

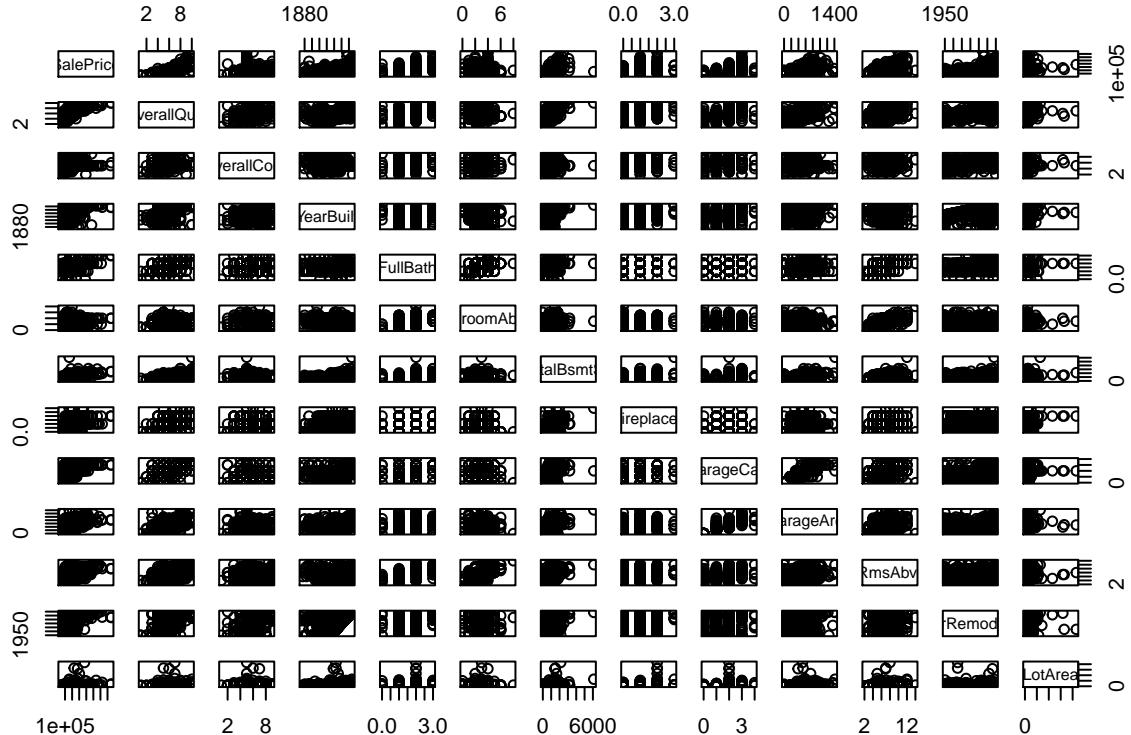
# SSC 442 Lab 02

Team 7

1/30/2020

## Exercise 1: Part 1

## Exercise 1: Part 2



## Exercise 1: Part 3

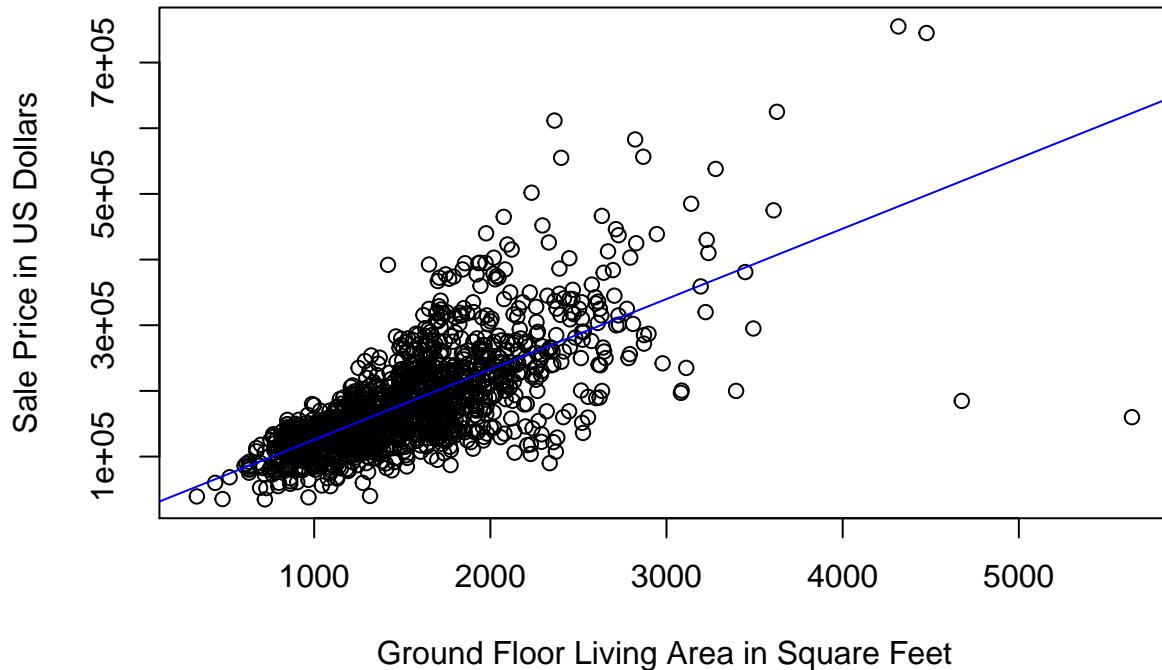
```
##          LotArea OverallQual OverallCond YearBuilt FullBath
## LotArea      1.00000000  0.10580574 -0.00563627  0.01422765  0.1260306
## OverallQual   0.10580574  1.00000000 -0.09193234  0.57232277  0.5505997
## OverallCond  -0.00563627 -0.09193234  1.00000000 -0.37598320 -0.1941495
## YearBuilt     0.01422765  0.57232277 -0.37598320  1.00000000  0.4682708
## FullBath      0.12603063  0.55059971 -0.19414949  0.46827079  1.0000000
## BedroomAbvGr  0.11968991  0.10167636  0.01298006 -0.07065122  0.3632520
## TotalBsmtSF   0.26083313  0.53780850 -0.17109751  0.39145200  0.3237224
## Fireplaces    0.27136401  0.39676504 -0.02381998  0.14771640  0.2436705
## GarageCars    0.15487074  0.60067072 -0.18575751  0.53785009  0.4696720
## GarageArea    0.18040276  0.56202176 -0.15152137  0.47895382  0.4056562
## TotRmsAbvGrd  0.19001478  0.42745234 -0.05758317  0.09558913  0.5547843
## YearRemodAdd  0.01378843  0.55068392  0.07374150  0.59285498  0.4390465
##          BedroomAbvGr TotalBsmtSF Fireplaces GarageCars GarageArea
## LotArea       0.11968991  0.26083313  0.27136401  0.15487074  0.18040276
## OverallQual   0.10167636  0.53780850  0.39676504  0.60067072  0.56202176
```

```

## OverallCond    0.01298006 -0.17109751 -0.02381998 -0.18575751 -0.15152137
## YearBuilt     -0.07065122  0.39145200  0.14771640  0.53785009  0.47895382
## FullBath      0.36325198  0.32372241  0.24367050  0.46967204  0.40565621
## BedroomAbvGr  1.00000000  0.05044996  0.10756968  0.08610644  0.06525253
## TotalBsmtSF   0.05044996  1.00000000  0.33951932  0.43458483  0.48666546
## Fireplaces    0.10756968  0.33951932  1.00000000  0.30078877  0.26914124
## GarageCars    0.08610644  0.43458483  0.30078877  1.00000000  0.88247541
## GarageArea    0.06525253  0.48666546  0.26914124  0.88247541  1.00000000
## TotRmsAbvGrd  0.67661994  0.28557256  0.32611448  0.36228857  0.33782212
## YearRemodAdd -0.04058093  0.29106558  0.11258132  0.42062215  0.37159981
##                 TotRmsAbvGrd YearRemodAdd
## LotArea        0.19001478  0.01378843
## OverallQual   0.42745234  0.55068392
## OverallCond   -0.05758317  0.07374150
## YearBuilt      0.09558913  0.59285498
## FullBath       0.55478425  0.43904648
## BedroomAbvGr  0.67661994 -0.04058093
## TotalBsmtSF   0.28557256  0.29106558
## Fireplaces    0.32611448  0.11258132
## GarageCars    0.36228857  0.42062215
## GarageArea    0.33782212  0.37159981
## TotRmsAbvGrd  1.00000000  0.19173982
## YearRemodAdd  0.19173982  1.00000000

```

## Exercise 1: Part 4



## Exercise 2: Part 1

```

##
## Call:
## lm(formula = SalePrice ~ GarageInside - 1, data = ameslist)

```

```

##
## Residuals:
##      Min     1Q Median     3Q    Max
## -150409 -35402  30598 118000  548598
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## GarageInside   206402      3247   63.57 <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 101800 on 1459 degrees of freedom
## Multiple R-squared:  0.7347, Adjusted R-squared:  0.7345
## F-statistic:  4041 on 1 and 1459 DF, p-value: < 2.2e-16

```

## Exercise 2: Part 2

```

##
## Call:
## lm(formula = SalePrice ~ ., data = Ames)
##
## Residuals:
##      Min     1Q Median     3Q    Max
## -448366 -17235  -2368  14868  305479
##
## Coefficients: (2 not defined because of singularities)
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept) 7.789e+03 1.713e+06  0.005 0.996373
## MSSubClass -1.897e+02 3.466e+01 -5.473 5.49e-08 ***
## LotFrontage -1.090e+02 6.174e+01 -1.765 0.077788 .
## LotArea      5.018e-01 1.586e-01  3.163 0.001603 **
## OverallQual  1.943e+04 1.483e+03 13.108 < 2e-16 ***
## OverallCond  5.194e+03 1.375e+03  3.777 0.000168 ***
## YearBuilt    3.585e+02 8.766e+01  4.089 4.64e-05 ***
## YearRemodAdd 8.512e+01 8.712e+01  0.977 0.328750
## BsmtFinSF1   2.080e+01 5.846e+00  3.558 0.000389 ***
## BsmtFinSF2   8.635e+00 8.845e+00  0.976 0.329181
## BsmtUnfSF    6.263e+00 5.313e+00  1.179 0.238736
## TotalBsmtSF        NA         NA         NA         NA
## X1stFlrSF    4.937e+01 7.380e+00  6.690 3.55e-11 ***
## X2ndFlrSF    4.904e+01 6.104e+00  8.035 2.41e-15 ***
## LowQualFinSF 3.071e+01 2.812e+01  1.092 0.275070
## GrLivArea       NA         NA         NA         NA
## BsmtFullBath  7.852e+03 3.214e+03  2.443 0.014704 *
## BsmtHalfBath  2.173e+03 5.120e+03  0.424 0.671332
## FullBath      4.581e+03 3.551e+03  1.290 0.197236
## HalfBath      -1.451e+02 3.329e+03 -0.044 0.965249
## BedroomAbvGr -1.048e+04 2.174e+03 -4.824 1.61e-06 ***
## KitchenAbvGr -2.248e+04 6.766e+03 -3.322 0.000924 ***
## TotRmsAbvGrd  5.496e+03 1.496e+03  3.674 0.000250 ***
## Fireplaces    4.180e+03 2.199e+03  1.901 0.057561 .
## GarageYrBlt   -7.611e+01 9.147e+01 -0.832 0.405508
## GarageCars    1.717e+04 3.517e+03  4.882 1.21e-06 ***

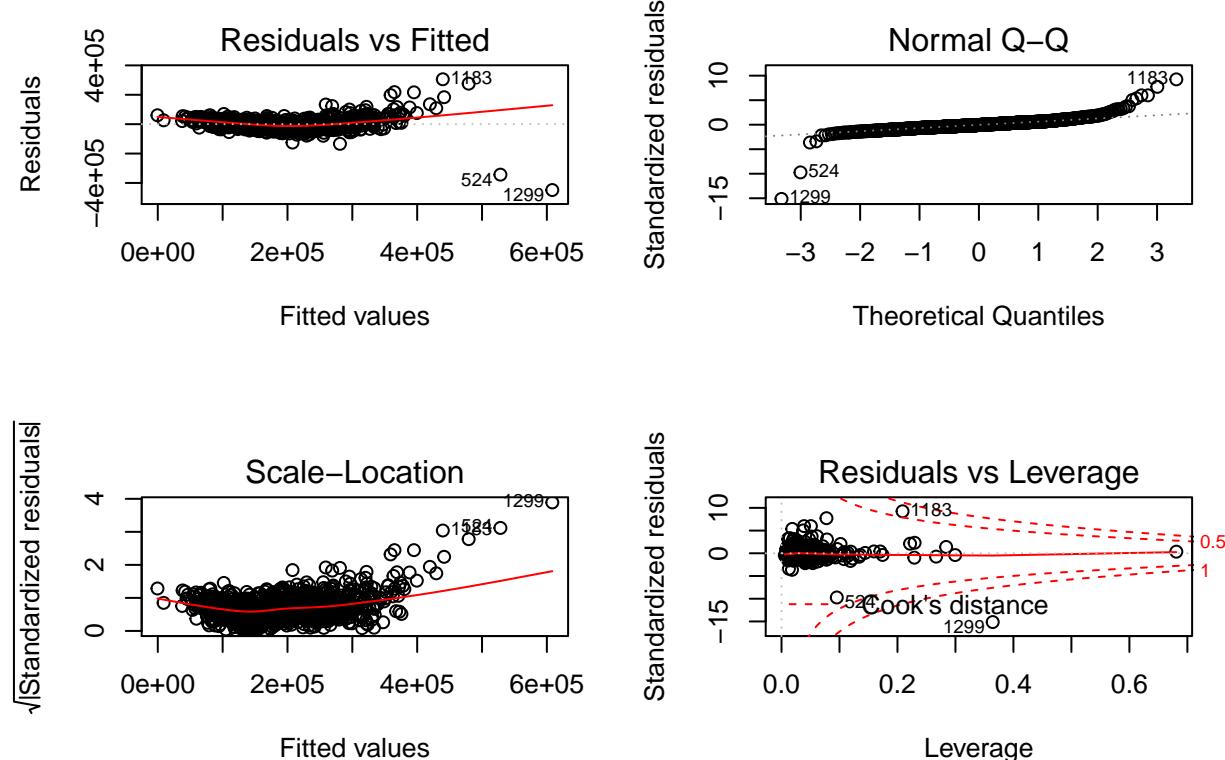
```

```

## GarageArea      1.072e+01  1.219e+01  0.880  0.379163
## WoodDeckSF     2.296e+01  1.009e+01  2.276  0.023036 *
## OpenPorchSF    -8.400e+00  1.947e+01  -0.432  0.666164
## EnclosedPorch   5.793e+00  2.081e+01  0.278  0.780771
## X3SsnPorch     3.561e+01  3.781e+01  0.942  0.346474
## ScreenPorch     5.794e+01  2.033e+01  2.850  0.004453 **
## PoolArea       -7.590e+01  2.974e+01  -2.552  0.010850 *
## MoSold        -2.310e+02  4.245e+02  -0.544  0.586393
## YrSold        -4.021e+02  8.520e+02  -0.472  0.637073
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 37150 on 1094 degrees of freedom
##   (333 observations deleted due to missingness)
## Multiple R-squared:  0.8063, Adjusted R-squared:  0.8007
## F-statistic: 142.4 on 32 and 1094 DF,  p-value: < 2.2e-16

```

## Exercise 2: Part 3



## Exercise 2: Part 4

```

##
## Call:
## lm(formula = SalePrice ~ . + LotArea:BedroomAbvGr, data = Ames)
##
## Residuals:
##    Min      1Q  Median      3Q     Max 
## -449022 -17456 -2139  14979 305834

```

```

##
## Coefficients: (2 not defined because of singularities)
##                               Estimate Std. Error t value Pr(>|t|)
## (Intercept)          9.893e+04  1.713e+06   0.058 0.953944
## MSSubClass         -1.993e+02  3.509e+01  -5.679 1.74e-08 ***
## LotFrontage        -1.114e+02  6.171e+01  -1.806 0.071233 .
## LotArea            -4.701e-01  5.951e-01  -0.790 0.429684
## OverallQual       1.956e+04  1.483e+03  13.188 < 2e-16 ***
## OverallCond       5.134e+03  1.375e+03   3.735 0.000198 ***
## YearBuilt          3.592e+02  8.758e+01   4.101 4.42e-05 ***
## YearRemodAdd      8.280e+01  8.706e+01   0.951 0.341761
## BsmtFinSF1        2.069e+01  5.841e+00   3.542 0.000414 ***
## BsmtFinSF2        8.779e+00  8.838e+00   0.993 0.320795
## BsmtUnfSF         6.074e+00  5.310e+00   1.144 0.252897
## TotalBsmtSF        NA          NA          NA          NA
## X1stFlrSF          4.947e+01  7.374e+00   6.708 3.15e-11 ***
## X2ndFlrSF          4.910e+01  6.098e+00   8.052 2.12e-15 ***
## LowQualFinSF      2.934e+01  2.811e+01   1.044 0.296928
## GrLivArea          NA          NA          NA          NA
## BsmtFullBath       7.915e+03  3.211e+03   2.465 0.013853 *
## BsmtHalfBath       1.980e+03  5.117e+03   0.387 0.698827
## FullBath           3.840e+03  3.575e+03   1.074 0.282933
## HalfBath           -4.599e+00 3.327e+03  -0.001 0.998897
## BedroomAbvGr      -1.388e+04 2.955e+03  -4.697 2.97e-06 ***
## KitchenAbvGr      -2.129e+04 6.796e+03  -3.133 0.001776 **
## TotRmsAbvGrd      5.467e+03  1.495e+03   3.658 0.000266 ***
## Fireplaces         4.436e+03  2.202e+03   2.015 0.044184 *
## GarageYrBlt       -7.559e+01 9.139e+01  -0.827 0.408322
## GarageCars          1.681e+04 3.520e+03   4.775 2.04e-06 ***
## GarageArea          1.213e+01 1.220e+01   0.994 0.320564
## WoodDeckSF         2.381e+01 1.009e+01   2.360 0.018446 *
## OpenPorchSF        -7.718e+00 1.945e+01  -0.397 0.691642
## EnclosedPorch      5.299e+00 2.079e+01   0.255 0.798897
## X3SsnPorch         3.709e+01 3.779e+01   0.982 0.326526
## ScreenPorch        5.542e+01 2.037e+01   2.721 0.006615 **
## PoolArea           -7.912e+01 2.978e+01  -2.657 0.007996 **
## MoSold              -2.206e+02 4.242e+02  -0.520 0.603138
## YrSold              -4.416e+02 8.516e+02  -0.519 0.604207
## LotArea:BedroomAbvGr 3.302e-01 1.949e-01   1.694 0.090472 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 37120 on 1093 degrees of freedom
##   (333 observations deleted due to missingness)
## Multiple R-squared:  0.8069, Adjusted R-squared:  0.801
## F-statistic: 138.4 on 33 and 1093 DF,  p-value: < 2.2e-16
##
## Call:
## lm(formula = SalePrice ~ . + BedroomAbvGr:TotRmsAbvGrd, data = Ames)
##
## Residuals:
##      Min    1Q Median    3Q    Max 
## -447154 -17317 -2435 14358 305398

```

```

##
## Coefficients: (2 not defined because of singularities)
##                               Estimate Std. Error t value Pr(>|t|)
## (Intercept)                 4.242e+04  1.712e+06   0.025  0.980241
## MSSubClass                  -1.942e+02  3.477e+01  -5.585  2.95e-08 ***
## LotFrontage                  -1.023e+02  6.187e+01  -1.653  0.098617 .
## LotArea                      4.931e-01  1.586e-01   3.108  0.001932 **
## OverallQual                  1.958e+04  1.485e+03  13.187 < 2e-16 ***
## OverallCond                  5.227e+03  1.375e+03   3.803  0.000151 ***
## YearBuilt                     3.525e+02  8.770e+01   4.019  6.25e-05 ***
## YearRemodAdd                 8.702e+01  8.708e+01   0.999  0.317860
## BsmtFinSF1                   2.159e+01  5.866e+00   3.681  0.000244 ***
## BsmtFinSF2                   9.516e+00  8.860e+00   1.074  0.283018
## BsmtUnfSF                    6.740e+00  5.319e+00   1.267  0.205411
## TotalBsmtSF                  NA          NA          NA          NA
## X1stFlrSF                     4.804e+01  7.429e+00   6.466  1.51e-10 ***
## X2ndFlrSF                     4.734e+01  6.204e+00   7.632  5.03e-14 ***
## LowQualFinSF                  2.594e+01  2.829e+01   0.917  0.359257
## GrLivArea                     NA          NA          NA          NA
## BsmtFullBath                  7.456e+03  3.222e+03   2.314  0.020860 *
## BsmtHalfBath                  2.142e+03  5.117e+03   0.419  0.675587
## FullBath                      5.053e+03  3.563e+03   1.418  0.156369
## HalfBath                      3.954e+02  3.347e+03   0.118  0.905957
## BedroomAbvGr                  -1.791e+04  5.391e+03  -3.321  0.000927 ***
## KitchenAbvGr                  -2.385e+04  6.824e+03  -3.496  0.000492 ***
## TotRmsAbvGrd                  2.324e+03  2.586e+03   0.899  0.368952
## Fireplaces                     4.328e+03  2.200e+03   1.968  0.049332 *
## GarageYrBlt                   -7.159e+01  9.146e+01  -0.783  0.433985
## GarageCars                     1.697e+04  3.517e+03   4.826  1.59e-06 ***
## GarageArea                     1.073e+01  1.218e+01   0.881  0.378582
## WoodDeckSF                     2.214e+01  1.010e+01   2.193  0.028483 *
## OpenPorchSF                   -8.499e+00  1.945e+01  -0.437  0.662280
## EnclosedPorch                  7.887e+00  2.084e+01   0.378  0.705213
## X3SsnPorch                     3.539e+01  3.779e+01   0.936  0.349248
## ScreenPorch                     5.601e+01  2.036e+01   2.751  0.006037 **
## PoolArea                       -7.863e+01  2.978e+01  -2.640  0.008405 **
## MoSold                          -2.436e+02  4.244e+02  -0.574  0.566070
## YrSold                          -4.089e+02  8.515e+02  -0.480  0.631162
## BedroomAbvGr:TotRmsAbvGrd    1.105e+03  7.348e+02   1.504  0.132933
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 37130 on 1093 degrees of freedom
##   (333 observations deleted due to missingness)
## Multiple R-squared:  0.8067, Adjusted R-squared:  0.8009
## F-statistic: 138.3 on 33 and 1093 DF,  p-value: < 2.2e-16
##
## Call:
## lm(formula = SalePrice ~ . + YearBuilt * YrSold, data = Ames)
##
## Residuals:
##      Min       1Q   Median       3Q      Max 
## -448059 -17462  -2005  14206  305988

```

```

##
## Coefficients: (2 not defined because of singularities)
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 1.098e+08 1.081e+08 1.016 0.310033
## MSSubClass -1.896e+02 3.466e+01 -5.469 5.60e-08 ***
## LotFrontage -1.076e+02 6.176e+01 -1.742 0.081719 .
## LotArea      5.039e-01 1.586e-01 3.176 0.001533 **
## OverallQual  1.931e+04 1.487e+03 12.988 < 2e-16 ***
## OverallCond  5.235e+03 1.376e+03 3.805 0.000150 ***
## YearBuilt    -5.529e+04 5.479e+04 -1.009 0.313132
## YearRemodAdd 8.894e+01 8.720e+01 1.020 0.308002
## BsmtFinSF1   2.085e+01 5.846e+00 3.567 0.000377 ***
## BsmtFinSF2   8.899e+00 8.849e+00 1.006 0.314803
## BsmtUnfSF    6.453e+00 5.316e+00 1.214 0.225105
## TotalBsmtSF        NA       NA       NA       NA
## X1stFlrSF     4.933e+01 7.380e+00 6.684 3.69e-11 ***
## X2ndFlrSF     4.928e+01 6.108e+00 8.069 1.86e-15 ***
## LowQualFinSF  3.020e+01 2.813e+01 1.074 0.283201
## GrLivArea      NA       NA       NA       NA
## BsmtFullBath  7.926e+03 3.214e+03 2.466 0.013819 *
## BsmtHalfBath  2.061e+03 5.121e+03 0.403 0.687368
## FullBath       4.631e+03 3.551e+03 1.304 0.192467
## HalfBath       -2.031e+02 3.330e+03 -0.061 0.951369
## BedroomAbvGr  -1.049e+04 2.174e+03 -4.826 1.59e-06 ***
## KitchenAbvGr  -2.225e+04 6.769e+03 -3.287 0.001043 **
## TotRmsAbvGrd  5.441e+03 1.497e+03 3.635 0.000291 ***
## Fireplaces     4.235e+03 2.199e+03 1.926 0.054416 .
## GarageYrBlt   -7.304e+01 9.151e+01 -0.798 0.424990
## GarageCars     1.737e+04 3.523e+03 4.931 9.43e-07 ***
## GarageArea     1.006e+01 1.220e+01 0.824 0.409965
## WoodDeckSF    2.314e+01 1.009e+01 2.294 0.021981 *
## OpenPorchSF   -8.710e+00 1.947e+01 -0.447 0.654681
## EnclosedPorch  5.111e+00 2.082e+01 0.245 0.806131
## X3SsnPorch    3.497e+01 3.782e+01 0.925 0.355352
## ScreenPorch    5.759e+01 2.033e+01 2.832 0.004705 **
## PoolArea       -7.613e+01 2.974e+01 -2.560 0.010616 *
## MoSold         -2.168e+02 4.248e+02 -0.510 0.609888
## YrSold         -5.507e+04 5.383e+04 -1.023 0.306524
## YearBuilt:YrSold 2.772e+01 2.729e+01 1.016 0.310006
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 37150 on 1093 degrees of freedom
##   (333 observations deleted due to missingness)
## Multiple R-squared:  0.8065, Adjusted R-squared:  0.8007
## F-statistic: 138.1 on 33 and 1093 DF,  p-value: < 2.2e-16

```

## Exercise 2: Part 1

```

##
## Call:
## lm(formula = SalePrice ~ . - LotArea + log2(LotArea), data = Ames)
##
```

```

## Residuals:
##      Min     1Q Median     3Q    Max
## -431768 -16763 -1665 14079 308099
##
## Coefficients: (2 not defined because of singularities)
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept) -6.865e+05 1.706e+06 -0.402 0.687466
## MSSubClass -1.151e+02 3.763e+01 -3.059 0.002274 **
## LotFrontage -2.085e+02 6.558e+01 -3.180 0.001516 **
## OverallQual 1.935e+04 1.470e+03 13.165 < 2e-16 ***
## OverallCond 5.536e+03 1.367e+03 4.051 5.46e-05 ***
## YearBuilt 3.790e+02 8.708e+01 4.352 1.48e-05 ***
## YearRemodAdd 7.384e+01 8.641e+01 0.854 0.393026
## BsmtFinSF1 2.265e+01 5.794e+00 3.909 9.85e-05 ***
## BsmtFinSF2 1.141e+01 8.713e+00 1.310 0.190543
## BsmtUnfSF 7.914e+00 5.269e+00 1.502 0.133407
## TotalBsmtSF NA NA NA NA
## X1stFlrSF 4.748e+01 7.334e+00 6.474 1.44e-10 ***
## X2ndFlrSF 4.748e+01 6.064e+00 7.831 1.14e-14 ***
## LowQualFinSF 3.155e+01 2.790e+01 1.131 0.258269
## GrLivArea NA NA NA NA
## BsmtFullBath 7.065e+03 3.192e+03 2.213 0.027113 *
## BsmtHalfBath 1.861e+03 5.078e+03 0.366 0.714075
## FullBath 4.904e+03 3.520e+03 1.393 0.163847
## HalfBath -3.591e+01 3.302e+03 -0.011 0.991324
## BedroomAbvGr -1.106e+04 2.155e+03 -5.132 3.39e-07 ***
## KitchenAbvGr -2.602e+04 6.737e+03 -3.862 0.000119 ***
## TotRmsAbvGrd 5.289e+03 1.484e+03 3.564 0.000381 ***
## Fireplaces 3.370e+03 2.189e+03 1.540 0.123941
## GarageYrBlt -7.757e+01 9.072e+01 -0.855 0.392730
## GarageCars 1.728e+04 3.489e+03 4.954 8.43e-07 ***
## GarageArea 7.791e+00 1.210e+01 0.644 0.519888
## WoodDeckSF 1.795e+01 1.007e+01 1.782 0.074969 .
## OpenPorchSF -1.127e+01 1.930e+01 -0.584 0.559449
## EnclosedPorch 5.007e+00 2.061e+01 0.243 0.808106
## X3SsnPorch 3.085e+01 3.751e+01 0.823 0.410959
## ScreenPorch 4.905e+01 2.025e+01 2.422 0.015583 *
## PoolArea -6.775e+01 2.956e+01 -2.292 0.022102 *
## MoSold -1.517e+02 4.214e+02 -0.360 0.719027
## YrSold -1.410e+02 8.470e+02 -0.166 0.867834
## log2(LotArea) 1.301e+04 2.456e+03 5.298 1.41e-07 ***
##
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 36850 on 1094 degrees of freedom
##   (333 observations deleted due to missingness)
## Multiple R-squared: 0.8095, Adjusted R-squared: 0.8039
## F-statistic: 145.2 on 32 and 1094 DF, p-value: < 2.2e-16
##
## Call:
## lm(formula = SalePrice ~ . + (OverallCond)^2 + (OverallQual)^2,
##      data = Ames)
##
```

```

## Residuals:
##      Min     1Q Median     3Q    Max
## -448366 -17235 -2368 14868 305479
##
## Coefficients: (2 not defined because of singularities)
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept) 7.789e+03 1.713e+06  0.005 0.996373
## MSSubClass -1.897e+02 3.466e+01 -5.473 5.49e-08 ***
## LotFrontage -1.090e+02 6.174e+01 -1.765 0.077788 .
## LotArea      5.018e-01 1.586e-01  3.163 0.001603 **
## OverallQual 1.943e+04 1.483e+03 13.108 < 2e-16 ***
## OverallCond 5.194e+03 1.375e+03  3.777 0.000168 ***
## YearBuilt    3.585e+02 8.766e+01  4.089 4.64e-05 ***
## YearRemodAdd 8.512e+01 8.712e+01  0.977 0.328750
## BsmtFinSF1  2.080e+01 5.846e+00  3.558 0.000389 ***
## BsmtFinSF2  8.635e+00 8.845e+00  0.976 0.329181
## BsmtUnfSF   6.263e+00 5.313e+00  1.179 0.238736
## TotalBsmtSF       NA      NA      NA      NA
## X1stFlrSF    4.937e+01 7.380e+00  6.690 3.55e-11 ***
## X2ndFlrSF   4.904e+01 6.104e+00  8.035 2.41e-15 ***
## LowQualFinSF 3.071e+01 2.812e+01  1.092 0.275070
## GrLivArea     NA      NA      NA      NA
## BsmtFullBath 7.852e+03 3.214e+03  2.443 0.014704 *
## BsmtHalfBath 2.173e+03 5.120e+03  0.424 0.671332
## FullBath      4.581e+03 3.551e+03  1.290 0.197236
## HalfBath     -1.451e+02 3.329e+03 -0.044 0.965249
## BedroomAbvGr -1.048e+04 2.174e+03 -4.824 1.61e-06 ***
## KitchenAbvGr -2.248e+04 6.766e+03 -3.322 0.000924 ***
## TotRmsAbvGrd 5.496e+03 1.496e+03  3.674 0.000250 ***
## Fireplaces    4.180e+03 2.199e+03  1.901 0.057561 .
## GarageYrBlt -7.611e+01 9.147e+01 -0.832 0.405508
## GarageCars    1.717e+04 3.517e+03  4.882 1.21e-06 ***
## GarageArea    1.072e+01 1.219e+01  0.880 0.379163
## WoodDeckSF   2.296e+01 1.009e+01  2.276 0.023036 *
## OpenPorchSF  -8.400e+00 1.947e+01 -0.432 0.666164
## EnclosedPorch 5.793e+00 2.081e+01  0.278 0.780771
## X3SsnPorch   3.561e+01 3.781e+01  0.942 0.346474
## ScreenPorch   5.794e+01 2.033e+01  2.850 0.004453 **
## PoolArea     -7.590e+01 2.974e+01 -2.552 0.010850 *
## MoSold        -2.310e+02 4.245e+02 -0.544 0.586393
## YrSold       -4.021e+02 8.520e+02 -0.472 0.637073
##
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 37150 on 1094 degrees of freedom
##   (333 observations deleted due to missingness)
## Multiple R-squared:  0.8063, Adjusted R-squared:  0.8007
## F-statistic: 142.4 on 32 and 1094 DF,  p-value: < 2.2e-16
##
## Call:
## lm(formula = SalePrice ~ . + sqrt(BedroomAbvGr), data = Ames)
##
## Residuals:

```

```

##      Min     1Q   Median     3Q    Max
## -447466 -17214 -2313  14656 305482
##
## Coefficients: (2 not defined because of singularities)
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)      2.108e+04  1.714e+06   0.012 0.990191
## MSSubClass      -1.898e+02  3.468e+01 -5.473 5.49e-08 ***
## LotFrontage     -1.069e+02  6.197e+01 -1.725 0.084782 .
## LotArea         4.976e-01  1.590e-01  3.129 0.001799 **
## OverallQual     1.943e+04  1.483e+03 13.104 < 2e-16 ***
## OverallCond     5.213e+03  1.377e+03  3.787 0.000161 ***
## YearBuilt       3.563e+02  8.784e+01  4.057 5.33e-05 ***
## YearRemodAdd    8.578e+01  8.717e+01  0.984 0.325298
## BsmtFinSF1      2.088e+01  5.851e+00  3.568 0.000375 ***
## BsmtFinSF2      8.858e+00  8.865e+00  0.999 0.317920
## BsmtUnfSF       6.303e+00  5.316e+00  1.186 0.236031
## TotalBsmtSF      NA        NA        NA        NA
## X1stFlrSF        4.904e+01  7.427e+00  6.602 6.30e-11 ***
## X2ndFlrSF        4.868e+01  6.166e+00  7.896 7.00e-15 ***
## LowQualFinSF    3.007e+01  2.818e+01  1.067 0.286138
## GrLivArea        NA        NA        NA        NA
## BsmtFullBath     7.723e+03  3.230e+03  2.392 0.016948 *
## BsmtHalfBath     2.154e+03  5.122e+03  0.421 0.674169
## FullBath         4.855e+03  3.612e+03  1.344 0.179249
## HalfBath         -1.765e+02  3.331e+03 -0.053 0.957759
## BedroomAbvGr    -7.391e+03  7.746e+03 -0.954 0.340207
## KitchenAbvGr    -2.318e+04  6.976e+03 -3.322 0.000922 ***
## TotRmsAbvGrd    5.487e+03  1.497e+03  3.667 0.000257 ***
## Fireplaces       4.234e+03  2.203e+03  1.922 0.054894 .
## GarageYrBlt     -7.449e+01  9.158e+01 -0.813 0.416159
## GarageCars       1.716e+04  3.519e+03  4.876 1.24e-06 ***
## GarageArea       1.065e+01  1.219e+01  0.874 0.382379
## WoodDeckSF       2.242e+01  1.017e+01  2.204 0.027738 *
## OpenPorchSF     -8.347e+00  1.947e+01 -0.429 0.668276
## EnclosedPorch    5.835e+00  2.082e+01  0.280 0.779275
## X3SsnPorch       3.532e+01  3.783e+01  0.934 0.350742
## ScreenPorch      5.708e+01  2.044e+01  2.792 0.005323 **
## PoolArea         -7.578e+01  2.976e+01 -2.547 0.011007 *
## MoSold           -2.355e+02  4.248e+02 -0.554 0.579497
## YrSold            -4.049e+02  8.523e+02 -0.475 0.634833
## sqrt(BedroomAbvGr) -9.542e+03  2.293e+04 -0.416 0.677404
##
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 37160 on 1093 degrees of freedom
##   (333 observations deleted due to missingness)
## Multiple R-squared:  0.8064, Adjusted R-squared:  0.8005
## F-statistic: 137.9 on 33 and 1093 DF,  p-value: < 2.2e-16

```