## 1285 Min2 1 Gd Detchd 1969 Unf  
## 1297 Typ 0 NoF Attchd 1963 RFn  
## 1311 Typ 2 TA Attchd 1959 Fin  
## 1326 Typ 0 NoF NoG NoG NoG  
## 1327 Typ 0 NoF NoG NoG NoG  
## 1334 Typ 0 NoF Detchd 1951 Unf  
## 1346 Typ 0 NoF Detchd 1997 Unf  
## 1350 Typ 0 NoF NoG NoG NoG  
## 1361 Typ 0 NoF BuiltIn 1998 RFn  
## 1371 Typ 0 NoF Detchd 1967 Fin  
## 1381 Typ 0 NoF Detchd 1938 Unf  
## 1383 Typ 0 NoF Detchd 1989 Unf  
## 1384 Typ 0 NoF Attchd 2007 Unf  
## 1394 Typ 1 TA Detchd 2003 Unf  
## 1397 Min1 2 TA Detchd 1966 Unf  
## 1398 Typ 0 NoF Detchd 1933 Unf  
## 1399 Min1 0 NoF Attchd 1950 Unf  
## 1401 Typ 1 Gd BuiltIn 1929 RFn  
## 1405 Typ 0 NoF Detchd 1998 Unf  
## 1417 Typ 0 NoF Detchd 1971 Unf  
## 1420 Typ 1 TA Attchd 1969 RFn  
## 1429 Typ 2 Gd Attchd 1940 Unf  
## 1430 Typ 1 TA Attchd 1981 Fin  
## 1439 Typ 0 NoF Attchd 1957 Unf  
## 1440 Typ 1 TA Attchd 1979 RFn  
## 1446 Typ 0 NoF Detchd 1990 Unf  
## 1459 Typ 0 NoF Attchd 1950 Unf  
## GarageCars GarageArea GarageQual GarageCond PavedDrive WoodDeckSF  
## 4 3 642 TA TA Y 0  
## 8 2 484 TA TA Y 235  
## 9 2 468 Fa TA Y 90  
## 15 1 352 TA TA Y 0  
## 22 1 280 TA TA N 0  
## 30 1 240 Fa TA Y 49  
## 31 1 250 TA Fa N 0  
## 49 0 0 NoG NoG N 0  
## 59 3 641 TA TA Y 192  
## 62 1 288 TA TA N 0  
## 64 2 480 TA TA Y 12  
## 70 2 667 TA TA Y 0  
## 75 1 379 TA TA Y 0  
## 80 2 440 TA TA Y 74  
## 89 0 0 NoG NoG N 0  
## 93 2 432 TA TA Y 0  
## 99 1 366 Fa TA Y 0  
## 109 0 0 NoG NoG N 0  
## 114 2 450 TA TA Y 166  
## 117 1 288 TA TA Y 0  
## 122 1 264 TA TA P 0  
## 135 2 440 TA TA Y 0  
## 155 1 312 Fa Fa Y 0  
## 156 0 0 NoG NoG N 0  
## 165 1 216 TA TA Y 0  
## 176 2 576 TA TA Y 0  
## 180 2 480 Fa TA N 0  
## 182 1 216 Fa TA Y 0  
## 198 2 795 TA TA Y 0  
## 199 0 0 NoG NoG Y 0  
## 203 1 398 TA TA Y 0  
## 211 0 0 NoG NoG Y 0  
## 218 1 210 TA TA Y 0  
## 219 2 431 TA TA Y 0  
## 231 1 312 TA TA Y 0  
## 232 3 810 TA TA Y 0  
## 243 1 352 Fa TA Y 0  
## 247 1 440 Po Po Y 0  
## 261 2 884 TA TA Y 0  
## 285 2 529 TA TA Y 0  
## 307 3 746 TA TA Y 127  
## 315 2 546 Fa TA Y 0  
## 319 3 656 TA TA Y 340  
## 326 2 360 TA TA Y 0  
## 329 2 441 TA TA Y 0  
## 330 1 189 Fa Fa N 0  
## 342 1 294 TA TA N 250  
## 355 1 240 TA TA Y 0  
## 359 1 288 TA TA Y 168  
## 363 2 672 TA TA Y 0  
## 366 1 468 TA Fa Y 0  
## 381 1 308 TA TA Y 0  
## 384 2 360 Fa Fa N 0  
## 391 1 384 TA TA Y 0  
## 408 1 308 TA TA Y 0  
## 414 2 360 TA TA Y 0  
## 420 1 304 TA TA Y 0  
## 426 1 240 TA TA P 0  
## 430 2 576 TA TA Y 0  
## 438 1 180 TA TA Y 0  
## 439 1 352 Gd TA P 0  
## 457 3 513 Fa Fa Y 0  
## 460 1 352 TA TA Y 0  
## 463 1 360 TA TA Y 0  
## 486 1 264 TA TA Y 0  
## 492 1 240 TA TA Y 0  
## 495 1 273 TA TA Y 144  
## 496 0 0 NoG NoG N 0  
## 497 2 546 TA TA Y 264  
## 503 2 461 Fa Fa Y 0  
## 509 2 360 TA TA N 0  
## 514 2 484 TA TA Y 120  
## 515 1 200 Po Po Y 0  
## 521 0 0 NoG NoG N 220  
## 523 2 420 TA TA Y 0  
## 527 1 252 TA TA Y 261  
## 529 0 0 NoG NoG N 0  
## 532 2 502 TA Fa Y 0  
## 536 0 0 NoG NoG N 85  
## 556 1 280 TA TA Y 0  
## 558 1 570 TA TA Y 0  
## 566 1 216 TA TA Y 0  
## 576 1 336 TA TA Y 158  
## 578 2 564 TA TA Y 160  
## 585 1 240 TA TA Y 0  
## 587 1 275 TA TA N 0  
## 610 1 261 TA TA Y 64  
## 621 0 0 NoG NoG N 0  
## 627 1 286 TA TA Y 0  
## 628 1 364 TA TA Y 0  
## 631 1 240 Fa Po N 0  
## 639 0 0 NoG NoG P 328  
## 646 2 576 TA TA Y 0  
## 649 2 442 TA TA Y 0  
## 654 1 216 TA TA Y 57  
## 658 1 270 TA TA P 0  
## 661 2 550 TA TA Y 0  
## 663 2 576 TA TA Y 0  
## 664 2 588 TA TA Y 0  
## 670 1 252 TA Fa Y 0  
## 677 3 779 Fa Fa N 0  
## 678 1 240 Fa Fa N 316  
## 682 1 281 TA TA Y 0  
## 694 1 326 TA TA Y 0  
## 697 1 205 TA TA Y 0  
## 704 2 672 TA TA N 344  
## 712 1 384 TA TA N 68  
## 717 2 704 TA TA P 0  
## 719 3 983 TA TA Y 250  
## 721 2 564 TA TA Y 114  
## 730 2 539 TA TA Y 0  
## 741 2 360 TA Gd Y 270  
## 745 2 462 TA TA Y 96  
## 748 4 864 TA TA N 181  
## 749 2 527 TA TA Y 240  
## 750 1 240 TA TA N 92  
## 767 2 496 TA TA Y 228  
## 768 1 423 TA TA Y 245  
## 785 0 0 NoG NoG Y 0  
## 787 1 416 TA TA Y 0  
## 800 1 240 TA TA Y 0  
## 801 2 603 TA TA Y 403  
## 814 1 301 TA TA Y 0  
## 815 1 280 TA TA P 207  
## 817 1 275 TA TA Y 0  
## 822 2 576 TA TA Y 0  
## 827 0 0 NoG NoG Y 0  
## 837 2 812 TA TA Y 0  
## 841 1 400 TA TA P 0  
## 842 2 686 Gd TA P 70  
## 845 3 720 TA TA Y 418  
## 847 2 425 TA TA Y 234  
## 857 2 576 TA Fa Y 0  
## 873 2 414 TA TA Y 196  
## 906 1 280 TA TA Y 0  
## 913 1 450 TA TA Y 0  
## 919 3 833 TA TA Y 72  
## 936 2 528 TA TA Y 0  
## 940 1 349 TA TA Y 56  
## 946 2 456 TA TA Y 48  
## 999 1 210 TA Fa P 0  
## 1002 1 216 Fa TA N 0  
## 1010 0 0 NoG NoG P 0  
## 1011 1 312 TA TA Y 0  
## 1013 1 180 TA TA Y 96  
## 1014 1 280 TA TA Y 0  
## 1023 1 160 Fa Fa Y 0  
## 1025 2 665 TA TA Y 0  
## 1031 0 0 NoG NoG N 0  
## 1060 2 432 TA Fa Y 0  
## 1061 2 582 TA TA Y 0  
## 1082 1 308 TA TA Y 0  
## 1093 2 576 TA TA Y 342  
## 1095 1 308 TA TA Y 0  
## 1097 0 0 NoG NoG Y 136  
## 1098 2 461 TA TA Y 0  
## 1104 2 539 TA TA Y 0  
## 1120 1 286 TA TA Y 140  
## 1121 1 308 TA TA Y 0  
## 1137 1 288 TA TA Y 0  
## 1138 0 0 NoG NoG N 0  
## 1140 2 495 TA TA Y 0  
## 1149 1 288 TA TA Y 0  
## 1151 1 306 TA TA Y 0  
## 1153 2 470 TA TA Y 0  
## 1154 1 432 TA TA Y 0  
## 1178 1 210 TA TA N 0  
## 1179 1 186 Fa TA Y 192  
## 1180 0 0 NoG NoG N 0  
## 1186 1 392 TA TA Y 0  
## 1188 3 757 TA TA Y 0  
## 1193 1 250 TA Fa P 0  
## 1198 1 225 TA TA Y 0  
## 1203 1 216 TA TA N 0  
## 1231 2 600 TA TA N 155  
## 1249 2 396 Fa Fa P 0  
## 1264 2 520 TA TA N 0  
## 1267 1 308 TA TA N 0  
## 1275 2 552 TA TA Y 242  
## 1280 2 528 TA TA Y 30  
## 1285 1 336 TA TA Y 272  
## 1297 2 525 TA TA Y 192  
## 1311 2 567 TA TA Y 0  
## 1326 0 0 NoG NoG N 0  
## 1327 0 0 NoG NoG Y 0  
## 1334 1 297 TA TA Y 0  
## 1346 1 308 TA TA Y 0  
## 1350 0 0 NoG NoG Y 0  
## 1361 2 621 TA TA Y 183  
## 1371 1 338 TA TA Y 0  
## 1381 1 200 TA Fa Y 0  
## 1383 2 576 TA TA N 36  
## 1384 2 576 TA TA N 0  
## 1394 2 672 Gd TA Y 0  
## 1397 2 572 TA TA N 0  
## 1398 1 180 Fa Fa N 24  
## 1399 1 240 TA TA Y 0  
## 1401 1 208 TA TA Y 0  
## 1405 3 936 TA TA Y 216  
## 1417 2 560 TA TA N 0  
## 1420 2 540 TA TA Y 0  
## 1429 1 240 TA TA Y 0  
## 1430 2 467 TA TA Y 0  
## 1439 2 923 TA TA Y 0  
## 1440 2 550 TA TA Y 0  
## 1446 1 240 TA TA Y 0  
## 1459 1 240 TA TA Y 366  
## OpenPorchSF EnclosedPorch X3SsnPorch ScreenPorch PoolArea PoolQC  
## 4 35 272 0 0 0 NoP  
## 8 204 228 0 0 0 NoP  
## 9 0 205 0 0 0 NoP  
## 15 213 176 0 0 0 NoP  
## 22 0 205 0 0 0 NoP  
## 30 0 87 0 0 0 NoP  
## 31 54 172 0 0 0 NoP  
## 49 0 102 0 0 0 NoP  
## 59 0 37 0 0 0 NoP  
## 62 0 144 0 0 0 NoP  
## 64 11 64 0 0 0 NoP  
## 70 21 114 0 0 0 NoP  
## 75 0 202 0 0 0 NoP  
## 80 0 128 0 0 0 NoP  
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## 4 NoF NoM 0 2 2006 WD Abnorml  
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## 9 NoF NoM 0 4 2008 WD Abnorml  
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## 30 NoF NoM 0 5 2008 WD Normal  
## 31 MnPrv NoM 0 7 2008 WD Normal  
## 49 NoF NoM 0 6 2009 New Partial  
## 59 NoF NoM 0 10 2006 New Partial  
## 62 NoF NoM 0 3 2007 WD Normal  
## 64 GdPrv NoM 0 4 2010 WD Normal  
## 70 NoF NoM 0 7 2006 WD Normal  
## 75 NoF NoM 0 5 2010 WD Normal  
## 80 MnPrv NoM 0 5 2009 WD Normal  
## 89 MnPrv NoM 0 10 2009 ConLD Abnorml  
## 93 NoF NoM 0 8 2009 WD Normal  
## 99 NoF Shed 400 5 2010 COD Abnorml  
## 109 NoF NoM 0 8 2007 WD Normal  
## 114 MnPrv NoM 0 10 2007 COD Abnorml  
## 117 NoF NoM 0 9 2009 WD Normal  
## 122 MnPrv NoM 0 6 2007 WD Normal  
## 135 MnPrv NoM 0 7 2006 WD Normal  
## 155 NoF NoM 0 3 2006 WD Family  
## 156 NoF NoM 0 4 2008 WD Normal  
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## 176 MnPrv NoM 0 6 2007 WD Normal  
## 180 NoF NoM 0 7 2007 WD Normal  
## 182 NoF NoM 0 7 2006 WD Normal  
## 198 GdPrv NoM 0 3 2006 WD Abnorml  
## 199 MnPrv NoM 0 7 2009 WD Abnorml  
## 203 NoF NoM 0 5 2006 COD Normal  
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## 315 NoF NoM 0 8 2006 WD Normal  
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## 326 NoF NoM 0 12 2007 WD Normal  
## 329 NoF NoM 0 7 2009 WD Normal  
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## 496 GdWo NoM 0 11 2009 WD Abnorml  
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## 514 NoF NoM 0 6 2007 WD Normal  
## 515 MnPrv NoM 0 6 2007 WD Normal  
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## 682 NoF NoM 0 7 2009 WD Abnorml  
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## 704 MnPrv NoM 0 5 2010 WD Normal  
## 712 NoF NoM 0 1 2010 WD Abnorml  
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## 719 NoF NoM 0 8 2008 WD Normal  
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## 800 MnPrv NoM 0 6 2007 WD Normal  
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## 1138 NoF NoM 0 5 2010 WD Normal  
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## 1149 NoF NoM 0 8 2008 WD Normal  
## 1151 GdPrv NoM 0 11 2007 WD Normal  
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## 1193 GdWo NoM 0 7 2007 WD Normal  
## 1198 NoF NoM 0 7 2006 ConLw Normal  
## 1203 NoF NoM 0 5 2009 WD Normal  
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## 1275 NoF NoM 0 11 2007 WD Normal  
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## 64 140000  
## 70 225000  
## 75 107400  
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## 89 85000  
## 93 163500  
## 99 83000  
## 109 115000  
## 114 217000  
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## 122 100000  
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## 182 200100  
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## 232 403000  
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## 247 137000  
## 261 176000  
## 285 179200  
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## 503 140000  
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## 1383 157000  
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## 1417 122500  
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## 1429 119000  
## 1430 182900  
## 1439 149700  
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if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "X3SsnPorch"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_X3Ss = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



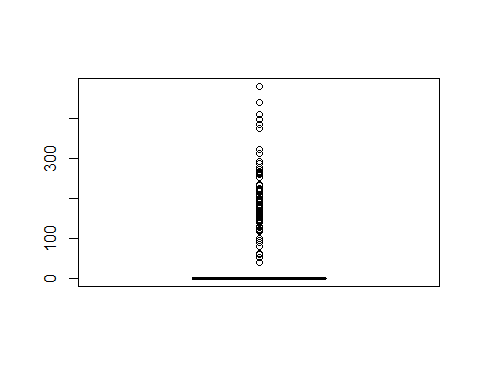
## [1] 24  
## [1] 320 407 130 180 168 180 140 508 238 245 196 144 144 182 168 162 23  
## [18] 168 216 96 216 153 290 304

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "ScreenPorch"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_screenPorch = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



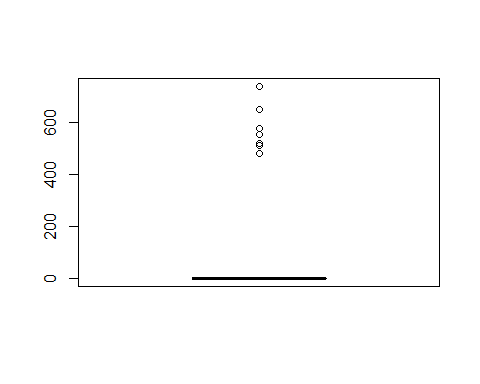
## [1] 116  
## [1] 176 198 291 252 99 184 168 130 142 192 410 224 266 170 154 153 144  
## [18] 142 128 259 160 198 271 234 184 374 192 185 182 90 144 224 396 170  
## [35] 176 140 276 192 180 161 168 145 200 122 95 144 120 60 120 126 189  
## [52] 260 147 385 287 200 156 100 180 216 210 197 204 192 225 192 152 175  
## [69] 126 312 222 265 224 322 120 190 233 63 147 180 53 143 189 189 189  
## [86] 192 160 160 126 100 273 180 90 288 263 224 147 120 80 163 90 288  
## [103] 116 259 224 216 480 120 178 440 155 168 220 119 165 40

if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "PoolArea"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_poolarea = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



## [1] 7  
## [1] 512 648 576 555 480 519 738

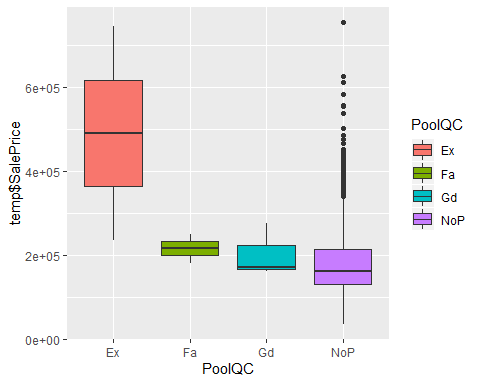
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "PoolQC"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 Ex 2  
## 2 Fa 2  
## 3 Gd 3  
## 4 NoP 1442

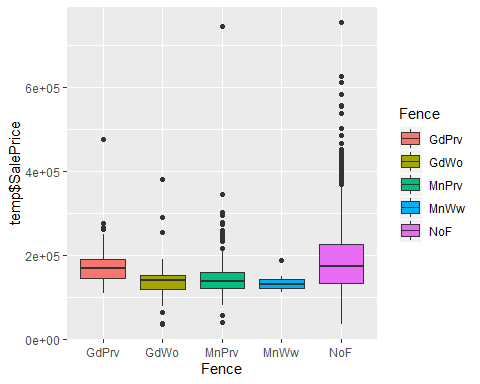
 Tooo big of a variance

attrib = attrib + 1  
colname[attrib]

## [1] "Fence"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 GdPrv 59  
## 2 GdWo 54  
## 3 MnPrv 156  
## 4 MnWw 11  
## 5 NoF 1169

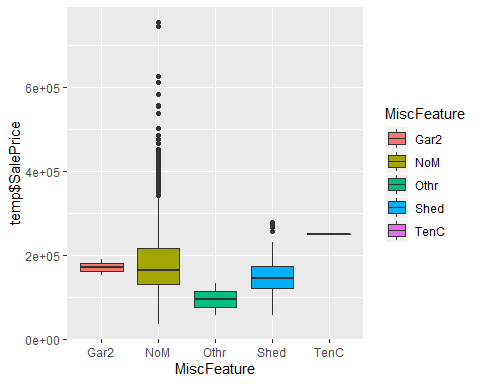


attrib = attrib + 1  
colname[attrib]

## [1] "MiscFeature"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
global = global + 1  
toremove[global] = attrib  
}

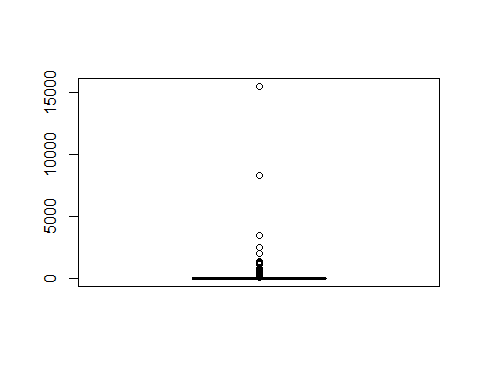
## Var1 Freq  
## 1 Gar2 2  
## 2 NoM 1395  
## 3 Othr 2  
## 4 Shed 49  
## 5 TenC 1



attrib = attrib + 1  
colname[attrib]

## [1] "MiscVal"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
outlier\_miscVal = subset(temp, temp[,attrib]>graph$stats[5]|temp[,attrib]<graph$stats[1])  
gg = gg+1  
outers[gg] = attrib  
}



## [1] 52  
## [1] 700 350 700 500 400 700 480 400 400 450 450  
## [12] 500 450 700 400 15500 1200 800 480 400 2000 2000  
## [23] 600 500 600 600 3500 500 400 450 500 1300 1200  
## [34] 500 400 54 500 400 400 2000 620 400 560 500  
## [45] 700 1400 400 8300 600 1150 2000 2500

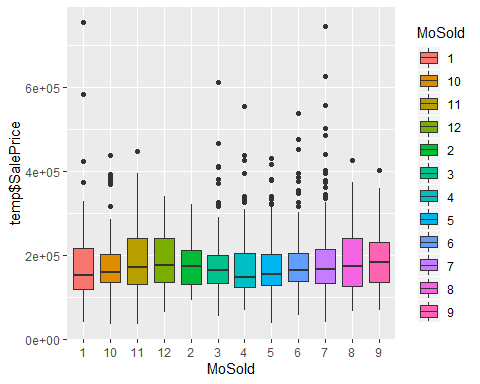
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
  
#global = global + 1  
#toremove[global] = attrib  
}

attrib = attrib + 1  
colname[attrib]

## [1] "MoSold"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 1 58  
## 2 10 89  
## 3 11 78  
## 4 12 58  
## 5 2 52  
## 6 3 104  
## 7 4 140  
## 8 5 201  
## 9 6 253  
## 10 7 233  
## 11 8 121  
## 12 9 62

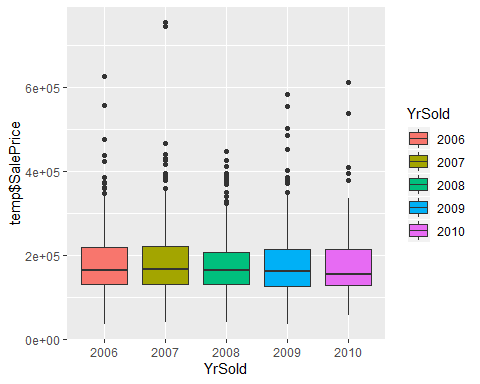


attrib = attrib + 1  
colname[attrib]

## [1] "YrSold"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 2006 313  
## 2 2007 327  
## 3 2008 299  
## 4 2009 336  
## 5 2010 174

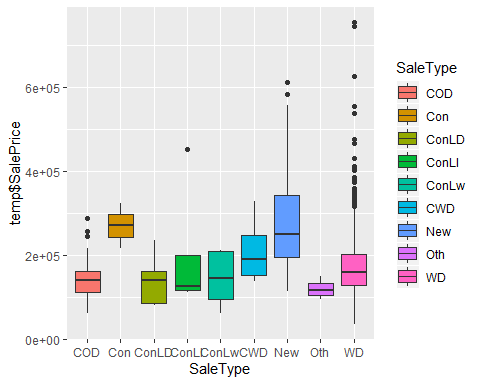


attrib = attrib + 1  
colname[attrib]

## [1] "SaleType"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
global = global + 1  
toremove[global] = attrib  
}

## Var1 Freq  
## 1 COD 43  
## 2 Con 2  
## 3 ConLD 9  
## 4 ConLI 5  
## 5 ConLw 5  
## 6 CWD 4  
## 7 New 119  
## 8 Oth 3  
## 9 WD 1259

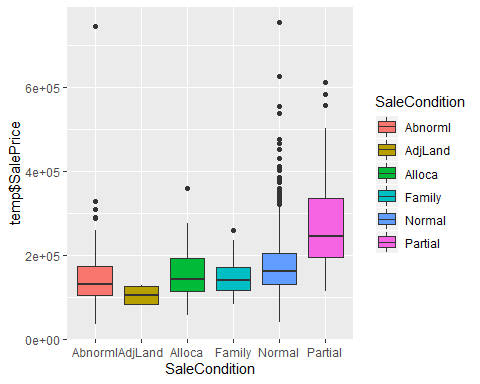
 To drop because of variance

attrib = attrib + 1  
colname[attrib]

## [1] "SaleCondition"

if (typeof(temp[,attrib]) == 'integer' ||(typeof(temp[,attrib]) == 'double')){  
graph = boxplot(temp[,attrib])  
print(length(graph$out))  
print(graph$out)  
outlierID = which(temp[,attrib]>graph$stats[5],)  
temp[outlierID,]  
  
}  
if (typeof(temp[,attrib]) == 'character'){  
print(as.data.frame(table(temp[,attrib])))  
print(ggplot(data = temp, aes(x=temp[,attrib], y=temp$SalePrice)) + geom\_boxplot(aes(fill = factor(temp[,attrib]) )) +scale\_x\_discrete(name = (colname[attrib])) + labs(fill = (colname[attrib])))  
  
#global = global + 1  
#toremove[global] = attrib  
}

## Var1 Freq  
## 1 Abnorml 101  
## 2 AdjLand 4  
## 3 Alloca 11  
## 4 Family 20  
## 5 Normal 1191  
## 6 Partial 122



Time to make some decisons.

print("The following attributes are under review to be removed:")

## [1] "The following attributes are under review to be removed:"

colname[toremove]

## [1] "MSZoning" "Street" "Alley" "LandContour" "Utilities"   
## [6] "LotConfig" "LandSlope" "Condition1" "Condition2" "BldgType"   
## [11] "RoofMatl" "BsmtCond" "Heating" "CentralAir" "Electrical"   
## [16] "Functional" "GarageQual" "GarageCond" "PavedDrive" "PoolQC"   
## [21] "Fence" "MiscFeature" "SaleType"

print("The following attributes have outliers that need to be addressed:")

## [1] "The following attributes have outliers that need to be addressed:"

colname[outers]

## [1] "LotFrontage" "LotArea" "YearBuilt" "MasVnrArea"   
## [5] "BsmtFinSF1" "BsmtFinSF2" "BsmtUnfSF" "TotalBsmtSF"   
## [9] "X1stFlrSF" "X2ndFlrSF" "LowQualFinSF" "GrLivArea"   
## [13] "GarageCars" "GarageArea" "WoodDeckSF" "OpenPorchSF"   
## [17] "X3SsnPorch" "ScreenPorch" "PoolArea" "MiscVal"

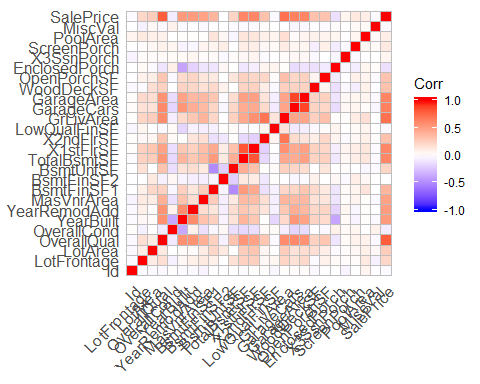
# 1.1.5 Low variance Filter and correlation of our numeric attributes, outlier handling and Feature engineering

We will be working on checking the vairance of each variable. We want high variance.

#The ruleset I am emplaying is if there is one variable with over 65% of the observations or 2 with over 70%, I shall remove the attribute based of low variance.   
temp[toremove] <- NULL

We shall look at the matrix of the numeric attributes and remove any that have higher than 0.75 correlation with the dependent variable

#Subsetting for numeric only  
nums <- unlist(lapply(temp, is.numeric))  
numONLY = temp[,nums]  
aa<-cor(numONLY)  
ggcorrplot(aa)



#We are only intrested in the Sales price of the matrix  
aa[,26]

## Id LotFrontage LotArea OverallQual OverallCond   
## -0.02477111 0.20850483 0.26464334 0.79002549 -0.07550025   
## YearBuilt YearRemodAdd MasVnrArea BsmtFinSF1 BsmtFinSF2   
## 0.52333350 0.50800276 0.47733825 0.38418943 -0.01040337   
## BsmtUnfSF TotalBsmtSF X1stFlrSF X2ndFlrSF LowQualFinSF   
## 0.21536457 0.61316258 0.60680522 0.32289059 -0.02530248   
## GrLivArea GarageCars GarageArea WoodDeckSF OpenPorchSF   
## 0.71019194 0.63961511 0.62245235 0.32498348 0.31112376   
## EnclosedPorch X3SsnPorch ScreenPorch PoolArea MiscVal   
## -0.12892149 0.04522141 0.11299246 0.09310460 -0.02098008   
## SalePrice   
## 1.00000000

There are some conclusions we can make.

#Might be better for us to remove 4 attributes and create a fuller 1 attribute  
temp$HouseArea <- temp$TotalBsmtSF + temp$X1stFlrSF + temp$X2ndFlrSF  
  
# Undo some work from before for this stage.  
temp$FullBath <- as.numeric(temp$FullBath)  
temp$BsmtFullBath <- as.numeric(temp$BsmtFullBath)  
temp$HalfBath <- as.numeric(temp$HalfBath)  
temp$BsmtHalfBath <- as.numeric(temp$BsmtHalfBath)  
  
# Why keep so many bathroom attributes. Let us condense instead.  
temp$TotalBath <- temp$FullBath + 0.5\*(temp$HalfBath) + temp$BsmtFullBath + 0.5\*as.numeric(temp$BsmtHalfBath)  
# Same with porch  
temp$TotalPorchSF <- temp$OpenPorchSF + temp$EnclosedPorch + temp$X3SsnPorch + temp$ScreenPorch + temp$WoodDeckSF  
# Lets include the garage now  
temp$TotalArea <-temp$HouseArea + temp$GarageArea  
#We also know that total basement SF = BsmtFinSF1 + BsmtFinSF2 + BsmtUnfSF. WHy not remove it   
#Another reason so remove total basement SF is because of its high correlation to 1stFlrSF  
temp$TotalBsmtSF <- NULL  
#Do not need house area, if we have total area  
temp$HouseArea <- NULL

We will remove OverallQual and GrLiveArea due to its high correlation. (above our 0.7 threshold) GarageCars and Garagearea also have high correlation, and they themselves are highly correlated (0.88), so I shall remove one because they pretty much provide the same amount of information to the dependent variable. I pick Garagearea to remove because there are already a lot of area variables.

Also lets remove the attributes used in the addition, as well.

temp$OverallQual <- NULL  
temp$GrLivArea <- NULL  
temp$GarageArea <- NULL  
  
  
temp$X1stFlrSF <-NULL  
temp$X2ndFlrSF <- NULL  
temp$FullBath <- NULL  
temp$HalfBath <-NULL  
temp$BsmtFullBath <- NULL  
temp$BsmtHalfBath <- NULL  
  
temp$OpenPorchSF <- NULL  
temp$EnclosedPorch <- NULL  
temp$X3SsnPorch <- NULL  
temp$ScreenPorch <- NULL  
temp$WoodDeckSF <- NULL  
temp$PoolArea <- NULL

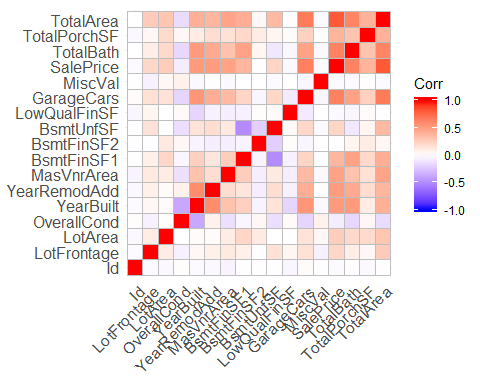
After our reduction, lets see our variables

colname\_new <- colnames(temp)  
colname\_new

## [1] "Id" "MSSubClass" "LotFrontage" "LotArea"   
## [5] "LotShape" "Neighborhood" "HouseStyle" "OverallCond"   
## [9] "YearBuilt" "YearRemodAdd" "RoofStyle" "Exterior1st"   
## [13] "Exterior2nd" "MasVnrType" "MasVnrArea" "ExterQual"   
## [17] "ExterCond" "Foundation" "BsmtQual" "BsmtExposure"   
## [21] "BsmtFinType1" "BsmtFinSF1" "BsmtFinType2" "BsmtFinSF2"   
## [25] "BsmtUnfSF" "HeatingQC" "LowQualFinSF" "BedroomAbvGr"   
## [29] "KitchenAbvGr" "KitchenQual" "TotRmsAbvGrd" "Fireplaces"   
## [33] "FireplaceQu" "GarageType" "GarageYrBlt" "GarageFinish"   
## [37] "GarageCars" "MiscVal" "MoSold" "YrSold"   
## [41] "SaleCondition" "SalePrice" "TotalBath" "TotalPorchSF"   
## [45] "TotalArea"

We removed 25 variables so far, and added 3

#Only intrested in the attributes we added, but lets take a look  
nums <- unlist(lapply(temp, is.numeric))  
numONLY = temp[,nums]  
aa<-cor(numONLY)  
ggcorrplot(aa)



#We are only intrested in the Sales price of the matrix  
aa[,15]

## Id LotFrontage LotArea OverallCond YearBuilt   
## 0.004045642 0.086229005 0.203137137 -0.168197692 0.524335321   
## YearRemodAdd MasVnrArea BsmtFinSF1 BsmtFinSF2 BsmtUnfSF   
## 0.444130722 0.319482646 0.479579877 0.053856240 -0.104937056   
## LowQualFinSF GarageCars MiscVal SalePrice TotalBath   
## -0.040678483 0.482803779 -0.025550618 0.631961576 1.000000000   
## TotalPorchSF TotalArea   
## 0.313955559 0.617533096

diag(var(numONLY))

## Id LotFrontage LotArea OverallCond YearBuilt   
## 1.779660e+05 1.202679e+03 9.998646e+07 1.237127e+00 9.119621e+02   
## YearRemodAdd MasVnrArea BsmtFinSF1 BsmtFinSF2 BsmtUnfSF   
## 4.265806e+02 3.283680e+04 2.075615e+05 2.620502e+04 1.956699e+05   
## LowQualFinSF GarageCars MiscVal SalePrice TotalBath   
## 2.381903e+03 5.609260e-01 2.479934e+05 6.297114e+09 6.144431e-01   
## TotalPorchSF TotalArea   
## 2.461454e+04 9.187692e+05

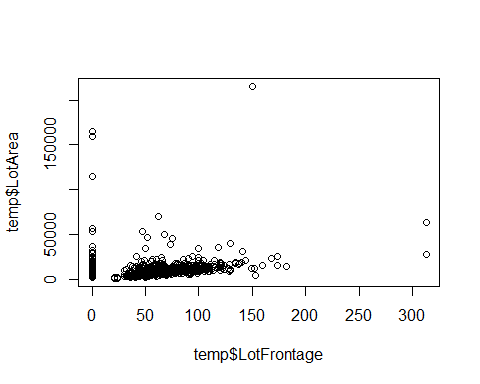
As assumed, the areas will be correlated with one another, highly. Also the sales price is largely correlated with areas, bathrooms. I know that these areas are highly correlated but because we added so many variables into it, I will not be removign them.

Finally, we will look at addressing the outliers. I was holding off for as long as I could because they may potentially be eliminated with the removal of some of the attributes, but we might be at a point where no more attributes are to be taken out.

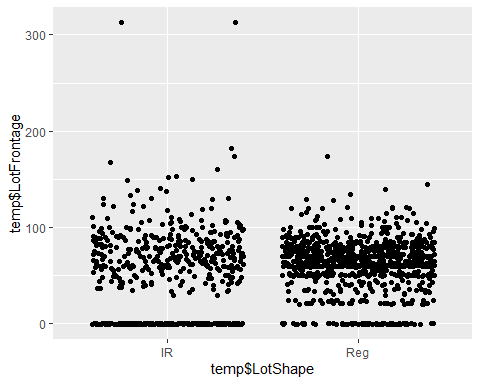
# 1.2 Bi variant analysis

Lets look for some patterns. A lot of it was discovered from the correlation table, but lets reillustrate some of it here. Truth be told, in our univariant work, we looked at some intresting combinations with the Sales price. I will re highlight these and look at some other combinations.

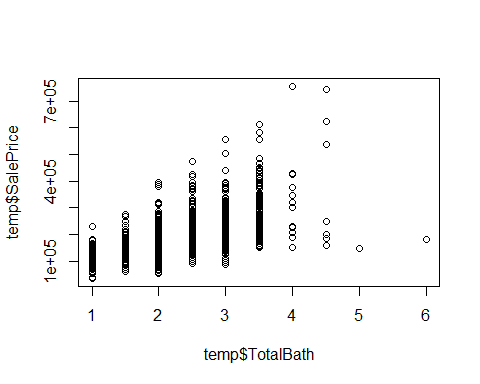
#Lets look at Lot  
plot(temp$LotFrontage, temp$LotArea)



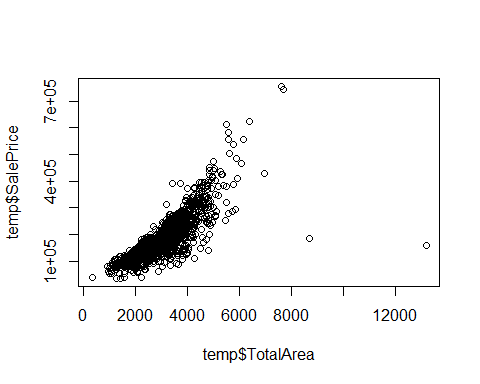
ggplot(data = temp, aes(y=temp$LotFrontage, x=temp$LotShape)) + geom\_jitter(aes((temp$LotShape) ))

 Nothing meaningful

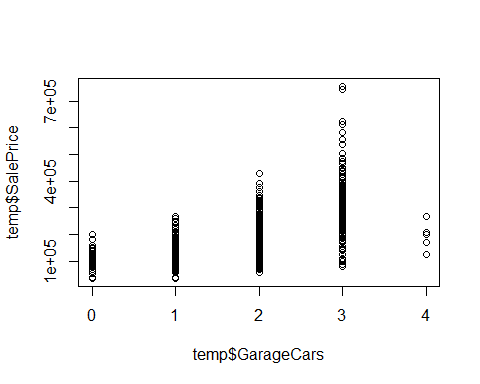
plot(temp$TotalBath,temp$SalePrice)



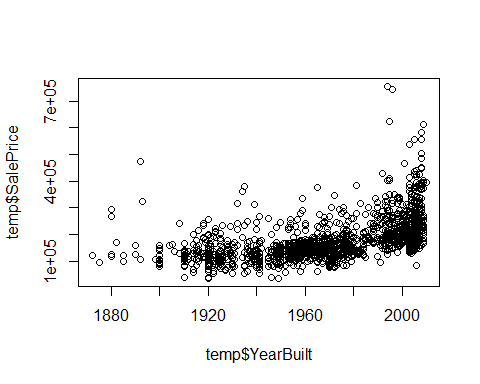
plot(temp$TotalArea,temp$SalePrice)



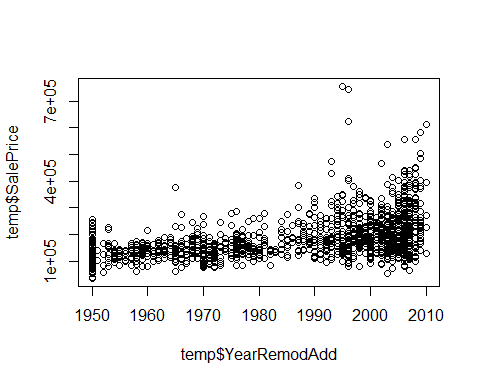
plot(temp$GarageCars, temp$SalePrice)



plot(temp$YearBuilt, temp$SalePrice)

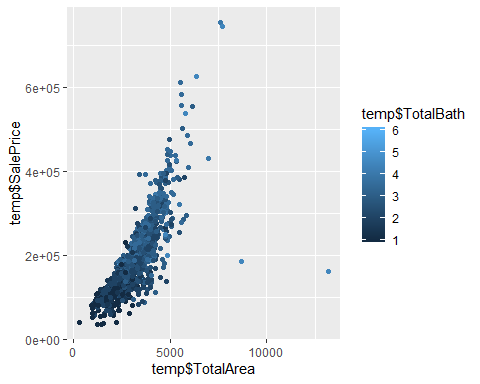


plot(temp$YearRemodAdd, temp$SalePrice)

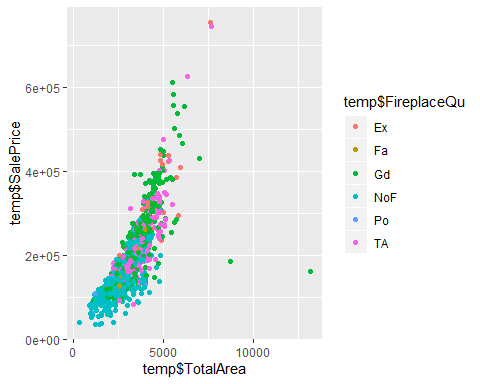


#These attributes had the highest correlation with sales price. It is evident in these plot.

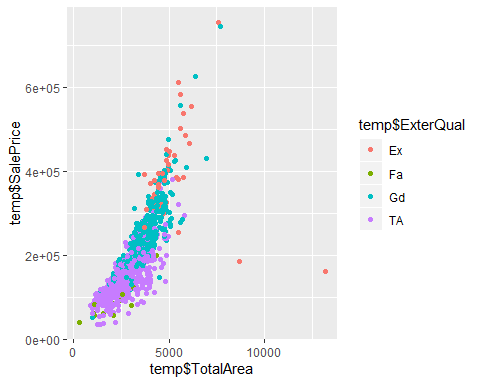
#Something else we can see from the last prompts is that larger homes would have more bathrooms, and in turn higher prices.   
qplot(temp$TotalArea,temp$SalePrice, data = temp, colour= temp$TotalBath)



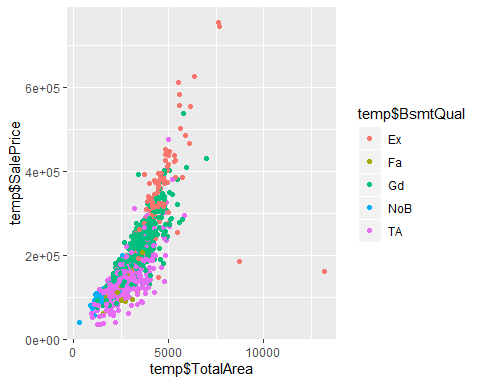
#Larger homes would also have better quality fireplaces.  
qplot(temp$TotalArea,temp$SalePrice, data = temp, colour= temp$FireplaceQu)



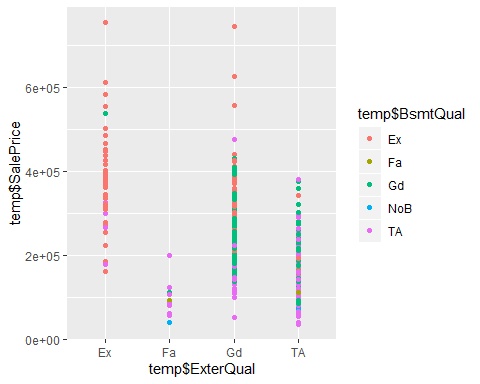
#And better exterior quality  
qplot(temp$TotalArea,temp$SalePrice, data = temp, colour= temp$ExterQual)



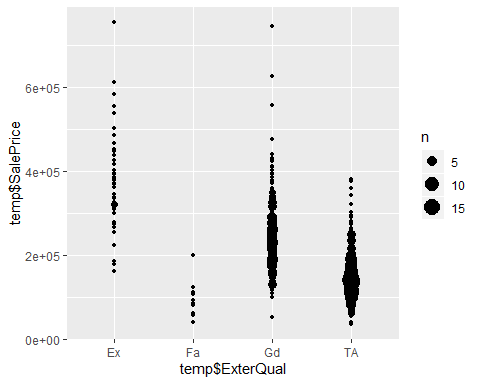
#And better Basement quality  
qplot(temp$TotalArea,temp$SalePrice, data = temp, colour= temp$BsmtQual)



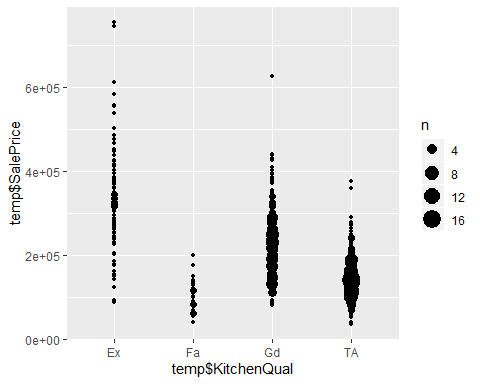
#QUality in general makes for a better house price  
qplot(temp$ExterQual,temp$SalePrice, data = temp, colour= temp$BsmtQual)



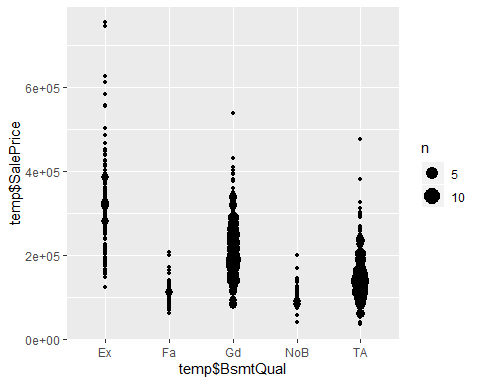
# Very imporant comparisons, used to make decisions. Great to find patterns  
ggplot(data = temp, aes(x=temp$ExterQual, y=temp$SalePrice)) + geom\_count(aes( factor(temp$ExterQual) ))



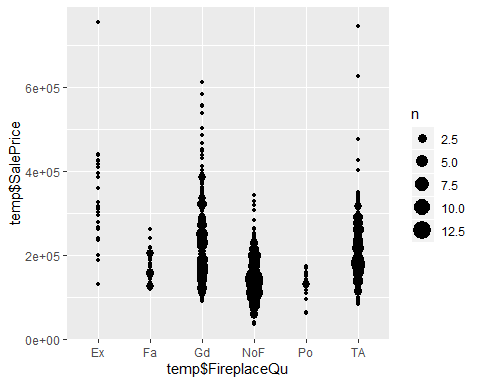
ggplot(data = temp, aes(x=temp$KitchenQual, y=temp$SalePrice)) + geom\_count(aes(factor(temp$KitchenQual) ))



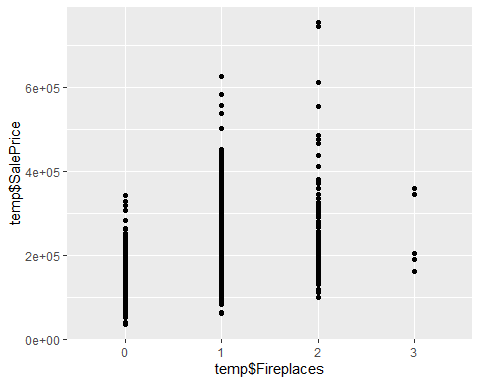
ggplot(data = temp, aes(x=temp$BsmtQual, y=temp$SalePrice)) + geom\_count(aes(factor(temp$BsmtQual) ))



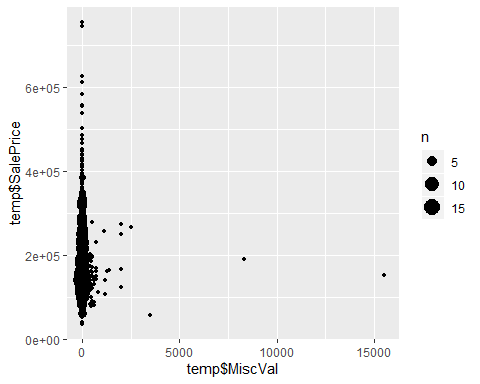
ggplot(data = temp, aes(x=temp$FireplaceQu, y=temp$SalePrice)) + geom\_count(aes(factor(temp$FireplaceQu) ))



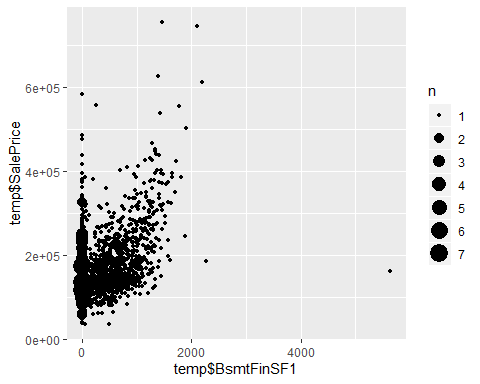
#ggplot(data = temp, aes(x=temp$Fireplace, y=temp$SalePrice)) + geom\_count(aes((temp$Fireplace) ))  
qplot(temp$Fireplaces,temp$SalePrice, data = temp)



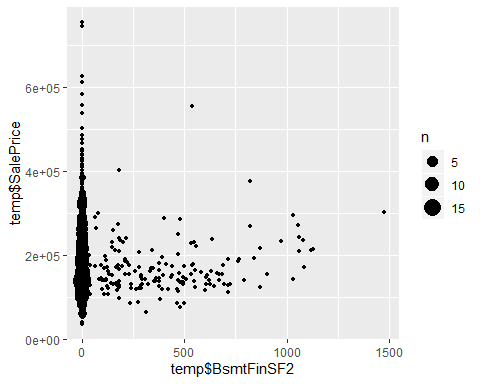
ggplot(data = temp, aes(x=temp$MiscVal, y=temp$SalePrice)) + geom\_count(aes((temp$MiscVal) ))



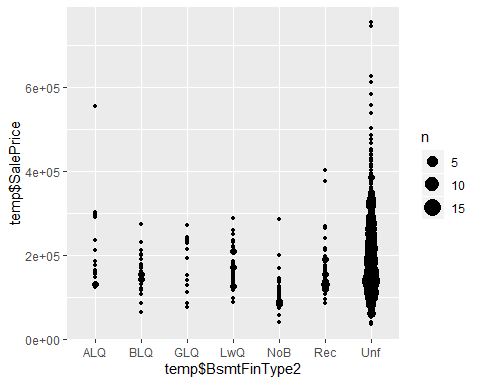
ggplot(data = temp, aes(x=temp$BsmtFinSF1, y=temp$SalePrice)) + geom\_count(aes((temp$BsmtFinSF1) ))



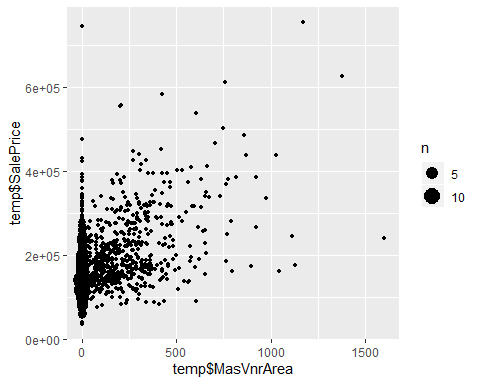
ggplot(data = temp, aes(x=temp$BsmtFinSF2, y=temp$SalePrice)) + geom\_count(aes((temp$BsmtFinSF2) ))



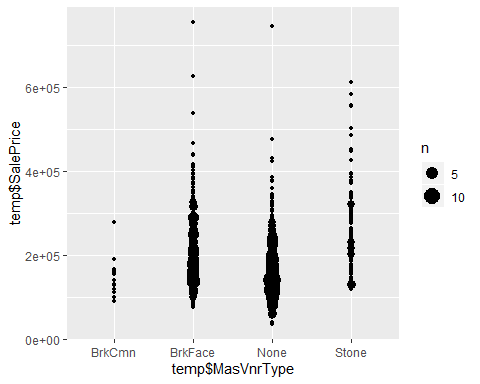
ggplot(data = temp, aes(x=temp$BsmtFinType2, y=temp$SalePrice)) + geom\_count(aes((temp$BsmtFinType2) )) #This got through the cracks, it should have been removed.



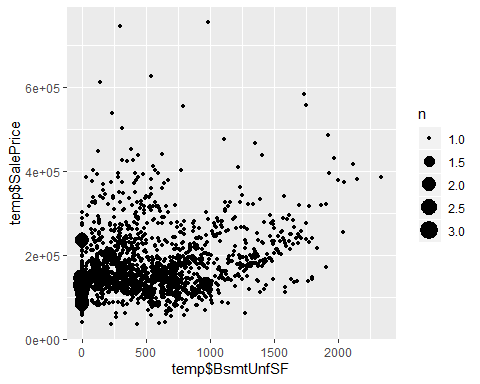
ggplot(data = temp, aes(x=temp$MasVnrArea, y=temp$SalePrice)) + geom\_count(aes((temp$MasVnrArea) ))



ggplot(data = temp, aes(x=temp$MasVnrType, y=temp$SalePrice)) + geom\_count(aes((temp$MasVnrType) ))



ggplot(data = temp, aes(x=temp$BsmtUnfSF, y=temp$SalePrice)) + geom\_count(aes((temp$BsmtUnfSF) ))



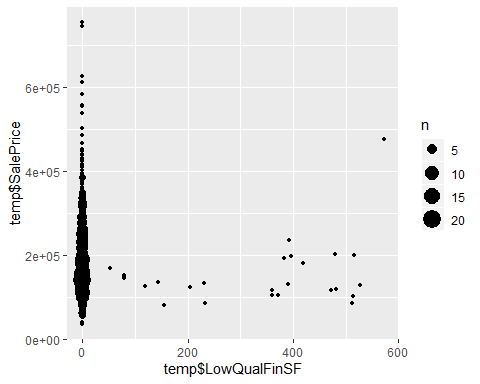
mean(temp$BsmtUnfSF)

## [1] 567.4651

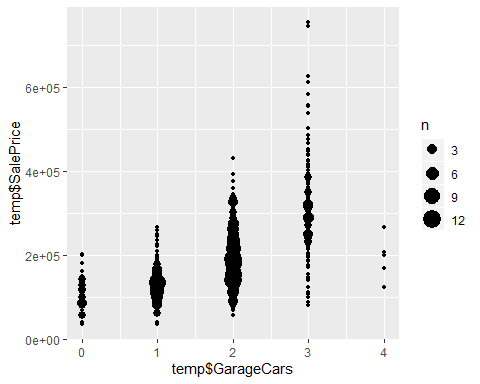
nrow(temp[temp$BsmtUnfSF<200,])#I decide to keep this, attribute

## [1] 335

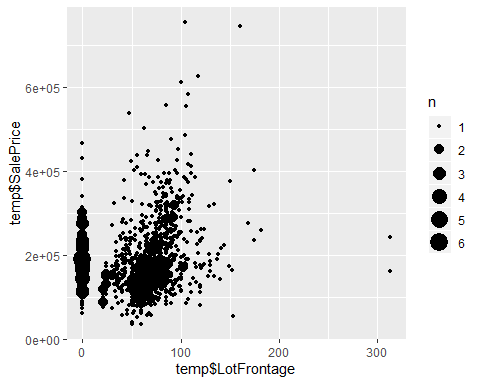
ggplot(data = temp, aes(x=temp$LowQualFinSF, y=temp$SalePrice)) + geom\_count(aes((temp$LowQualFinSF) ))



ggplot(data = temp, aes(x=temp$GarageCars, y=temp$SalePrice)) + geom\_count(aes((temp$GarageCars) ))



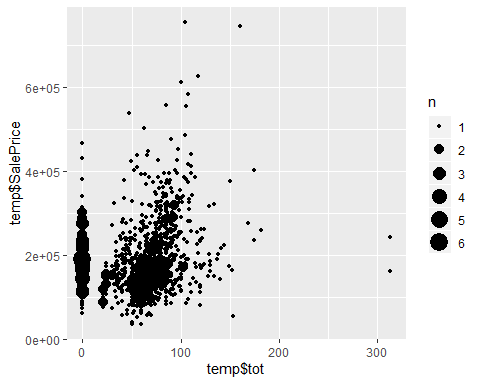
ggplot(data = temp, aes(x=temp$LotFrontage, y=temp$SalePrice)) + geom\_count(aes((temp$LotFrontage) ))



nrow(temp[temp$LotFrontage<10,])#I decide to keep this, attribute

## [1] 257

ggplot(data = temp, aes(x=temp$tot, y=temp$SalePrice)) + geom\_count(aes((temp$LotFrontage) ))



mean(temp$PoolArea)

## Warning in mean.default(temp$PoolArea): argument is not numeric or logical:  
## returning NA

## [1] NA

mean(temp$MiscVal)

## [1] 43.81919

mean(as.numeric(temp$Fireplaces))

## [1] 0.6128364

#After observing the graphics and looking into variances and mean, these need to be removed. The means alone tell a story of how skewed of a picture these give. Because of a lack of normalization, means can show a picture as well.   
temp$Fireplace <- NULL   
temp$PoolArea <- NULL   
temp$MiscVal <- NULL   
temp$BsmtFinSF2 <- NULL  
temp$MasVnrArea <- NULL  
temp$LowQualFinSF <-NULL

# 1.3 Remove those outlier!

I saved this for as late as possible. I wanted to see if most of the attributes will be eliminated before we remove observations due to outliers.

#bsmtfinsf1  
flattened\_outlier = unlist(outlier\_bsmtFinSF1[1], use.names = FALSE)  
temp = subset(temp, !(temp$Id %in% flattened\_outlier))  
#removed bsmtfinsf2  
outlier\_bsmtFinSF2 = 0  
#removed masvnrarea  
outlier\_masVnrArea = 0  
#bsmtUnfSF  
flattened\_outlier = unlist(outlier\_bsmtUnfSF[1], use.names = FALSE)  
temp = subset(temp, !(temp$Id %in% flattened\_outlier))  
#removed garage area  
outlier\_garageArea = 0  
#removed garage car  
flattened\_outlier = unlist(outlier\_garagecars[1], use.names = FALSE)  
temp = subset(temp, !(temp$Id %in% flattened\_outlier))  
#removed grlivarea  
outlier\_grLivArea = 0  
#lotarea  
flattened\_outlier = unlist(outlier\_lotArea[1], use.names = FALSE)  
temp = subset(temp, !(temp$Id %in% flattened\_outlier))  
#lotfrontage  
flattened\_outlier = unlist(outlier\_lotFrontage[1], use.names = FALSE)  
temp = subset(temp, !(temp$Id %in% flattened\_outlier))  
#removed lowqualfin  
outlier\_lowQualFinSF = 0  
#removed misc  
outlier\_miscVal = 0  
#removed OpenPorch  
outlier\_openPorch = 0  
#removed pool  
outlier\_poolarea = 0  
#removed screen porch   
outlier\_screenPorch= 0  
#removed total Basement SF   
outlier\_totalBsmtSF= 0  
#removed wood deck   
outlier\_woodDeck= 0  
#removed 1st flr sf   
outlier\_x1stFlrSF= 0  
#removed 2nd flr sf   
outlier\_x2stFlrSF= 0  
#removed 3Ss  
outlier\_X3Ss= 0  
  
print("it is a good idea we waited to remove the outliers, otherwise we would have lost a lot of observations only to remove the attributes later")

## [1] "it is a good idea we waited to remove the outliers, otherwise we would have lost a lot of observations only to remove the attributes later"

#I will allow this outliers:  
#outlier\_yearbuilt

#after all our intial analysis, we can set the data back to our original name  
modified\_data = temp  
modified\_data = subset(modified\_data, select=-c(SalePrice))  
modified\_data$SalePrice = temp$SalePrice

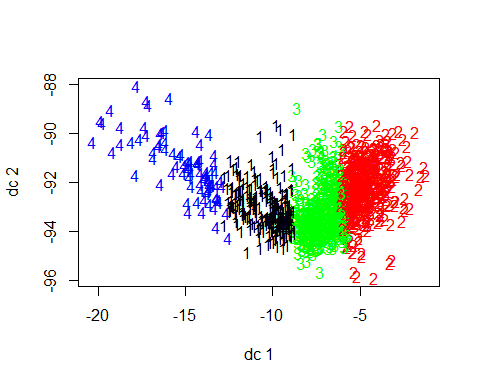
# 2 - EDA

# 2.1 Normalization

# Our Normalizing technique  
normalize <- function(x) {  
 if (is.numeric(x)){  
 return ((x - min(x)) / (max(x) - min(x))) }  
 else{  
 return (x)  
 }  
}  
data\_norm = as.data.frame(lapply(modified\_data[2:39], normalize))  
data\_norm <- cbind(modified\_data$SalePrice, data\_norm)

# 2.2 Clustering

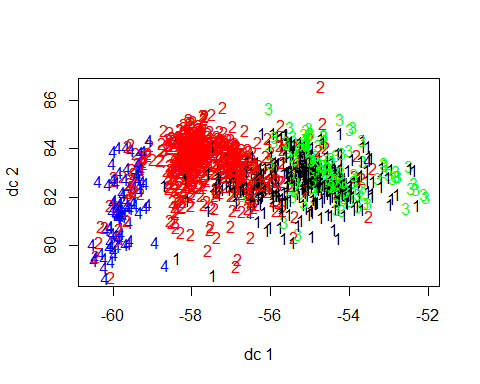
numsonly <- unlist(lapply(modified\_data, is.numeric))  
numarray = temp[,numsonly]  
numarray = subset(numarray, select = -c(Id))  
fit = kmeans(numarray,4)  
plotcluster(numarray,fit$cluster)



#str(fit)  
  
fit = kmodes(numarray, 4)

## Warning in kmodes(numarray, 4): data has numeric coloumns with more than 30  
## different levels!

plotcluster(numarray,fit$cluster)



# It is not meaningful to have clustering for categorical variables. I did only numerical values.

In fact, these clusters are not meaningful for the numerical only attributes, either! It would have been a better tool to be used in EDA of 2-5 variables perhaps, but I will do without it.

# We are now into our Deisgn and Testing stage!!!

# 3 - Experimental Design and Modeling

# 3.0 Training and test set Split

set.seed(1)  
#Splitting training to 80%, test to 20%  
index <- sample(1:nrow(data\_norm), 0.80 \*nrow(data\_norm))  
data\_train <- data\_norm[index,]  
data\_test <- data\_norm[-index,]

# 3.1 KNN

#Our label is the Sales price, in col 1  
trainlabel <- data\_train[,1]  
testlabel <- data\_test[,1]  
  
#Applying KNN  
##test\_pred <- knn(train = data\_train[,2:39], test = data\_test[,2:39],cl = data\_train[,1], k=9)  
#Creating accuracy matrix  
##CrossTable(x=testlabel, y=test\_pred, prop.chisq=FALSE)

Learned that KNN might not be a good suit for someone with categorical data within the DF. We shall need to look at regression.

# 3.2 Decision Tree

#tree = rpart(data\_train$'modified\_data$SalePrice'~MSSubClass+LotFrontage+LotArea+LotShape+Neighborhood+HouseStyle+OverallCond+YearBuilt+YearRemodAdd+RoofStyle+Exterior1st+Exterior2nd+MasVnrType+ExterQual+ExterCond+Foundation+BsmtQual+BsmtExposure+BsmtFinType1+BsmtFinSF1+BsmtFinType2+BsmtUnfSF+HeatingQC+BedroomAbvGr+KitchenAbvGr+KitchenQual+TotRmsAbvGrd+FireplaceQu+GarageType+GarageYrBlt+GarageFinish+GarageCars+MoSold+YrSold+SaleCondition+TotalBath+TotalPorchSF+TotalArea, data\_train, method = "class")

# 3.3 Regression