

Assignment-1

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#data source :<https://www.kaggle.com/c/house-prices-advanced-regression-techniques/data> #House Prices
– Advanced Regression Techniques #Predict sales prices and practice feature engineering, RFs, and gradient
boosting

#Importing the dataset

```
library(readr)
train <- read_csv("train.csv")
```

```
## Rows: 1460 Columns: 81
## -- Column specification -----
## Delimiter: ","
## chr (43): MSZoning, Street, Alley, LotShape, LandContour, Utilities, LotConf...
## dbl (38): Id, MSSubClass, LotFrontage, LotArea, OverallQual, OverallCond, Ye...
##
## i Use 'spec()' to retrieve the full column specification for this data.
## i Specify the column types or set 'show_col_types = FALSE' to quiet this message.
```

```
View(train)
```

Print out descriptive statistics for a selection of quantitative and categorical variables.

The summary command will show a variety of descriptive statistics for each variable in the data set i

```
summary(train)
```

```
##           Id           MSSubClass           MSZoning           LotFrontage
## Min.      : 1.0      Min.      : 20.0      Length:1460      Min.      : 21.00
## 1st Qu.: 365.8      1st Qu.: 20.0      Class :character  1st Qu.: 59.00
## Median : 730.5      Median : 50.0      Mode  :character  Median : 69.00
## Mean     : 730.5      Mean     : 56.9                        Mean     : 70.05
## 3rd Qu.:1095.2      3rd Qu.: 70.0                        3rd Qu.: 80.00
## Max.     :1460.0      Max.     :190.0                        Max.     :313.00
##                                     NA's    :259
##           LotArea           Street           Alley           LotShape
## Min.      : 1300      Length:1460      Length:1460      Length:1460
## 1st Qu.: 7554      Class :character  Class :character  Class :character
```

```

## Median : 9478   Mode :character   Mode :character   Mode :character
## Mean   : 10517
## 3rd Qu.: 11602
## Max.   :215245
##
## LandContour      Utilities      LotConfig      LandSlope
## Length:1460      Length:1460      Length:1460      Length:1460
## Class :character  Class :character  Class :character  Class :character
## Mode  :character  Mode  :character  Mode  :character  Mode  :character
##
##
##
## Neighborhood      Condition1      Condition2      BldgType
## Length:1460      Length:1460      Length:1460      Length:1460
## Class :character  Class :character  Class :character  Class :character
## Mode  :character  Mode  :character  Mode  :character  Mode  :character
##
##
##
## HouseStyle      OverallQual      OverallCond      YearBuilt
## Length:1460      Min.   : 1.000      Min.   :1.000      Min.   :1872
## Class :character  1st Qu.: 5.000      1st Qu.:5.000      1st Qu.:1954
## Mode  :character  Median : 6.000      Median :5.000      Median :1973
##                      Mean   : 6.099      Mean   :5.575      Mean   :1971
##                      3rd Qu.: 7.000      3rd Qu.:6.000      3rd Qu.:2000
##                      Max.   :10.000      Max.   :9.000      Max.   :2010
##
## YearRemodAdd      RoofStyle      RoofMatl      Exterior1st
## Min.   :1950      Length:1460      Length:1460      Length:1460
## 1st Qu.:1967      Class :character  Class :character  Class :character
## Median :1994      Mode  :character  Mode  :character  Mode  :character
## Mean   :1985
## 3rd Qu.:2004
## Max.   :2010
##
## Exterior2nd      MasVnrType      MasVnrArea      ExterQual
## Length:1460      Length:1460      Min.   : 0.0      Length:1460
## Class :character  Class :character  1st Qu.: 0.0      Class :character
## Mode  :character  Mode  :character  Median : 0.0      Mode  :character
##                      Mean   : 103.7
##                      3rd Qu.: 166.0
##                      Max.   :1600.0
##                      NA's   :8
## ExterCond      Foundation      BsmtQual      BsmtCond
## Length:1460      Length:1460      Length:1460      Length:1460
## Class :character  Class :character  Class :character  Class :character
## Mode  :character  Mode  :character  Mode  :character  Mode  :character
##
##
##
## BsmtExposure      BsmtFinType1      BsmtFinSF1      BsmtFinType2

```

```

## Length:1460      Length:1460      Min.   : 0.0      Length:1460
## Class :character  Class :character  1st Qu.: 0.0      Class :character
## Mode  :character  Mode  :character  Median : 383.5    Mode  :character
##                                     Mean  : 443.6
##                                     3rd Qu.: 712.2
##                                     Max.   :5644.0
##
## BsmFinSF2         BsmUnfSF         TotalBsmSF         Heating
## Min.   : 0.00      Min.   : 0.0      Min.   : 0.0      Length:1460
## 1st Qu.: 0.00      1st Qu.: 223.0    1st Qu.: 795.8    Class :character
## Median : 0.00      Median : 477.5    Median : 991.5    Mode  :character
## Mean   : 46.55      Mean   : 567.2     Mean   :1057.4
## 3rd Qu.: 0.00      3rd Qu.: 808.0    3rd Qu.:1298.2
## Max.   :1474.00     Max.   :2336.0     Max.   :6110.0
##
## HeatingQC         CentralAir         Electrical         1stFlrSF
## Length:1460      Length:1460      Length:1460      Min.   : 334
## Class :character  Class :character  Class :character  1st Qu.: 882
## Mode  :character  Mode  :character  Mode  :character  Median :1087
##                                     Mean   :1163
##                                     3rd Qu.:1391
##                                     Max.   :4692
##
## 2ndFlrSF         LowQualFinSF         GrLivArea         BsmFullBath
## Min.   : 0      Min.   : 0.000    Min.   : 334      Min.   :0.0000
## 1st Qu.: 0      1st Qu.: 0.000    1st Qu.:1130     1st Qu.:0.0000
## Median : 0      Median : 0.000    Median :1464     Median :0.0000
## Mean   : 347     Mean   : 5.845     Mean   :1515     Mean   :0.4253
## 3rd Qu.: 728     3rd Qu.: 0.000    3rd Qu.:1777     3rd Qu.:1.0000
## Max.   :2065     Max.   :572.000    Max.   :5642     Max.   :3.0000
##
## BsmHalfBath       FullBath         HalfBath         BedroomAbvGr
## Min.   :0.00000    Min.   :0.000     Min.   :0.0000    Min.   :0.000
## 1st Qu.:0.00000    1st Qu.:1.000     1st Qu.:0.0000    1st Qu.:2.000
## Median :0.00000    Median :2.000     Median :0.0000    Median :3.000
## Mean   :0.05753    Mean   :1.565     Mean   :0.3829     Mean   :2.866
## 3rd Qu.:0.00000    3rd Qu.:2.000     3rd Qu.:1.0000    3rd Qu.:3.000
## Max.   :2.00000    Max.   :3.000     Max.   :2.0000     Max.   :8.000
##
## KitchenAbvGr      KitchenQual      TotRmsAbvGrd      Functional
## Min.   :0.000      Length:1460      Min.   : 2.000     Length:1460
## 1st Qu.:1.000      Class :character  1st Qu.: 5.000     Class :character
## Median :1.000      Mode  :character  Median : 6.000     Mode  :character
## Mean   :1.047                                     Mean   : 6.518
## 3rd Qu.:1.000                                     3rd Qu.: 7.000
## Max.   :3.000                                     Max.   :14.000
##
## Fireplaces         FireplaceQu         GarageType         GarageYrBlt
## Min.   :0.000      Length:1460      Length:1460      Min.   :1900
## 1st Qu.:0.000      Class :character  Class :character  1st Qu.:1961
## Median :1.000      Mode  :character  Mode  :character  Median :1980
## Mean   :0.613                                     Mean   :1979
## 3rd Qu.:1.000                                     3rd Qu.:2002
## Max.   :3.000                                     Max.   :2010

```

```

##                                     NA's   :81
## GarageFinish      GarageCars      GarageArea      GarageQual
## Length:1460      Min.    :0.000      Min.    : 0.0      Length:1460
## Class :character  1st Qu.:1.000      1st Qu.: 334.5      Class :character
## Mode  :character  Median :2.000      Median : 480.0      Mode  :character
##                                     Mean  :1.767      Mean   : 473.0
##                                     3rd Qu.:2.000      3rd Qu.: 576.0
##                                     Max.   :4.000      Max.   :1418.0
##
## GarageCond        PavedDrive        WoodDeckSF        OpenPorchSF
## Length:1460      Length:1460      Min.    : 0.00      Min.    : 0.00
## Class :character  Class :character  1st Qu.: 0.00      1st Qu.: 0.00
## Mode  :character  Mode  :character  Median : 0.00      Median : 25.00
##                                     Mean  : 94.24      Mean   : 46.66
##                                     3rd Qu.:168.00      3rd Qu.: 68.00
##                                     Max.   :857.00      Max.   :547.00
##
## EnclosedPorch     3SsnPorch         ScreenPorch         PoolArea
## Min.    : 0.00      Min.    : 0.00      Min.    : 0.00      Min.    : 0.000
## 1st Qu.: 0.00      1st Qu.: 0.00      1st Qu.: 0.00      1st Qu.: 0.000
## Median : 0.00      Median : 0.00      Median : 0.00      Median : 0.000
## Mean    : 21.95      Mean    : 3.41      Mean    : 15.06      Mean    : 2.759
## 3rd Qu.: 0.00      3rd Qu.: 0.00      3rd Qu.: 0.00      3rd Qu.: 0.000
## Max.    :552.00      Max.    :508.00      Max.    :480.00      Max.    :738.000
##
## PoolQC            Fence            MiscFeature         MiscVal
## Length:1460      Length:1460      Length:1460         Min.    : 0.00
## Class :character  Class :character  Class :character     1st Qu.: 0.00
## Mode  :character  Mode  :character  Mode  :character     Median : 0.00
##                                     Mean    : 43.49
##                                     3rd Qu.: 0.00
##                                     Max.    :15500.00
##
## MoSold            YrSold            SaleType            SaleCondition
## Min.    : 1.000      Min.    :2006      Length:1460         Length:1460
## 1st Qu.: 5.000      1st Qu.:2007      Class :character     Class :character
## Median : 6.000      Median :2008      Mode  :character     Mode  :character
## Mean    : 6.322      Mean    :2008
## 3rd Qu.: 8.000      3rd Qu.:2009
## Max.    :12.000      Max.    :2010
##
## SalePrice
## Min.    : 34900
## 1st Qu.:129975
## Median :163000
## Mean    :180921
## 3rd Qu.:214000
## Max.    :755000
##

```

Following are individual descriptive statistics for quantitative variables:

```
mean(train$SalePrice)  # Mean Sale Price

## [1] 180921.2

median(train$SalePrice) # Median Sale Price

## [1] 163000

sd(train$SalePrice) # Standard Deviation of Sale Price

## [1] 79442.5

min(train$SalePrice) # Minimum Sale Price

## [1] 34900

max(train$SalePrice) # Maximum Sale Price

## [1] 755000
```

Following are descriptive statistics for categorical variables:

```
table(train$Street) # shows the frequency of homes located on gravel streets vs paved streets

##
## Grvl Pave
##      6 1454
```

```
table(train$CentralAir) # shows the frequency of homes with and without central air

##
##      N      Y
##    95 1365
```

```
table(train$CentralAir, train$Electrical) # cross classification of homes with and without central air

##
##      FuseA FuseF FuseP Mix SBrkr
##    N     22    18     3    0    52
##    Y     72     9     0    1   1282
```

To show the percentage of the frequency for each value in a specific categorical variable (such as SaleCondition)

```
table1 <- table(train$SaleCondition)
prop.table(table1)
```

```
##
##      Abnorml      AdjLand      Alloca      Family      Normal      Partial
## 0.069178082 0.002739726 0.008219178 0.013698630 0.820547945 0.085616438
```

4. Transform at least one variable. It doesn't matter what the transformation is.

```
train$SalePrice_Transformed <- (train$SalePrice - mean(train$SalePrice))/sd(train$SalePrice)
train$SalePrice_Transformed
```

```
##      [1] 0.3471542702 0.0072858242 0.5359700735 -0.5151045650 0.8695446594
##      [6] -0.4773414043 1.5870447120 0.2401586483 -0.6422405392 -0.7920344099
##     [11] -0.6472756273 2.0653780804 -0.4647536841 1.2408824059 -0.3011133212
##     [16] -0.6158063268 -0.4018150830 -1.1444905761 -0.2759378808 -0.5276922852
##     [21] 1.8173999921 -0.5226571971 0.6177902549 -0.6422405392 -0.3388764819
##     [26] 0.9488472968 -0.5805607102 1.5744569918 0.3345665500 -1.4151265609
##     [31] -1.7738765872 -0.3974093809 -0.0128545282 -0.1941176994 1.2157069655
##     [36] 1.6122201525 -0.4521659639 -0.3514642021 -0.9053238919 -1.2451923379
##     [41] -0.2633501606 -0.1374729584 -0.4647536841 -0.6378348372 -0.5025168448
##     [46] 1.7494263029 0.7397149130 0.8657683433 -0.8549730110 -0.6787449279
##     [51] -0.0493589168 -0.8360914307 -0.8927361717 2.5688868893 -0.6409817672
##     [56] -0.0053018960 -0.1060036578 0.1961016275 3.2458544828 -0.7051791404
##     [61] -0.2885256010 -1.0060256537 0.2716279489 -0.5151045650 0.4856191926
##     [66] 1.7129219142 -0.0115957561 0.5674393741 -1.2703677783 0.5548516538
##     [71] 0.7940183380 -0.6472756273 0.0513428450 -0.4534247359 -0.9254642442
##     [76] -1.1319028559 -0.5686023759 -0.6787449279 -0.5591615858 -0.8927361717
##     [81] 0.1583384669 -0.3451703420 0.8066060583 -0.6850387880 -0.1563545387
##     [86] 0.9954218616 -0.0871220775 -0.2067054196 -1.2074291772 -0.7215431766
##     [91] -0.8939949437 -1.0362361822 -0.2192931398 -0.5918896584 0.2999503193
##     [96] 0.0513428450 0.4163867314 -1.0846989050 -1.2326046176 -0.6541988735
##    [101] 0.3030972494 -0.0367711966 -0.7798998476 0.2263121561 -0.1437668185
##    [106] 0.8695446594 -1.0186133739 -0.8297975705 -0.8297975705 0.1142814461
##    [111] -0.5541264977 -0.0115957561 2.5559215375 0.4541498921 0.9891280015
##    [116] -0.0619466370 -0.5276922852 -0.3262887617 1.7506850749 -0.2131251569
##    [121] -0.0115957561 -1.0186133739 -0.5654554459 -0.3401352539 0.0009919641
##    [126] -1.2137230373 -0.6661572077 -1.1822537368 -0.3262887617 -0.3892273628
##    [131] 0.5674393741 0.7940183380 -0.3797865726 0.4919130527 -0.0115957561
##    [136] -0.0871220775 -0.4773414043 -0.1248852381 0.6177902549 0.6366718353
##    [141] -0.8297975705 0.9954218616 -0.1878238392 0.2905095292 -0.7039203683
##    [146] -0.6409817672 -0.9556747728 0.5233823533 -0.5025168448 -0.8297975705
##    [151] -0.7416835290 2.4103067900 0.1142814461 0.6807288561 -0.7039203683
##    [156] -1.2829554985 -0.8990300318 1.1150052037 0.9312244885 1.7506850749
```

```

## [161] -0.2318808600  2.9150491954  0.4919130527 -0.9783326692 -0.3640519223
## [166] -0.6724510678  0.1142814461  1.8214784134  0.0324612646  0.5926148145
## [171] -0.6598633476  0.4289744516  0.7310797369 -0.2255869999  0.0387551247
## [176]  0.7814306178  0.3786235707 -0.1060036578  4.0395983568 -1.0186133739
## [181] -0.0493589168  0.2414174203 -0.7668589694  0.2401586483 -0.6787449279
## [186]  3.7017817093 -0.0997097977 -0.5780431661 -0.3472221404  1.3227025874
## [191]  1.6877464738  0.0387551247  0.1394568865 -0.6409817672 -0.6787449279
## [196] -0.4081089431  1.6483720849  0.6807288561 -0.9682624930  1.1829788929
## [201] -0.5151045650 -0.1185913780 -0.8675607312 -0.4018150830 -0.8927361717
## [206] -0.0053018960 -0.4660124561 -0.5025168448  1.2094131054 -0.4521659639
## [211] -1.0437888143  0.0639305652  0.9032545741 -0.3137010415 -0.2413216502
## [216] -0.5849664122  0.3660358505 -0.9304993323  1.6436894530 -0.1722150662
## [221]  0.3018384774  0.2401586483 -0.0128545282 -1.0563765345  2.5846215396
## [226] -0.8675607312  1.3730534682 -0.9430870525 -0.7039203683  0.1457507466
## [231] -0.4144028032  2.7954658533 -1.0878458351 -0.6636396636  0.4478560320
## [236] -1.1507844362  0.0576367051  0.1709261871  1.7255096345 -0.8549730110
## [241]  1.0268911622 -0.8864423115 -1.2829554985 -0.7668589694  0.3030972494
## [246]  0.7625490375 -0.5528677257 -0.5151045650 -0.0115957561  1.2094131054
## [251] -1.3144247991  0.6807288561 -0.0997097977 -0.2885256010 -0.4521659639
## [256]  0.6177902549  0.3345665500  0.4919130527  0.6366718353 -1.0563765345
## [261] -0.0619466370  1.1968253851 -0.3766396426 -0.6409817672 -1.3584818199
## [266] -0.0682404971  0.0513428450 -0.0178896162 -0.7605651093 -0.4144028032
## [271]  1.0709481829  0.7625490375  1.3730534682 -0.5276922852 -0.7102142284
## [276]  0.3030972494  0.2527463685 -0.5025168448  2.9502696366  0.1394568865
## [281]  0.5989086746  0.0513428450  0.3345665500  0.8015709702 -0.0216659323
## [286] -0.2041878755 -0.2759378808 -1.1696660165 -0.7416835290 -0.3442262630
## [291]  0.6584485913 -0.5667142179 -0.6283940470  0.6807288561 -0.1752361190
## [296] -0.4836352645 -0.3640519223  0.7310797369 -0.0745343572 -0.2822317409
## [301] -0.3011133212  1.0835359031  0.3030972494 -0.3904861348  1.4359920694
## [306]  1.5731982198  0.5548516538 -1.1507844362 -1.2388984778  2.2541938838
## [311] -0.1928589273 -0.6158063268 -0.7681177415  2.4430096871 -0.0367711966
## [316]  0.0953998657  0.9954218616  1.1212990638  0.9954218616  0.0828121455
## [321]  2.0357088239  2.1786675624  1.5115183907 -0.6891297971  0.7688428976
## [326] -1.1822537368  1.8010359558 -0.4490190338  0.4226805915 -1.2955432187
## [331] -0.7794466897 -0.5276922852  1.2975271469  0.3282726898  0.1394568865
## [336]  0.6045731487  2.4735474963  0.4163867314  0.2716279489 -0.3262887617
## [341]  0.2766630369 -1.2451923379 -1.1759598766  1.0709481829 -1.2074291772
## [346] -0.5125870210 -0.3703457825 -0.2948194611 -0.3388764819  3.2253868497
## [351]  1.7262774854  0.1142814461 -1.0815519750 -0.9443458246 -0.5151045650
## [356] -0.0430650567 -0.0997097977 -0.5906308863 -0.6409817672  1.2471762660
## [361] -0.3137010415 -0.4521659639  0.2212770680 -0.7920344099  0.1142814461
## [366] -0.4269905235 -0.2759378808 -0.2004115595 -0.6158063268 -0.2381747201
## [371] -0.1072624298 -0.5851929912 -0.7039203683 -0.7290958088  0.4856191926
## [376] -1.5095344625 -0.4144028032  2.0024394793  2.6876142664 -0.0241834764
## [381] -0.6787449279  0.0859590756  0.4100928713 -1.3207186592  0.7436674572
## [386]  0.1394568865 -1.2577800581 -0.7039203683  0.1268691663  3.0849834184
## [391] -0.7794466897  0.4289744516 -0.9367931924 -1.0186133739 -0.9053238919
## [396] -0.6535694874 -0.7290958088 -0.1437668185 -1.4340081412  0.7562551774
## [401]  0.8128999184 -0.2005374367 -0.9179116121  0.9702464212 -0.1626483988
## [406] -0.3892273628 -0.8297975705 -0.0493589168  1.2471762660  1.9992925493
## [411] -1.5221221827 -0.4521659639  0.5170884932 -0.8297975705  0.5926148145
## [416]  0.0026787186 -0.3955212229  0.7310797369 -0.6913326481 -0.4899291246
## [421]  0.3194612857  0.4289744516 -0.8549730110  1.6877464738 -0.5276922852
## [426] -0.5780431661  1.1842376649 -0.9052231901  0.1822551353 -0.0745343572

```

```

## [431] -1.2023940891 -1.2716265503 -0.7353896689 0.0009919641 -1.2577800581
## [436] 0.3912112910 -0.8172098503 -0.7794466897 -1.1400848740 -0.8927361717
## [441] 4.7087993270 -0.7920344099 -0.2268457719 -0.1060036578 0.3660358505
## [446] -0.6724510678 0.1142814461 0.2388998763 -0.7731528295 -0.7668589694
## [451] -0.8927361717 1.2471762660 0.2905095292 0.3660358505 0.0891060056
## [456] -0.0682404971 -1.0437888143 0.9450709807 -0.2507624403 -0.8927361717
## [461] 1.0386606806 -0.3262887617 -1.4921256455 0.0979174098 -0.7165080886
## [466] -0.0274562836 -0.1752361190 -0.4332843836 0.8695446594 0.0765182854
## [471] 0.3912112910 0.1142814461 -0.4144028032 3.2612115015 0.8821323796
## [476] -0.6095124667 0.3521893583 2.5059482882 1.4611675098 -1.1511494801
## [481] 1.8262113962 2.4304219669 -0.3262887617 -0.2129992797 -0.6095124667
## [486] -0.4269905235 -0.3137010415 -0.0745343572 -0.2633501606 -1.1948414570
## [491] -0.8297975705 -0.6032186066 -0.1024161575 -0.3262887617 -1.1281265398
## [496] -1.8380739603 3.1353342993 0.0387551247 -0.6409817672 -0.7668589694
## [501] -0.8549730110 0.5762507782 -0.5151045650 1.3604657480 -0.4269905235
## [506] -0.7102142284 0.4289744516 0.3446367261 -0.2507624403 -0.7102142284
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## [516] 2.7937161602 -0.2885256010 1.0583604627 0.3786235707 0.6681411358
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## [526] -0.0619466370 -0.6158063268 3.3400232178 -1.1948414570 0.2480133857
## [531] -0.0745343572 -0.6661572077 -0.9242054722 -1.7826879913 -0.0367711966
## [536] -0.9242054722 0.0891060056 -0.8770015214 -0.2885256010 1.1464745043
## [541] 1.6877464738 0.8443692189 0.4069459412 -0.6032186066 -0.0158126424
## [546] 0.6052025347 0.3660358505 -0.6472756273 -0.7039203683 1.0331850223
## [551] -0.5151045650 -0.8612668711 0.9387771206 -0.9179116121 1.2975271469
## [556] -0.8549730110 -0.5025168448 -0.9179116121 -0.0745343572 0.6681411358
## [561] -0.7479773891 -0.1374729584 -0.9179116121 0.0513428450 1.0961236234
## [566] -0.6661572077 1.8136236760 0.4163867314 1.7078868261 -0.5659589547
## [571] -0.4823764924 -0.7668589694 0.5485577937 -0.1374729584 -0.5276922852
## [576] -0.7857405498 -0.4521659639 -0.2067054196 -0.4395782437 -0.6221001869
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## [606] 0.3030972494 -0.3640519223 0.5548516538 2.2428649356 -0.7857405498
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## [646] -0.4741944743 -1.0400124982 -0.3262887617 -0.3262887617 -1.2137230373
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## [666] 0.6240841151 -0.6535694874 0.1583384669 -0.1626483988 -0.5465738656
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```



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## [711] -1.6228239445 -0.9836698625 0.1016937259 -0.6535694874 -0.6346879071
## [716] -0.2004115595 -0.2696440207 -0.3011133212 2.0150271996 -0.6598633476
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## [731] 0.6996104364 0.0828121455 0.5233823533 -0.6233589589 -0.9179116121
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## [741] -0.6158063268 -0.4899291246 -0.0241834764 -0.0745343572 -0.0115957561
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## [751] -1.0626703946 -0.2381747201 0.4541498921 1.1905315250 -0.3137010415
## [756] -0.1060036578 0.3912112910 -0.2771966528 -0.0191483883 1.3730534682
## [761] -0.6724510678 -1.0186133739 0.4314919957 1.9646763187 1.1212990638
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## [796] -0.1248852381 -0.4710475442 -0.8927361717 3.8276589115 -0.0745343572
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## [821] 0.0261674045 -1.1067274154 0.5548516538 -0.5213984251 0.6505183275
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## [886] 1.8627157849 -0.4521659639 -0.5717493060 1.0961236234 -0.3955212229
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## [946] -0.7051791404 -0.4773414043 1.1212990638 0.1457507466 0.2086893477
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## [956] -0.4521659639 -0.7165080886 -0.6158063268 0.0513428450 -0.3262887617
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## [991] 2.1031412411 -0.1626483988 0.0765182854 -0.0883808495 1.9709701788
## [996] -0.7467186171 -0.5591615858 0.0513428450 -1.1319028559 0.3156849696
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## [1066] 1.8513868367 -0.0367711966 -0.1639071708 -0.3716045545 -0.5780431661
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## [1106] 1.8136236760 -0.0128545282 1.1807760419 0.0009919641 1.2471762660
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## [1116] 1.7255096345 0.0400138968 -0.6409817672 -0.5151045650 -0.5944072024
## [1121] -0.7869993218 0.4025402392 -0.8675607312 -0.7920344099 -0.2142580517
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## [1176] 1.3101148671 -0.7731528295 -0.8297975705 -0.3275475337 -1.1067274154
## [1181] 0.8695446594 2.6632947910 7.1004661691 -0.7668589694 0.0727419693
## [1186] -0.9569335448 -1.0815519750 1.0205973020 0.1772200472 0.1016937259
## [1191] -0.1626483988 -0.0871220775 -0.7039203683 -0.2004115595 -0.2885256010
## [1196] -0.0619466370 0.4819687538 -0.4647536841 -0.0367711966 -0.4144028032
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## [1211] 0.1016937259 -0.2129992797 -0.8549730110 -0.4521659639 -0.5843370262
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## [1231] 0.1142814461 -0.6095124667 -0.9959554775 -0.4899291246 -0.6409817672
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```

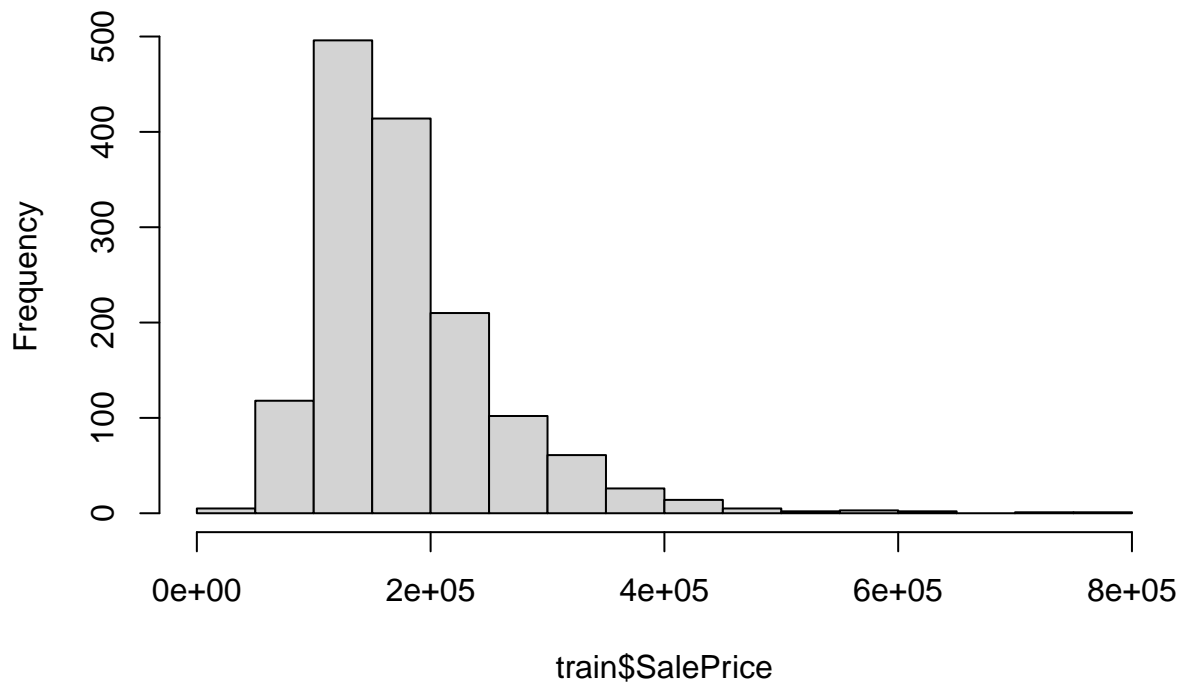
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## [1246] -0.0367711966 0.0702244253 -0.1387317304 -0.6472756273 -0.7794466897
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## [1326] -1.5850607838 -1.2829554985 -0.6346879071 0.9450709807 -0.0556527769
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## [1376] 0.7310797369 -1.1319028559 -0.8046221301 -1.2326046176 -0.1689422589
## [1381] -1.5410037631 0.7121981566 -0.3011133212 -0.8675607312 -0.9556747728
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## [1396] 1.2624451707 -0.2633501606 -0.5465738656 -0.5402800054 -0.5472032516
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## [1406] 1.1842376649 -0.6032186066 -0.8675607312 -0.6976265082 0.4289744516
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## [1416] -0.0632054090 -0.7353896689 2.0024394793 -0.7165080886 0.5296762134
## [1421] -0.0128545282 -0.6724510678 -0.5591615858 1.1838600333 -0.4647536841
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## [1431] 0.1412191674 -0.4679006142 -1.4654774417 0.0702244253 -0.2633501606
## [1436] -0.0871220775 -0.7605651093 2.6899429947 -0.3930036789 0.2023954876
## [1441] 0.1268691663 -0.3980387669 1.6248078727 -0.7542712492 -0.0166308442
## [1446] -0.6535694874 -0.2897843730 0.7436674572 -0.8675607312 -1.1193151356
## [1451] -0.5654554459 1.3364232024 -0.4521659639 -1.2137230373 0.0513428450
## [1456] -0.0745343572 0.3660358505 1.0772420430 -0.4883556595 -0.4206966633
```

5. Plot at least one quantitative variable, and one scatterplot.

```
# Show histogram of SalePrice
```

```
hist(train$SalePrice)
```

Histogram of train\$SalePrice



```
# Show scatterplot of sales price (SalePrice) to total square footage (TotalLivingSF):
```

```
library(ggplot2)
```

```
plot(train$SalePrice,train$TotalLivingSF,xlab ="SalePrice" , ylab = "TotalLivingSF")
```

```
## Warning: Unknown or uninitialised column: 'TotalLivingSF'.
```

