CSE6242 Toy Model

Reading in Data and Libraries

```
library(glmnet)
```

```
## Loading required package: Matrix
```

```
## Loaded glmnet 4.1-4
```

```
set.seed(100)
frisco = read.csv(file = "Cleaned Frisco.csv")
frisco = data.frame(frisco)
head(frisco)
```

```
##   X                      id is_claimed is_closed review_count rating
## 1 0 9VqZZiaiyGH_6smpvUKaQQ       True     False          127    4.5
## 2 1 dPaJzxW0foPByEXbPFkh_Q       True     False          141    4.0
## 3 2 RhL6hXqiz_nMz06Xx7tBcg       True     False            8    4.5
## 4 3 yawhLqszfIp9q1aGNdLoig       True     False           23    4.5
## 5 4 g_XBHNmwfPUOI4qE_bBgPQ       True     False           83    3.0
## 6 5 n9xpJEWHDFXu5AdrOWBILQ       True     False            8    3.5
##   Restaurant.Category.1 Pickup.Available Delivery.Available
## 1                   bbq                0                  0
## 2                  thai                1                  1
## 3              soulfood                1                  1
## 4             foodtrucks                1                  1
## 5              japanese                1                  1
## 6               seafood                0                  0
##   Reservation.Available Price.Level number.of.photos      City State
## 1                     0      Medium                3    Aubrey    TX
## 2                     0      Medium                3    Aubrey    TX
## 3                     0                            3 East Aubrey    TX
## 4                     0      Medium                3    Aubrey    TX
## 5                     0                            3    Aubrey    TX
## 6                     0                            3    Aubrey    TX
##   Opening.Time Closing.Time Has.Messaging
## 1          700         2100             0
## 2         1100         2130             0
## 3         1500         2100             0
## 4         1100         1800             0
## 5         1100         1430             1
## 6         1400         2000             1
```

We have 17 columns and 895 rows in the data set.

```
frisco$Opening.Time <- as.character(frisco$Opening.Time)
frisco$Closing.Time <- as.character(frisco$Closing.Time)
first_model = lm(rating~review_count+Restaurant.Category.1+Pickup.Available+Delivery.Available+Reservat
summary(first_model)
```

```
##
## Call:
## lm(formula = rating ~ review_count + Restaurant.Category.1 +
##     Pickup.Available + Delivery.Available + Reservation.Available +
##     Price.Level + number.of.photos + Opening.Time + Closing.Time +
##     Has.Messaging, data = frisco)
##
## Residuals:
##     Min     1Q  Median     3Q     Max
## -2.4283 -0.3729  0.0000  0.3909  2.0847
##
## Coefficients: (2 not defined because of singularities)
##                                       Estimate Std. Error t value
## (Intercept)                          2.3460557  0.5899471   3.977
## review_count                         0.0006837  0.0001424   4.800
## Restaurant.Category.1asianfusion    -0.3674267  0.4930507  -0.745
## Restaurant.Category.1bagels         -0.8191789  0.8081693  -1.014
## Restaurant.Category.1bakeries       -0.0854530  0.4934734  -0.173
## Restaurant.Category.1bars           -0.1623797  0.4818516  -0.337
## Restaurant.Category.1bbq            -0.2215656  0.4583984  -0.483
## Restaurant.Category.1bowling        -0.1837485  0.8677646  -0.212
## Restaurant.Category.1brazilian       0.0424418  0.6529921   0.065
## Restaurant.Category.1breakfast_brunch 0.2326323 0.4610592   0.505
## Restaurant.Category.1british        -0.0438550  0.8620187  -0.051
## Restaurant.Category.1bubbletea       0.5792252  0.6491244   0.892
## Restaurant.Category.1buffets         0.3035500  0.8165426   0.372
## Restaurant.Category.1burgers        -0.0550916  0.4413744  -0.125
## Restaurant.Category.1cafes           0.2800352  0.5157384   0.543
## Restaurant.Category.1cajun          -0.1519242  0.5086214  -0.299
## Restaurant.Category.1cakeshop        0.7589579  0.7029289   1.080
## Restaurant.Category.1cheesesteaks    0.0294321  0.6466641   0.046
## Restaurant.Category.1chicken_wings  -0.2847311  0.4510551  -0.631
## Restaurant.Category.1chickenshop     0.1170714  0.4879130   0.240
## Restaurant.Category.1chinese        -0.0875777  0.4488114  -0.195
## Restaurant.Category.1cocktailbars    0.2196335  0.5643669   0.389
## Restaurant.Category.1coffee          0.5318160  0.4649300   1.144
## Restaurant.Category.1comfortfood     0.1429229  0.6573425   0.217
## Restaurant.Category.1convenience     1.4662925  0.8520882   1.721
## Restaurant.Category.1creperies       0.9239629  0.8198630   1.127
## Restaurant.Category.1delis          -0.2276457  0.5522461  -0.412
## Restaurant.Category.1desserts        0.6354734  0.5428956   1.171
## Restaurant.Category.1dimsum          0.6114452  0.8249834   0.741
## Restaurant.Category.1dinnertheater   0.3880209  0.8287958   0.468
## Restaurant.Category.1donuts         -0.0546631  0.8363546  -0.065
## Restaurant.Category.1filipino       -1.3798834  0.8775696  -1.572
## Restaurant.Category.1fishnchips     -0.1878641  0.8272450  -0.227
## Restaurant.Category.1food_court      0.2829819  0.8628851   0.328
## Restaurant.Category.1fooddeliveryservices -1.7905149 0.5077880 -3.526
## Restaurant.Category.1foodtrucks      0.8588109  0.5335629   1.610
## Restaurant.Category.1french          0.4431225  0.6623760   0.669
## Restaurant.Category.1gluten_free     0.9377007  0.8287010   1.132
## Restaurant.Category.1golf           -1.3098075  0.8337591  -1.571
## Restaurant.Category.1greek           0.4570084  0.5874861   0.778
## Restaurant.Category.1grocery        -0.2937290  0.6620051  -0.444
```

```
## Restaurant.Category.1halal              0.3878732  0.5271116   0.736
## Restaurant.Category.1hawaiian            0.7072765  0.5517540   1.282
## Restaurant.Category.1hotdog              0.5531158  0.5827165   0.949
## Restaurant.Category.1hotdogs            -0.3777430  0.4389645  -0.861
## Restaurant.Category.1hotpot              1.4038721  0.8295446   1.692
## Restaurant.Category.1icecream            1.2426604  0.8225503   1.511
## Restaurant.Category.1indpak             -0.2269449  0.4350603  -0.522
## Restaurant.Category.1intlgrocery         1.5155221  0.8303961   1.825
## Restaurant.Category.1italian             0.0986726  0.4530313   0.218
## Restaurant.Category.1japanese            0.5125796  0.4606236   1.113
## Restaurant.Category.1juicebars           0.2081987  0.4946258   0.421
## Restaurant.Category.1korean              0.4391784  0.5409721   0.812
## Restaurant.Category.1laotian             0.2336843  0.8182935   0.286
## Restaurant.Category.1latin               0.0228276  0.8226958   0.028
## Restaurant.Category.1meats               2.5724275  0.9459943   2.719
## Restaurant.Category.1mediterranean       0.4697022  0.4596764   1.022
## Restaurant.Category.1mexican             0.0112885  0.4427607   0.025
## Restaurant.Category.1mideastern          1.0111164  0.8406673   1.203
## Restaurant.Category.1mini_golf           0.0441586  0.8439464   0.052
## Restaurant.Category.1mongolian          -1.0692890  0.8162029  -1.310
## Restaurant.Category.1movietheaters       0.5682918  0.8226448   0.691
## Restaurant.Category.1newamerican         0.1056990  0.4537319   0.233
## Restaurant.Category.1noodles             0.4286568  0.6518957   0.658
## Restaurant.Category.1pakistani          -0.3120285  0.8283575  -0.377
## Restaurant.Category.1persian             0.6738647  0.8205527   0.821
## Restaurant.Category.1pizza               0.0575471  0.4327328   0.133
## Restaurant.Category.1poke                0.1162245  0.6641545   0.175
## Restaurant.Category.1poolhalls           0.1354155  0.8389810   0.161
## Restaurant.Category.1portuguese         -0.1953849  0.8255698  -0.237
## Restaurant.Category.1pubs                0.3814289  0.5713372   0.668
## Restaurant.Category.1ramen               0.6960369  0.5854075   1.189
## Restaurant.Category.1salad              -0.1614241  0.4592285  -0.352
## Restaurant.Category.1salvadoran          0.4684878  0.8279294   0.566
## Restaurant.Category.1sandwiches         -0.4114634  0.4453579  -0.924
## Restaurant.Category.1scandinavian        0.8679073  0.9212464   0.942
## Restaurant.Category.1seafood             0.0210045  0.4892099   0.043
## Restaurant.Category.1servicestations     1.8087011  0.5783218   3.127
## Restaurant.Category.1soulfood            0.8469994  0.8438805   1.004
## Restaurant.Category.1soup               -1.3525183  0.8232806  -1.643
## Restaurant.Category.1southern           -0.1443670  0.5061352  -0.285
## Restaurant.Category.1spanish             0.7804255  0.8320414   0.938
## Restaurant.Category.1sportsbars          0.1365385  0.4701915   0.290
## Restaurant.Category.1steak              -0.0551826  0.4908269  -0.112
## Restaurant.Category.1sushi               0.2628191  0.4566932   0.575
## Restaurant.Category.1tacos               0.0217613  0.4793698   0.045
## Restaurant.Category.1taiwanese           0.5317388  0.6560037   0.811
## Restaurant.Category.1tea                -0.9509342  0.8841000  -1.076
## Restaurant.Category.1tex-mex             0.0529959  0.4648950   0.114
## Restaurant.Category.1thai                0.3020938  0.4656575   0.649
## Restaurant.Category.1tradamerican       -0.0441807  0.4489123  -0.098
## Restaurant.Category.1turkish             0.4003177  0.8257466   0.485
## Restaurant.Category.1vegan               0.4128613  0.8299588   0.497
## Restaurant.Category.1vegetarian         -0.1924663  0.5856626  -0.329
## Restaurant.Category.1venues              1.9829528  0.8559312   2.317
```

```
## Restaurant.Category.1vietnamese   -0.0693510  0.5299867  -0.131
## Restaurant.Category.1wine_bars      0.2208820  0.5269172   0.419
## Pickup.Available                    0.0127829  0.0662139   0.193
## Delivery.Available                 -0.1848031  0.0835660  -2.211
## Reservation.Available               0.1021551  0.4173406   0.245
## Price.LevelHigh                      0.1399304  0.2362217   0.592
## Price.LevelLow                      -0.1887903  0.0880737  -2.144
## Price.LevelMedium                   -0.0065067  0.0791628  -0.082
## Price.LevelVery High                 0.4276557  0.7574400   0.565
## number.of.photos                     0.0633522  0.1151474   0.550
## Opening.Time1000                     0.5572926  0.2522598   2.209
## Opening.Time1030                     0.3813981  0.2602838   1.465
## Opening.Time1045                     0.0205854  0.3252557   0.063
## Opening.Time1100                     0.4974279  0.2522201   1.972
## Opening.Time1115                     0.4339989  0.5002919   0.867
## Opening.Time1130                     0.2051544  0.2919151   0.703
## Opening.Time1200                     0.9553318  0.3432807   2.783
## Opening.Time1300                     0.6409263  0.5121083   1.252
## Opening.Time1400                     0.5316164  0.5784427   0.919
## Opening.Time1500                     0.6963246  0.3353951   2.076
## Opening.Time1600                     0.7936055  0.3018563   2.629
## Opening.Time1630                     0.6641098  0.4192019   1.584
## Opening.Time1700                     0.3379175  0.3438399   0.983
## Opening.Time1730                     1.1497546  0.5822322   1.975
## Opening.Time1900                    -0.3947457  0.8528118  -0.463
## Opening.Time400                     -0.6153554  0.7877995  -0.781
## Opening.Time430                      2.0339548  0.7446517   2.731
## Opening.Time500                      0.1901209  0.3259637   0.583
## Opening.Time530                      0.3270482  0.6728296   0.486
## Opening.Time600                      0.2389997  0.2635510   0.907
## Opening.Time630                      0.3129489  0.3214734   0.973
## Opening.Time700                      0.6158836  0.2686847   2.292
## Opening.Time730                      0.8754520  0.4650314   1.883
## Opening.Time800                      0.1986103  0.2723140   0.729
## Opening.Time830                     -0.2125962  0.6964750  -0.305
## Opening.Time900                      0.2626666  0.3073724   0.855
## Opening.Time930                     -0.5766566  0.4716479  -1.223
## Closing.Time100                     -0.2801735  0.3137887  -0.893
## Closing.Time1000                     1.0825691  0.5327681   2.032
## Closing.Time1030                     0.5504049  0.7516219   0.732
## Closing.Time1100                     0.7485068  0.5539795   1.351
## Closing.Time1230                            NA         NA      NA
## Closing.Time1300                     2.5888804  1.0355852   2.500
## Closing.Time1330                     1.6575345  0.5249481   3.158
## Closing.Time1400                     0.6952450  0.2439139   2.850
## Closing.Time1430                     0.6468935  0.1796911   3.600
## Closing.Time1500                     0.8785724  0.1823697   4.818
## Closing.Time1530                     1.1928098  0.4682305   2.547
## Closing.Time1600                     0.7155177  0.3727966   1.919
## Closing.Time1630                     1.7369605  0.6373195   2.725
## Closing.Time1700                     0.7944550  0.3945206   2.014
## Closing.Time1800                     1.3374556  0.3469799   3.855
## Closing.Time1830                            NA         NA      NA
## Closing.Time1900                     0.8204077  0.2374616   3.455
```

```
## Closing.Time1930                           0.1722356  0.7678940   0.224
## Closing.Time200                           -0.0902500  0.1910787  -0.472
## Closing.Time2000                           0.6771860  0.1635728   4.140
## Closing.Time2030                           0.6800307  0.3156112   2.155
## Closing.Time2045                           0.6514941  0.7424916   0.877
## Closing.Time2100                           0.5871147  0.1264836   4.642
## Closing.Time2130                           0.5833144  0.1694020   3.443
## Closing.Time2145                           0.1371543  0.7155561   0.192
## Closing.Time2200                           0.3151151  0.1232061   2.558
## Closing.Time2230                           0.7462883  0.4359555   1.712
## Closing.Time2245                          -2.0273437  1.0137892  -2.000
## Closing.Time2300                           0.1593340  0.1518317   1.049
## Closing.Time2330                           0.1135295  0.5450483   0.208
## Closing.Time300                            0.8582808  0.7098556   1.209
## Has.Messaging                              0.1423338  0.0650124   2.189
##                                            Pr(>|t|)
## (Intercept)                                7.75e-05 ***
## review_count                               1.95e-06 ***
## Restaurant.Category.1asianfusion           0.456405
## Restaurant.Category.1bagels                0.311128
## Restaurant.Category.1bakeries              0.862573
## Restaurant.Category.1bars                  0.736229
## Restaurant.Category.1bbq                   0.629007
## Restaurant.Category.1bowling               0.832367
## Restaurant.Category.1brazilian             0.948197
## Restaurant.Category.1breakfast_brunch      0.614033
## Restaurant.Category.1british               0.959440
## Restaurant.Category.1bubbletea             0.372542
## Restaurant.Category.1buffets               0.710196
## Restaurant.Category.1burgers               0.900705
## Restaurant.Category.1cafes                 0.587324
## Restaurant.Category.1cajun                 0.765263
## Restaurant.Category.1cakeshop              0.280660
## Restaurant.Category.1cheesesteaks          0.963711
## Restaurant.Category.1chicken_wings         0.528088
## Restaurant.Category.1chickenshop           0.810447
## Restaurant.Category.1chinese               0.845348
## Restaurant.Category.1cocktailbars          0.697275
## Restaurant.Category.1coffee                0.253088
## Restaurant.Category.1comfortfood           0.827943
## Restaurant.Category.1convenience           0.085743 .
## Restaurant.Category.1creperies             0.260156
## Restaurant.Category.1delis                 0.680311
## Restaurant.Category.1desserts              0.242204
## Restaurant.Category.1dimsum                0.458855
## Restaurant.Category.1dinnertheater         0.639812
## Restaurant.Category.1donuts                0.947908
## Restaurant.Category.1filipino              0.116330
## Restaurant.Category.1fishnchips            0.820418
## Restaurant.Category.1food_court            0.743053
## Restaurant.Category.1fooddeliveryservices  0.000450 ***
## Restaurant.Category.1foodtrucks            0.107960
## Restaurant.Category.1french                0.503732
## Restaurant.Category.1gluten_free           0.258235
```

```
## Restaurant.Category.1golf                0.116661
## Restaurant.Category.1greek               0.436899
## Restaurant.Category.1grocery             0.657405
## Restaurant.Category.1halal               0.462081
## Restaurant.Category.1hawaiian            0.200331
## Restaurant.Category.1hotdog              0.342859
## Restaurant.Category.1hotdogs             0.389803
## Restaurant.Category.1hotpot              0.091045  .
## Restaurant.Category.1icecream            0.131325
## Restaurant.Category.1indpak              0.602093
## Restaurant.Category.1intlgrocery         0.068436  .
## Restaurant.Category.1italian             0.827647
## Restaurant.Category.1japanese            0.266194
## Restaurant.Category.1juicebars           0.673947
## Restaurant.Category.1korean              0.417176
## Restaurant.Category.1laotian             0.775292
## Restaurant.Category.1latin               0.977872
## Restaurant.Category.1meats               0.006711 **
## Restaurant.Category.1mediterranean       0.307238
## Restaurant.Category.1mexican             0.979667
## Restaurant.Category.1mideastern          0.229495
## Restaurant.Category.1mini_golf           0.958286
## Restaurant.Category.1mongolian           0.190617
## Restaurant.Category.1movietheaters       0.489923
## Restaurant.Category.1newamerican         0.815867
## Restaurant.Category.1noodles             0.511050
## Restaurant.Category.1pakistani           0.706528
## Restaurant.Category.1persian             0.411805
## Restaurant.Category.1pizza               0.894245
## Restaurant.Category.1poke                0.861135
## Restaurant.Category.1poolhalls           0.871823
## Restaurant.Category.1portuguese          0.812987
## Restaurant.Category.1pubs                0.504613
## Restaurant.Category.1ramen               0.234868
## Restaurant.Category.1salad               0.725315
## Restaurant.Category.1salvadoran          0.571681
## Restaurant.Category.1sandwiches          0.355873
## Restaurant.Category.1scandinavian        0.346479
## Restaurant.Category.1seafood             0.965766
## Restaurant.Category.1servicestations     0.001839 **
## Restaurant.Category.1soulfood            0.315887
## Restaurant.Category.1soup                0.100884
## Restaurant.Category.1southern            0.775553
## Restaurant.Category.1spanish             0.348600
## Restaurant.Category.1sportsbars          0.771608
## Restaurant.Category.1steak               0.910518
## Restaurant.Category.1sushi               0.565157
## Restaurant.Category.1tacos               0.963805
## Restaurant.Category.1taiwanese           0.417898
## Restaurant.Category.1tea                 0.282494
## Restaurant.Category.1tex-mex             0.909276
## Restaurant.Category.1thai                0.516724
## Restaurant.Category.1tradamerican        0.921630
## Restaurant.Category.1turkish             0.627980
```

```
## Restaurant.Category.1vegan                 0.619036
## Restaurant.Category.1vegetarian            0.742538
## Restaurant.Category.1venues                0.020819 *
## Restaurant.Category.1vietnamese            0.895930
## Restaurant.Category.1wine_bars             0.675206
## Pickup.Available                           0.846974
## Delivery.Available                         0.027339 *
## Reservation.Available                      0.806704
## Price.LevelHigh                            0.553803
## Price.LevelLow                             0.032427 *
## Price.LevelMedium                          0.934517
## Price.LevelVery High                       0.572530
## number.of.photos                           0.582376
## Opening.Time1000                           0.027497 *
## Opening.Time1030                           0.143302
## Opening.Time1045                           0.949555
## Opening.Time1100                           0.048997 *
## Opening.Time1115                           0.385982
## Opening.Time1130                           0.482431
## Opening.Time1200                           0.005538 **
## Opening.Time1300                           0.211171
## Opening.Time1400                           0.358400
## Opening.Time1500                           0.038261 *
## Opening.Time1600                           0.008757 **
## Opening.Time1630                           0.113613
## Opening.Time1700                           0.326072
## Opening.Time1730                           0.048707 *
## Opening.Time1900                           0.643603
## Opening.Time400                            0.435015
## Opening.Time430                            0.006472 **
## Opening.Time500                            0.559915
## Opening.Time530                            0.627070
## Opening.Time600                            0.364814
## Opening.Time630                            0.330664
## Opening.Time700                            0.022201 *
## Opening.Time730                            0.060191 .
## Opening.Time800                            0.466046
## Opening.Time830                            0.760273
## Opening.Time900                            0.393102
## Opening.Time930                            0.221893
## Closing.Time100                            0.372245
## Closing.Time1000                           0.042550 *
## Closing.Time1030                           0.464247
## Closing.Time1100                           0.177104
## Closing.Time1230                                 NA
## Closing.Time1300                           0.012659 *
## Closing.Time1330                           0.001662 **
## Closing.Time1400                           0.004501 **
## Closing.Time1430                           0.000342 ***
## Closing.Time1500                           1.80e-06 ***
## Closing.Time1530                           0.011072 *
## Closing.Time1600                           0.055366 .
## Closing.Time1630                           0.006589 **
## Closing.Time1700                           0.044437 *
```

```
## Closing.Time1800                      0.000127 ***
## Closing.Time1830                             NA
## Closing.Time1900                      0.000585 ***
## Closing.Time1930                      0.822595
## Closing.Time200                       0.636853
## Closing.Time2000                      3.92e-05 ***
## Closing.Time2030                      0.031544 *
## Closing.Time2045                      0.380560
## Closing.Time2100                      4.15e-06 ***
## Closing.Time2130                      0.000610 ***
## Closing.Time2145                      0.848055
## Closing.Time2200                      0.010757 *
## Closing.Time2230                      0.087387 .
## Closing.Time2245                      0.045927 *
## Closing.Time2300                      0.294366
## Closing.Time2330                      0.835064
## Closing.Time300                       0.227053
## Has.Messaging                         0.028916 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6944 on 672 degrees of freedom
##   (61 observations deleted due to missingness)
## Multiple R-squared:  0.5088, Adjusted R-squared:  0.3911
## F-statistic: 4.323 on 161 and 672 DF,  p-value: < 2.2e-16
```