

SSC 442 Lab 02

Team 7

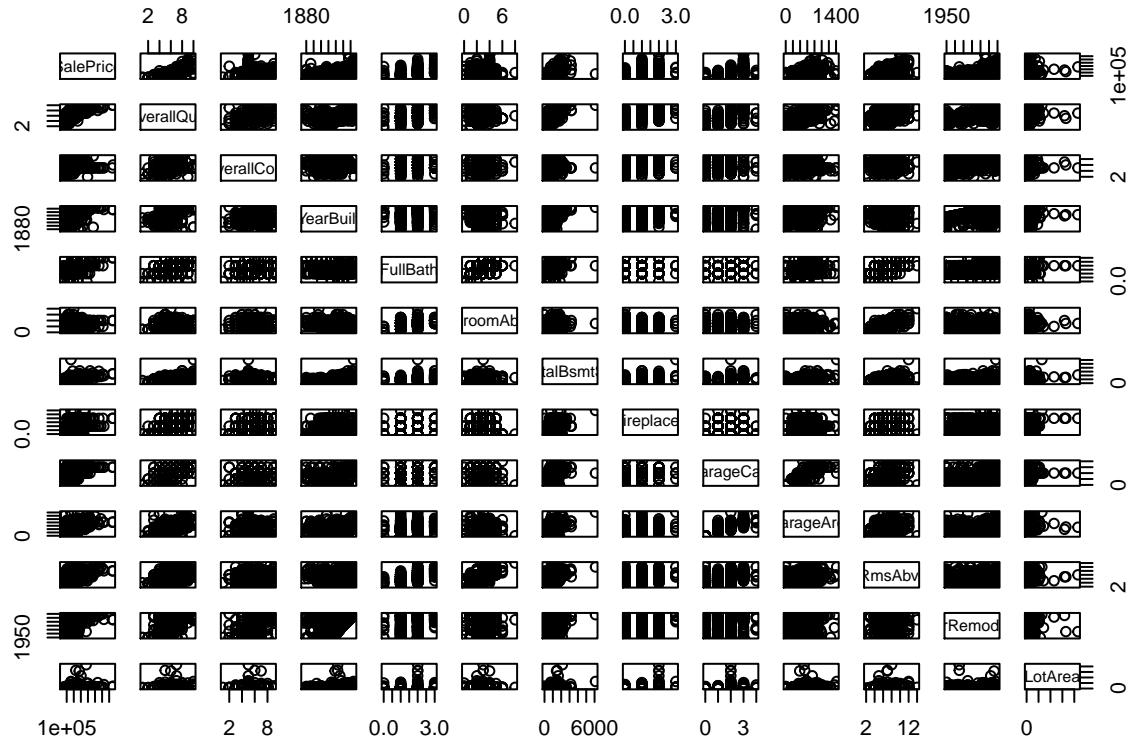
1/30/2020

Exercise 1

Part 1:

```
## [1] "MSSubClass"      "LotFrontage"     "LotArea"        "OverallQual"  
## [5] "OverallCond"     "YearBuilt"       "YearRemodAdd"   "BsmtFinSF1"  
## [9] "BsmtFinSF2"       "BsmtUnfSF"       "TotalBsmtSF"    "X1stFlrSF"  
## [13] "X2ndFlrSF"        "LowQualFinSF"    "GrLivArea"      "BsmtFullBath"  
## [17] "BsmtHalfBath"     "FullBath"        "HalfBath"       "BedroomAbvGr"  
## [21] "KitchenAbvGr"     "TotRmsAbvGrd"    "Fireplaces"     "GarageYrBlt"  
## [25] "GarageCars"        "GarageArea"      "WoodDeckSF"     "OpenPorchSF"  
## [29] "EnclosedPorch"     "X3SsnPorch"      "ScreenPorch"    "PoolArea"  
## [33] "MoSold"           "YrSold"          "SalePrice"
```

Part 2



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

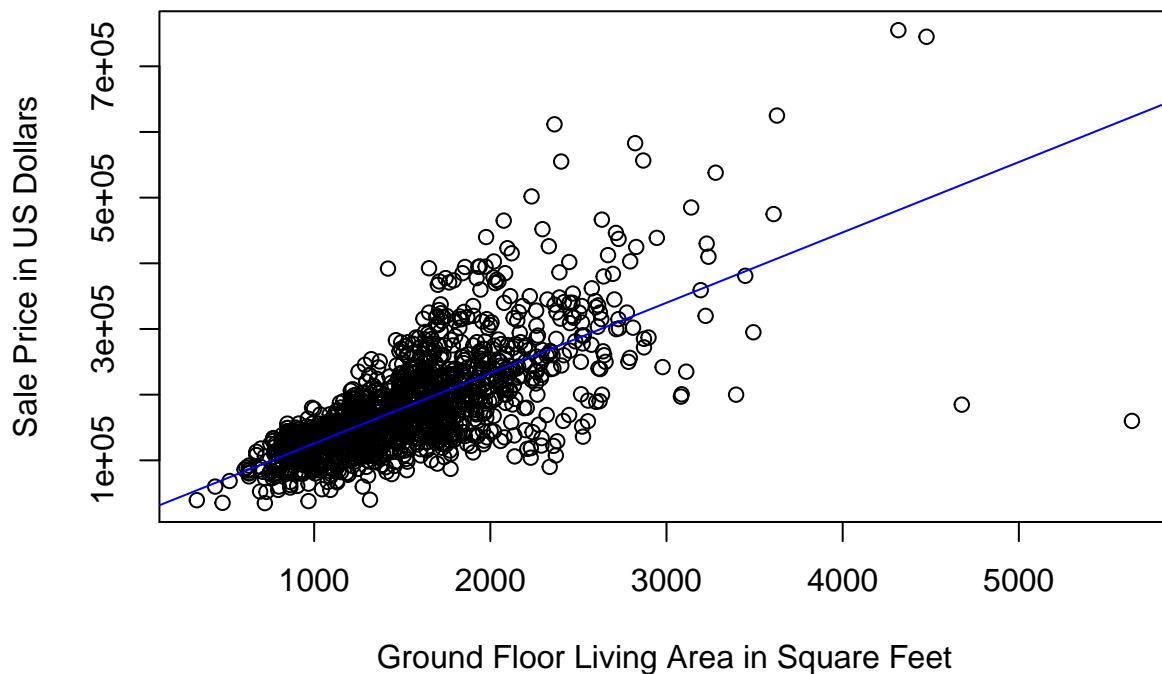
```

```

## 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

```

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

```

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 ***

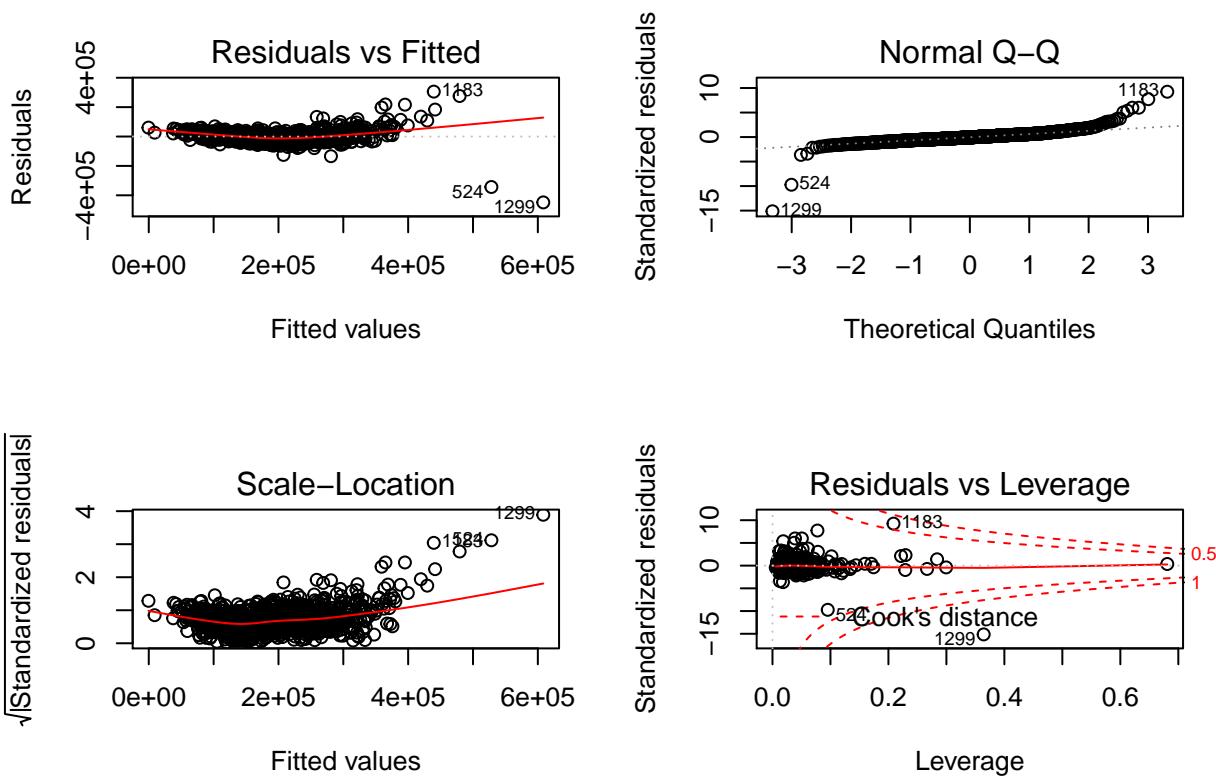
```

```

## 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

```

Part 3



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

```

Part 5

```

## 
## 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

```